

COPY

UNITED STATES DISTRICT COURT
FOR THE
DISTRICT OF COLUMBIA

A detailed line drawing of a single, long, narrow, curved leaf, likely a grass blade. The leaf is oriented vertically, with its tip pointing upwards and to the right. It features a prominent midrib running along its length and several smaller veins branching off from it. The drawing is done with fine lines and shading to indicate texture and depth.

STENOGRAPHIC TRANSCRIPT

FRIENDS FOR ALL CHILDREN, INC.,
as legal guardian and next friend
of the named 150 infant individuals,
et al.

Plaintiffs,

-VS-

Civil Action No.
76-0544

LOCKHEED AIRCRAFT CORPORATION,

**Defendant and
Third-Party Plaintiff,**

-VS-

THE UNITED STATES OF AMERICA,

Third-Party Defendant.

Arlington, Virginia

Thursday, October 8, 1981

Deposition of

JAMES W. TURNBOW

Mattingly Reporting, Inc.

COURT REPORTERS

4339 Farm House Lane
Fairfax, Va. 22032

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Deposition of JAMES W. TURNBOW, a witness herein,
called for examination by counsel for the Plaintiffs in the
above-entitled action, pursuant to notice, the witness being
duly sworn by Claireen M. Holmes, a Notary Public in and
for the Commonwealth of Virginia at Large, at the offices
of Lewis, Wilson, Lewis & Jones, Ltd., 2054 North Fourteenth
Street, Suite 300, Arlington, Virginia, commencing at

1 1:05 o'clock p.m., the proceedings being taken down by
2 stenotype by Claireen M. Holmes and transcribed under her
3 direction.

4 APPEARANCES:

5 On behalf of the Plaintiffs:

6 OREN R. LEWIS, JR., ESQUIRE
7 ROBERT W. LEWIS, ESQUIRE
8 Lewis, Wilson, Lewis & Jones, Ltd.
9 2054 North Fourteenth Street
Suite 300
Arlington, Virginia 22216

10 On behalf of the Defendant:

11 CARROLL E. DUBUC, ESQUIRE
12 Haight, Gardner, Poor & Havens
Federal Bar Building
13 1819 H Street, N.W.
Washington, D.C. 20006

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C O N T E N T SDeposition ofExamination by Counsel for
Plaintiffs Defendant

James W. Turnbow

4

EXHIBITSFor IdentificationTurnbow Deposition Exhibit No. 1
(Diagram of Troop Compartment)

44

PROCEEDINGS

Whereupon,

JAMES W. TURNBOW

a witness herein, was called for examination by counsel for the Plaintiffs, and, having been first duly sworn, was examined and testified as follows:

EXAMINATION BY COUNSEL FOR PLAINTIFFS

BY MR. OREN LEWIS:

Q Would you state your full name, please?

A. James W. Turnbow.

MR. DUBUC: You should know, before you start, that in that description what he is going to testify to, he is not testifying on pressure differentials in the airplane. His field is the G force area. He is not going to be offered on the hypoxic decompression at this point.

MR. OREN LEWIS: Okay.

BY MR. OREN LEWIS:

Q Now, sir, I have a report that you gave the Defendant, Lockheed, which is Exhibit D1303. Was that prepared by you, sir?

A. Yes, sir.

Q And I may have missed it, but I don't know that
I know the date of it. What is the date of it, can you

1 tell me?

2 A It was very close to September the 8th. I may
3 be one day, I guess, off.

4 Q Well, if I were under oath and I had to say when
5 I completed it, what date would I put?

6 A September the 8th, 1981.

7 Q 1981. All right. When were you asked to prepare
8 this report, sir?

9 A It would have been sometime after July the 27th --
10 29th.

11 Q 1981?

12 A 1981.

13 Q Okay. And who were you first contacted by?

14 A In conjunction with this case?

15 Q Yes, sir.

16 A I believe that that would have been Mr. Piper.

17 Q And that was on or about the 27th of July?

18 A No. That would be a little earlier than that.

19 Q Can you tell me when that was?

20 A Probably June of '81.

21 Q May or June of 1981?

22 A May or June of 1981.

23 Q Now, have you ever worked for the United States

1 as a consultant, sir?

2 A Yes, sir, I have.

3 Q How many times?

4 A Well, I wouldn't be able to give you an exact
5 number, I am sure, but I have done some work for the U.S.
6 Army. I have been involved in at least one official
7 meeting with the U.S. Air Force. Let's see. I have done
8 some work for the F.A.A. in conjunction with one or two
9 aircraft accidents.

10 Q Anything else?

11 A That is about it, I think.

12 Q Did you ever work for the Lockheed Aircraft
13 Corporation or any of its subsidiaries?

14 A Not to my knowledge, prior to this time.

15 Q All right, sir. And you are consultant in this
16 case to the Lockheed Aircraft Corporation?

17 A Yes, sir.

18 Q Your profession at this time, sir, is as a
19 consultant, sir? An engineering consultant?

20 A That is correct.

21 Q And you have been doing that since 1972?

22 A Well, actually I have been doing that since
23 about 1960, and there have been a few occasions prior to

1 1960 in which I have.

2 Q Well, Doctor, I wasn't suggesting that you didn't
3 have experience prior to 1972.

4 A I understand.

5 Q It is just that I am having difficulty understand-
6 ing your C.V. and it is no doubt to me, but it says
7 consulting experience, and it seems to suggest that you
8 worked at various places up to '69, and then in '72 you
9 were consultant to Sikorsky, and then after '72, it says
10 aviation and automotive accident investigation for various
11 legal firms.

12 A Well, that would be correct as far as the legal
13 firms.

14 Q So that is why I framed the question as I did,
15 sir.

16 A However, I would point out to you that I
17 furnished you, I believe, a copy of my vita in conjunction
18 with this report, and that will give you a little better
19 understanding of what all I have done.

20 Q Well, sir, on the second page of your report,
21 which is Exhibit 1303, it says -- that is a document with
22 your picture, is that your personal brief history, sir?

23 MR. DUBUC: On the second page?

1 THE WITNESS: On the second page?

2 MR. OREN LEWIS: Yes. The one with your
3 picture.

4 MR. DUBUC: That is at the end, I guess.

5 THE WITNESS: It should be in the last page.

6 BY MR. OREN LEWIS:

7 Q Well, in the copy that I have, it happens to be
8 the second page. I don't know how it became that way.

9 MR. DUBUC: The exhibit that is marked has it
10 at the end, so --

11 MR. OREN LEWIS: Well, whichever is the one with
12 your picture on it, is that your personal brief history?

13 THE WITNESS: Yes, sir.

14 BY MR. OREN LEWIS:

15 Q And you are not speaking of anything else?

16 A No, sir.

17 Q All right. What are you doing in -- let's say in
18 1980. Were you doing essentially consulting work?

19 A That is correct.

20 Q For various clients?

21 A That's correct.

22 Q And has that been the case since 1972?

23 A Yes, and also prior to that time.

1 Q I appreciate you did consulting prior to that
2 time, but it seems that you were working in a more
3 concentrated -- I don't know that this is true, but it
4 seems to suggest that you were more concentrated prior to
5 '72, the way you put it out. In other words, for example,
6 you say in 1954 to 1959, Bellconi's Research Center
7 (phonetic), University of Texas. Now, was that, in effect,
8 a full-time position, sir?

9 A It was full time at the University of Texas,
10 yes, sir. That is correct.

11 Q All right. And then after that, from '60 to
12 '69, it says consultant for the Flight Safety Foundation?

13 A Yes, sir.

14 Q Was that a full-time position there?

15 A No, sir, it was not.

16 Q All right. So then that was a -- but you did
17 act as a consultant for the Flight Safety Foundation
18 during that period, but you did other consulting work; is
19 that correct, sir?

20 A Yes, sir. That would be correct, although 99.9
21 percent of it, in a period from 1960 to '69 would have
22 been with the Flight Safety Foundation.

23 Q Well, that is what I thought. It seems, the way

1 that this is structured, that you were primarily occupied
2 with the companies that were described here?

3 A. Have I cleared it up for you?

4 Q. Yes, some.

5 Now, then it says in 1972 -- 1972, were you
6 with Sikorsky Aircraft at that time?

7 A. I did some work for Sikorsky, yes, sir. That is
8 correct. As a consultant.

9 Q. Now, was that full time, sir?

10 A. No, sir, it was not.

11 Q. That was as you are now?

12 A. That is correct.

13 Q. But among the clients that you had, was Sikorsky?

14 A. Sikorsky would have been one of my clients,
15 that is correct.

16 Q. So in effect, then, from January of 1972 on, your
17 experience as it is now, that you are a general consultant
18 for various clients?

19 A. That would be correct.

20 Q. Yes, sir. Now, it reads aviation and automotive
21 accident investigation for various legal firms, and that is
22 where we see 1972 on. Which law firms?

23 A. I have worked for Mr. Franklin Houser in

1 San Antonio; I have worked for Mr. Gerald Sterns in
2 San Francisco; I have worked for Mr. Cathcart, McGania
3 and Cathcart (phonetic) in Los Angeles; and a number of
4 others.

5 Q Now, since 1972, are your clients essentially
6 law firms?

7 A Essentially, that would be correct. However,
8 I have done some work for Peter's Helicopter and some work
9 for Bell Helicopter and Sikorsky, as indicated here.

10 Q All right, sir.

11 A Let's see. I can't think of any other category
12 that you wouldn't include under the title "law firms".

13 Q And is it essentially in connection with
14 litigation, since 1972?

15 A Essentially, that would be correct, sir. Yes,
16 more than 50 percent.

17 Q Well, what percentage is not connected with
18 litigation since 1972?

19 A A very few percent..

20 Q So, it is well over 95 percent?

21 A I would say probably so, yes.

22 Q All right. On the basis of fees received, is
23 the bulk of it for plaintiffs or for defendants?

1 A. I have worked for both. I would say the bulk
2 would probably be plaintiff.

3 Q. That is in dollars?

4 A. In dollars?

5 Q. Yes, sir.

6 A. Yes, sir.

7 Q. I'm talking about in revenues.

8 A. Did you ask me a question?

9 Q. Yes, sir. I'm trying to find out, and I
10 probably wasn't too clear as to what percentage of your
11 consulting work, from a dollar standpoint, was received
12 from plaintiffs and from defendants.

13 A. Well, again, it would be more than 50 percent,
14 I believe, for plaintiffs.

15 Q. Do you know?

16 A. Probably -- I don't have the faintest idea. Maybe
17 70-30, something like that. Seventy percent for the
18 plaintiffs, 30 percent for manufacturer, whatever.

19 Q. All right. But since 1972, your engineering work
20 has been almost exclusively for litigation; is that a fair
21 statement?

22 A. That would be correct, yes, sir.

23 Q. These involve matters that are either in court

1 or contemplated in going to court; is that correct?

2 A That is correct. Yes, sir.

3 Q How many times have you testified, sir?

4 A I haven't the faintest idea.

5 Q Can you give me some estimates?

6 A By testifying, you mean in court?

7 Q Well, I am going to break it down any way that
8 is clear. How many times in court since 1972?

9 A Well, I'd say -- this is a very crude estimate,
10 maybe 15 times, something like that.

11 Q Okay. How many times have you given your
12 deposition?

13 A Well, at least that many times, I would say.

14 Q All right. So you have been in court 15 times;
15 you have given your deposition --

16 A Fifteen or 20 times, probably.

17 Q -- 15 times?

18 A Maybe more than that.

19 Q I would like your best judgment.

20 MR. DUBUC: He is giving it to you.

21 THE WITNESS: I am giving you, you know, the
22 best I can, and that is very crude, I want you to understand
23 that.

1 BY MR. OREN LEWIS:

2 Q I understand that, sir. And you have records
3 on this, do you not?

4 A Not really, no.

5 Q You don't have records on how many cases or
6 matters that you have handled?

7 MR. DUBUC: Asked and answered.

8 THE WITNESS: No, sir. I haven't maintained
9 such records.

10 BY MR. OREN LEWIS:

11 Q Well, you don't maintain --

12 MR. DUBUC: Asked and answered. He has told you.

13 BY MR. OREN LEWIS:

14 Q What kind of records do you maintain,
15 Dr. Turnbow?

16 A Well, I have some of the depositions of which
17 I have given, for example.

18 Q Do you keep those?

19 A I keep those.

20 Q All of them?

21 A No.

22 Q Why not?

23 A Well, some of them I never wound up with to begin

1 with.

2 Q All right. Do you have records of the people
3 that you worked for, the law firms and such, in the cases
4 that they asked you to handle?

5 A Some of them I do have, yes. Some of them I
6 don't.

7 Q What is your -- and it is no doubt on here, sir,
8 and I -- your bachelor's degree in engineering, sir, what
9 area is that in?

10 A It is mechanical engineering.

11 Q And that is machines or devices that move, in a
12 sense?

13 A That is correct, among other things.

14 Q And then your master's degree is -- what is that
15 in, sir?

16 A Engineering mechanics.

17 Q A refinement of the same subject, sir?

18 A Yes, but -- that is a good way to put it, I
19 guess. Sure.

20 Q If it isn't -- what is your thesis in?

21 A The response of a beam to an impact load. I
22 presume you meant thesis and not dissertation.

23 Q Well, I understood that a thesis was the master's

1 degree.

2 A That is correct.

3 Q And the dissertation was the doctoral.

4 A That is the reason I asked the question.

5 Q Okay. Response of a beam to a load?

6 A Impact load.

7 Q Impact load, I am sorry.

8 Now, what was your Ph.D. in, sir? What branch?

9 A It was also in engineering mechanics.

10 Q And what was your dissertation?

11 A Properties of materials. Specifically, aluminum,
12 copper at high rates of strain.

13 Q Now, in your analysis of the crash here, you
14 have on a page that is unnumbered, under the heading of
15 analysis of G levels associated with the C5A accident
16 near Saigon, April 4, 1975, and it says referenced used:
17 and you have 13 items; is that correct, sir?

18 A Yes, sir.

19 Q Does that describe all of the information that
20 you had at the time that you did the report?

21 A Well, I am not sure that it does. In all
22 probability, it does not.

23 Q Would you tell me what else that you had that --

1 A. I have two base board boxes I would say probably
2 somewhere between 30 and 40 pounds each, both full.

3 Q. Well, that doesn't help me much, Doctor. I'm
4 going to want to know precisely what it is that you
5 used and relied on in reaching your conclusions.

6 A. Well, precisely, that is what I used.

7 Q. Precisely --

8 A. But most specifically, the 13 items which I
9 have listed here.

10 Q. Would you describe the contents of the boxes?

11 A. Yes, sir.

12 Q. In addition to these items.

13 A. I can't tell you.

14 Q. You don't have any idea?

15 A. I don't have any idea.

16 Q. Why didn't you describe it here?

17 A. Because these were the things that I used in the
18 report.

19 Q. Well, what I am trying to find out, sir, and if
20 I am not clear, I want you to be sure and tell me. What
21 I am trying to find out is the data that you used, the
22 information that you used, the facts or assumptions that
23 you made in arriving at the conclusions that you arrived at.

1 So, that is where I would like to start, and I gather
2 that you have done the same thing in effect by setting
3 out these 13 items?

4 A Yes, sir.

5 Q And a casual reader would assume that these are
6 the things that you would rely on. This is the factual
7 basis for your report, and if it is not, I want to find
8 out what other factual basis, if any, there is. And so
9 when you talk about two boxes of materials, that does not
10 help me at all.

11 A I understand that, but I can't tell you what is
12 in those two boxes with great detail today.

13 Q Can you tell me with any detail?

14 A If I would, I could -- if I could, I would. Let
15 me see if I can think of anything that I have not listed
16 here.

17 I don't think of anything at the moment that I
18 have that I would have used certain extensively, other
19 than what I have listed in these 13 items. Most of these
20 boxes involve depositions and trial testimony --

21 Q I understand that.

22 A -- from previous trials and that is listed in
23 item number six.

1 Q Okay. Now, can you tell me, sir, where was
2 Regina Aune located in the troop compartment?

3 A Yes, sir. I think so. She was seated on the
4 floor in the aisle about midway, lengthwise in the aisle,
5 in much an Indian style. I believe there is one term
6 that is used. Maybe not by Regina Aune, but one of the
7 people describing how they were sitting.

8 Q Where was Barbara Adams located?

9 A She was between rows two and three on the right-
10 hand side of the aircraft in the front of the troop
11 section.

12 Q She was between the seats?

13 A She was between the seats, that is correct.

14 Q All right. Who was holding Barbara Adams' hand?

15 A That would have been her daughter.

16 Q What is her name?

17 A It is a short name, about four letters.

18 Q Linda?

19 A Linda, uh-huh.

20 Q All right.

21 A Five letters, I guess.

22 Q Where was Thelma Thompson?

23 A I don't know about Thelma Thompson at this point.

1 Q Where was Peter Daughtry, D-A-U-G-H-T-Y?

2 A I don't know about Daughtry.

3 Q You don't have any idea where he was?

4 A I just don't recall at the moment.

5 Q Where was William Parker?

6 A Parker would have been in the aisle, probably
7 to the rear of a midpoint in the aisle.

8 Q Where was Linda Adams located?

9 A I have told you where Linda Adams was located.

10 Q She was on the same side of the main aisle as
11 her mother and next to her; is that correct?

12 A That is correct. Both her mother and she were
13 between rows two and three, Linda says, on the right-hand
14 side.

15 Q All right. Now, there is a main aisle that runs
16 from forward to aft in this troop compartment; is that
17 correct?

18 A That is what I understand.

19 Q And how many seats on each side?

20 A Three. Well, that is not quite correct. There
21 is two sets of seats up in the front, in which there are
22 only two seats on the left-hand side of the airplane,
23 across from the latrine.

1 Q All right, sir. Now, other than that, is there
2 any other main aisle in the forward and aft?

3 A Not to my knowledge, other than the fact that
4 in the extreme rear of the aircraft. That would not
5 perhaps completely describe the arrangement.

6 Q All right. But there is no side aisle on either
7 side of the aircraft; is that correct, going forward and
8 aft?

9 A As far as I know, there is not.

10 Q So the seats, then, are, for the main, arranged
11 on either side of the aisle in rows of three?

12 A That is correct.

13 Q And then, of course, there would be an aisle
14 or space, in any event, between the rows of seats?

15 A Yes, sir.

16 Q That's correct. So, when you say, for example,
17 that Barbara Adams, she was located in the space between
18 rows of seats two and rows of seats three; is that correct?

19 A That is what she says, at any rate.

20 Q Well, I am just trying to understand where you
21 undertook to place her in your analysis of this.

22 A I didn't undertake to place her in any place. I
23 simply take her statement --

1 Q All right. Well, I want to know, did you assume
2 that she was in that location? That Barbara Adams was
3 in that location?

4 A I have assumed that, I suppose.

5 Q You see, I need to know what factual assumptions
6 you made. If you didn't do that, I want to know where you
7 placed her?

8 A I am happy with that.

9 Q All right. And you assumed that her daughter,
10 Linda Adams, was located next to her on that same side of
11 the main aisle in the rows -- between rows two and three;
12 is that correct?

13 A That is correct.

14 Q All right. Now, where was Christie Lievermann
15 located?

16 A She was between probably the -- well, the last
17 row and the next to the last row, or in about that
18 location. It might have been between two and three or
19 one and two, near the back of the airplane, and I believe
20 on the left-hand side. Although, at the moment, I can't
21 say that I recall whether it was left or right.

22 Q Now, you have called out row numbers. How are
23 you counting?

1 A In the first case, rows two and three were
2 measured from the front of the plane.

3 Q All right.

4 A But are you talking about the Adams girls?

5 Q I am speaking of Barbara Adams.

6 A Uh-huh. In the second case, I used the same
7 terminology that Lievermann used. She said rows two and
8 three, I think, but she is referring to the back of the
9 aircraft, at least as far as I can ascertain.

10 Q All right. But let's just talk about one
11 nomenclature, just so that we can understand, you know,
12 when somebody does their thesis, can understand what we
13 are talking about. And it doesn't make any difference
14 to me whether you choose to count from the front or the
15 back, sir, but whatever you think is reasonable. Do you
16 want to start from the front?

17 A I am happy with that, if you are.

18 Q All right. I am, too.

19 So then the Adams women were located between
20 rows two and three, counting from the front; is that
21 correct, of the troop compartment?

22 A That is what they say, yes.

23 Q All right. And that is what you have assumed?

1 A Yes.

2 Q And on which side of the aisle, right or left?

3 A On the right-hand side.

4 Q On the right side, all right. Now, and then
5 what row would Christie Lievermann be in, then?

6 A Do we have a layout of the --

7 Q Do you know the number?

8 A I don't know how many rows there are at the
9 moment, so we will have to do some counting for you here.

10 MR. OREN LEWIS: Would you let the record show
11 that counsel and the witness are consulting.

12 MR. DUBUC: Yes. We are counting the rows.

13 MR. OREN LEWIS: Well, I don't know whether
14 that requires a conference off the record.

15 MR. DUBUC: Okay. Let the record reflect that
16 we have counted the rows. Do you want me to count them
17 on the record? We can do that, too.

18 MR. OREN LEWIS: Well, let's do this.

19 Dr. Turnbow, I have a --

20 MR. DUBUC: Just so you know what we are
21 counting from, we are looking Exhibit D1210.

22 MR. OREN LEWIS: Well, I happen to have one of
23 those, too.

1 MR. DUBUC: Okay.

2 BY MR. OREN LEWIS:

3 Q Would you do this for me, sir, take that diagram
4 and write -- put bow or front -- is bow a better word or
5 front for an airplane?

6 A Forward.

7 Q Forward? All right. Put forward for the forward
8 portion of the airplane, would you, so that we would be
9 able to see? Then, would you, along whichever side makes
10 sense, let's say the closest to you, start with one, two,
11 three, four, five, and then let's go down so that we can --

12 A You want me to number them?

13 Q Yes, sir. Just put numbers on those rows. May I
14 come over there and just see how you have numbered that,
15 sir?

16 So there are 14 rows; is that correct, sir?

17 A That is what this diagram would indicate.

18 Q All right. Now, would you then locate Christie
19 Lievermann where you assume she was for purposes of your
20 analysis on this diagram?

