

UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLUMBIA

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

Plaintiff

-against-

Civil Action No.  
76-0544

LOCKHEED AIRCRAFT CORPORATION,

Defendant and  
Third-Party Plaintiff

-against-

THE UNITED STATES OF AMERICA,

Third-Party Defendant

Deposition of:

**JOHN ROBERT CROMACK**

Tuesday, October 27, 1981

Washington, D. C.

GASDOR REPORTING COMPANY  
General Stenotype Reporting  
499 South Capitol Street, SW, Suite 408  
Washington, D. C. 20003  
(202) 484-0016

Deposition of JOHN ROBERT CROMACK was taken, pursuant to notice, before Albert J. Gasdor, a Notary Public in and for the District of Columbia, commencing at 1:00 o'clock, p.m., Tuesday, October 27, 1981, in the law offices of Haight, Gardner, Poor & Havens, Suite 1000, 1819 H Street, N. W., Washington, D. C.

APPEARANCES:

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# I N D E X

Tuesday, October 27, 1981

Washington, D. C.

## DEPONENT

## DIRECT EXAMINATION

JOHN ROBERT CROMACK

4

## E X H I B I T S

### NUMBER

### FOR ID.

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1 Whereupon,

2 JOHN ROBERT CROMACK

3 was called as a witness and, having been duly sworn by the  
4 Notary Public, was examined and testified as follows:

5 DIRECT EXAMINATION

6 BY MR. DUBUC:

7 Q State your full name and address for the record,  
8 please.

9 A John Robert Cromack, [REDACTED] Tempe,  
10 Arizona.

11 Q You have produced for us a copy of your curriculum  
12 vitae. I would like to ask you a couple of questions about it.

13 (Said document marked Cromack Exhibits

14 A and No. 1, respectively, for  
15 identification.

16 BY MR. DUBUC:

17 Q Mr. Cromack, is this a copy of your current cur-  
18 riculum vitae?

19 A No, sir, I don't believe it is. It is reasonably  
20 correct.

21 Q Do you have a more current one?

22 A Yes, sir.

1 Q Do you have it with me?

2 A No, sir.

3 MR. DUBUC: Can we get a copy of that, Mr.  
4 McManus?

5 MR. MCMANUS: Certainly.

6 BY MR. DUBUC:

7 Q Can you tell us what changes, additions or deletions  
8 your current one has?

9 A I think it has a few more papers on there, and  
10 probably some additional information about my present affili-  
11 ations.

12 Q What would be different about your present  
13 affiliations?

14 A It would upgrade or update the affiliations and  
15 reflect the current status of them rather than when this was  
16 made a couple of years ago.

17 Q Are you still the president of Cromack Engineering  
18 Associates, Inc.?

19 A Yes, I am.

20 Q You are referring to affiliations on what page  
21 of this updated CV? The first page, where it says "Pro-  
22 fessional Affiliations"?

1           A     I think that the new one has got a little different  
2 structure than this.

3           Q     Are there any additional affiliations?

4           A     Yes, sir.

5           Q     What would those be?

6           A     I am a member of the Desert Samaritan Hospital  
7 Advisory Board. I am a current secretary of the board.

8           I am also a member of the Vestry of St. Augustine's  
9 Episcopal Church.

10          There are some additional publications that I have. I  
11 don't recall the names of them. My secretary takes care of  
12 that stuff.

13          Q     Are there any publications that would be relevant  
14 to the opinions you have been asked to give in this case,  
15 any publications, for example, with respect to investigation  
16 of aircraft accidents or aircraft engineering, aircraft  
17 phenomenon as far as G-forces are concerned?

18          A     I would expect that any publication I prepared  
19 would be relevant to this particular accident.

20          Q     Are you talking about additional publications  
21 that would be listed under the section "Publications,  
22 Journals, Proceedings and Transactions" and maybe there

1 would be some additional ones there.

2 A Publications and presentations. I guess the answer  
3 to that would be generally, yes.

4 Q Do you have a lot of publications dealing with  
5 automobile accidents, auto safety? Is that correct?

6 A That is correct.

7 Q Do you feel those are applicable to the aircraft?

8 A To some extent.

9 Q To what extent would they not be applicable?

10 A I would not be able to assess that for you without  
11 considerable study, I would suspect.

12 Q I would suspect you have done considerable study  
13 with respect to the C5A accident, have you not?

14 A No, sir.

15 Q When were you first contacted to consult on this  
16 case?

17 A I believe it would be sometime in December of 1979.

18 Q Who contacted you?

19 A Doctor Michael Cohen.

20 Q How did he contact you?

21 A I believe it would be by telephone.

22 Q Did he ever follow up that telephone contact in



1 writing?

2 A Yes, I think he did.

3 Q Did he write more than one letter to you?

4 A Yes, he has written several letters.

5 Q Do you have those with you?

6 A Yes, sir.

7 Q When was the first time you consulted with Doctor  
8 Cohen or any other representative of the Lewis firm in  
9 connection with this accident?

10 A When you say "consult," what do you mean?

11 Q Sat down and talked about it in person.

12 A I believe I met Doctor Cohen in person in the  
13 early part of March, 1980.

14 Q Where was that?

15 A In Rosslyn, Virginia.

16 Q Do you recall the approximate date? Would it be  
17 around the 8th of March?

18 A Somewhere around that time.

19 Q Did you attend a symposium of a number of doctors  
20 and medical people held on or about March 8, 1980?

21 A Yes.

22 Q Did you speak at that symposium?

1 A I spoke, but I am not sure I understand what you  
2 mean.

3 Q I don't speak in the manner of a conversational  
4 discussion. Did you give any presentation?

5 A No, sir.

6 Q Do you recall who was at that symposium as speakers?

7 A I think I have an itinery or agenda, but I don't  
8 recall the names of all the people. There was quite a large  
9 number.

10 Q Did you have any discussions that could be con-  
11 sidered consultations as to facts, circumstances or opinions  
12 relative to this accident at that symposium or a day before or  
13 a day after in March 1980?

14 A I believe I was given some information at that  
15 meeting.

16 Q Who gave that to you?

17 A Doctor Cohen would have been one and certainly  
18 the people who attended the meeting presented materials  
19 that I listened to.

20 Q You say you talked with some people about this  
21 accident. Do you recall who you had specific discussions  
22 with in March of 1980?

1 A No, sir.

2 Q Did you have any discussions with Doctor Cohen?

3 A Other than Doctor Cohen.

4 Q Did you have any discussions with Doctor Busby?

5 A I don't recall. I think I met a Doctor Busby.

6 Q How about Doctor Mason?

7 A I believe I may have met a Doctor Mason, also.

8 Q How about Doctor Snyder? Did you talk with him?

9 A Which Snyder?

10 Q Jerry Snyder.

11 A Yes.

12 Q Was he at that meeting?

13 A I believe he was.

14 Q How about Mr. Carroll?

15 A I don't recall a Mr. Carroll.

16 Q How about Mr. Timm?

17 A I may have met a Mr. Timm.

18 Q Is there anyone else you can recall?

19 A No, sir, I don't recall very much about the meeting.

20 Q You say you had some consultations with Doctor  
21 Cohen before that meeting?

22 A We talked at some point in time during that meeting.

1 but that has been a long time ago and I don't recall whether  
2 it was before or after.

3 Q Did you attend any symposiums of similar presenta-  
4 tions prior to that meeting on March 8, 1980?

5 A Relative to this accident?

6 Q Yes, sir.

7 A No, sir.

8 Q Did you have any consultations the day after with  
9 Doctor Cohen or members of the Lewis firm or any of the  
10 other experts in attendance?

11 A I believe I just answered that. I said I don't  
12 recall when the discussions or conversations went on because  
13 it has been so long ago.

14 Q Were you given any materials?

15 A Yes, sir, I was given some material but, again,  
16 I don't recall if it was at that time, subsequent or before.

17 Q When was the next time you consulted in person  
18 with Doctor Cohen or any member of the Lewis firm or any of  
19 their experts?

20 A I believe that would be October 26, 1981.

21 Q So, between February 1980 and October 26, 1981,  
22 you didn't have any in-person consultation with Doctor Cohen

1 or anyone else at the Lewis firm; is that correct?