21 A Well, I will give you two possible locations.

22 Q Okay.

23 A All right. My difficulty here is that I don't

1 know what she means by two or three rows from the rear.

2 This could be a couple of places.

3 Q All right. Well, just tell me where you placed
4 her for purposes of your analysis?

5 A Okay. I have given you two locations.

6 Q All right. Would you describe them? Between
7 what rows?

8 A Well, they would actually come between rows 10
9 and 11, or 12 and 13.

10 Q All right. And on the left side of the aisle,
11 which would, in this case, be the row closest to the one
12 who is looking at this diagram; is that correct?

13 A That would be correct. Yes, sir.

14 Q All right, sir. Or in other words, it would be
15 port -- on the port side?

16 A That is correct.

17 Q All right. Would you put CL in those rows?

18 MR. DUBUC: He has already written Christie
19 Lievermann.

20 BY MR. OREN LEWIS:

21 Q All right. That is fine.

22 Between 10 and 11, or 11 and 12, and we understand
23 for the record that it was one of those locations.

1 A. (Nodding head, indicating in the affirmative.)

2 Q. Would you put Barbara Adams in her location,
3 since we have these numbered now? Just put BA, if you will.

4 MR. DUBUC: BA, okay.

5 BY MR. OREN LEWIS:

6 Q. And then you have put an LA for Linda Adams, all
7 right.

8 A. Right.

9 Q. Now, would you put Harriet Coffinet Neill on this
10 diagram?

11 A. Yes. She would have been directly across the
12 aisle.

13 Q. Across which aisle, sir?

14 MR. DUBUC: You have established that there is
15 only one aisle.

16 MR. OREN LEWIS: Oh, he means the main aisle.
17 All right.

18 And between what rows of seats, sir?

19 THE WITNESS: Well, that would be between four
20 and five. However, I would point out to you, you know,
21 that while they have said rows two and three, that rows two
22 and three measured from the end of the latrine or measured
23 from the bulk end, and I don't know the answer to that.

1 BY MR. OREN LEWIS:

2 Q All right.

3 A But in view of the fact that Barbara Adams was
4 on the right-hand side -- Linda Adams was on the right-hand
5 side, if she was looking into rows, then she was looking
6 at the end of the latrine.

7 Q All right.

8 A So that is the reason I come up with them located
9 between rows four and five.

10 Q All right, sir. Now, then --

11 A But see, now, we are --

12 Q And Harriet Neill then is between four and five
13 on the left-hand or port side of the airplane; is that
14 correct, sir?

15 A That is correct. I will write Neill --

16 Q Would you mark that HN or whatever you think is
17 fair for that?

18 MR. DUBUC: Neill. He came up with Neill. That
19 is close.

20 MR. OREN LEWIS: Neill, all right.

21 BY MR. OREN LEWIS:

22 Q Now, would you locate Marcia Tate?

23 A At the moment, I don't recall where she is

1 located.

2 Q You don't know where she was; is that correct?

3 A At the moment, I don't recall.

4 Q All right. And would you locate Regina Aune
5 for me?

6 A Aune?

7 Q Yes.

8 A I can do so only approximately.

9 Q All right.

10 A Okay.

11 Q And where did you put her, sir? May I see
12 the document?

13 A Well, I have her between rows eight and nine.
14 That could be between nine and ten or ten and eleven.

15 Q All right. But she was in the main aisle; is
16 that correct?

17 A That is my understanding, yes, sir.

18 MR. DUBUC: You said or between 10 or 11? Why
19 don't you makr that to indicate --

20 THE WITNESS: Okay.

21 BY MR. OREN LEWIS:

22 Q Now, where was Gregory Gmerek, spelled

23 G-M-E-R-E-K?

1 A. My recollection is that Gmerek would have been
2 somewhere in the vicinity of Aune.

3 Q. Well, where was he from your review of the data?
4 Where was he located?

5 A. I have told you everything I can, at the moment.

6 Q. You don't know whether he was between the seats
7 or in the aisle or any place, do you?

8 A. I believe that he was in the main aisle.

9 Q. All right.

10 A. That is the impression that I have gotten.

11 Q. Well, I want you to give us as accurately as you
12 can. I want you to be as precise as you can. If you
13 don't know --

14 A. This is as precise as I can, at the moment.
15 Although, I will tell you that I am not absolutely positive.

16 Q. All right. Who else was in the --

17 A. I am not sure that they know exactly where they
18 were, as a matter of fact.

19 Q. So Aune could be mistaken as to where she was?

20 A. She seems to be pretty clear about her location
21 and the fact that she was sitting on the floor in about the
22 middle of the airplane.

23 Q. Well, when you said "they", I presume you meant

1 all of them. Or do you just feel that this particular
2 airman doesn't know where he was?

3 A. That is what I have referred to. Yes, sir.

4 Q. Well, you said "they". Who else did you have in
5 mind when you said "they"? They means more than one to me.

6 A. Well, for example, Parker.

7 Q. Where was he? Do you know where he was?

8 A. To the best of my knowledge, he would have been
9 at some point to the rear of the aircraft, relative to Aune.

10 Q. But you don't know whether he was in the aisle
11 or between the seats, do you?

12 A. I am reasonably certain that he was in the aisle.

13 Q. How do you know?

14 A. Because he went down the aisle.

15 Q. He could have been thrown into the aisle.

16 A. Say again?

17 Q. He could have been thrown into the aisle, he
18 could have walked into the aisle. I want to know how you
19 know, if you know, sir?

20 A. He had gotten up in the process of attempting
21 to move to a slide, which had begun to expand as a result
22 of the first impact, with the intent, I believe, of
23 deflating that slide.

1 Q Who reported that? Which witness stated that?

2 A I don't know which witness stated that.

3 Q Where was Susan Dirge located?

4 A I don't recall at the moment.

5 Q Can you tell me where Dr. Merritt Stark was
6 located? You put him on the diagram.

7 A I can only give you an approximation of his
8 location.

9 Q Well, where was that?

10 A It would be on the right-hand side of the
11 aircraft, between rows of seats. He was not in the aisle.
12 He was between rows of seats, and he would have been near
13 the rear of the aircraft, in the front of the aircraft.

14 Q All right. And have you located Harriet Neill?
15 I guess you have.

16 MR. DUBUC: Yes.

17 BY MR. OREN LEWIS:

18 Q May I see your diagram now? So, we have located
19 everybody that you know their location of, Doctor? Can
20 you place anybody else on this diagram?

21 A There were two of the sergeants. They were very
22 near Aune, but at the moment, I don't think I can tell you
23 what those sergeants' names were.

1 Q. How about Thelma Thompson? Where was she?

2 A. I don't know where Thelma Thompson was.

3 Q. She was between the seats, wasn't she?

4 A. I don't know.

5 Q. Well, who else -- what other adults were in the
6 troop compartment that you know of, in addition to those
7 we have named? You mentioned -- what are the sergeants'
8 names?

9 A. There were two sergeants that we haven't talked
10 about.

11 Q. Do you know what their names were?

12 A. At the moment, I don't recall them.

13 Q. And you don't know where they were?

14 A. They were very near Aune.

15 Q. But you don't know whether they were between the
16 seats or in the aisle; is that correct?

17 A. They were in the aisle, is my understanding.

18 Q. Are you sure about that?

19 A. Well, that is what --

20 Q. I am not debating it with you, Doctor. I am just
21 asking you if you are sure about that.

22 A. Well, I guess I would have to say that I am as
23 sure about that as I am about the other locations that were

1 given. That is what is stated in either the court's
2 testimony or their statements.

3 Q Now, what injuries did Linda Adams have?

4 A She had knee injuries and those being the
5 major injuries that she had.

6 Q What did --

7 A Maybe cut, bruise, that sort of thing.

8 Q What injuries did Barbara Adams sustain?

9 A I believe that she was one of the fatalities in
10 the aircraft.

11 Q What injury did Harriet Neill suffer?

12 A I believe she had a broken collar bone and
13 that would have been her primary injury.

14 Q What would have been her primary injury?

15 A The collar bone.

16 Q What injuries did Christie Lievermann suffer?

17 A Bruise. That is about it.

18 Q And the injuries to Susan Dirge?

19 A To who?

20 Q Susan Dirge.

21 A I can't give you any information on that at the
22 moment.

23 Q And what injuries did you say Linda Adams had?

1 A Knee injury.

2 Q What kind of knee injury?

3 A The cartilage in the knee.

4 Q Which knee?

5 A Probably both. At least that is what she says.

6 Knees, I believe.

7 Q Is that the extent of her injuries?

8 A Say again?

9 Q Did she have any other injuries?

10 A If there were other injuries, they apparently
11 were minor.

12 Q Did she sustain any cuts?

13 A Possibly.

14 Q Well, did she or didn't she?

15 A If you want to know, we can get out her statement.

16 Q I know, sir. I'm just trying to understand what
17 it is that you used in coming to your conclusions, and I
18 am just trying to get that.

19 MR. DUBUC: He is telling you.

20 MR. OREN LEWIS: Okay.

21 MR. DUBUC: He can get out the statement, if you
22 want to look at it.

1 BY MR. OREN LEWIS:

2 Q Now, what injuries did Peter Daughtry,
3 D-A-U-G-H-T-Y, have?

4 A None -- say again? Say the name, I'm sorry.

5 Q Peter Daughtry, D-A-U-G-H-T-Y.

6 A No. I was thinking of Boutwell, and he is one
7 of the chaps whose name I had forgotten. Daughtry, I don't
8 recall.

9 Q You say Boutwell had no injuries at all?

10 A I don't think so.

11 Q All right. How about Peter Daughtry,
12 D-A-U-G-H-T-Y.

13 A I don't recall about Daughtry. It must have been
14 very minor.

15 Q And William Parker?

16 A I believe he was the military fatality in the
17 troop compartment.

18 Q What did he die of?

19 A I don't have an answer.

20 Q Do you have any idea of the injuries he sustained?

21 A He was observed to have a head injury.

22 Q Any others?

23 A Well, let's see. Gmerek. If you will permit me

1 to ask a question here --

2 Q. Certainly. I am speaking of William Parker, now.

3 A. Say again?

4 Q. My question is with respect to William Parker.

5 MR. DUBUC: Well, you said any others, and he --

6 MR. OREN LEWIS: Well, I am talking about any
7 other injuries to William Parker.

8 MR. DUBUC: Oh.

9 MR. OREN LEWIS: I am sorry if I wasn't clear,
10 Doctor.

11 THE WITNESS: I don't have any further
12 information on Parker.

13 BY MR. OREN LEWIS:

14 Q. What fractures did he sustain.

15 MR. DUBUC: Who?

16 BY MR. OREN LEWIS:

17 Q. William Parker.

18 A. What? Say again?

19 Q. What fractures, if any, did William Parker have?

20 A. I have no knowledge of his fractures.

21 Q. Can you describe what bones were broken, if any?

22 A. I cannot.

23 Q. Can you describe in any detail, with any precision,

1 the type of injuries that William Parker sustained?

2 A He was observed to have a head wound, I believe.

3 Q How long post-accident did he die?

4 A I don't have the answer to that.

5 Q Did you read his medical reports?

6 A I did not.

7 Q Did you see any data about his injuries?

8 A I did not.

9 Q Can you describe what injuries Thelma Thompson
10 sustained?

11 A I have no information on Thelma Thompson.

12 Q So, you don't know? You couldn't describe that to
13 any degree; is that correct?

14 A That is correct.

15 Q And you can't describe with any precision the
16 injuries to Barbara Adams; is that right?

17 A Statements were made by -- I believe it would
18 have been Harriet Neill, but I could be mistaken on that
19 point. But, one of the nurses, that she appeared to have
20 a broken back.

21 Q All right. When you say a broken back, the
22 back has a number of bones and things attached to it. Are
23 you speaking of a broken spinal column --

1 A. Spinal column.

2 Q. -- or fractured bones? What are you speaking of?

3 A. Spinal column.

4 Q. Did you make any attempt to try to analyze the
5 type of wounds to the body that Barbara Adams sustained?

6 A. Well, she reports that she had the knee injuries.
7 However, she helped evacuate the aircraft, take the
8 children out of the aircraft, and she was ambulatory.

9 Q. Now, sir --

10 MR. DUBUC: Was your question with regard to
11 Barbara or Linda?

12 MR. OREN LEWIS: I am content.

13 THE WITNESS: Oh, I am sorry. I am thinking of
14 Linda Adams.

15 MR. OREN LEWIS: Note for the record that
16 Mr. Dubuc reminded the witness.

17 MR. DUBUC: Well, note for the record that
18 Dr. Turnbow has some hearing problems and I know you have
19 dropped your voice once in a while, Mr. Lewis. So, if you
20 would keep your voice up, as you ask him to, maybe he will
21 catch all of your --

22 MR. OREN LEWIS: I will. And if you don't under-
23 stand me or if I am not loud enough, Doctor, you tell me. I

1 usually haven't had the problem of being heard, but if
2 you do have a problem --

3 THE WITNESS: Well, I am sure I heard you, but
4 for some reason I was thinking of Linda Adams rather than
5 Barbara Adams. And, I think I made the same mistake the
6 first time you asked me about one of the Adams girls.

7 BY MR. OREN LEWIS:

8 Q. I am interested in as much accuracy as you can
9 give me, Dr. Turnbow. I mean, it is important to me.

10 A. I understand that.

11 Q. Now, what --

12 MR. DUBUC: I am sure you are not trying to
13 have him say that Barbara Adams was ambulatory and working
14 on the airplane. I know you are not intending to do that.
15 So, I thought I would point it out, his having already
16 testified that she was one of the fatalities.

17 BY MR. OREN LEWIS:

18 Q. Would you tell me, sir, what wounds the body of
19 Barbara Adams sustained?

20 A. I have already done that.

21 Q. Would you tell me?

22 A. Again?

23 Q. Yes.

1 A. I believe that it was -- Harriet Neill was not
2 her name at the time, is my understanding, at any rate,
3 observed that she was in the front of the aircraft and was
4 in a position that would suggest to Harriet Neill that she
5 would have had a broken spinal column.

6 Q. Did you look at any documents such as medical
7 reports or body identification reports or autopsies which
8 described with any precision the location of wounds, bruises,
9 and fractures on the body of Barbara Adams?

10 A. No, I did not.

11 Q. Did you look at any type of reports by either a
12 physician or a body identification person or any other
13 person that had the responsibility to locate and point out
14 wounds and accident marks on the persons of anybody in the
15 troop compartment?

16 A. No, sir, I have not.

17 Q. Now, have you reviewed -- and I want to make sure
18 that I am not confusing you. Have you reviewed any
19 medical reports or medical data on any of the children in
20 the troop compartment?

21 A. I have not.

22 Q. Now, for the purpose of your report, you have
23 assumed that all of the children were in seats; is that

1 correct?

2 A. That is correct.

3 Q. And that they -- there were two in a seat; is
4 that correct?

5 A. No, that is not correct.

6 Q. What have you assumed?

7 A. That there were one or two to a seat.

8 Q. All right. Well, let's find that out, then.

9 They were all in seats, is that the assumption that you
10 have made? Is that the basis that you have been working
11 on?

12 A. That is correct. Yes, sir.

13 Q. All right. Now, how many were one to a seat?

14 A. I don't know.

15 Q. Do you know how many were two to a seat?

16 A. I don't know.

17 Q. Do you know how many there were in the troop
18 compartment?

19 A. One hundred and forty-three.

20 Q. How many died in the troop compartment? I am
21 speaking of children.

22 A. Maybe 144.

23 Well, certainly one died.

1 Q Is there any report that said more than one died?

2 A There was some indication that there could have
3 been two.

4 Q The collateral report said two died, didn't it?

5 A I don't know whether I got that statement from
6 the collateral report or not, but -- so, I don't remember
7 whether the answer to your question is yes or no.

8 Q All right. I see the first item that you reviewed,
9 under references used, was U.S.A. Collateral Report, Volumes
10 One, Two, and Three.

11 A Yes, sir.

12 Q So, you had the collateral material?

13 A I had that material, yes, sir.

14 Q All right. Now, for purposes of this report,
15 how many children did you assume died in their seat?

16 A One or two.

17 Q One or two. And did you ask for any information
18 about injuries to the children that were in the seats of
19 the troop compartment?

20 A No, sir. I have not done that.

21 Q Did you ask for the medical reports and/or the
22 death certificates or whatever documents may exist as to the
23 adults in the troop compartment?

1 A. No, sir, I have not.

2 Q. And you didn't look at the medical reports of
3 the surviving children or ask for any of this information?

4 A. No, sir.

5 Q. Now, do you have a wreckage distribution diagram
6 as part of your report, sir?

7 A. Yes, sir, I believe so.

8 Q. Before we do that, let me ask the court reporter
9 to mark this as Turnbow's Exhibit Number One. This is
10 Defendant's Exhibit 1210, as drawn on by the witness.

11 (The document, Diagram of
12 Troop Compartment, was marked
13 as Turnbow Deposition Exhibit
14 No. 1 for identification.)

15 BY MR. OREN LEWIS:

16 Q. Now, do you have a wreckage distribution diagram,
17 sir?

18 A. I do have, yes, sir.

19 Q. And now if you will refer to the wreckage
20 distribution diagram that is attached to your report, sir.

21 A. Yes, sir.

22 Q. I want to ask you some questions about this.
23 Firstly, what photographs did you see at the time you wrote

1 your report?

2 A Well, I had seen photographs of the initial
3 touchdown location.

4 Q Is that an aerial photograph or is it a ground
5 level photograph?

6 A Well, if it was an aerial photograph, it was
7 taken from only a few feet from the ground. Well,
8 correction. I believe that there were also some aerial
9 photographs. A fairly large number of photographs.

10 Q Well, you mention in item two of your references,
11 photographs of the aircraft prior to and following the
12 accident.

13 A Yes, sir.

14 Q Do you see that? Did they give you copies and
15 did you keep copies of these photographs?

16 A I have copies of some of the photographs, not all
17 of them, that I looked at prior to writing this report.

18 Q In the two boxes?

19 A That is correct. Yes, sir.

20 Q Firstly, how many photographs did you see?

21 A Well, I can't give you an exact number, but
22 probably -- I just don't remember.

23 Q Can you give me an order of numbers? Is it more

1 than 100? Less than 100?

2 A Maybe 50.

3 Q Fifty. And I understand that that is not exact,
4 but approximately 50; is that correct, sir?

5 A That might be 25 and that might be 125.

6 Q Well, that is a pretty wide range.

7 A Yes, sir. I understand that is, but that is the
8 best I can do for you right now.

9 Q But in any event, you have them in the boxes?

10 A No, sir. I don't have all of those. I would guess
11 offhand that I might have 20, 25 photographs.

12 MR. OREN LEWIS: Mr. Dubuc, can you tell me
13 what photographs he was furnished with?

14 MR. DUBUC: Yes. He was furnished with photographs
15 used in the first trial, both color and black and white,
16 that were marked as exhibits, and some that weren't marked
17 as exhibits, but were in the series of, I think, series
18 three and ten and two, if I am not mistaken.

19 MR. OREN LEWIS: But no photographs other than
20 those that were marked, whether they were exhibits or --

21 MR. DUBUC: Well, some were not marked as exhibits.

22 MR. OREN LEWIS: I understand that, but all but
23 the exhibits three, ten, and two. There were no others?

1 MR. DUBUC: I think that is right. Three, ten,
2 and two series. That was before he wrote his report.

3 MR. OREN LEWIS: Pardon?

4 MR. DUBUC: That was before he wrote his report.

5 MR. OREN LEWIS: I understand that.

6 MR. DUBUC: He has seen a bunch of pictures
7 yesterday -- last night.

8 MR. OREN LEWIS: You understand, Mr. Dubuc, why
9 I am interested --

10 MR. DUBUC: Oh, yes.

11 MR. OREN LEWIS: -- in trying to see what he has
12 seen, and I don't really want to get into any difficulty
13 over that. I would just like to make as clear a record
14 as we can of what he saw before he wrote his report.

15 MR. DUBUC: He saw those series that we had
16 at those previous trials that were available.

17 MR. OREN LEWIS: Well, when did --

18 MR. DUBUC: I suspect he has probably seen some --
19 I am not sure. He may have seen some of the AAR photographs.

20 MR. OREN LEWIS: What do you mean by "AAR"?

21 MR. DUBUC: The sanitized portion was released in
22 1976, and was marked in the liabilities stage. I don't
23 remember if he saw any of those part photographs or not.

1 They were marked in our exhibits -- depositions, but I
2 guess they weren't used at the trial, because they weren't
3 talking about those issues.

4 BY MR. OREN LEWIS:

5 Q Well, sir, when was the first occasion that you
6 saw photographs of the crash, site and the parts? I am
7 speaking of the wreckage parts as opposed to the mechanical.

8 A Well, I believe the first photographs I would
9 have seen would have been in late July of this year. That
10 is not correct. I have -- I have seen photographs and
11 slides, and I believe also some motion pictures of this
12 accident over the last couple of years, much prior to the
13 time that I was contacted --

14 Q All right.

15 A -- by Mr. Dubuc here in conjunction with this
16 case.

17 Q What were the motion pictures of? The accident
18 scene or the aerial pictures?

19 A The photographs that I am thinking about --

20 Q I am speaking of motion pictures.

21 A I am not absolutely certain that these were
22 motion pictures, but they were aerial scenes predominantly,
23 that's correct.

1 Q And slides, you mentioned slides?

2 A Slides, and these would have been aerial scenes.

3 Q And ground level shots?

4 A There may have even been some ground level shots.

5 Q All right. And who showed those to you?

6 A These, I believe, would have been shown by Air
7 Force personnel.

8 Q All right. And what was the occasion?

9 A Well, I am director of a short course, at least
10 previously I was director of a short course at Arizona
11 State University, in which we trained Air Force, Army, and
12 other personnel in accident investigation, and these
13 photographs were shown in conjunction with the short
14 course.