2 A I don't recall whether there was someone from the  
3 Lewis firm present at a subsequent meeting, subsequent,  
4 that is, to the early March meeting.

5 Q Where did that meeting take place?

6 A In San Antonio, Texas.

7 Q This was to inspect the parts of the aircraft that  
8 were located there?

9 A Yes, sir.

10 Q Mr. Timm was there, was he not?

11 A Yes, sir, he was there.

12 Q Do you recall who else was at that meeting?

13 A I may have made a note of that in my notes, but  
14 I can't recall anybody, offhand, other than Mr. Timm.

15 Q He is the only one you remember being present?

16 A Yes.

17 Q Did you ever meet a Mr. Frazier of the Lewis  
18 firm?

19 A I don't recall.

20 Q Do you recall if he was present?

21 A I don't know.

22 Q Do you have any notes about that inspection?

1 A Yes, I have some in my file.

2 Q Do you have those with you?

3 A I believe so.

4 Q Do you have any notes of the first meeting on  
5 March 1980?

6 A I believe there are some notes in there.

7 Q In that meeting in San Antonio, did you go just  
8 for the day or did you remain overnight, either the night  
9 before the inspection or the night after?

10 A I don't remember.

11 Q Would your notes indicate one way or the other?

12 A Whether I remained overnight?

13 Q Yes, sir.

14 A I doubt it.

15 Q Do you date your notes as you take them?

16 A Yes, sir.

17 Q If you had notes the day before, they would have  
18 a different date than the date of the inspection; is that  
19 correct?

20 A That is correct.

21 Q Did you take some pictures during that trip?

22 A Yes, sir.

1 Q I think we have had those produced today.

2 Approximately how many pictures did you take?

3 A I don't recall.

4 Q Would it be 50 or 60?

5 A I don't recall.

6 MR. DUBUC: May I have this exhibit marked  
7 Cromack Exhibit 2.

8 (Said document marked Cromack  
9 Exhibit No. 2 for identification.)

10 BY MR. DUBUC:

11 Q Would you take a look at Cromack Exhibit 2 and tell  
12 me if those are all of the pictures that you took in San  
13 Antonio?

14 Let the record reflect he is taking what I guess are  
15 some original pictures from his file.

16 A No, sir.

17 Q Those are not all the pictures?

18 A No, sir.

19 Q There are some additional ones?

20 A Yes, sir.

21 Q Do you have those with you?

22 A Yes, sir.

1 Q Could we see those?

2 A Yes, sir.

3 MR. DUBUC: Let the record reflect Mr. Cromack  
4 has produced six additional pictures, which I would like to  
5 mark.

6 We will mark these Cromack Exhibit 2, 2-A, -B,  
7 -C, -D, -E, and -F.

8 (Said documents marked Cromack  
9 Exhibits 2-A thru 2-F, respect-  
10 ively, for identification.)

11 BY MR. DUBUC:

12 Q Do you recall if Mr. Timm took any pictures?

13 A No, sir, I don't recall.

14 Q Did you take these pictures, yourself?

15 A Yes, sir, I did.

16 Q This is a picture of Mr. Timm, isn't it?

17 In fact, there are two of them.

18 A Yes, I believe that is Mr. Timm.

19 Q Two of the pictures are pictures of a cargo door  
20 of an aircraft; is that correct, if you know?

21 A Yes, sir.

22 Q Do you know of any reason why those were not



1 catalogued and on separate sheets with identification, such  
2 as other pictures in Exhibit 2?

3 A It appears that those did not get printed for some  
4 reason or other --I don't know why -- at the same time.

5 Q When were the pictures which were part of Cromack  
6 Exhibit 2 printed?

7 A Shortly after the inspection.

8 Q That would be sometime in June or July of 1980?

9 A I would imagine, of 1980.

10 Q When were the last six printed?

11 A Probably as soon as these were checked and found  
12 to have been deficient.

13 Q Is there any technical distinction as to relevancy  
14 or importance?

15 A No, sir, just sometimes people don't print them all.

16 Q I may be repetitive and if it is, it is transi-  
17 tional.

18 Between the inspection in San Antonio in June of 1980,  
19 the next time you indicated you consulted with Doctor Cohen  
20 or members of the Lewis firm in person was October 6?

21 A October 26, 1981.

22 Q That was yesterday?

1           A     That is correct.

2           Q     Had you conferred with anyone or consulted with  
3 anyone by telephone between the San Antonio meeting and the  
4 meeting yesterday?

5           A     Yes, I have talked with Doctor Cohen on various  
6 occasions.

7           Q     How many times?

8           A     I don't recall.

9           Q     Have you been sent material by Doctor Cohen?

10          A     Yes, sir.

11          Q     Or others of the Lewis firm?

12          A     Yes, sir.

13          Q     Between that first time that you met in March  
14 of 1980 at that symposium and yesterday, October 26, other  
15 than the meeting in San Antonio where Mr. Timm was present,  
16 have you consulted by telephone or in person with any of  
17 the other experts retained by the Lewis firm, such as  
18 Doctor Busby?

19          A     I don't recall having talked with Doctor Busby.

20          Q     How about Doctor Jerry Snyder?

21          A     With regard to this case?

22          Q     Yes, sir.

1 A I don't recall having talked with Doctor Snyder with  
2 regard to this case.

3 Q How about Doctor Mason?

4 A No, sir.

5 Q How about Mr. Carroll?

6 A No, sir.

7 Q How about Mr. Morain?

8 A No, sir.

9 Q How about Doctor Liu?

10 A No, sir.

11 Q Anyone else that you can recall, other than Doctor  
12 Cohen or members of the Lewis firm that you have discussed  
13 this case with?

14 A Not that I can recall. I may have had a conversa-  
15 tion with Mr. Timm but I don't recall the conversation. He  
16 would be the only one.

17 Q You have not had any personal consultations with Mr.  
18 Timm?

19 A Not that I recall.

20 Q Has he sent you anything or have you sent him  
21 anything?

22 A Yes, sir.

1 Q Did you send him anything?

2 A I believe I sent him some photographs.

3 Q When did you do that?

4 A It would have been at the same time that these  
5 photographs were received.

6 Q Copies of what are in Exhibit 2?

7 A Yes, sir.

8 Q Sometime in June or July of 1980?

9 A Yes, sir.

10 Q Did he send you anything?

11 A Yes, sir.

12 Q What did he send you?

13 A He sent me a letter.

14 Q One letter or more than one letter?

15 A One letter.

16 Q Do you have a copy of that?

17 A Yes, sir.

18 Q Is that the letter which has already been marked  
19 Timm Exhibit 3 for identification, dated June 26, 1980?

20 A Yes, sir.

21 Q Did yo' ever respond to this letter?

22 A I never sent him a letter; no.

1 Q Did you ever send anybody else the documentation  
2 calculations or anything else that could be considered a  
3 response to the subject matter of this letter?

4 A No, sir.

5 Q Have you ever made any calculations as referred  
6 to in here as to the seat strength, and so on?

7 A No, sir.

8 Q Have you made any calculations as to the strength  
9 of any of the components of the C5A?

10 A No, sir.

11 Q Have you made any calculation of the G-forces  
12 operative on the C5A troop compartment or cockpit in this  
13 accident?

14 A I have made some calculations in which G-forces  
15 were the result, but I don't believe that those were the  
16 forces that were imposed on the C5A in this accident.

17 Q I don't quite understand but I am not the quickest  
18 person in the world. Do you mean calculations as to the  
19 G-forces that were the result, you don't believe were the G-  
20 forces operative on the troop compartment at the time? Is  
21 that what you are saying?

22 A Essentially, that is what I am saying.

1 Q Would it be a fair statement that your calculations  
2 are as to ultimate G-forces operative on components?

3 A No.

4 Q Tell us what your computations consist of.

5 A I computed some average G-forces, which simply  
6 are mathematically precise calculations that do not neces-  
7 sarily represent the real situation.