15 Q I understand, sir. Now, just so that I can
16 identify the short course a little better, were you the
17 teacher in that course, sir?

18 A Yes. There were other teachers that I had.

19 Q But you were one of the principal teachers?

20 A That is correct. Yes, sir.

21 Q All right. Who brought the films to the --

22 A This would have had to have been U.S. Air Force
23 people, I believe.

1 Q I understand. And that would have been some of
2 the -- but were they students or teachers, sir?

3 A Say again?

4 Q Would the --

5 A It would have been a student.

6 Q A student?

7 A I believe. However, we called upon our students
8 to make presentations --

9 Q I understand.

10 A -- about current events.

11 Q I understand. But were there any Air Force
12 teachers, sir?

13 A Were there any Air Force teachers?

14 Q Yes, sir.

15 A In this class?

16 Q Yes, sir.

17 A There could have been, yes.

18 Q I am just trying to pin down who it was.

19 A Some of the teachers varied from time to time.

20 These are elective --

21 Q I understand. And when was this course given?

22 A Well, it has been given since about 1958, I guess.

23 Q I understand.

1 A Three or four times a year.

2 Q And can you give us an approximation as to when
3 you first saw these motion pictures and still pictures
4 involving the crash?

5 A I first saw them, I think it was very shortly
6 following the accident.

7 Q Would it have been in -- we are speaking of '75
8 or '76, sir?

9 A Yes, sir. That would probably be about the
10 right order of magnitude in any event.

11 Q And did you say that this was at Arizona State
12 University, sir?

13 A Yes, sir.

14 Q And who were the students in the class? In other
15 words, was this for Air Force people?

16 A Anybody interested in aviation safety, but Air
17 Force, Marines, Army, Department of Transportation --

18 Q I understand.

19 A -- Canadian Department of Transportation, lawyers,
20 manufacturers.

21 Q I understand, sir. And approximately what was
22 the duration of the course? Was it a semester course?

23 A No. It is a two-week, seven hours a day.

1 Q So it was an intensive kind of a program?

2 A That is correct, sir.

3 Q With a number of lectures, including yourself?

4 A That is correct.

5 Q Who would cover various phases of aircraft
6 accident investigation among other things; is that correct,
7 sir?

8 A Yes, sir.

9 Q And these motion and still pictures were shown as
10 one of the presentations in that course in which you were
11 present?

12 A Yes, sir.

13 Q And by an Air Force officer, either a student
14 or one of the teachers?

15 A Yes, sir. That is correct. And that has been
16 done on more than one occasion.

17 Q Can you give me some idea of how many times that
18 would be?

19 A I would say two or three times.

20 Q And this was -- the slides were color slides of
21 the wreckage and that sort of thing?

22 A Yes, sir. I am sure there were color slides. I
23 remember color, I think. Yes.

1 Q Let me show you some of the color slides,
2 Doctor, and ask you if these are the type of pictures that --

3 MR. ROBERT LEWIS: Prints.

4 MR. OREN LEWIS: These are prints, of course,
5 but if you could just look at those. Take your time.

6 THE WITNESS: Well, they are the sorts of things
7 that I am referring to. Some of the ones that impressed
8 me at the time, and this I remember quite specifically,
9 were the aerial shots. It showed the river and the
10 distribution of the wreckage and where the aircraft
11 touched down.

12 BY MR. OREN LEWIS:

13 Q I understand.

14 A And that sort of thing.

15 Q But there were ground level shots of the wreckage
16 as well?

17 A I am not sure about that particular detail. It seems
18 to me that I remember ground level shots, as well as the
19 aerial shots. But I could be mistaken on that point.

20 Q All right.

21 A After you've looked at several hundreds of these
22 photographs in the case --

23 Q I understand.

1 A It is kind of hard to tell when you saw what.

2 Q Now, would there be any way to locate that
3 material, sir?

4 A I don't know of any way to do that. No, sir.

5 Q The Air Force people took it back with them?

6 A Yes, sir.

7 Q It didn't remain part of the curriculum?

8 A No, sir.

9 Q Was there a program of some kind that one could
10 look back and identify who it was that produced that?

11 A No, sir. It would be possible to. There is
12 more than one of these impromptu things, that people were
13 discussing this particular accident, and somebody had the
14 slides, so we put them on.

15 Q I understand. Now, calling your attention to the
16 wreckage diagram --

17 MR. DUBUC: That is Exhibit D9, by the way.

18 MR. OREN LEWIS: Thank you. Exhibit D-9?

19 D as in "dog"? Nine?

20 MR. DUBUC: Yes.

21 BY MR. OREN LEWIS:

22 Q What damage -- strike that.

23 Describe, if you will, the condition of the ground

1 in the area of the first impact. I mean, from that point
2 to the river. You see the diagram here, sir?

3 A All right. Yes, sir, I am clear on what you
4 are asking me, but I am not sure whether you are asking me
5 about the nature of the terrain or --

6 Q Everything.

7 A What it looked like, the airplane touchdown?

8 Q Everything that you are relying on as a fact on
9 which you base your conclusions, Doctor.

10 A All right. It is level terrain or essentially
11 level terrain. In fact, I guess probably rice footage.
12 There are some relatively small ditches, boons, that sort
13 of thing. Various edges of some of the fields. There
14 were some palm trees, which were shown on the diagram and
15 there were, I think, four of these palms. The diagram
16 shows three. It seems to me I recall that the aircraft,
17 right-hand wing, passed through four of them. There are
18 photographs which show the marks made by the landing gear
19 on the aircraft as it touched down in this area.

20 Q Would you put those on this diagram, where this
21 airplane first hit the ground?

22 A It would be where it says initial touchdown. It
23 is already laid out there.

1 Q And how long are the gouge marks?

2 A I will have to estimate that for you. I don't
3 know that anyone has given a specific measurement.

4 Q Well, I want whatever you have concluded, that is
5 the basis of your analysis of these facts, Doctor.

6 A Well, I have not made any conclusions one way or
7 the other as far as my knowledge is concerned of the length
8 of those marks.

9 Q Well, how deep are they?

10 A Again, I would have to estimate that.

11 Q Well, give me your best estimate.

12 A Well, I would say that while the tires were on
13 the ground, the depth -- if you want specific numbers here --
14 now, you are just trying to find out what I know about this?

15 Q Yes, I am.

16 A Or do you want to know what the answers are?

17 Q Well, I want to find out what you know about it.

18 A Well, you know, there are an awful lot of things
19 about this accident -- Mr. Lewis, is it?

20 Q Yes, sir.

21 A That pretty obviously that I don't know and
22 an awful lot of things about this accident that nobody knows
23 anything about, and there are an awful lot of things about

1 this accident that nobody is ever going to know anything
2 about. One can spend a lifetime in looking at details of
3 this accident and I will say, "never have scratched the
4 surface."

5 You are asking me about things that are in-
6 significant as far as I am concerned.

7 Q I understand that, Doctor. You will have to
8 forgive me --

9 A I will try to find out what you want to know, and
10 I will do my best to tell you, sir.

11 Q I understand, sir, but there were a number of
12 very small children that were hurt in this crash, and it
13 is important that we get what the situation is, sir. And,
14 I believe that it is a very reasonable thing for me to try
15 to find out the depth of your knowledge.

16 Now, I am sorry if you feel that is unreasonable,
17 because I really don't intend it to be.

18 A No, I don't feel that it is unreasonable at all.
19 That is the reason that I am asking you here, because if
20 you are interested in some particular detail, I don't want
21 to give you a wrong number.

22 Q Sir, you see, this is your field, the engineering,
23 and not mine. Now, I am a trial lawyer and I am just

1 interested in your knowledge of the facts, and I would like
2 you to tell me, if you can, what your estimate of the
3 length of the gouge marks at the point that the airplane
4 first came to the ground, and I am speaking of that side
5 of the river. I don't know whether that would be -- we
6 can speak of left bank and right bank or any other reasonable
7 way that you think would be a reasonable way to describe it.
8 But since north is in the upper part of the diagram, I
9 guess --

10 A. East bank and west bank.

11 Q. -- this would be east bank and west bank.

12 A. That is very good.

13 Q. Well, let's speak of east bank and west bank. On
14 the east bank, could you tell me how long the gouge marks
15 are in the ground, to your best estimate?

16 A. Could you let me take a look at your photographs
17 that show those gouge marks?

18 Q. If you can't do it without looking at the
19 photographs, I will accept that. But, I am anxious to see
20 what you know.

21 MR. DUBUC: He indicated --

22 THE WITNESS: I can give you some crude
23 approximations, but you will have to understand that they will

1 be crude.

2 BY MR. OREN LEWIS:

3 Q You never undertook to try to analyze that; is
4 that correct?

5 A That is correct, because I don't feel that it is
6 significant.

7 Q I understand that, but if you would just give me
8 your best estimate, how long they are.

9 A If you look at the photographs, you are going to
10 discover that the left-hand gear, and this would be the
11 rear main gear on the aircraft, touched down first. There
12 will be wheel marks for a distance of some 10 or 15 feet.
13 And about the point in which those wheel marks begin to
14 play out, you will discover that there will be wheel marks
15 due to the right-hand rear gear.

16 Q The first was to the left; is that correct?

17 A That is correct.

18 Q Ten to 15 feet of field marks to the left gear,
19 and then the right gear touches down; is that right?

20 A If we understand now that by 15, that is a very
21 crude approximation.

22 Q All right.

23 A On the right-hand side, I would say that the

1 length of the wheel marks are probably less long. Again,
2 this would be clearly shown if you look at the photographs,
3 but the length of the marks would be somewhere, again, in
4 the vicinity of 10 to 15 feet.

5 Q On the right side?

6 A On the right side, that is correct.

7 Q All right. When you say right side, you are
8 speaking of the right side or starboard side of the aircraft?

9 A That is correct. Then returning to the left-hand
10 side, both of the rear main gears broke off in this first
11 touchdown, and the break occurred at a point -- well, it
12 occurred in the moveable part of the oleo strut and just
13 above, once referred to as a bogey. And if you look at
14 the photograph, you will find that as soon as the load was
15 removed from that left-hand moveable part of the oleo, it
16 extended and started making a mark in the soil, and the
17 depth of the mark is -- might be a foot deep.

18 Q Not deeper than that?

19 A Maybe two foot deep. Probably about a foot deep
20 would be my guess, looking at the --

21 Q Your best estimate.

22 A About a foot deep, and the length of this mark
23 will probably be of the order of maybe 20, 30, it could be

1 40 feet. That order of magnitude.

2 Q Twenty to 40 feet?

3 A Something like that, yes.

4 Q And this is the mark made by the left landing
5 gear after the wheels broke off?

6 A At least a portion of the left landing gear, that
7 is correct. In the inside of that, there will be a parallel
8 mark, and that will be roughly the same length, should be
9 about the same length. And that mark is most probably
10 made by the rear inboard wheel door, landing gear wheel
11 door. On the right-hand side of the airplane, there will
12 be a couple of -- I say a couple, now that could be four,
13 six, or two. Photographs will clearly show what the
14 situation is there, but these are a couple of indentations
15 in the soil and these are also probably made by the broken
16 right-hand gear.

17 Okay. I think I have answered your question.

18 Q All right. Let me make sure that I understand.

19 How many landing gear -- how many main landing gear does
20 this aircraft have?

21 A Four.

22 Q Four. And how are they arranged on the aircraft?

23 A They are in tandem pairs.

1 Q So there are two pairs -- excuse me, there is
2 one pair of two on each side?

3 A That is correct. Yes, sir.

4 Q And are they side by side or one behind each
5 other?

6 A They are tandem. One in front of the other.

7 Q All right. The reason I am asking you this,
8 sir, is somebody -- you clearly understand it, but somebody
9 without the background may not understand precisely what
10 that means, so that is why I am asking that question that
11 way.

12 A Okay.

13 Q So then the -- how many of the tandem gears on the
14 left side broke off?

15 A One.

16 Q So then there was one set of wheels left, right?

17 A That is correct.

18 Q And one set of -- excuse me. And one shaft with
19 no wheel?

20 A That is correct.

21 Q And which broke off, the front or the back on the
22 left side?

23 A The back.

1 Q The back. So, there were wheels on the front
2 and no wheels on the back shaft?

3 A That is correct.

4 Q That is with the left side. Now, how about
5 the right side, sir?

6 A The same situation.

7 Q So the front gear you say were left on?

8 A The two front main gears were left on.

9 Q On both those sides?

10 A On both sides.

11 Q And they were just shafts?

12 A No. No. The complete gear with all -- let's see.

13 There would be a two, three, four, five, six, a total of
14 12 wheels.

15 Q No, I am speaking of in the part of the landing
16 gear where the wheels broke off, there was just a shaft;
17 is that correct? There weren't wheels at that part?

18 A That is correct.

19 Q So --

20 A Apparently I didn't understand your question.

21 Q I understand that. I just want to be clear. Now,
22 the wheels were located under the wings or were they in the --
23 I am speaking of the main landing gear, sir, or were they in

1 the fuselage?

2 A They were in the fuselage. They attach
3 structurally to the fuselage structure.

4 Q All right, sir. Now, how long was the mark on
5 the -- I believe you said on the left side, and I may be
6 mistaken. There was a 10 or 15 foot wheel mark, and then
7 there was a shaft mark, if that is a fair way to put it,
8 which was 20 to 40 feet?

9 A That is on the left-hand side.

10 Q That is correct. Now, what is the shaft mark
11 on the right-hand side? You may have said, I just want to
12 make sure.

13 A There were just two or three nicks on the ground.

14 Q Just nicks on the ground. So there is no long
15 shaft mark; is that correct?

16 A That is true.

17 Q And they arrange from two to six; is that
18 correct, sir?

19 A That is the way I recall it, yes.

20 Q Over what distance?

21 A Well, it would be about the same distance as on
22 the left-hand side.

23 Q Twenty to 40 feet?

1 A. Yeah, somewhere in that range.

2 Q. Okay. Now, did the front wheels make marks?

3 A. No, sir. I find no evidence of that.

4 Q. Did any other portion of the airplane touch the
5 ground other than the wheels that you have described and/or
6 the shaft?

7 A. The landing gear.

8 Q. Yes, sir.

9 A. The left-hand landing gear door.

10 Q. The left-hand landing gear door. Anything else?

11 A. Well, are you talking about in that particular
12 location?

13 Q. Any place on the east bank.

14 A. Yes, I believe that there were some other pieces
15 of the aircraft which were shed on the west bank, at least
16 there is a possibility that that could be true.

17 Q. All right. What parts were shed on the east bank,
18 sir?

19 A. Well, they probably would be parts associated with
20 the landing gear doors or skin in that general vicinity of
21 the fuselage.

22 Q. Well, I would like you to tell me with as much
23 precision as you can what parts were found on the east bank.

1 A I have no knowledge of what specific parts were
2 found.

3 Q Do you know how many wheels were found on the
4 east bank?

5 A No, I don't know how many wheels were found. I
6 have seen quite a few of them, let's see, I think about
7 at least eight or ten, I would say, just looking at the
8 photographs.

9 Q Well, there are four main landing gear, I believe,
10 we have already established.

11 A Yes, sir.

12 Q Now, how many wheels does each one have?

13 A Each landing gear has six wheels.

14 Q So, there were 24 wheels in total in the main
15 landing gear; is that correct, sir?

16 A Yes, sir.

17 Q Plus whatever is in the nose?

18 A Yes.

19 Q And how many are there in the nose?

20 A There are four in the nose.

21 Q All right, sir. Now, so you don't know how many
22 wheels were found?

23 A I don't know how many, but I have already given

1 you a wrong answer, and I am counting here in my mind
2 wheels that I have seen in the photographs, and I have seen
3 more than ten.

4 Q So, you have seen --

5 A I wouldn't be surprised if all 24 of the --
6 correction. All 12 -- well, if I see more than 10, that
7 would be 12 in the rear gears, and I have seen four and
8 four and some more. So, I have seen -- well, at least 10,
9 I guess. That is about as close as I can be. But, I
10 started to say, I wouldn't be surprised if all 12 wheels
11 were on the east side of the river.

12 Q Well, did you undertake to find that out? That
13 is one of the things --

14 A I didn't. I know that all 12 broke off on the
15 east side of the river, and that is as far as I need to go.

16 Q How do you know that?

17 A Say again?

18 Q How do you know that?

19 A Well, I don't really care where the wheels went.

20 Q I know. How do you know that they all broke off
21 on the east side?

22 A Because they took the bogeys off.

23 Q And what is a bogey?

1 A. The bogey is the thing that the wheel is attached
2 to, and so when the bogey goes, the wheels go with it.

3 Q. And were all the bogeys found for the rear wheels
4 on the east bank?

5 A. Well, the left-hand bogey probably broke into
6 several parts, at least I think that it broke into several
7 parts. So, I can't tell you that it couldn't have been a
8 part on the west side of the river.

9 Q. I just want to know if you know or not.

10 A. Well, haven't I told you?

11 Q. No.

12 A. I haven't told you?

13 Q. Was there any --

14 A. Then the answer is I don't know, I guess.

15 Q. Well, the court reporter isn't going to be able
16 to guess, Mr. Turnbow, and I don't want to, either. She
17 writes down as accurately as she can, which is quite
18 accurately, everything that you or I say. And so, deductions
19 are, I guess, for later, but I just want to try to get the
20 data that you have and the analysis that you made.

21 A. Very good.

22 Q. Now, were there any other marks on the east bank
23 other than those you have described from the aircraft?

1 A. Yes, sir.

2 Q. What were they?

3 A. Well, there were marks made by various wheels
4 as they went forward from the initial touchdown site.

5 Q. Okay. And where are they located?

6 A. Out in front of this shaded area, it appears --
7 well, perhaps within the shaded area that appears in the
8 wreckage diagram.

9 MR. DURUC: Exhibit D9.

10 THE WITNESS: Exhibit D9?

11 MR. DUBUC: Yes.

12 THE WITNESS: I think I have answered your
13 question.

14 BY MR. OREN LEWIS:

15 Q. Well, I am trying to find as clearly as I can,
16 sir, what marks in the ground were on the east bank. Now,
17 you have described -- I don't know whether you have described
18 them all, but I want all of them.

19 A. No, I haven't described them all.

20 Q. Well, I may not have been clear, but I do want
21 them all.

22 A. All right. There were also two marks that were
23 made by the -- by the air flow into the two left-hand

1 engines of the aircraft, and then there is a -- there is
2 an area that extends generally within this shaded area
3 in Exhibit D9, and perhaps extended a little bit further
4 than that, in which these wheels are continuing to roll or
5 to move along the surface. There is probably also some
6 air blast from the aircraft that has disturbed the natural
7 straw and dust, and that sort of thing, which disappears.

8 Q What was the state of the field? Would you say
9 it was a rice field? That was on the east bank?

10 A Well, I am presuming that it would be a rice
11 field.

12 Q Was rice growing in the field at the time?

13 A Basically, I don't think so. No.

14 Q What was the condition of the ground?

15 A I believe it would have been dry or nearly dry
16 as compared to what you would expect to find in a currently
17 growing green rice field.

18 Q It was like a field in the United States?

19 A It would be like a wheat field in the United
20 States in the wintertime.

21 Q Okay. Now, on the left bank -- excuse me, on the
22 west bank, what is the dike made of?

23 A Say again? On the west bank?

1 Q Yes, sir. What was the dike constructed of?

2 A I believe it to be constructed of soil.

3 Q Was it compacted?

4 A I can't answer that -- well, let me ask you
5 this. What do you mean by "compacted"?

6 Q Well, I'd rather just ask you to tell me --

7 MR. DUBUC: Well, he is using your word. That is
8 a pretty valid question.

9 MR. OREN LEWIS: I understand that, but --

10 MR. DUBUC: I should have asked you that three
11 days ago.

12 MR. OREN LEWIS: I know you think this is amusing,
13 Mr. Dubuc, but I don't really think that it is.

14 MR. DUBUC: No, I don't think it is amusing. I
15 think it is a good question.

16 BY MR. OREN LEWIS:

17 Q Well, let me ask you this, sir. Soil comes in
18 varying states of compaction, does it not, depending upon
19 where it is, what has been done to it?

20 A Yes, sir, I would agree with that.

21 Q Now, that may not be an engineering term, and I
22 am only a lawyer, and if there is another word that makes
23 more sense, I will be glad to use it. I am just trying to

1 understand what you understood the construction of the dike
2 to be like.

3 MR. DUBUC: Can we go off the record?

4 MR. OREN LEWIS: Sure.

5 (Discussion off the record.)

6 (Brief recess.)

7 BY MR. OREN LEWIS:

8 Q Sir, what was the state of the soil in the dike
9 on the west bank of the Saigon River?

10 A Well, I can give you my best guesstimate as
11 to what it would have been.

12 Q Well, did you make any -- did you make any attempt
13 to come to any conclusion on what it was like? In other
14 words, did you --

15 A Well, I think the answer is yes, I have.

16 Q All right. What is that?

17 A At least as it affects this accident.

18 Q That is what I mean. Would you tell me what
19 you did?

20 A Well, I have talked with Mr. John Edwards and I
21 have looked at the photographs of the dike, and I believe it
22 to be just an ordinary dirt dike. You asked me if it was
23 compacted, and I am extremely doubtful that it was done with

1 sheet roller, that sort of thing. I have no scientific
2 reason for giving you that answer, I guess, but it would
3 be kind of doubtful that that was done. It undoubtedly
4 has been compacted by people walking up and down the dike,
5 because when dikes are built, and people walk on them, --

6 Q Well, I just want to know --

7 MR. DUBUC: Well, wait a minute.

8 MR. OREN LEWIS: I'm sorry. Did you finish?

9 THE WITNESS: Just an ordinary dirt dike along
10 a canal.

11 BY MR. OREN LEWIS:

12 Q Well, I am trying to get you -- if you feel that
13 it has any type of strength, I'd like you to tell me what
14 you think it has and if you made any attempt, did you make
15 any inquiry about the quality of the soil? What type of
16 soil it was or any of that kind of stuff? Did you make
17 any assumptions?

18 A I assumed that it is soil that, you know, would
19 grow crops and rice or --

20 Q Well, soil varies widely and its quality, does
21 it not, as far as its capacity to be compacted and how hard
22 it gets when it is compacted?

23 A Well, since there is a ditch adjacent to the field,

1 I would presume that the soil has been pulled out of that
2 ditch and piled up as a dike, as contrasted as, say, going
3 out here with a truck and hauling quarrel or calechi --
4 or what do you people use in this country? Oyster shell
5 or whatever. In other words, it was dirt that was a
6 characteristic of this field area that we're talking about.

7 Q Well, I just want to know, did you -- so, you
8 have made no assumptions as to --

9 MR. DUBUC: He has told you what he did. He just
10 gave you several assumptions from pictures.

11 MR. OREN LEWIS: Well, I don't believe that I
12 ever suggested that it was quarrel or oyster shell or
13 calechi.

14 MR. DUBUC: No. No. He says it is not that,
15 he says it is dirt. He just said that.

16 BY MR. OREN LEWIS:

17 Q Well, can you tell me, sir, do different types
18 of soil have different qualities as far as their capacity
19 to be compacted and their resistance to impact when
20 compacted?

21 A Yes, sir.

22 Q Did you make any attempt to get any understanding
23 of what those qualities might be in the case of this

1 particular dike?

2 A. Not beyond what I have told you.

3 Q. All right. What did Edward tell you?

4 A. He indicated that it was just a dirt dike.

5 Q. He didn't tell you what kind of dirt, how hard it
6 was, or anything like that?

7 A. No.

8 Q. Do you know how old it is?

9 A. No, I don't.

10 Q. All right, sir. Now, where did the airplane
11 first hit the ground, or any part of it, on the west bank?

12 A. You said any part of it, didn't you?

13 Q. Yes, sir.

14 A. Well, I believe that some part of the main gear
15 on the airplane may well have conducted -- compacted this
16 dike, the top of the dike. I say the top of the dike,
17 change that to read the dike.

18 Q. When you say some part of the main gear, which
19 part of the main gear?

20 A. Well, it would be the wheels of the main gear,
21 because those are the things that extend down the fenders,
22 and the fenders forward in that particular aircraft.

23 Q. So, we are talking about the front pair of landing

1 gear, the ones that you say still have wheels?

2 A Yes, sir. That is correct. I will also tell you
3 that there is some possibility that the nose gear also
4 contacted this dike.

5 Q All right, sir. And how do you see that, sir?

6 A How do I see that?

7 Q Yes. Well, how would one conclude that, or
8 what evidence is there?

9 A Well, I don't know whether -- I haven't come to
10 a final conclusion on that.

11 Q I understand.

12 A And in part because of these additional photo-
13 graphs that have shown up.

14 Q Well, there is some evidence, though, that the
15 front landing gear struck the dike; is that not correct,
16 sir, from the marks on the dike?

17 A From the marks on the dike?

18 Q Yes.

19 A The front landing gear contacted the dike?

20 Q Yes.

21 A You said crossed it. There is no doubt in my
22 mind that it went across it.

23 Q No. I am speaking of struck the dike. I mean the

1 front landing gear.

2 A Okay. I think we better start over on this one,

3 Mr. Lewis.

4 Q All right. I understood you to say --

5 MR. DUBUC: He is having trouble with front landing
6 gear, I think. Are you talking about front mains or nose
7 gear?

8 MR. OPEN LEWIS: I guess I am not being
9 precise and I apologize to you.

10 The front, you have told me, that the front main
11 landing gear you felt struck the dike, and I believe you
12 told me, and I may be mistaken, that there is some
13 possibility that the forward landing gear --

14 MR. DUBUC: Nose gear.

15 THE WITNESS: Nose gear.

16 BY MR. OPEN LEWIS:

17 Q Nose gear, if you prefer, struck the dike; is
18 that correct?

19 A Yes, sir. That is correct.

20 Q All right. And is that because of marks on the
21 dike, sir?

22 A In part, yes. That is correct.

23 Q Well, what else suggests that the nose gear struck

1 the dike? What other evidence in addition to the marks on
2 the dike suggests that the nose gear struck the dike?

3 A. Well, at the moment, I really can't think of
4 any other evidence.

5 Q. The only reason I ask the question, sir, is
6 because you said "in part" and I --

7 A. I understand, but what other evidence do I have
8 that the nose gear might or might not have struck the dike
9 other than --

10 Q. I thought you said the most recent photographs
11 that you saw.

12 A. Well, that is correct. These recent photographs
13 show the dike to a little bit better detail than we have
14 ever seen them before.

15 Q. Have you ever seen the movie?

16 A. I have seen the movie, yes, today for the first
17 time, but --

18 Q. Well --

19 A. Standby. The movie that I think you are referring
20 to I have seen today for the first time.

21 Q. Well, I am speaking of the one that I most
22 recently obtained a copy of, and there were, for your
23 information, two of them. One of them is a shorter one.

1 MR. DUEUC: That is the one he saw.

2 BY MR. OREN LEWIS:

3 Q The shorter one is one showing apparently an
4 attempt to fly over the crash scene directly; it is the
5 smaller one. Then there is a larger one, which has a number
6 of other scenes, apparently including that one scene in it.

7 A Well --

8 Q What did you see?

9 A Let me clear up one point, if I may.

10 Q Yes, sir.

11 A I told you previously that I think that I could
12 have seen some movies of this accident site.

13 Q Yes, sir.

14 A And it is possible that the movie that I saw may
15 have been one of these movies taken from a helicopter in
16 which they flew the flight path.

17 Q And so they looked the same?

18 A Well, I just don't remember that much detail
19 about --

20 Q I understand.

21 A -- what I looked at previously. So, I can't
22 tell you whether it looked the same or not.

23 Q Well, it is the same sort of movie; is that

1 correct, sir?

2 A. Yes. The sort of thing that I remember is yes,
3 it would have been the same kind of movie.

4 Q. Okay. So, it was from the movies and the most
5 recent pictures that you saw which were the ones that you
6 saw either last night or this morning; is that correct,
7 sir?

8 A. That is correct. This morning.

9 Q. That suggest evidence that the nose gear may
10 have struck the dike; is that correct?

11 A. Well, it really doesn't suggest evidence that the
12 nose gear struck the dike. It appears to be some
13 disturbance in the top six inches of the dike, I will
14 say, that would suggest that maybe something struck the
15 dike.

16 Q. All right, sir.

17 A. And in view of the fact that this wreckage
18 diagram, they bring the impact -- when I say they bring
19 the impact area, let me see what it says. It says debris
20 area. That is all it says. Debris area right up to the
21 dike, and that would suggest to me that maybe somebody
22 thought that the dike was involved.

23 Q. All right. What was the terrain on the west bank?

1 Was it like a wheat field in the winter?

2 A No, sir. It would have been more like a rice
3 field with water in the field, and that might not be true
4 of all areas of that field over there. See, this airplane
5 went something like a third of a mile or better, but
6 generally speaking, at the time of the accident, I believe
7 there would have been a great deal of water in that field.

8 Q All right. All the way up to the dike?

9 A Yes, sir.

10 Q Including all that shaded area? That is what's
11 called the debris area; is that correct?

12 A Yes, sir, generally --

13 MR. DUBUC: Are we referring to Exhibit D9 now?

14 MR. OREN LEWIS: Yes, sir. And I am speaking of
15 the west bank now.

16 So the terrain, for all practical purposes, was
17 the same through the debris areas; is that your understand-
18 ing?

19 THE WITNESS: More or less. There was different
20 amounts of vegetation in some fields than in others.

21 BY MR. OREN LEWIS:

22 Q Was there rice under cultivation?

23 A I am not sure about that. I am not an expert on

1 rice farming.

2 Q. Well, was there any kind of a crop that looked
3 like grain growing in a field?

4 A. Well, I have seen some of the photographs, and
5 it would suggest to me that yes, there was something growing
6 there, but I am not sure. I am not sure when those
7 photographs were taken.

8 Q. Well, you used the expression rice field
9 earlier. I was just curious --

10 A. Well, it wasn't corn or maize or cotton, at least

11 Q. Well, were they rice fields or not, sir, in your
12 judgment?

13 A. Say again?

14 Q. Did you conclude that those were rice fields or
15 not?

16 A. I considered that they were rice fields. Sure.

17 Q. All right, sir. Now, I would like you to
18 describe your understanding of the -- is gouge mark a fair
19 way to put what the type of mark that the wreckage makes
20 when it travels across the ground?

21 A. Yes, sir. That is descriptive.

22 Q. If there is another word, I am willing to use
23 that. I just want to make sure we are on the same wave

1 length, sir.

2 A. That is quite a description.

3 Q. All right. Now, I'd like you to describe the
4 gouge marks and you notice there is a diagram -- this is
5 the Air Force diagram; is that correct, sir?

6 MR. DUBUC: It is Exhibit D9.

7 THE WITNESS: Yes.

8 BY MR. OREN LEWIS:

9 Q. Exhibit D9. And you see where it says impact?

10 A. Yes, sir.

11 Q. And it points towards the dike; is that correct,
12 sir?

13 A. Yes, sir. That is correct.

14 Q. And then --

15 A. Although observe that the arrow is going to the
16 west side of the dike.

17 Q. Well, it looks to me like it's pointing to the
18 dike.

19 A. Well, it curves up and points directly towards
20 the west side of the dike.

21 Q. All right. You disagree with that?

22 MR. DUBUC: Well, he has stated what it is.

23 MR. OREN LEWIS: Well, I just want to know --

1 MR. DURUC: Does he disagree with what?

2 MR. OREN LEWIS: That the second impact was pointed
3 out by this arrow.

4 THE WITNESS: I don't disagree with it, no.

5 BY MR. OREN LEWIS:

6 Q All right. Now, from the point there on the dike,
7 how far was the -- did the gouge mark go?

8 A Well, it depends.

9 Q From the dike.

10 A Well, it depends upon, of course, what piece of
11 the aircraft you are talking about.

12 Q Well, going from east to west on the west bank,
13 was there more than one set of gouge marks?

14 A Yes, sir.

15 Q All right. How many gouge marks were there?

16 A I don't recall by sets, and I assume you mean
17 parallel rows?

18 Q Yes, sir.

19 A Well, that would be rather difficult to answer
20 that question.

21 Q Well, would you do the best that you can?

22 A Well, we can start with one, and there is one
23 path at least within which there appears to be more than one

1 individual mark.

2 Q All right. How far does that path extend?

3 MR. DUBUC: Were you finished?

4 THE WITNESS: (Nodding head, indicating in the
5 affirmative.)

6 MR. DUBUC: Okay.

7 BY MR. OREN LEWIS:

8 Q How far does that one path extend from the dike
9 going west?

10 A Well, if you go with the troop compartment, then
11 the distance is something like around 650 yards, or about --
12 I get 1,950 feet, just scaling the diagram. Other people
13 have gotten, I think, a little higher.

14 Q All right. Is there an unbroken path of gouge
15 marks from the dike to where the troop compartment ended
16 up?

17 A Well, I don't think the path is unbroken. It
18 is somewhat variable, of course.

19 Q Well, how much are there tracks, gouge marks,
20 that lead from the initial impact point to where the troop
21 compartment ended up, unbroken?

22 MR. DUBUC: Unbroken?

23 MR. OREN LEWIS: Yes.

1 THE WITNESS: Well, I think any individual
2 gouge marks would necessarily have to be broken, because of
3 the way the aircraft separated.

BY MR. OPEN LEWIS:

Q All right. Well, how did the aircraft separate?

A. Well, into several major components, and then, of course, to a relatively large number of smaller components.

Q. All right. Well, where did the airplane separate?

A Well, it separated after the cockpit section.

11 Q Well, no, I am speaking -- I am sorry. Would
12 you show me --

13 MR. DUBUC: In other words, you're asking him
14 where it separated in terms of a point from the dike? Is
15 that what you're asking him?

MR. OREN LEWIS: Where on the ground.

MR. DURUG: Where on the ground.

THE WITNESS: Where on the ground. Yes, sir.

MR. DUBUC: He has got it.

BY MR. OPEN LEWIS:

Q. Well, would you take that diagram that you have
in front of you, sir, and put an "X" at the point where the
plane broke apart?

1 MR. DUEUC: Well, this is his. If you are
2 going to mark this, this is his. Do you want to mark a
3 copy of the diagram rather than -- this is on his report.

4 MR. OREN LEWIS: We can use this one.

5 THE WITNESS: First, that cannot be done with one
6 X mark.

7 BY MR. OREN LEWIS:

8 Q. Here, let me pass this to you, sir, and --

9 A. I can show you where the separation started.

10 Q. All right. Put an X-1 where the separation
11 started.

12 A. Okay. I have done so.

13 Q. May I look over your shoulder just so that I
14 can coordinate with you, sir?

15 A. Yes, sir.

16 Q. And you have put an X at the dike; is that
17 correct?

18 A. That is correct.

19 Q. Would you put a 1 --

20 A. I put an x sub-one.

21 Q. X-1, okay. And then what happened after that?

22 A. I am not sure that I understand the specific
23 question.

1 Q Well, we were talking about gouge marks, and you --

2 A Yes, sir.

3 Q -- said that the plane began to separate or
4 break apart, I guess, is what you mean.

5 MR. DUBUC: No, that is not it.

6 THE WITNESS: No, that is not quite descriptive.

7 BY MR. OREN LEWIS:

8 Q Well, at what point on this diagram, going from
9 east to west, did the tail break off?

10 A I can only give you a range of values.

11 Q What is the range?

12 A Well, the range of values, of course, are between
13 the dike and the point at which the tail came to rest.

14 Q But you can't come any closer than that; is that
15 correct?

16 A Well, I can tell you that it wasn't at the dike,
17 I think. Extremely unlikely. And that it wasn't at the
18 point in which the tail came to rest.

19 Q But you cannot do any better than that; is that
20 correct.

21 MR. DUBUC: You are asking for his best estimate?

22 MR. OREN LEWIS: I am asking if he has made a
23 calculation of where that happened.

1 THE WITNESS: I have not made any further
2 estimate than that.

3 BY MR. OREN LEWIS:

4 Q All right. At what point, going from east to west,
5 did the flight deck break off a hull?

6 A Well, if this diagram is correct --

7 Q I am not representing that it is. I am only
8 representing that it is the Air Force's diagram.

9 A I understand, but we have to start with something.
10 If this diagram is correct --

11 Q Have you assumed that it was correct?

12 A I have assumed that it is generally correct, but
13 it may not be correct in all details.

14 Q Well, let's correct it, then, by your judgment
15 first. And where is the diagram incorrect, in your opinion?

16 A I don't know that.

17 Q So, you didn't make any attempt to verify and
18 see whether this diagram was correct; is that right, sir?

19 A I don't know any way that I could verify that.

20 Q Well, I am not --

21 A No.

22 Q -- I am just saying that you never took the
23 photographs or made any calculations or tried to measure the

1 location of the parts or gouge marks or anything like that?

2 A No, sir. I have not done that.

3 Q All right.

4 A Generally that these records of distribution
5 patterns are generally pretty good, at least -- as done by
6 the Air Force, they are generally pretty accurate with
7 regard to those components that cannot be easily picked up
8 and moved by someone.

9 Q Well --

10 A I haven't answered your question, I guess.

11 Q No, you really haven't. Would you tell me -- I
12 believe you told me, sir, that you felt it was generally
13 correct, but it may not be correct in all details; and I
14 was just asking you what details might not be correct.

15 A Well, I am just assuming that, you know, if I
16 say that it is correct, then you are going to call me on
17 the carpet on the witness stand and --

18 Q If it isn't --

19 A -- describe that that means every last detail,
20 and I would be -- I am not a betting man, but if I were,
21 I would maybe bet that --

22 Q That it isn't correct?

23 A Someone could find a little detail here that might

1 not be quite right.

2 Q Well, are there major details in which it is not
3 correct, or is it correct in all material details?

4 A Is it correct?

5 Q In all material details.

6 A I have assumed that --

7 Q That it is?

8 A In -- the major part is correct, yes, sir.

9 Q Major isn't a very scientific word, and we
10 lawyers may use it, but you engineers don't ordinarily,

11 and I am trying to say when you say "major", is it --

12 A Well, yes, I find a discrepancy here, I think.

13 Q All right. Where is that?

14 A This diagram shows -- the way I would interpret
15 it, three broken trees. That is what the arrow says --

16 Q All right.

17 A -- and I think the photographs show four. Now,
18 I could be in error about that, but if you want to find out,
19 we can look at the photographs right quick and straighten
20 that out.

21 Q All right. So, there are four broken trees?

22 A Yes.

23 Q Anything else?

1 A I don't think I have observed anything else.

2 Q And are the four broken trees in a row?

3 A Yes, sir. They are in a row.

4 Q And there are four and it is in unbroken sequence?

5 In other words, there are four broken trees in a row?

6 A I believe that that is correct, yes, sir. That
7 is my recollection.

8 Q All right. And then any other discrepancies
9 that you have observed?

10 A As I have stated before --

11 Q In Exhibit D9?

12 A -- I have not observed any, and I have not checked
13 for any.

14 Q All right. Do you see the flight deck, for
15 example, the tracks leading up to it are shown in an arc?

16 A Yes, sir.

17 Q What is that arc?

18 A What is that arc?

19 Q Yes.

20 A It is just the path followed by the flight deck.

21 Q Well, did you measure the degree of arc?

22 A No, sir, I have not measured the degree of arc.

23 Q Now, when the airplane struck the dike, would you

1 draw an arrow for me in the river side of the dike as to
2 the direction of flight of the aircraft?

3 MR. DUBUC: The question, I object to the form.
4 It is suggesting the airplane rather than the wheels. You
5 mean the wheels struck the dike? That is what he's
6 testified to.

7 MR. OREN LEWIS: Mr. Dubuc, I have always thought
8 that the wheels were a necessary component of airplanes.

9 MR. DUBUC: All right.

10 MR. OREN LEWIS: Particularly this one.

11 MR. DUBUC: Why don't I go ahead and assume later
12 that it was the airplane and not the wheels? You mean any
13 part of the airplane?

14 MR. OREN LEWIS: Yes, but I am interested in --
15 the question is on the flight path, the direction of travel
16 of the aircraft, and just prior to the time that it impacted
17 with the dike or any part of it impacted with the dike.

18 THE WITNESS: I am going to ask you to ask that
19 question again.

20 BY MR. OREN LEWIS:

21 Q I would be happy to.

22 A You are talking about the whole aircraft, at
23 least --

1 Q Well, if I took a piece of paper, sir, and I
2 drew a little airplane on it --

3 A Yes, sir.

4 Q -- and I used my heavier line for the direction
5 of travel, I am going to put a little arrow in the front of
6 the airplane; can you show me, sir, which direction the
7 airplane was going when it struck the dike or any part of it
8 struck the dike?

9 A Yes, sir.

10 Q All right. Would you --

11 A Do you want me to draw this on the diagram?

12 A Yes, I would.

13 All right, sir. Now, would you draw a dotted
14 line leading up to the point that any part of the aircraft
15 struck the dike?

16 A All right. I have done that.

17 Q Now, have you done that as precisely as you can?

18 A There could be nothing considered to be precise
19 about what I have done here.

20 Q All right. I am just trying to get the line of
21 travel just as good as I can.

22 A This is generally from east to west.

23 Q All right. Assuming that the arrow here is due

north, was the airplane flying due west?

A Very nearly.

Q Well, what degree west was it going?

A. What degree from due west?

Q Yes.

A. Do you mean --

Q Well, I mean it was heading west and if north is zero and south is 180 degrees --

MR. DUBUC: He is drawing it based on the arrow being north.

THE WITNESS: 270 degrees, and that could be
275 degrees or --

BY MR. OREN LEWIS:

Q From 270 to 275?

A 270 plus or minus 10 degrees I would say would probably do it.

Q. That is 20 degrees. You can't tell me within the 20: is that right, sir?

A Well --

0 You can't make it finer than 20 degrees?

A. 270 plus or minus one, but I don't know how accurate that is.

Q Well, I want you to be as accurate as you can, sir.

1 MR. DUBUC: Well, Mr. Lewis, you are asking him
2 to draw it based upon an arrow on the diagram, and that is
3 what he has given you the estimate on. He is not able to
4 give you the exact degrees unless you want to have a
5 compass at the place and check whether north is north. But
6 he has given you a reference as you asked him to from the
7 indicated direction of north.

8 MR. OREN LEWIS: I understand that, and I am
9 assuming that north is as precisely indicated on this chart
10 here, because the grid lines are oriented --

11 MR. DUBUC: Right.

12 MR. OREN LEWIS: -- north and south, east and
13 west; is that correct, sir?

14 THE WITNESS: The grid lines are oriented -- that
15 is what this diagram would indicate, yes.

16 BY MR. OREN LEWIS:

17 Q So I want you to assume then that the grid lines
18 are accurate, that north is where it is and east is in the
19 direction to the right, and west is the direction to the
20 left. And so assuming that that is correct, then, I'd
21 like you to tell me as closely as you can, from your
22 understanding of the data that you have reviewed, the
23 direction of the airplane just immediately prior to its

touching the dike.

MR. DUBUC: As indicated on this diagram?

BY MR. OREN LEWIS:

Q Yes, sir. Or your analysis, if you think it is wrong or anything like that, you can correct that, too. I am just trying to get the direction of travel.

MR. DUBUC: You have asked him twice, and he has answered it, and he has also drawn a line.

MR. OREN LEWIS: He has a 20 degree spread --

MR. DUBUC: That's right.

MR. OREN LEWIS: -- and I am just asking him if he can close it any. If he can't, I understand that. I am not going to argue with the witness.