8 Q When did you do those calculations?

9 A This morning.

10 Q How long did it take you?

11 A I didn't time it.

12 Q What time did you start making the calculations  
13 this morning?

14 A Just sometime this morning. I don't remember.

15 Q Where did you make those calculations?

16 A I am sorry.

17 Q Where did you make them?

18 A At the Lewis law firm.

19 Q What time did you arrive there this morning?

20 A A little before 9:00.

21 Q Did you have a conference before you made the  
22 calculations?

1 A Yes. Let's go back and start again.

2 Q Did you have a conference before you made the  
3 calculations?

4 A Yes.

5 Q Who was present?

6 A I was, Mr. Cohen was.

7 Q Anybody else?

8 A No.

9 Q Prior to this morning, had you made any calculations  
10 as to G-forces on this C5A aircraft, either as to components  
11 or the effects on passengers?

12 A No.

13 Q After your conference with Doctor Cohen -- he was  
14 the only one present at the conference this morning?

15 A Yes.

16 Q How long did that conference last?

17 A I was at the firm all morning long.

18 Q Did you talk to anyone else other than Doctor Cohen?

19 A Yes.

20 Q Who else?

21 A Mr. McManus.

22 Q Was that before or after you made your calculations?

1 A After.

2 Q Approximately how long did you talk to Mr. McManus?

3 A I don't recall.

4 Q Did you talk to anyone else after you talked with  
5 Mr. McManus?

6 A Yes, sir.

7 Q Who was that?

8 A The secretaries.

9 Q Anyone else?

10 A Yes, sir.

11 Q Who?

12 A My secretary.

13 Q Anybody else?

14 A Not that I recall.

15 Q Have those calculations you made been reduced to  
16 writing?

17 A Yes, sir.

18 Q Do you have those with you?

19 A Yes, sir.

20 Q Prior to making those calculations, did you review  
21 any material other than the pictures you have already shown  
22 us?



1 A Yes, sir, I did.

2 Q Tell us what you reviewed, either this morning or  
3 whenever.

4 A At any time?

5 MR. MCMANUS: Does it have to do with these cal-  
6 culations, or anything having to do with this accident?

7 BY MR. DUBUC:

8 Q We know about the inspection at San Antonio. Are  
9 all of the things you used there written down here?

10 A Yes.

11 Q Can we mark that for identification.

12 MR. DUBUC: I will ask this be marked Cromack  
13 Exhibit 3 for identification. This is apparently a list  
14 of the things Mr. Cromack has reviewed.

15 (Said document marked Cromack

16 Exhibit No. 3 for identification.)

17 BY MR. DUBUC:

18 Q You have reviewed the statement of Captain Harp?

19 A Yes, sir.

20 Q Have you reviewed any of his testimony?

21 A In trial?

22 Q Yes.

1 A No, sir.

2 Q Have you reviewed the statements of Captain, now  
3 Major Traynor, the pilot?

4 A I don't recall whether I have or not.

5 Q I don't see it listed on here.

6 Would this fairly and accurately, to the best of your  
7 recollection, be what yo' have reviewed?

8 A Yes, sir.

9 Q When did you make this list, Cromack Exhibit 3?

10 A Yesterday.

11 Q Was this while you were at the Lewis firm?

12 A Yes.

13 MR. MCMANUS: Did you say why or while?

14 MR. DUBUC: While you were there.

15 BY MR. DUBUC:

16 Q Did you look at documents to remind you whether  
17 you had or had not seen them?

18 A Yes, sir, I did.

19 Q Do you recall whether you were shown the statement  
20 or the transcript of the pilot's deposition or testimony?  
21 That is, Major Traynor.

22 A I don't recall that I was.

1 Q How about Captain Malone, either his statement or  
2 trial testimony?

3 A Not to my recollection.

4 Q There is a reference to the wreckage schematic.

5 Is that what has been marked Exhibit D-9 for identifi-  
6 cation in this litigation?

7 Is that what you mean by a reference to the wreckage  
8 schematic?

9 A Yes, sir.

10 Q Summary of Events.

11 Do you have that with you?

12 A Yes, sir.

13 Q Who provided you with that? Is that from the  
14 accident report?

15 A Yes, sir.

16 That was provided to me -- I don't know whether it  
17 was from the accident report or not.

18 To answer your question, it was provied to me by Doctor  
19 Cohen.

20 Q Do you have a copy of that with you?

21 A Yes, sir.

22 Q You refer to the Collateral Report Summary. Is

1 that the initial 20 or 21 pages of the Summary of the Collat-  
2 eral Report?