THE WITNESS: Well, I have not done any analysis on this, other than what we have done here in a couple of minutes today. And you know, it is ridiculous to think that I could be more than maybe plus or minus ten degrees.

BY MR. OREN LEWIS:

Q. All right. Then that hasn't been part of your calculations, sir?

A. No, sir.

Q All right. You just have to excuse me. I
didn't, you know, I thought that you would try to calculate

1 how the parts ended up by the direction of travel. And
2 that didn't have anything to do with it?

3 A No, sir. It does not.

4 Q All right. Now, how long is the gouge mark or
5 path of wreckage leading from the dike in an unbroken
6 sequence?

7 A In an unbroken?

8 Q Yes, sir.

9 MR. DUBUC: You have asked him that before. he
10 said there isn't one, there are several marks.

11 MR. OREN LEWIS: I thought he said there was a
12 path made up of several marks.

13 MR. DUBUC: He said there were several paths and
14 he gave you an example of one. Now, you have asked him and
15 he's answered it.

16 MR. OREN LEWIS: Well, I misunderstood the witness
17 and I am sorry, Doctor, but are there several paths leading
18 from the dike?

19 THE WITNESS: Well, there is one, of course,
20 general major path.

21 BY MR. OREN LEWIS:

22 Q That is what I thought you said.

23 A And within that path, there are numerous marks.

1 If you try to follow one mark in an aircraft accident --
2 generally, this is going to run out, but something will
3 pick up over here and continue for a while, and something
4 else will pick up and continue for a while.

5 Q I understand.

6 A So, I really don't understand quite what you are
7 asking me. And --

8 Q I just want to know --

9 A -- I don't think it is important.

10 Q The path that you have through here, on this
11 chart, D9, which is Defendant Lockheed's exhibit --

12 MR. DUBUC: That he has.

13 MR. OREN LEWIS: Well, he has attached it to his
14 report.

15 MR. DUBUC: He didn't refer to the chart.

16 MR. OREN LEWIS: No, we know the Air Force did it.

17 MR. DUBUC: Okay.

18 MR. OREN LEWIS: But you did attach it to his
19 report, and I have assumed that he has relied on it. We
20 will never finish the deposition at that rate.

21 I just want you to tell me, sir, do you see the
22 line that goes from the dike out away from the dike?

23 THE WITNESS: Yes, sir. I see that.

1 BY MR. OREN LEWIS:

2 Q. And you see there is a break past that?

3 A. Yes, sir. I do.

4 Q. All right. I want you to tell me, if you can,
5 how long that path is as shown here?

6 A. All right. I am going from the point that I have
7 marked X-1 --

8 Q. Yes, sir.

9 A. -- out, roughly 273 degrees to the end of a mark
10 that appears in the diagram, which may or may not be a "path"
11 but it ends about midway between 1225 and 1400 yards --

12 Q. Have you --

13 MR. DUBUC: Wait a minute, he is not finished.

14 MR. OREN LEWIS: I understand he is going to
15 calculate the measurement.

16 You didn't do that before; is that right?

17 THE WITNESS: No, sir. Do you want a number?

18 BY MR. OREN LEWIS:

19 Q. Yes.

20 A. All right. And it goes a little further than
21 midway, and I would say it goes about 55 percent of midway.

22 Do you want this in yards, feet, miles?

23 Q. Feet. Feet.

1 A. Well, I came up -- I come up with 663 and
2 three-quarters feet.

3 Q. All right. Would you write 663 feet on the diagram
4 that you have in front of you to indicate the area and also
5 write the 273 degrees?

6 Now, would you write an X-2 at the end of that
7 line there? In other words, the western end of it?

8 A. Well, I've got the X-2 and you asked me to do
9 something else?

10 Q. Put the degrees --

11 A. 200 and -- what did I say?

12 Q. 273.

13 A. All right. I have done that.

14 Q. All right. And you put the 663 feet, right?

15 MR. DUBUC: And three-quarters.

16 THE WITNESS: And three-quarters.

17 BY MR. OREN LEWIS:

18 Q. All right. Now, from the point X-2, sir, -- let
19 me make sure we are speaking of the same thing. Would you
20 put an arrow or something? I just want to be clear.

21 All right. From point X-2 to the troop
22 compartment, is there any gap in the gouges?

23 A. Do you mean in the diagram?

1 Q Or on the ground?

2 A Or on the ground.

3 Q On the ground.

4 A In the diagram, there would be a gap.

5 Q And how big is the gap on the diagram?

6 MR. DUBUC: Wait a minute, He is not finished.

7 THE WITNESS: On the ground, there will be no
8 gap.

9 BY MR. OREN LEWIS:

10 Q All right. On the diagram, how much is the gap
11 that is shown on the diagram? In other words, how many
12 feet?

13 A I get 236 and a quarter feet.

14 Q 236 -- pardon, sir?

15 A And a quarter feet.

16 Q All right. And would you show -- put an X-3
17 at the beginning of the mark shown that leads to the troop
18 compartment, would you do that?

19 A Okay. Well, I am not being terribly accurate
20 here. It is going to be really a little less than that
21 number that I have given you, so I will correct it.

22 Q What is the distance?

23 A Standby. (Pause) It is about 233 feet.

1 Q All right. And would you write on there showing
2 the gap shown here of 233 feet?

3 MR. DUBUC: This is the gap based on the marks
4 on D9.

5 BY MR. OREN LEWIS:

6 Q Yes, sir, and then an X-3 at the point that they
7 show that.

8 A Standby. I think I have made an error here.

9 (Pause) I think I have made an error. It is 210 feet.

10 Q All right. You have an X-2 to X-3. I want an
11 X-3.

12 A You want an X-3 down here?

13 Q No. Let's keep them all on the same side.

14 A All right.

15 Q And just draw an arrow to the point that that
16 goes to.

17 A Okay. Go ahead.

18 Q I'm sorry, sir?

19 A I said go ahead.

20 Q All right. Now, what is the direction, compass
21 direction, true direction, from X-2 to X-3?

22 A Well, there is a compass direction from X-2 to
23 X-3.

1 Q. Yes.

2 A. Just between these two points, that is all you
3 want?

4 Q. Yes, sir.

5 MR. DUBUC: As shown on D9?

6 MR. OREN LEWIS: As shown on D9.

7 MR. DUBUC: Well, you realize that he doesn't have
8 a compass on his, so I think I will object to having him
9 try to estimate without a compass.

10 BY MR. OREN LEWIS:

11 Q. Can you do that?

12 A. Well, I can estimate. It will be, you know, an
13 estimate, but --

14 MR. DUBUC: I am going to object to having him do
15 this without a compass.

16 MR. OREN LEWIS: He said he can do it.

17 MR. DUBUC: Without a compass?

18 THE WITNESS: Well, as long as you understand
19 that it is without a compass.

20 MR. DUBUC: I want to confer with him.

21 MR. OREN LEWIS: Let the record show that counsel
22 is conferring with the witness.

23 MR. DUBUC: I'm conferring with him as to whether

1 he can do it or not.

2 All right. If you can do it. Recognize that
3 it is an estimate.

4 MR. OREN LEWIS: I understand that he has no
5 compass.

6 Did you do the estimate of the --

7 MR. DUBUC: He is still doing it.

8 THE WITNESS: Okay. And you want me to write
9 that down here?

10 BY MR. OREN LEWIS:

11 Q Yes, if you would.

12 Q Do you want me to draw that line in here?

13 Q No. No, just leave that, because the apparent
14 gap may be obscured here, and I don't want to do that. If
15 you can indicate that without -- or just write on the side
16 you know, from X to X is so many degrees.

17 MR. DUBUC: He has got it in the corner.

18 MR. OREN LEWIS: That is fine.

19 So that is 2.96.56 degrees true; is that your
20 estimate?

21 THE WITNESS: That's correct.

22 BY MR. OREN LEWIS:

23 Q All right. Now, what is the arc in the -- well,

1 would you put an X-4 at the eastern end of the troop
2 compartment as shown there?

3 MR. DUBUC: On D9?

4 MR. OREN LEWIS: Yes, sir. On D9.

5 THE WITNESS: Yes, sir.

6 BY MR. OREN LEWIS:

7 Q Now, X-3 and X-4 is shown as an arc on this
8 diagram; is that correct?

9 A At least there is an arc down between these two
10 points, yes, sir.

11 Q All right. Did you measure that arc?

12 A By measuring the arc, do you mean --

13 Q Showing the degree of arc?

14 A Well, you will have to tell me what you mean by
15 that. Do you mean the term the radius curvature of the arc?

16 Q The radius, yes.

17 A And define the angle?

18 Q Yes, sir.

19 A No, sir, I did not.

20 Q Now, would you describe the wreckage of the troop
21 compartment after it came to a rest?

22 A Yes, sir.

23 Q Would you start with the front?

1 A. Front of the troop compartment?

2 Q. Yes, the forward end, exterior. What parts of
3 the structural members, if any, of the aircraft were attached
4 to the remains of the troop compartment?

5 A. Well, there is a truss like structure at the forward
6 end of this piece of the airplane, which has been referred
7 to as the troop compartment. That truss, I don't think, is
8 in the troop compartment properly.

9 Q. Well, I am not suggesting that it is. But just
10 so we can have common nomenclature to the Exhibit D9, has
11 a structure identified as troop compartment. Do you see
12 that, sir?

13 A. Yes, sir.

14 MR. DUBUC: That is what he is telling you.

15 BY MR. OREN LEWIS:

16 Q. I understand that. And so that piece of the airplane --

17 MR. DUBUC: That is what he is describing.

18 THE WITNESS: That is what I am talking about.

19 BY MR. OREN LEWIS:

20 Q. All right. Would you describe the truss that was
21 attached to that portion of the airplane?

22 A. Yes, sir. It is a typical open truss.

23 Q. How many members does it have?

1 A. I wouldn't have the faintest idea without
2 looking at the photographs.

3 Q. What was the function of that truss?

4 A. I am not sure.

5 Q. And when you say truss, you are speaking of
6 something that looks like a series of --

7 A. Bridge truss.

8 Q. Like a bridge truss, sir?

9 A. Yes, sir.

10 Q. And was that on the same level as the troop
11 compartment? I mean, was it on the same level as the
12 passenger seats in the troop compartment?

13 A. Well, I can't answer that. If you are talking
14 about, you know, plus or minus six, eight, twelve inches,
15 and that sort of thing.

16 Q. Yes.

17 A. Generally, it is on the same level. Generally,
18 it is on the same level.

19 Q. All right. I am speaking of generally, sir.

20 Now, were any of those truss members, and I am
21 speaking of the individual beams, if that is a reasonable
22 word to use, deformed?

23 A. I don't know.

1 Q Did you undertake to find out?

2 A I have looked at the photographs and I didn't see
3 any apparent deformation, but I didn't look to see whether
4 there were some that were deformed or not deformed. Just a
5 casual observation.

6 Q All right. That wasn't part of your study, then;
7 is that correct?

8 A That is correct.

9 Q Did you see that photograph before you wrote
10 your report?

11 A I don't think so.

12 Q Well, describe the photographs that you had
13 available to you of the troop compartment at the time you did
14 your analysis and wrote your report.

15 MR. DUBUC: We have already covered that. The series
16 that he told you about.

17 MR. OREN LEWIS: I want him to tell me what
18 pictures --

19 MR. DUBUC: Describe pictures?

20 MR. OREN LEWIS: Yes, what he saw of the troop
21 compartment. That piece of the airplane.

22 Did it include any views of the truss section that
23 you described?

1 THE WITNESS: I don't recall whether it did or
2 not.

3 BY MR. OREN LEWIS:

4 Q What hold the wings to the hull?

5 A I don't know.

6 Q Is there some kind of a structural member?

7 MR. DUBUC: He said he doesn't know. What is
8 the next question? You have asked him and he has answered.

9 BY MR. OREN LEWIS:

10 Q You have no idea of whether there was any kind
11 of a structural member holding the wings?

12 A Oh, yes. Yes, I have an idea about that.

13 Q I feel sure you do, and Mr. Dubuc says you don't.

14 MR. DUBUC: Well, you asked him specifically
15 what one does, and you said does any, and he says he hasn't
16 an idea about any, but he does remember a specific one. I
17 think that is what he is saying, but go ahead. Do you know
18 the question? Do you understand the question?

19 THE WITNESS: No, I will have the question again,
20 if I may.

21 BY MR. OREN LEWIS:

22 Q All right, sir. I understand that --

23 MR. DUBUC: Let's have the question.

1 MR. OREN LEWIS: Mr. Dubuc, allow me to -- he
2 wants an explanation.

3 MR. DUBUC: No, he just wants the question, not
4 an explanation. What is the question?

5 THE WITNESS: What is the question?

6 BY MR. OREN LEWIS:

7 Q All right. Is there any kind of a structural
8 member shown in the photographs that you have seen which has
9 as its primary function the attachments of either the
10 wing to the airplane or that are part of the wing structure?

11 A I don't know.

12 Q Do you know whether the wings broke off at any
13 time from the hull of this aircraft?

14 A At least the wing and the spar, a portion of the
15 fuselage immediately above and below, and the wing
16 separated at some time.

17 Q Do you know at what time it separated?

18 A No, sir. I don't.

19 Q And you wouldn't know in what point of travel
20 between X-1 and X-4 the wing separated?

21 A As to a specific point?

22 Q Yes, sir.

23 A No, sir, I don't.

1 MR. OREN LEWIS: Could we take a two-minute
2 break?

3 (Brief recess.)

4 BY MR. OREN LEWIS:

5 Q Sir, at the time the wings separated from the
6 hull, how many inches were still in place?

7 A I have not looked at that. I don't know the
8 answer to that.

9 Q Well, where, at what point, between X-1 and
10 points west, going from X-1 west, did the first engine
11 separate from the wing?

12 A I have not looked at that detail.

13 Q How strong is the connection between the engine
14 and the wing? In other words --

15 MR. DUBUC: You mean what the strength of the
16 material is?

17 MR. OREN LEWIS: Yes. In other words, what kind
18 of force does it take to tear the engine off of the wing?

19 THE WITNESS: About the same force it would
20 take to tear the engine out of a Cessna two-place 150. I
21 could be wrong about that. I don't have an answer to that.

22 BY MR. OREN LEWIS:

23 Q How much force does it take to tear the engine out

1 of a Cessna two-place 150?

2 A I don't have an answer to that pretty accurately.

3 You know, it is a six or seven G airplane at most, and I
4 am just anticipating that this C5A is at least a six G
5 airplane.

6 Q All right. Was that one of the assumptions that
7 you made in your preparing your report, sir?

8 A No, sir. I doesn't have anything to do with my
9 report at all.

10 Q Well, do you know how many Gs the airplane would
11 take before it would be expected to break up structurally?

12 MR. DUBUC: I object. He says it's got nothing
13 to do with his report, so what is the relevance of it,
14 Mr. Lewis?

15 MR. OREN LEWIS: If you will forgive me, I don't
16 think I have to have everything relevant. It only needs
17 to lead to relevant evidence, and I don't think I have to
18 explain, Mr. Dubuc.

19 MR. DUBUC: Oh, yes. Yes, if I object to the
20 form of the question and if I call for relevance or anything
21 leading to relevant information. He has already said he
22 didn't use the figure or the concept in reaching his figures.
23 It doesn't have any relevance and he said that. So, all

1 this does is prolong the deposition. That is the point,
2 and we know we have -- I have already told you, we have
3 a 6:15 airplane, and certainly Dr. Turnbow wants to make
4 that. And so we will go on until at least 5:15 or whatever.

5 MR. OREN LEWIS: I am going to suspend at 5:15
6 so that the gentleman can catch his airplane.

7 MR. DUEUC: Well, no, I am not willing to bring
8 him back, because you spent the entire -- almost three
9 hours now on many things that doesn't have anything to do
10 with his field, and that is what he is here for.

11 MR. OREN LEWIS: Mr. Dubuc --

12 MR. DUBUC: This is not overall discovery, it
13 is pretrial examination of an expert. This is not general
14 pretrial discovery.

15 MR. OREN LEWIS: Mr. Dubuc, I think I have a
16 right to find out what he considered and what he didn't
17 and --

18 MR. DUBUC: Well, if you would --

19 MR. OREN LEWIS: Let me finish, Mr. Dubuc, please.

20 MR. DUBUC: That would shorten it.

21 MR. OREN LEWIS: You won't let me finish? Now,
22 you just talk on and let me know when you are finished,
23 and then I will start.

1 MR. DUBUC: Well, it certainly would shorten it
2 if you want to ask him what he has considered and what he
3 didn't consider. As you know, the rule on expert witnesses
4 is not quite the same as Rule 30 and Rule 26. It isn't
5 general discovery. It is defined and restricted to certain
6 things as to what his opinion is and what he based his
7 opinion on and what factors he considered, and the reasons
8 for it. It is not general discovery.

9 MR. OREN LEWIS: Just tell me when you are
10 finished.

11 MR. DUBUC: I am finished.

12 MR. OREN LEWIS: Mr. Dubuc, the gentleman said
13 that he assumed that this was a six G airplane.

14 MR. DUBUC: And he also stated that it had nothing
15 to do with his opinion. He is assuming for the purpose of
16 your question, but not for his opinion. He has told you
17 that already.

18 MR. OREN LEWIS: Mr. Dubuc, you and I can debate
19 all the way to 5:15 and if you want to use the time that
20 way --

21 MR. DUBUC: My statement on the record is saying
22 what is your next question, Mr. Lewis?

1 BY MR. OREN LEWIS:

2 Q My question is, sir, how do you come to the
3 conclusion that this is a six G airplane? Did anyone tell
4 you that?

5 A No. No one has told me that.

6 Q But that is your judgment; is that correct?

7 A I anticipate that this airplane would generally
8 meet F.A.A. requirements for transport type aircraft, and
9 perhaps a little bit more so that possibly the airplane
10 might be as strong as six Gs.

11 Q But as an engineer, you would expect the airplane
12 to be able to take six Gs before it began to destruct?

13 MR. DUBUC: I object. He has just told you he
14 doesn't know that. You are directed not to answer that
15 question.

16 What is the next question?

17 BY MR. OREN LEWIS:

18 Q All right. How deep are the gouge marks from X-3
19 to X-4?

20 MR. DUBUC: The gouge marks of the airplane?

21 MR. OREN LEWIS: Yes. That is all there is
22 between X-3 and X-4, I believe.

23 THE WITNESS: I don't have a definite measurement

1 for you. I am sure that they are probably variable.

2 BY MR. OPEN LEWIS:

3 Q How wide are the gouge marks between X-3 and X-4?

4 A It depends on which gouge marks you are talking
5 about, of course.

6 Q Well, I am speaking of the gouge marks that I
7 understood -- well, maybe I am making an unfair assumption.

8 Were there gouge marks between X-3 and X-4 on
9 the ground?

10 A That is what this shaded pattern would indicate.

11 Q The cross-marked area, sir?

12 A Cross X mark labelled debris area in the ledger.

13 Q Now, are there tracks that lead up from X-3 to
14 the troop compartment?

15 A Yes, sir.

16 Q Now, how many tracks are there?

17 A On this diagram?

18 Q On the ground.

19 A There is probably an infinite number on the ground.

20 Q Now, are there primary gouge marks?

21 A I would say that there are two primary gouge marks,
22 yes, sir.

23 Q All right. Can you tell us the length of both

1 gouge marks from X-3 to X-4?

2 A X-3 to X-4, I can give you a reasonable proximation.

3 Q All right.

4 A I get about 1118 and a half feet, the way I have
5 computed it on the diagram.

6 Q Would you write that down?

7 A On the diagram?

8 Q I want to know that, certainly.

9 MR. DUBUC: Are you talking about what is on the
10 diagram as opposed to what is on the ground?

11 MR. OREN LEWIS: Well, I'm going to go to that.
12 Do you know what goes on the ground? Do you have any
13 measurement of the gouge marks on the ground?

14 THE WITNESS: No, sir.

15 BY MR. OREN LEWIS:

16 Q So if you don't use this diagram, you don't have
17 any way of knowing that; is that correct?

18 A That is correct.

19 Q And you have no measurements or assets to
20 measurements by anyone other than this diagram as to these
21 distances; is that correct?

22 A That is correct.

23 MR. DURUC: Which distances?

1 MR. OREN LEWIS: The distances from one point to
2 the other on the Defendant's Exhibit D9.

3 MR. DUBUC: You mean the gouge marks by the
4 airplane?

5 MR. OREN LEWIS: Or anything else.

6 MR. DUBUC: Or anything else?

7 MR. OREN LEWIS: Anything at all.

8 Isn't that correct, Dr. Turnbow?

9 THE WITNESS: That is correct. Yes, sir.

10 BY MR. OREN LEWIS:

11 Q I mean, if there is, then I don't mean to be
12 tedious. I would like to know what they are.

13 A I don't have access to other information.

14 Q All right, sir. Now, I didn't write that down.
15 Would you state the distance from X-3 to X-4?

16 MR. DUBUC: 1118 and a half.

17 MR. OREN LEWIS: Pardon?

18 MR. DUBUC: 1118 and a half.

19 BY MR. OREN LEWIS:

20 Q This is in feet, right, sir?

21 A That is correct. Yes, sir.

22 Q Now, how widely separated are the two primary
23 gouge marks?

1 A. In feet?

2 Q. Yes, sir.

3 A. I would not be able to tell you.

4 Q. All right.

5 A. But they will be equal to the width of the floor
6 area plus maybe as much as two or three feet; and I should
7 have said the floor area of the troop compartment.

8 Q. All right. What is the width of the floor area
9 of the troop compartment?

10 A. I don't know.

11 Q. Do you know how much that structure weighs?

12 A. No, sir, I don't.

13 Q. I mean, the wreckage that is on the diagram.

14 A. No, sir, I don't.

15 Q. Did you compute the surface of the exterior of
16 the troop compartment?

17 A. The surface of the exterior?

18 Q. Yes, sir.

19 A. That is the open end?

20 Q. No. Well, did you compute the surface of the open
21 end?

22 A. No.

23 Q. Did you compute the surface of the other -- rest of

1 the area of the stern and the top or surrounding the top
2 and walls, or whatever you would call the upper part of
3 the hull?

4 A. I computed no surface areas.

5 Q. All right, sir. Did you -- and, you have already
6 told us that you don't know how deep those gouge marks are
7 from X -- the primary gouge marks, I am speaking of, from
8 the point X-3 to X-4; is that correct?

9 A. That is correct.

10 Q. You don't know how deep they are or how wide they
11 are; is that correct?

12 A. I have given you the width.

13 Q. Well, I am speaking of the width of each mark.

14 A. Oh, the width of each mark?

15 Q. Yes, sir.

16 A. No, sir. I don't believe I have a measurement
17 on that.

18 Q. All right. Now, did you calculate how fast the
19 troop compartment decelerated from the point X-3 to X-4?

20 A. Yes, sir, in a way.

21 Q. All right. How did you do that?

22 A. I computed an average deceleration from X-1 to
23 X-4.

1 Q All right. Well, are you suggesting that there
2 are gouge marks of the same depth from X-1 to X-4?

3 MR. DUBUC: You are talking about --

4 MR. OREN LEWIS: I am talking about the primary
5 gouge marks.

6 MR. DUBUC: The gouge marks of the airplane?

7 MR. OREN LEWIS: Yes.

8 THE WITNESS: No, I am not suggesting that.

9 BY MR. OREN LEWIS:

10 Q All right. Now, did you calculate the coefficient
11 of friction of any part of the wreckage?

12 A Coefficient of the friction of any part of the
13 wreckage?

14 Q Yes.

15 A Yes, sir. In a way, I have done that.

16 Q All right. How did you do that?

17 A Well, I calculated the average coefficient friction.

18 Q The average coefficient of friction of what?

19 A That is for the airplane.

20 Q All right. Now, what is the formula for
21 calculating the coefficient of friction that you used?

22 A It is equal to the average of deceleration
23 measured in Gs.

1 Q All right. Now, would you tell me how you say
2 that in mathematical terms? What is the formula?

3 A I just stated that.

4 Q I beg your pardon, sir?

5 A The average coefficient of friction --

6 Q Yes.

7 A -- is equal to the average G level or average
8 deceleration measured in Gs. That is the formula.

9 Q So, is it your testimony, sir, that as an
10 engineer, that I can pick any point along the line and
11 you can tell me with any precision what the G force was at
12 that point?

13 A At that point? No, sir, you cannot do that.

14 Q So when you take average, the average is like
15 many averages, inaccurate, or may be inaccurate, for any
16 particular point; is that correct?

17 A For any particular point, well, it is not in-
18 accurate in the sense that it's accurately what you have,
19 the average.

20 Q But it is an average?

21 A It is an average, that is correct.

22 Q All right. Now, what is the coefficient of
23 friction of a body weighing whatever the troop compartment

1 weighed, passing through material? In other words, the
2 soil, to the depth that it was passing through some point
3 three to point four?

4 A. Well, you have asked a question here that is kind
5 of a meaningless question, and I am not being --

6 Q. It is as good as I can do.

7 A. -- critical here, Mr. Lewis, but coefficient of
8 friction is not really totally descriptive here. It is
9 really coefficient of resistance.

10 Q. If you prefer.

11 A. Okay. And there is quite a difference.

12 Q. All right.

13 A. And what I have done is to give you the average
14 coefficient of the resistance or the deceleration distance
15 covered by the troop compartment.

16 Q. Well, would you tell me what the high point is?

17 A. What the high point is?

18 Q. In Gs.

19 A. In Gs?

20 Q. Yes.

21 A. My best estimate would be the order of three times
22 the average value.

23 Q. And what is the average value?

1 A We are talking about this accident, now?

2 Q Yes.

3 A Okay. The average G value I computed was 1.66.

4 Q All right. And so what is 3.166?

5 A It would be about five Gs, but I will get it
6 for you exactly.

7 Q All right.

8 A It is about 4.98.

9 Q All right. Is five close enough to talk about,
10 or should we say 4.98?

11 A No, five is fine.

12 Q Five is reasonable to you?

13 A Yes, sir.

14 Q All right. Now, can you tell me at what point
15 from X-1 to X-4 was the G force on the troop compartment
16 five?

17 A At what point?

18 MR. DUBUC: You are talking about on the airplane,
19 right?

20 MR. OREN LEWIS: No. He said that it was five.

21 THE WITNESS: (Nodding head, indicating in the
22 affirmative.)

1 BY MR. OREN LEWIS:

2 Q At what point was it five?

3 A Well, specifically, I can't answer that question.

4 I don't think I should address myself to it.

5 Q Can you tell me how long it was five?

6 A Not very long.

7 Q Can you give me any idea how long it was five?

8 Did you calculate that?

9 A I have looked at it from this standpoint. Let's
10 just suppose there is five for the total distance.

11 Q Pardon?

12 A Let's just suppose it is five for the total
13 distance.

14 Q From X-1 to --

15 A From X-1,

16 Q -- X-4.

17 A Uh-huh.

18 Q All right.

19 A And we can come up with some conclusions. Okay.

20 Q Well, you just tell me how you explain it.

21 MR. DUBUC: That is what he is going to do.

22 THE WITNESS: Well, that is what I am going to do.

23 Now, I haven't done this, but I will do it on my computer

1 here and give you the answers.

2 BY MR. OREN LEWIS:

3 Q Well, I am really interested in what you did,
4 Doctor.

5 MR. DUBUC: Well, let him finish. You asked him
6 to do it, and he is going to do it.

7 MR. OREN LEWIS: Mr. Dubuc, I don't want you --

8 MR. DUBUC: Well, you keep changing your question
9 as to whether or not he's going to be able to do it or
10 not.

11 MR. OREN LEWIS: Well, he asked me. He said
12 that he had not done it. And I am asking him --

13 MR. DUBUC: All right. You asked him to do it.

14 MR. OREN LEWIS: I am trying to get the basis,
15 the factual basis of what he knows and what he doesn't
16 know.

17 MR. DUBUC: But your question was would you do it.

18 MR. OREN LEWIS: And he said let's assume that
19 it was five all the way, and then since that isn't the
20 case --

21 MR. DUBUC: And then you said explain that.

22 MR. OREN LEWIS: I will withdraw that, Mr. Dubuc.

23 MR. DUBUC: All right.

1 MR. OREN LEWIS: You are going to keep this --
2 we are going to be three days instead of only one.

3 MR. DUBUC: No, we are only going to be today.

4 MR. OREN LEWIS: Oh, we will see, Mr. Dubuc.

5 MR. DUBUC: Yes, we will.

6 MR. OREN LEWIS: We will definitely see that.

7 MR. DUBUC: We will.

8 MR. OREN LEWIS: You deposed Mr. Timm for a rather
9 long time.

10 MR. DUBUC: I haven't deposed Mr. Timm at all
11 in this aspect of this case.

12 MR. OREN LEWIS: You asked him a great deal --

13 MR. DUBUC: Not on this aspect of the case.

14 MR. OREN LEWIS: On any aspect of the case. You
15 took rather a long time.

16 MR. DUBUC: I haven't had a chance to depose
17 Mr. Timm. I was supposed to do that this morning, and he
18 was withdrawn.

19 MR. OREN LEWIS: Do you want to debate that right
20 now, Mr. Dubuc?

21 MR. DUBUC: That is a fact. I don't have to debate
22 it.

23 MR. OREN LEWIS: Do you want to debate it? I will

1 tell you that we did not have the pictures. We have not
2 had an opportunity to analyze the data, Mr. Dubuc.

3 MR. DUBUC: What is your next question, Mr. Lewis?

4 BY MR. OREN LEWIS:

5 Q Sir, how long, in your calculations, was any
6 occupant in the troop compartment subjected to five Gs?

7 A Well, it couldn't have been very long, and more
8 specifically, I have kind of done this for you in my
9 report.

10 Q All right. Would you direct me to that?

11 A Yes, sir.

12 MR. DUBUC: Exhibit D1303, the report number.

13 THE WITNESS: Look at page six, if you would,
14 please.

15 BY MR. OREN LEWIS:

16 Q Is it numbered six, sir?

17 A It is not numbered.

18 Q It is not numbered?

19 A No, sir.

20 MR. DUBUC: The last page has the words "the
21 wreckage diagram" and at the bottom there is asterisk that
22 says see Appendix One.

1 BY MR. OREN LEWIS:

2 Q All right. I am looking at that page.

3 A If you read the last couple sentences in the
4 paragraph --

5 MR. DUBUC: Well, read it to him.

6 THE WITNESS: All right. The reader should
7 observe carefully the fact that such peaks, that is five
8 Gs, cannot physically be applied for any appreciable period
9 of time otherwise the aircraft would have to stop and
10 much less at 1950 feet. The value would be 646 feet at
11 five Gs constant deceleration.

12 Now, we know it didn't stop at 646 feet, so we
13 know that the G level was generally less than five Gs over
14 the period in question.

15 BY MR. OREN LEWIS:

16 Q How long was it at five Gs? You used the
17 expression couldn't be very long or very long. Those are
18 not engineering terms, as I understand it. I would like to
19 know if you have calculated how long?

20 MR. DUBUC: He has just read to you how to calculate
21 it.

22 BY MR. OREN LEWIS:

23 Q How long?

1 A. Well --

2 MR. DUBUC: Go ahead.

3 THE WITNESS: I will give you an upper limit.

4 BY MR. OREN LEWIS:

5 Q. All right.

6 A. It couldn't be longer than about nine seconds.

7 8.8 seconds, I think it is on the --

8 Q. 8.8 seconds?

9 A. Yes, sir.

10 Q. All right. Subjected to five Gs, right?

11 A. That is correct. And it is much, much less
12 than that number, and I can tell you why, if you would
13 like me to tell you.

14 Q. I'll be interested in a minute, but I am anxious
15 for the measurement first, and then I will --

16 MR. DUBUC: The measurements?

17 MR. OREN LEWIS: Well, he said that there was
18 a --

19 MR. DUBUC: What is the question? You made a
20 statement.

21 MR. OREN LEWIS: Mr. Dubuc, if you are going to
22 continue to interrupt my deposition, I am going to suspend
23 it and then just seek the Court's assistance. This man is

1 an engineer and --

2 MR. DUBUC: I am looking for questions rather
3 than statements. So what you are interested in -- ask him
4 a question and he will answer the question.

5 MR. OREN LEWIS: Are you finished?

6 MR. DUBUC: Yes. What is the question?

7 BY MR. OREN LEWIS:

8 Q The question is how did you arrive at 8.8 seconds
9 as an upper limit?

10 A Well, I know that the initial velocity of the
11 aircraft was about 450 feet per second. Looking at the
12 troop compartment, we know the final velocity was zero.
13 So, we know the average velocity was half of 450 or 225 feet
14 per second, and we know that the aircraft went -- my scale
15 of measurement was 1950 feet. If we take the individual
16 measurements that we have just come up with, we get about
17 1990 feet. About a 40 foot difference, which is insignifi-
18 cant, so I will just assume that it is 1950 feet and I come
19 up with 8.67 seconds as the time to decelerate, and that
20 time has to be very close to the true time to decelerate.
21 So, we know that whatever deceleration took place between
22 X-1 and X-2, it could not have occurred for a longer period
23 of time than about 8.67 seconds.

1 Q All right. So that is how you have your upper
2 limit?

3 A (Nodding head, indicating in the affirmative.)

4 Q Now, can you tell me, were there peaks and
5 valleys in the Gs that the occupants were subjected to?

6 A Where?

7 Q Were there peaks and valleys?

8 MR. DUBUC: Were there.

9 THE WITNESS: Were there peaks? Yes, sir, there
10 were peaks and valleys.

11 BY MR. OREN LEWIS:

12 Q All right. Now, have you calculated the peak
13 Gs?

14 A Yes, sir.

15 Q And how did you do that?

16 A I multiplied the average value, 1.66.

17 Q By?

18 A By a factor of three.

19 Q And why did you use the factor of three?

20 A Because of various factors.

21 Q Which include?

22 A Which include my some ten years of experience
23 in crash testing aircraft and making deceleration measurements

1 within the aircraft, from observing the physical facts
2 associated with this accident. More specifically, that as
3 the troop compartment is concerned, the nature of this
4 accident, the terrain over which it passed, the nature of
5 the gouge marks, the lack of any initial deep penetration
6 of the fuselage proper, the lack of impact with any major
7 obstructions like extremely large trees, bridge abutments,
8 huge boulders, and so forth and so on, clearly indicates
9 that this is an accident in which the G level over the
10 deceleration distance of 1950 feet to 1990 feet for the
11 troop compartment is very nearly a constant level
12 deceleration. Much more so than occurs in many accidents
13 and at other circumstances, have occurred in this accident,
14 much more so than could have occurred in this accident.

15 MR. DUBUC: For the record, we are trying to
16 finish the deposition and this is the third time we have
17 had something brought in to interrupt it.

18 MR. OREN LEWIS: And how long is your estimate,
19 Mr. Dubuc, that Mr. Fricker's giving me this note took?

20 MR. DUBUC: I haven't computed it.

21 MR. OREN LEWIS: Well, do you want to make an
22 estimate?

23 MR. DUBUC: No, I'd like to hear your next

1 question.

2 (Discussion off the record.)

3 BY MR. OREN LEWIS:

4 Q Sir, I don't see where you get the factor of
5 three. What gives you the three?

6 A Well, should I give it to you again?

7 Q Well, I heard the items that you mentioned, sir.

8 I don't see the connection between those and the three. Is
9 that some kind of a formula that you have evolved yourself,
10 sir, or is it in common use in the engineering profession,
11 or where does it come from? In other words, do we use a
12 three times average Gs under some circumstances and another
13 factor under other circumstances?

14 A That would be correct.

15 Q All right. Would you tell me where I would find
16 the reference for that?

17 A You would find yourself a good expert and talk
18 to him.

19 Q But that is not published.

20 A Not to my knowledge.

21 Q And you haven't published on it, and to your
22 knowledge, no one else has?

23 A Not to my knowledge.

1 Q All right. Now, did you undertake to calculate
2 how many Gs it would take to break off any part of this?

3 A I have not made a calculation, but I can give
4 you a pretty good close number.

5 Q All right.

6 A About a thousandth of a G.

7 Q A thousandth of a G?

8 A Yes, sir.

9 Q To break off what part?

10 A To break off a landing gear door.

11 Q All right. Any other factors? How much would
12 it take to break off an engine?

13 A I don't have a specific number on that, but let
14 me see if I can --

15 Q All right.

16 A Now, if you understand that these are ballpark
17 numbers.

18 Q I understand that that is your best judgment,
19 sir.

20 A Well, I don't think it would take more than a
21 quarter of a G.

22 Q To break off an engine on a C5A?

23 A Yes, sir.

1 Q Well, what factors would you take into
2 consideration? Gee --

3 MR. DUBUC: What kind of Gs are you asking him
4 for?

5 MR. OREN LEWIS: Well, G is a --

6 MR. DUBUC: Are you asking him for X factors?
7 YX is G? Or what are you asking him?

8 MR. OREN LEWIS: Well, is there a difference in
9 what Gs it would take to break off the engine?

10 THE WITNESS: Yes, sir. It would depend upon the
11 circumstances.

12 BY MR. OREN LEWIS:

13 Q Under these circumstances. Under the
14 circumstances of this crash as you understand it. I want
15 you to tell me how many Gs it would take to break an
16 engine free from its supports on the wing.

17 A Well, again, if you understand that this is
18 pretty crude. I might be off by 100 percent.

19 Q Well, what is the range, then?

20 A I'll say anywhere from zero to a half a G.

21 Q Half a G?

22 A Yeah. But a quarter of a G would probably do it
23 pretty well.

1 Q And what force would it take to break the wing
2 off, in Gs?

3 A Well, again, it depends upon the nature of the
4 failure and I am not sure that we know in this particular
5 case just exactly how the failures occurred, but it could
6 be done as a very low load, like certainly below five Gs.

7 Q A load before five Gs?

8 A Even below a couple of Gs.

9 Q All right. Now, the wing is an outboard of the
10 hull, a series of fuel tanks, is it not?

11 A I presume that that is the case, yes, sir. That
12 is my understanding.

13 Q Are there any dry bays?

14 A Are there any dry bays?

15 Q Yes.

16 A I don't know whether there are or not.

17 Q Do you know how many gallons of fuel there were in
18 the wing tanks, either separately or together, at the time
19 of impact?

20 A No, sir, but there would have been quite a bit.

21 Q Do you have any idea how much?

22 A I'd say maybe a railroad tank car.

23 Q How many gallons in a railroad tank car?

1 A Eight thousand gallons.

2 Q So your judgment is that there were 8,000 gallons
3 of fuel in each wing or together?

4 A I don't know. I don't have the faintest idea.

5 We are talking about thousands of gallons rather than
6 gallons.

7 Q There is many, many gallons, right?

8 A Yeah.

9 Q And it would weigh a great deal; is that correct?

10 A It would weigh quite a bit, that is right.

11 Q And how many pounds is a gallon of aviation fuel?

12 A About six and a half pounds.

13 Q Did you make any calculations as to how much the
14 wing structure weighed, either individually or together?

15 A The wing structure itself?

16 Q Yes.

17 A I have made no such calculations.

18 Q Either with the engines or separated from the
19 engine?

20 A Either with the engine or separated -- I made no
21 calculations, no, sir.

22 Q But I am still trying to get why you used a factor
23 of three, for example, instead of five or two or eight.

1 MR. DUBUC: He has told you that.

2 BY MR. OREN LEWIS:

3 Q That is just a judgment, is that right?

4 MR. DUBUC: It is based upon his experience. He
5 explained it all in a long paragraph. Do you want to have
6 her read that back or something?

7 MR. OREN LEWIS: I am trying to find out the
8 basis for his opinion.

9 MR. DUBUC: But you asked him this before, and
10 he's answered that.

11 MR. OREN LEWIS: I fully understand --

12 MR. DUBUC: And you are not permitted to ask
13 questions three times.

14 MR. OREN LEWIS: I am permitted to ask questions --

15 MR. DUBUC: The same question.

16 MR. OREN LEWIS: -- Mr. Dubuc, to the point that
17 I can understand it.

18 MR. DUBUC: No, you are not, Mr. Lewis.

19 MR. OREN LEWIS: We'll see. We'll see.

20 MR. DUBUC: You are permitted to ask questions
21 if there is a common objection, I think, sustained
22 universally by Courts as to asked and answered question. He
23 has told you this already.

1 MR. OREN LEWIS: In a discovery situation of
2 this kind?

3 MR. DUBUC: Yes, sir.

4 MR. OREN LEWIS: Well, I am willing to stop now
5 and certify it to the Court. We have a hearing Tuesday,
6 and we can take this up. This is an expert that has
7 obviously looked at these facts --

8 MR. DUBUC: We will just note another objection.

9 MR. OREN LEWIS: -- and I think I have a right to
10 try to understand how he arrived at the factor of three.
11 He has already told me it is not public, and so there is no
12 other source that I can get it from, other than this
13 gentleman here.

14 MR. DUBUC: It is based on his experience. Do
15 you want him to tell you about his experience?

16 MR. OREN LEWIS: I am going to ask him, sir, some
17 of these details. Now, that is a preliminary question,
18 but if you don't want him to answer any of that, why don't
19 you instruct him not to answer any more questions along this
20 line, and we will certify that to the Court.

21 MR. DUBUC: All right.

22 MR. OREN LEWIS: If that is your position. I am
23 telling you I want to ask him how he arrived at the three. I

1 understand that he says it is from his experience and so
2 forth. I want to know what percentage experience, what
3 percentage terrain, what percentage of these other things.
4 I want to understand how he arrived at the three.

5 MR. DUBUC: Percentage of terrain?

6 MR. OREN LEWIS: Yes. He gave me a number of
7 factors. He said that he comes up with the three because of
8 the physical facts of the accident, the terrain, the lack
9 of impact with heavy objects, and all those different
10 things, and I want to know what percentage of his thinking
11 went into each element. Now, if you don't want me to
12 inquire, I will just have to certify it to the Court.

13 MR. DUBUC: Tell him your percentage or estimate,
14 if you can, as to the factors, and if you have got
15 experience in accidents, how you evolve in formulating.

16 THE WITNESS: Well, again, I base it upon what
17 I see taking place with respect to the aircraft structure
18 and the ground. That is the nature of the gouge marks that
19 appear in the ground.

20 BY MR. OREN LEWIS:

21 Q All right. Go on.

22 A They are much, much closer to being uniform
23 gouge marks than one sees in, I would say, 90 percent of the

1 accidents which occur.

2 Q All right.

3 A This airplane basically landed at high speed. I
4 base it in part on --

5 Q I want to stop you right there.

6 MR. DUBUC: No. No. Let him finish his answer.

7 MR. OREN LEWIS: I want to get each element. This
8 is one element, and if you finish this answer on that
9 element as to the nature --

10 MR. DUBUC: No. Please let him finish.

11 MR. OREN LEWIS: Oh, I am anxious to have him
12 finish.

13 I'd like to take up each element at a time as we
14 go on.

15 MR. DUBUC: But you've asked him the general
16 question, so let him finish his answer, and then you can go
17 back and pick at it.

18 THE WITNESS: I think I finished that answer.

19 BY MR. OREN LEWIS:

20 Q All right. Now, then, are you then saying that
21 the gouge marks are, in your judgment, uniform from
22 throughout the crash landing process; is that correct?

23 A Much more so than one finds in most accidents.

1 Q All right. Did you measure the depth of gouge
2 marks or the width of the gouge marks?

3 A You don't have to measure them.

4 Q I'm not asking you do you have to. I am saying,
5 did you measure any gouge marks or make any attempt to
6 calculate how much dirt was misplaced, or what the
7 resistance of the material through which parts of the
8 airplane were passing?

9 A No, sir.

10 Q You did not; is that correct?

11 A That is correct.

12 Q All right. Now, what percentage of -- what
13 weight did you give that particular aspect?

14 A What weight did I give it?

15 Q Yes.

16 A I didn't give it any particular weight.

17 Q In coming up with your formula three X?

18 A I have no formula.

19 Q I beg your pardon, sir? You mentioned three
20 times the gravity, which was 1.6 something. I have a note
21 on that here. I believe you said three times 1.66.

22 A Yes, sir.

23 Q All right. Now, if that is not a formula, then

1 I apologize to you. I just thought that it was.

2 So, you can't tell me how much weight you gave to
3 the terrain itself?

4 A I gave a very high weight to that fact. Now,
5 percentage-wise, I have not attempted to address that
6 problem.

7 Q All right.

8 A Whether that is 50 percent of the total or 75
9 percent of the total. I trust that is what you are asking
10 me.

11 Q Yes.

12 A I haven't done that. I'll try to do that for you
13 before the trial, if you so desire.

14 Q Well, if you can't tell me now, I want to know --
15 if you have not done that, then you haven't done that.

16 MR. DUBUC: He is offering to do it for you.

17 BY MR. OREN LEWIS:

18 Q Do you want to do it now?

19 A No, I don't propose to do it now.

20 Q All right. Now, tell me, you say you have
21 crash tested aircraft?

22 A Yes, sir.

23 Q What is the largest aircraft that you have crash

1 tested?

2 A Four engine transport.

3 Q What is the name of this airplane?

4 A DC-7. Well, that might not be right. 1649

5 Super Connie (phonetic) might conceivably weighed more than
6 the DC-7.

7 Q All right. Where did you crash test the 649?

8 Is that the name of it, sir?

9 A 1649.

10 Q 1649 Super Constellation?

11 A Yes, sir.

12 Q When did you do that?

13 A When did I do it?

14 Q Yes.

15 A About 1967.

16 Q Who for?

17 A For the F.A.A., NASA, U.S. Air Force, and the
18 Navy, I think all participated.

19 Q And also did you say a Douglas aircraft 7, sir?

20 A Yes, sir.

21 Q And who did you do that for?

22 A Same program.

23 Q In the same year?

1 A. About the same year.

2 Q. 1967?

3 A. Yes, sir, about.

4 Q. Okay. Where abouts did it crash?

5 A. In Phoenix, Arizona -- near Phoenix, Arizona.

6 Q. All right. And now were there any other crash
7 tests that you considered comparable to the C5A crash?

8 A. Well --

9 Q. That you did?

10 A. Well, there are all comparable in a way, if you
11 understand the difference between the characteristic
12 decelerations that take place on a large aircraft and a
13 smaller aircraft.

14 Q. Well, then tell me all of the crashes.

15 A. All of the crashes?

16 Q. Yes.

17 A. Well, I could best give it to you this way. I
18 think there were about 34 full-scale crashes.

19 Q. All right. For whom?

20 A. The the U.S. Army, U.S. Air Force, the F.A.A.,
21 U.S. Navy.

22 Q. And this was all the same program, sir?

23 A. Flight Safety Foundation, yes, sir. Well, no,

1 there were more than one program involved.

2 Q All right. Well, who paid for the airplanes,
3 the start-up?

4 A Who paid for the airplanes?

5 Q Yes.

6 A It depends on a particular test.

7 Q Well, who paid for the Super Constellation?

8 A I believe the F.A.A.

9 Q It was destroyed as far as its usefulness, was
10 it not?

11 A Yes, sir. That is correct.

12 Q And is that true in all of these cases?

13 A Yes, sir.

14 Q All right. The F.A.A., did they buy a new
15 Super Constellation or was it a used one?

16 A No. They were used airplanes.

17 Q How many hours on it?

18 A I don't recall. They were flyable. They were
19 flown in to Phoenix.

20 Q All right, sir. And under what circumstances
21 was this Super Constellation crashed?

22 A For the purposes of investigating a post-crash
23 fire, the performance of transport forward-facing seats,

1 performance of cargo and litter tie downs, performance of
2 air bags for use as decelerators for the occupants, and
3 other experiments.

4 Q Was there a test protocol?

5 A Yes, sir. There would have been.

6 Q Who was in charge of the test?

7 A I was in charge of the scientific efforts.

8 Q All right. And the government then has the
9 records on this? Did you turn your records over to the
10 government?

11 A Yes, sir. There are records available. They
12 would most likely be with the F.A.A.

13 Q All right. Now, how fast was the airplane going
14 when it struck the ground?

15 A As I recall, the DC-7 was doing about 160 and I
16 don't remember whether that was knots or miles per hour,
17 knots probably. And the Super Connie was about 100 and --
18 about 135, 36 miles an hour.

19 Q That is not knots, that is miles per hour?

20 A That is miles per hour.

21 Q Okay. Well, how many miles per hour is 160 knots?

22 A 160 knots?

23 Q Yes.

1 A It would be 184 miles an hour, but the speed was
2 probably 160 miles an hour and not knots.

3 Q All right. 160 miles per hour. All right. Now,
4 in the 1649 Super Constellation, where was this airplane
5 crash?

6 A Near Phoenix.

7 Q Is it an air base or does it have a location?

8 A It was an airport, yes, sir.

9 Q An airport?

10 A Yes, sir.

11 Q Which airport?

12 A Deer Valley.

13 Q Deer Valley?

14 A Yes, sir.

15 Q Was it crashed on the runway?

16 A On a specially built runway.

1 Q What kind of a specially built runway was it?

2 A Well, it consisted of a railroad track, as a mono-
3 rail, to guide the nose gear and then two paved strips to
4 provide support for the main gear.

5 Q So then this wasn't an airplane that was flown
6 through the air and crashed into the ground?

7 A No, it was flown through the air for part of the
8 time. Yes, sir.

9 Q Well, how much of the time?

10 A Well, how many feet?

11 Q Well, I am just trying to get some understanding
12 of the test protocol, what was done.

13 A Well, we ran the airplane 3,000 feet down the
14 track, at which time it reached the speed of 160 miles an
15 hour. We knocked both of the main gears and the nose gear
16 out from underneath the airplane simultaneously, took off
17 basically all four engines and ran the airplane through two
18 telephone poles, struck the left wing with a hill, struck
19 the fuselage with an eight degree slope on hard compacted
20 ground, nodded to impact on that slope and continue the
21 impact of twenty degrees slope and then go over that hill
22 and impact beyond the hill with basically a free-fall of
23 about 60 feet for the fuselage.

1 Q And is it your statement that that is comparable
2 to this crash?

3 A No, it isn't comparable in the sense that it is not
4 a one to one situation. That was a fairly high G situation
5 as far as large fixed-wing transports are concerned because
6 of the steepness of the slope, the nature of the soil and
7 the nature of the impact angle. Well, that is about it, I
8 guess.

9 Q Were there any people in it?

10 A No, sir. We had one man that offered to ride it.

11 Q You declined?

12 A We declined. Yes, sir.

13 Q Do you have any of these crashes, these 34, that
14 where the airplane was flying through the air at 310 miles
15 an hour and struck the ground?

16 A Do I have what?

17 Q Are there any of these crashes where the airplane
18 was a large structure, large transport type airplane and
19 struck the ground at or around 310 miles an hour?

20 A I am not familiar with any test crash in which
21 that has been done. There have been some crashes which have,
22 of course -- real crashes that have occurred in that
23 configuration, in addition to this one.

1 Q Which ones?

2 A Well, the L1011 that crashed in the Everglades
3 would have -- have some of the characteristics of this
4 crash.

5 Q All right.

6 A I am not sure of the exact speed of the L1011, but
7 it would not have been, I think, under 200 miles an hour.
8 I am familiar with one accident that occurred at 450 miles
9 an hour in a B51 Mustang in which the occupants survived
10 with basically only a spinal fracture.

11 Q How many people lived in the L1011 crash?

12 A I think about half of them or something like that.
13 Maybe more than half.

14 Q That was a Lockheed Aircraft?

15 A That was a Lockheed Aircraft. Yes, sir, that is
16 correct.

17 Q And was the speed in the vicinity of 310?

18 A I don't recall the exact speed, but I would say
19 probably between 200 and 300.

20 Q All right. And were there a number of serious
21 injuries in addition to --

22 A Sure.

23 Q -- the people that died?

1 A Sure.

2 Q What was the angle that the airplane struck the
3 ground?

4 A I don't have a number for you on that.

5 Q Any other large aircraft crashes that you feel are
6 -- I am talking about where there was a speed of comparable
7 -- roughly comparable speed of the large transport aircraft?

8 A Well, I can think of one other at least, and this
9 was a DC6 or DC7 accident that occurred in Florida in
10 probably the 1950's. I think the speed was around 205, but
11 I could be in error on that. That was a long time ago.

12 Q Well, I am interested in 300 category, which is,
13 I believe, roughly a third more than 205.

14 A I don't recall any others at the moment.

15 Q But the closest would be the L1011 in the
16 Everglades?

17 A I don't know whether that is the closest or not.

18 Q Is the closest one that you can think of?

19 A The closest one that I can think of at the moment.
20 Sure.

21 Q Sir, did you look into the, when you were doing
22 this investigation into the crash, whether or not the wing
23 supports were weaker than designed?

1 A Were weaker than designed?

2 Q Yes, sir.

3 A No, sir. I have not looked at that.

4 Q Had any defects?

5 A No, sir, I have not looked at that.

6 Q Are you familiar with a program to reinstall or
7 replace the wings on the C5A fleet.

8 A I have heard of that program. Yes, sir.

9 Q And that was because there were a number of
10 fractures or faults found in the structural members of the
11 wings, is that not correct?

12 A I would presume that that would be perhaps the
13 reason.

14 Q And do you know whether that program is actually
15 going forward at this time?

16 A I do not know.

17 Q But you didn't take that into consideration in
18 your analysis?

19 A No, sir. It has no significance.

20 Q Can you tell me what the resistance of the -- in
21 any measurement -- well, let me withdraw that.

22 When you are talking about resistance of moving
23 through a material like soil, how is that measured, in foot

1 pound? How would you describe that?

2 A Well, generally the term resistance implies a
3 force and forces are measured in pounds.

4 Q All right. So then in pounds, sir?

5 A Yes, sir.

6 Q So if we had a soil of the type that was in this
7 west bank and we were able to take a test and propel a
8 particular sized object through it to a certain depth and
9 width, then the result would be -- you would come out and
10 you would find out how many pounds that would take, is that
11 right sir?

12 A Are you talking about this dike over here?

13 Q No. I'm speaking of soil --

14 A You said soil, west bank.

15 Q Well, when I say west bank, it is opposed to the
16 east bank of the Saigon river. I am not speaking of the
17 dike itself.

18 A You are talking about the general level terrain?

19 Q Yes, sir. The terrain there.

20 A Well, I don't know what you have in mind with
21 regard to what you're talking about here. There are all
22 types of soil tests that could be conducted that would give
23 one some feel for the resistance of the soil to compressive

1 loading and so forth and so on. Sure.

2 Q In other words, but the force would depend upon the
3 weight of the objects and the size of the face that was
4 presented to the soil would it not, and the speed that it
5 was -- initially impacted the soil?

6 A Yes, sir, I think it would depend upon certainly
7 the size of the object, talking about the force in pounds,
8 it would depend upon -- what else did you say? The speed?

9 Q Yes.

10 A Yes, sir. I think -- probably depend certainly on
11 the speed. The specific amount of plowing or moving, in
12 other words, that was being done at the time of the question.

13 Q And then by doing that, you would come up with an
14 analysis of how fast you could stop a given object moving
15 through that material, to that depth?

16 A Well, some people have attempted to do this. I
17 think in all probability -- I don't think it is a very good
18 approach, but --

19 Q No, I just wanted to know if that -- in this case,
20 you say?

21 A In any case.

22 Q No. No. I am saying did you say somebody has
23 attempted to do that in this case?

1 A Well, I think people have attempted to do that,
2 yes. I'm sure they have.

3 Q Who?

4 A I don't know, but, you know, you talk to various
5 hundreds of people that are composing computer programs to
6 try to do this and that. Where they take into account that
7 it is all characteristic --

8 Q Who did you talk to that suggested that?

9 A I haven't the faintest idea.

10 Q Well, who have you talked to about this case?

11 A This case? I haven't talked to anybody about this
12 case except this law firm.

13 Q When you say this law firm you mean --

14 A And the other experts that are involved. I have
15 talked to one or two of those, I guess. One.

16 Q Who?

17 A John Edwards.

18 Q Anybody else?

19 A Well, let's see. I have talked very, very briefly
20 with Doctor McMeekin.

21 Q Anybody else?

22 A Yes. I'm sure one or two other two other people
23 who were present at the meeting and, of course, I heard their

1 input.

2 Q At what meeting?

3 A At the meeting.

4 Q Which meeting, sir.

5 A The meeting of Mr. Dubuc's experts in late July --
6 27th, I think.

7 Q All right. Who was there?

8 A I don't know all of the people who were there,
9 but --

10 Q Just tell me who you know.

11 A Doctor McMeekin, Mr. Edwards, and I would say
12 probably -- maybe 10 or 15 other people, MD's, Psychologists
13 --

14 Q Just --

15 A -- maybe even some other engineers. I don't know.

16 Q Can you tell me who you remember as being there,
17 sir?

18 A I have told you who I remember. These are the only
19 ones that I know.

20 Q Any others that you can tell me the name of?

21 A No, at the moment, I can't.

22 Q Can you tell me who was there, Mr. Dubuc, so I can
23 ask the witness if he remembers X or Y?

1 MR. DUBUC: No, I am not going to tell you who was
2 there.

3 BY MR. LEWIS:

4 Q Did you see any representatives of the Plaintiff
5 there?

6 A Of what?

7 Q Did you see any representatives of the Plaintiff
8 there at the meeting?

9 A I wouldn't have recognized that fact. Had there
10 been, I don't know.

11 Q But nobody identified themselves to you?

12 A No, sir.

13 Q There were a number of lawyers there for the
14 government and for the Lockheed Aircraft Corporation, sir?

15 A Yes, sir. There would have been.

16 Q Can you tell me who?

17 A Yes, sir. Maybe I can. I believe Mr. Piper may
18 have been there. I could be in error about that. Let's see.
19 One of the young -- couple of the young lawyers from Mr.
20 Dubuc's office and Tom Almy.

21 Q Um-hmm. Okay.

22 A And John Connors.

23 Q Anybody else?

1 A That is all I recall at this moment, but there
2 were others there.

3 Q How much time have you devoted to the study of
4 this material, sir.

5 A In total days?

6 Q Well, hours or days or any other units you want to
7 use.

8 A Um-hmm. Well, I would say probably around 170
9 hours.

10 Q And what was your Consultant Fee? Was it on an
11 hourly basis?

12 A No, sir. It is on a daily basis.

13 Q And how much is that, sir?

14 A \$750 a day for the Routine Engineering Work, \$850
15 for Deposition and \$1,000 for Court Testimony.

16 Q I presume you get your expenses?

17 A Yes, sir. I hope so, anyway.

18 Q I hope you do, too.

19 MR. OREN LEWIS: Mr. Dubuc, I have a great deal
20 more to ask the witness. I'm willing to go on --

21 MR. DUBUC: Well, you have another 25 minutes.

22 MR. OREN LEWIS: I'm willing to take the 25

23 minutes and I'm also, if there's any advantage to the witness

1 I am going to suspend now.

2 MR. DUBUC: No, it isn't any advantage to the
3 witness unless you are done --

4 MR. OREN LEWIS: No, I am a long way from being
5 done.

6 MR. DUBUC: -- that would be to his advantage.

7 MR. OREN LEWIS: I beg your pardon, sir?

8 MR. DUBUC: That would be to his advantage.

9 BY MR. OREN LEWIS:

10 Q Do you have any idea, sir, what force, either in
11 pounds or otherwise, any other unit of measurement that it
12 takes to break any human bone?

13 A That it takes to break?

14 Q Any human bone.

15 A Any human bone?

16 Q Yes, sir.

17 A Yes, sir.

18 Q How much does it take to break the humerus in a
19 one year old child?

20 A Well, I don't have a number for that

21 Q How about the femur?

22 A No, sir.

23 Q Any other bones?

1 A. The skull.

2 Q. How much does it take to break the skull on a one
3 year old child?

4 A. I am not talking about a young child, but an adult.

5 Q. How much force does it take to break the skull in
6 adult?

7 A. Well, it takes about 140 G's to -- between that
8 and about 400 G's, depending upon the length of time for
9 which the load is applied. And at 140 G's, which would be
10 the lower level, if you allow about 12 pounds for the head,
11 that would be 680 pounds.

12 Q. And how do you come to -- then what you're saying
13 is you can do it in G's?

14 A. Yes, sir.

15 Q. Or translate it into pounds?

16 A. You can translate that into pounds, yes, sir.

17 Q. So you gave me the G figure and then the pounds,
18 is that right, sir?

19 A. Yes, sir.

20 Q. All right. Did you make any investigation of the
21 seats in this crash?

22 A. Did I make any investigation in the seats?

23 Q. Yes. Yes.

1 A Well, I did to this extent. I have questioned
2 Mr. Edwards, who was on the site and claims that he went
3 back and forth through this section of the troop compartments
4 and that there were two exceptions. All of the seats were
5 in place and the two exceptions were two forward facing seats
6 at the very rear of the aircraft and it was discovered that
7 both seats were not properly installed and as a result of the
8 rear legs not being properly attached in the seat tracks.
9 They rotated forward. They stayed in place, but they just
10 rotated forward.

11 Q What seat tracks were they?

12 A What seat tracks?

13 Q Oh, I understand. But they never completely
14 displaced, turned over or anything of that kind?

15 A No. Just rotated forward.

16 Q So the occupants in those seats still would have
17 been safe?

18 A Yes, sir. I believe that to be the case and there
19 is considerable questions as far as I can ascertain as to
20 whether there were any occupants at all.

21 Q So you have assumed that there were no occupants
22 of those seats?

23 A I haven't considered it either way. It is not

1 important, I think, really.

2 Q All right. And you have assumed that all the
3 children were in rearward facing seats, is that correct?

4 A I have. Yes, sir.

5 Q And it is your opinion to an absolute scientific
6 certainty I gather that the children in those seats would
7 have sustained no physical injury.

8 MR. DUBUC: The standard I think is a reasonable --

9 MR. OREN LEWIS: I understand that. I'm just
10 reading -- well, I am not reading from his report. But I
11 am saying what I understood his report to be.

12 MR. DUBUC: Well, I understand your question to be
13 absolute scientific certainty.

14 MR. OREN LEWIS: That is what it says. It is the
15 opinion of this author that it is a scientific certainty,
16 that the decelerations occurring in the April 4, 1975 C5A
17 accident did not provide any direct hazard to the life or
18 health of the children or adults located in the troop
19 compartment of that aircraft.

20 MR. DUBUC: You are reading from Exhibit D --

21 MR. LEWIS: I am reading from his report, the
22 third sentence of the Conclusion..

23 MR. DUBUC: Exhibit D-1303?

1 MR. OREN LEWIS: Yes, sir.

2 THE WITNESS: Yes, sir. That is my conclusion.

3 MR. OREN LEWIS: I don't see any modifier in
4 there.

5 MR. DUBUC: But your question had a modifier.

6 MR. OREN LEWIS: I beg your pardon.

7 MR. DUBUC: Your question had a modifier in it.

8 BY MR. OREN LEWIS:

9 Q Was it your understanding and did you assume that
10 there were no injuries to the children in those seats?

11 A No, there were injuries.

12 Q You do understand that there were injuries?

13 A Yes, sir.

14 Q The children that were sitting in the seats?

15 A One or two did not survive, at least one did not
16 survive.

17 Q All right. How about beyond that? Any orthopedic
18 injuries?

19 A I have no further information than that.

20 Q Would that be important to know?

21 A It would depend upon what is known about a situa-
22 tion.

23 Q All right. Did anyone tell you that one of the

1 children --

2 A Well, no. No. Standby. I don't think it is
3 important.

4 Q Why not?

5 A Simply because of the fact that the decelerations
6 that occurred in this accident were so low compared with the
7 tolerance of the human head to the solidity level, that
8 brain injuries simply could not have occurred as a direct
9 result of these deceleration levels.

10 Q Do you know what a coup-counter-coup injury is?

11 A Yes, sir, I do.

12 Q What is it?

13 A It means a blow to one side of the head resulting
14 in a tendency for the brain to separate from the skull
15 cavity on the opposite side of the head producing a contusion
16 or bruises. In other words, to the skull.

17 Q All right. How much force does it take to the
18 outside of the head to cause the brain to move around inside
19 the skull?

20 A Well, apparently the tolerance of the human head,
21 to blows of this type are at least something in the order of

22 140 PG's.

23 Q So what you're saying is that any loading under

1 140 PG's wouldn't injure the brain in the skulls of any of
2 these children seated as they were, is that correct?

3 A Would not produce any permanent injury.

4 Q Well, you mean you might get some kind of a
5 temporary or nonpermanent --

6 A Yes, you might be knocked out, for example. You
7 might even have a hairline skull fracture, for example.

8 Q I understand. So what you're saying is you could
9 have a hairline skull fracture and not injure the brain?

10 A I believe that to be correct, at least people do
11 have skull fractures from time to time and don't discover
12 the fact that they have had one. Now, whether the brain was
13 injured in this process or not, that might be a little bit
14 of a technical question. There might be a very minor injury
15 to the brain.

16 Q I understand.

17 A But, you know, if you don't find out about it and
18 you don't suffer any ill effects, that is what I'm talking
19 about.

20 Q I understand. So what was the thickness of the
21 padding, if any, on the chairs here?

22 A I don't have a number for you on that.

23 Q Do you know to what it's resistance to compression

1 is?

2 A The resistance of the padding?

3 Q Yes.

4 A As contrasted to the chair itself?

5 Q Well, the chair -- yes, I am speaking, as opposed
6 to the chair frame.

7 MR. DUBUC: The thickness of the cushion on the
8 back of the chairs?

9 MR. OREN LEWIS: Yes. That is what I'm asking
10 him.

11 Different padding has different compression rates,
12 is that right?

13 THE WITNESS: Yes, sir. They do.

14 BY MR. OREN LEWIS:

15 Q And if you have a very quick compression rate,
16 then that decreases the padding effect, does not?

17 A Well, not necessarily. In fact, it may actually
18 increase the thickness. The effect of thickness.

19 Q How is that?

20 A It is very rapidly applied in very rapidly applied
21 loads. Materials can appear to be stiffer, if you will,
22 than they really are.

23 Q So, do you know what the padding -- you don't know

1

What the padding is, the material is?

2

A. No, sir. I don't.

1 Q. You don't know?

2 A. I have assumed it is consistent with the general
3 aircraft seat.

4 Q. Alright. And what is that?

5 A. I would use the term foam rubber. Generally, it
6 is not really rubber, but some type of plastic.

7 Q. Foam rubber or plastic?

8 A. Yes, sir.

9 Q. How thick is it?

10 A. A resilient and of the order of -- well, the
11 order of a couple of inches.

12 Q. We're speaking two inches?

13 A. Um-hmm.

14 Q. And how fast will that compress under what
15 circumstances?

16 A. I have no numbers for you on that today.

17 Q. Pardon?

18 A. I don't have any numbers on that for you today.

19 Q. At 310 miles an hour, can you tell me how many --

20 A. Well, that 310 miles an hour would have nothing to
21 do with it really.

22 Q. But unless the G factor was over 140 then your
23 testimony is that there would be any possibility of injury to

1 these babies' brains?

2 A. The possibility would be extremely rare.

3 Q. Alright. And it wouldn't make any difference how
4 often the brain was moved from side to side or vibration as
5 long as it was under 142?

6 MR. DUBUC: Side to side he is talking about.

7 MR. LEWIS: Yeah, that would be moving back and
8 forth inside the skull.

9 MR. DUEUC: Forward and aft is one way.

10 MR. LEWIS: Forward and aft. Alright. Let's stick
11 with forward and aft.

12 In any direction, would it make any difference?

13 THE WITNESS: Are you talking about this accident
14 or hypothetical situations?

15 BY MR. LEWIS:

16 Q. This accident. This accident.

17 A. In this accident, no, I don't think that it would
18 have made any difference.

19 Q. So side to side or forward to back wouldn't make
20 any difference?

21 A. No, sir. I don't think so.

22 Q. Alright. Or up and down?

23 A. Or up and down even, no, sir.

1 Q. Alright. Did you calculate whether there was any
2 up or down G's?

3 A. Yes, sir. I did that. At least I considered that.

4 Q. What did you calculate?

5 A. Well, the design people at Lockheed have calculated
6 a vertical load as a result of, we will say, "a normal
7 landing" -- that is perhaps not quite right. A hard landing
8 at sink speeds of the order, I think they used eleven to
9 sixteen feet per second. I'm sure you've got this informa-
10 tion, and they concluded that the G load, not counting the
11 static one G which we all have on us, was somewhere between,
12 I think, about seven tenths and one point zero five or one
13 point zero two.

14 Q. One point zero two to one point zero five?

15 A. Yes, sir.

16 Q. What would be the peak load?

17 A. That is the peak load that they computed.

18 Q. Who did this computation, do you know?

19 A. No. It would have been done by the structures
20 department, I believe, with Lockheed.

21 Q. You didn't do it?

22 A. I did not compute that, no.

23 Q. And other than assuming that they know how to do

1 that, you wouldn't know if their computation was accurate,
2 right?

3 A. I think their computation is realistic because
4 the sink speeds at which this aircraft touched down was in
5 the order of 500, 600 feet per minute. And that is about
6 normal sink speed, and there is a normal landing that we
7 are talking about. The vertical loads would have been
8 insignificant.

9 Q. Now, what experience do you have in human
10 tolerance to deceleration?

11 A. Well, I have quite a bit of experience in that
12 area. I teach it from time to time. I have taught it from
13 time to time.

14 Q. In what school, sir?

15 A. At Arizona State University and to --

16 Q. In what course?

17 A. Say again?

18 MR. DUBUC: He didn't finish his answer yet.

19 MR. LEWIS: I apologize.

20 MR. DUBUC: Arizona State University and?

21 THE WITNESS: And one of my senior dynamics courses.
22 I have also taught it to the U. S. Army. U. S. Air Force
23 people do cover certain aspects of it in conjunction with the

1 short course that I have been involved in for the past
2 eleven or twelve years -- more than than. Twenty-one years.
3 I have witnessed some human subject sled rides at Holoman
4 Air Force Base. I have acted as a guinea pig myself with
5 suddenly applied loads to the head. I have been involved
6 in tests of animals, specifically bears in crash tests of
7 aircrafts. Although they're not human, their anatomy is
8 surprisingly quite similar to that of a human. That is
9 about my experience.

10 BY MR. LEWIS:

11 Q. Okay. What training have you had in -- you call
12 it human dynamics? I don't know, whatever you call it. Did
13 you use the word --

14 A. I used the word dynamics.

15 Q. Dynamics.

16 A. It is a college senior level course in which this
17 material that we are discussing, human tolerance to
18 decelerating loading was covered.

19 Q. I just want to know what training you have had,
20 sir.

21 A. What training have I had?

22 Q. Yes.

23 A. Well, about twenty years practical experience, I

1 guess.

2 Q. But you haven't had any educational background
3 in any aspect of the human tolerance to deceleration, is
4 that correct?

5 A. No, sir. That is not correct.

6 Q. Alright. What have you had?

7 A. I am a graduate engineer, Ph.D. and while that
8 particular subject was not covered, I still consider that
9 education to be most appropriate to this particular topic
10 which has to do with really the engineering aspects of the
11 human body.

12 Q. And then you feel that you are an expert in how
13 the human body would react under various engineering
14 circumstances, is that correct?

15 A. I am at least an expert with regard to certain
16 areas in this field.

17 Q. Including the head?

18 A. Yes, sir. I have some knowledge having to do with
19 the impact of the head.

20 Q. How about the knee?

21 A. Say again?

22 Q. The knee.

23 A. I have not looked into that.

1 Q. Do you know what force it takes to break any
2 of the arm or leg bones in a child from say one to four?

3 A. Well, that information may be available, surpris-
4 ingly, but --

5 Q. You don't know?

6 A. I don't have it, no, sir. I have not had occasion
7 to make use of it.

8 Q. You say it couldn't have happened to any of the
9 children in the seats?

10 A. That is correct. And from the fact that the
11 deceleration levels were just so low compared with the
12 tolerance of the overall human body to deceleration in a
13 rearward situation.

14 Q. I understand that. So, there certainly wouldn't
15 be enough Gs or force or whatever way you want to put it to
16 to fracture any of the leg bones in these children, is that
17 correct?

18 A. Not as long as they were seated.

19 Q. And you have assumed that they were seated. And
20 that is part of the data that you got, isn't it?

21 A. That is correct.

22 Q. Now, do you know whether Barbara Adams just was
23 crushed or not?

1 MR. DUBUC: We have already been through that.
2

3 MR. LEWIS: No.
4

5 MR. DUBUC: Yes, you asked him before whether he
6 knew the injuries to Barbara Adams, and he answered he did
7 not, no.
8

9 MR. LEWIS: Alright.
10

11 Then I am going to ask you to assume that she had
12 a crushed chest.
13

14 THE WITNESS: Yes, sir.
15

16 MR. DUBUC: Are you reading from something?
17

18 MR. LEWIS: I just want him to assume that she
19 had a crushed chest.
20

21 Do you know what force it takes to crush a human
22 chest.
23

24 THE WITNESS: Well, that depends upon exactly how
25 the load was applied. It could be a relatively low force
26 if it were applied over a relatively small area. It could be
27 at a relatively large force like the order -- well --
28

29 BY MR. LEWIS:
30

31 Q. What would be the range of force required to cross
32
33 --

34 A. Well, it would depend entirely upon the distribution
35 of the load over the chest.
36

1 Q. Well, now, you have told us that she was located
2 between rows four and five.

3 A. Yes, sir.

4 Q. On the right side of the airplane?

5 A. Yes, sir.

6 Q. Alright. At that location --

7 A. Yes, sir.

8 Q. -- under these circumstances, how much force would
9 it take to crush her chest?

10 A. It would depend upon the area in which the load
11 was distributed, and I have no knowledge of what that area
12 was.

13 Q. I believe you said in your report, doctor, that
14 the accident did not provide hazard to the life or health
15 of the children or adult located in the troop compartment.

16 A. No, sir. I didn't say that.

17 Q. Well, that is what I read.

18 A. Well, read it carefully.

19 Q. It is a scientific certainty that deceleration
20 occurring in the April 4, 1975 Saigon CSA accident did not
21 provide a direct hazard to the life or health of the children
22 or adults located in the troop compartment of that aircraft.

23 A. Yes, sir. That is what I said.

1 Q. Alright. Now, how do you explain that she died?

2 A. The fact that she was standing adjacent to the isle
3 and that she went forward down the isle and wound up at the
4 bulkhead and in the process of doing that, she achieved
5 appreciable velocity with respect to the airplane. She did
6 not participate in the G level associated with the airplane
7 proper, that is the troop compartment proper and the rest of
8 the children who were seated in the seats. She, in effect,
9 had a fall, if you will, from between rows four and five to
10 the bulkhead and a G level somewhere between we'll say
11 one point six and five. And so, she hit the end of the
12 bulkhead with appreciable speed.

13 Q. How fast was she going?

14 A. Well, If you'll let me approximate.

15 Q. Surely.

16 A. I would say the distance from her position at the
17 front of the bulkhead might have been, I'd say 12 ft. Now,
18 that could have been 15 ft. Let's see. This thing is
19 60 ft. long -- let's say about 12 ft., and she would have hit
20 the bulkhead at about 44 ft. per second or about 30 miles
21 an hour.

22 Q. And what was the G load on her?

23 A. I don't know what the G load would have been on

1 her at that particular point. It would have, depending
2 upon --

3 Q. What factors?

4 A. What she hit, it would depend upon her --

5 Q. What did she hit?

6 A. I don't know what she hit. She hit something
7 that was sufficient to cause her not to survive the accident.

8 Q. Did she hit a bulkhead?

9 A. She may have.

10 Q. Is your testimony that you have calculated from
11 some of these reports that she was standing?

12 A. She was standing?

13 Q. Yes.

14 A. Did I calculate that? I didn't calculate that.

15 Q. Well, how do you come to the conclusion that she
16 was standing?

17 A. Did I say she was standing?

18 Q. You just did.

19 A. I could well be in error, but she may have been
20 standing.

21 Q. Well, was she standing?

22 A. Nobody knows the answer to that question.

23 Q. Well, there may be people that know. You mean you

1 don't know?

2 A. Well, I don't know, and Neil doesn't know, and
3 Neil was standing in the isle adjacent to her.

4 Q. Looking at her?

5 A. Say again?

6 Q. Looking at her?

7 A. Oh, I don't know whether she was looking at her or
8 not, but she doesn't know.--

9 Q. Was Neil communicating with her, do you know?

10 A. -- that is what I get from Neil's statement.

11 Q. Do you know whether Neil was communicating with
12 her or not?

13 A. I don't know.

14 Q. Do you know whether anybody was talking with her?
15 Do you know whether any of the people in the troop compartment
16 were talking with her or not?

17 A. No.

18 Q. And so you don't know whether she was braced
19 behind those seats or how she was, do you?

20 A. I know she wasn't braced enough to prevent her
21 from going down the isle.

22 Q. How do you know she didn't go over the top of
23 the seats?

1 A. You mean if she stood up?

2 Q. No, wonder if she was thrown up? Why couldn't
3 she have been thrown up over the top of the seats and flung
4 down against the bulkhead?

5 A. Well, that is a good question. Well, had that
6 been the case, she would have wound up against the lavatory.

7 Q. Do you know that she didn't? Where did she end
8 up?

9 A. My understanding is that she wound up down near
10 the bulkhead.

11 Q. Which bulkhead?

12 A. Just about station or just in front of chairs in
13 row one.

14 Q. Was there a bulkhead there?

15 A. I guess there must have been.

16 Q. Well, do you know whether there was a bulkhead
17 there or not, sir?

18 A. No, I don't know whether there was one there or not,
19 but she must have hit something in that area.

20 Q. And your testimony is that she then went to the
21 left around the lavatory and struck a bulkhead which was
22 just ahead of station one; is that your testimony?

23 A. That would be the implication of what I get,

1 from what I'm able to read in the various depositions and
2 statements.

3 Q. Have you looked at the pictures of the troop
4 compartment?

5 A. Have I looked at the pictures of the troop compart-
6 ment?

7 Q. Um-hmm.

8 A. Yes, sir. I have looked at some.

9 Q. And are you telling me whether there was a bulk-
10 head there, just prior to seat one?

11 A. No, I am not telling you that. I'm telling you
12 that in the various statements that several of these people
13 used, they refer to the bulkhead at the end -- forward end
14 of the troop compartment. So, I presume, you know, that there
15 was one there. Maybe I am wrong.

16 Q. Well, the partition at the lavatory would be a
17 bulkhead, at least by my standard, would it not?

18 A. Sure.

19 Q. I mean, that partition, wall is another word for
20 bulkhead, isn't it?

21 A. Something across there, yes.

22 Q. That's right. And so the lavatory has a bulkhead
23 in its rearward orientation?

1 A. Yes, sir. It does have.

2 Q. So, if she left,-- you have her daughter to the
3 right of her, is that right? The way I see this diagram
4 here --

5 A. Yes, sir. That is correct.

6 Q. You have Barbara next to her daughter there?

7 A. That is correct. That is correct.

8 Q. Now, you don't know that she wasn't flung up
9 over those seats, do you?

10 A. No, I don't know that.

11 Q. And if she was flung up over those seats from a
12 braced position between the seats striking anything forward
13 there, meaning several rows of seats forward, that would
14 suggest that your calculations are off, wouldn't it?

15 A. No, not at all.

16 Q. How many Gs --

17 A. Oh, you mean with regard to the speed at which she
18 hit the bulkhead?

19 Q. Or the G bars or anything else.

20 A. I have not computed the G bars. I have calculated
21 the speed based upon an estimated distance.

22 Q. What kind of force would it take to propel her
23 out of that position and up over the seat and down the aisle

1 to strike anything at thirty miles an hour?

2 A. Might not take virtually any force at all. It
3 depends on what she does. Does she turn loose? Does she stand
4 up? Does she move out in the isle to try to do whatever she
5 has decided she's going to do? Does she think the first
6 impact is it and it is all over, and she steps out into the
7 isle and at the second impact and wham, down the isle she
8 goes?

9 Q. Do you know whether she was killed at the first or
10 second impact?

11 A. She was not killed at the first impact. That is
12 an absolute certainty.

13 Q. How do you know that?

14 A. Because the change of velocity in the first impact
15 was less than one foot per second, and so if she went down
16 the isle, she did so at less than crawling speed.

17 Q. Tell me this --

18 A. She would not have been killed as a result of such
19 action.

20 Q. How did the two babies die?

21 A. I am not sure that two did, first.

22 Q. Do you have any explanation?

23 A. The one that died --

1 Q. Right.

2 A. -- to my knowledge --

3 Q. Alright.

4 A. -- died because of strangulation.

5 Q. And how did that happen?

6 A. Because of some cord that got wrapped around the
7 child's neck, having to do with a satchel or something that
8 was placed around it's neck.

9 Q. How would that happen?

10 A. I don't know.

11 Q. No, I am talking about how would it happen
12 mechanically that that child would die by the cord being
13 around its neck?

14 A. If you get strangled?

15 Q. Yes.

16 A. Just by getting strangled.

17 Q. But where would the cord have to be? The pressure
18 would have to be on the front of the neck not the back of it,
19 is that right?

20 A. It would have to be on the front of the neck?

21 Q. Yes.

22 A. It would have to be all the -- well, it would have
23 to close off the air passage.

1 Q. Alright. Now, how would that cord then strangle
2 the child?

3 A. Well, let's just -- do we know where the child
4 was seated?

5 Q. I don't know if she was -- somebody and that child
6 was in the troop compartment in a rearward facing seat. You
7 have assumed all of them were. Did you assume that one was
8 different?

9 A. You understand that I don't know, and I don't think
10 you know, and I don't think anybody knows how this happened.
11 We can only surmise at how it might have happened; and I'm
12 willing to do that --

13 Q. Well, let me make sure that I understand this,
14 Doctor Turnbow. Essentially much of what you have said
15 about this crash is surmised, isn't that true?

16 A. Much of what I said? Much means more than 50%?

17 Q. Yes.

18 A. Well, you know, Mr. Lewis, this is not the first
19 one of these that I have been through; but I think that this
20 case is so straight forward with regard to the G levels
21 associated with this troop compartment that, like I said in
22 my statement, I think it is beyond any possibility that the
23 deceleration were high enough to provide any direct hazard

1 to those children certainly who were seated and the adults
2 who remained in position --

3 Q. Between the seats?

4 A. -- in the aircraft, wherever they were. Some of
5 them remained in position in the isle.

6 Q. Well, let me ask you this --

7 A. Or even who restricted the motion to the point to
8 where they didn't develop a relatively large velocity with
9 respect to the aircraft and hit down here at the "the bulk-
10 head" and whatever that is. Maybe it isn't a bulkhead.

11 Q. You're speaking of forward end?

12 A. Forward end.

13 Q. Let me ask you this, then, sir. If G loadings of
14 five Gs or less would damage a baby's brain, then you could
15 be wrong, is that right? I'm not asking you to agree,
16 doctor, but if that were true, then you could be wrong about
17 the capacity to injure babies' brains, is that correct?

18 A. Yes, I guess that possibly would be correct
19 because I can anticipate that peak accelerations in this
20 accident could have been as high as five Gs.

21 Q. So if somebody who was very knowledgeable in
22 infants' brains, both as to their structure and what the
23 anatomy is; and if both people concluded that five Gs could

1 injure babies' brains, then you would agree that there would
2 be forces that could do so, otherwise not?

3 A. Yes, sir --

4 MR. DUBUC: Just a minute. Just a minute. I
5 object to the form.

6 MR. LEWIS: Okay.

7 MR. DUBUC: Are you asking him to assume that or
8 are you saying is that?

9 MR. LEWIS: I'm just asking him to assume that.

10 MR. DUBUC: Assume that. Without any disagreement,
11 okay, even though somebody may disagree.

12 BY MR. LEWIS:

13 Q. Alright. But is that correct, sir? In other
14 words, if five Gs could injure a baby's brain, and I'm not
15 asking you to agree with their studies, but if that was
16 established, then the capacity to injure baby's brains would
17 be present, is that correct?

18 MR. DUBUC: Hold the question.

19 MR. LEWIS: I am happy to hold it. (Pause)

20 MR. LEWIS: Let me just get this one question,
21 Carroll, and I know that the witness has to go.

22 Sir, I am just trying to establish this one thing.
23 Assume, if you will, and I'm not asking you to agree that this

1 is the case, but assume, if you will, that loads of five Gs
2 had the capacity to injure babies' brains. If that were
3 true, then there would be the capacity -- then this airplane
4 crash had the capacity to injure the children in the seats?

5 MR. DUBUC: When you say five Gs, you are talking
6 about five Gs minus X, in rearward facing seats?

7 MR. LEWIS: I'm speaking as they were oriented
8 here.

9 MR. DUBUC: Alright. You are assuming if, under
10 those circumstances, minus X, five Gs had the capacity to
11 injure children's brains, what?

12 MR. LEWIS: Then he would concede that this air-
13 craft, there was enough force to injure their brains.

14 MR. DUBUC: Oh, the ones in there?

15 MR. LEWIS: Yes.

16 MR. DUBUC: I don't think you're asking him a
17 positive question. These are individual people.

18 BY MR. LEWIS:

19 Q. But isn't that so, sir?

20 A. Well, that is not quite true because what I've told
21 you here is that I don't think the G levels exceeded five
22 Gs.

23 Q. I understand that.

1. A. The question is what were they really. One?

2. Q. I believe you said there was a peak of five Gs.

3. A. Okay. Now, the question is how long is that
4. load applied. The peaks imply very very short duration,
5. okay. So, for me to go along with your supposition here
6. about the only outcome of this --

7. Q. Yes.

8. A. -- you know, you are going to have to talk about
9. how long this load was applied. Five Gs is not the whole
10. story.

11. Q. Alright. I think we just better quit here,
12. Mr. Dubuc, in fairness to the witness.

13. MR. DUBUC: Alright.

14. MR. LEWIS: We will suspend and I will agree with
15. the time with counsel to resume.

16. (A discussion was held off the record.)

17. MR. LEWIS: Thank you, doctor.

18.
19. Whereupon, at 5:25 o'clock p.m., the taking of the
20. instant deposition ceased.

1 CERTIFICATE OF NOTARY PUBLIC

2 COMMONWEALTH OF VIRGINIA)
3 COUNTY OF FAIRFAX)4 I, CLAIREEN M. HOLMES, the officer before whom the
5 foregoing deposition was taken, do hereby certify that
6 Dr. James Turnbow, whose testimony appears in the foregoing
7 deposition, was duly sworn by me, a Notary Public in and for
8 the Commonwealth of Virginia at Large; that the testimony
9 of said witness was recorded by me by stenotype and there-
10 after reduced to typewritten form under my direction; that
11 said deposition is a true record of the testimony given by
12 said witness; that I am neither counsel for, related to, nor
13 employed by any of the parties to the action in which this
14 deposition was taken; and, further, that I am not a relative
15 of or employee of any attorney or counsel employed by the
16 parties hereto, nor financially or otherwise interested in
17 the outcome of the action.18
19 
20 Notary Public in and for the
21 Commonwealth of Virginia

22 My Commission Expires:

February 8, 1985