3 A I don't recall how many pages there were.

4 Q Did you review the entire Collateral Report? Did  
5 you have an opportunity to see all of that? It stands  
6 about that high.

7 A No, sir.

8 Q How about the official Air Force accident report,  
9 the AAR. Did you have an opportunity to review that?

10 A Not that I recall.

11 Q Or the Summary?

12 A The Summary you are referring to may be the  
13 Summary of Events I have listed as Item 3 on my list.

14 Q You have seen some enlargements of photos in the  
15 possession of the Lewis firm?

16 A Yes, sir.

17 Q You mentioned the medical conference attendance  
18 before. Is that the March 8, 1980 conference?

19 A Yes.

20 Q And a report by Bill Timm. Is that a formal report  
21 or is this a summary of notes, or what?

22 A That is the letter we discussed earlier.

1 Q That is the letter marked Timm Exhibit 3?

2 A I don't recall what exhibit it was, but it was  
3 the letter you showed me a minute ago.

4 Q That is the only report of Mr. Timm you reviewed?

5 A Yes.

6 Q You referred to the inspection of the C5. We  
7 have covered that. You have some notes on that, and the  
8 damaged parts?

9 A Yes, sir.

10 Q You have read Doctor Turnbow, Mr. Edwards' and  
11 Mr. Jablonsky's reports?

12 A Yes, sir.

13 Q Have you read the five volumes of Mr. Edwards'?

14 A I have them but I have not read them.

15 Q When did you receive those?

16 A It has been several weeks now.

17 Q Have you read any of the testimony by deposition  
18 of Doctor Turnbow, Mr. Edwards recently; Doctor Gaume?

19 A All three or any one of them?

20 Q Any one of them, given the last month or two.

21 A I have read some deposition material and some  
22 testimony. I don't recall the dates.

1 Q You have the volume deposition of Doctor Turnbow.  
2 It would have to be the one I mentioned. That was taken in  
3 the last month.

4 A Okay, I have read that.

5 Q And you have probably read Mr. Edwards' deposition?

6 A Those are five volumes?

7 Q No, there is one volume listed here. This is trial  
8 transcription. Have you read that one of Mr. Edwards?

9 A Yes, sir.

10 Q But you have not read his deposition within the  
11 last month?

12 A I have not read his deposition, period.

13 Q You have OCC Distribution on Troop Compartment. Is  
14 that something you received from Doctor Cohen?

15 A Yes, sir.

16 Q Do you have that with you?

17 A Yes.

18 Q Have you read that?

19 A Yes.

20 Q And the general dimensions of the C5A. Is that a  
21 diagram?

22 A Yes.

1 Q Is that a diagram used before, Exhibit D-4?

2 A No.

3 Q Something else?

4 A Yes.

5 Q You have that with you, too?

6 A Yes.

7 Q Decoding of SLRP Messages on Record 11977. Have  
8 you read those?

9 A I have looked at it.

10 Q When did you receive those?

11 A October 26, 1981.

12 Q A large number of color and black and white  
13 photos, 5 by 7. Have you looked at those?

14 A Yes.

15 Q When did you first get those?

16 A October 26, 1981.

17 Q Would the same be true with respect to the en-  
18 largements of photos that you referred to at the top of this  
19 list?

20 A No, sir.

21 Q When did you receive those?

22 A I have not received those.

Q You have not seen those?

A I have seen those.

1 Q But you have not received it?

2 A That is correct.

3 Q When did you first look at them?

4 A It would be in March of 1980.

5 Q Two movies of the accident site. When did you see  
6 those movies?

7 A October 26, 1981.

8 Q Yesterday?

9 A Yesterday.

10 Q Was that the first time you have seen those?

11 A Yes.

12 Q Data plot unreadable and printout also largely  
13 unreadable. When did you first see that?

14 A October 26, 1981.

15 Q Other than the computations you referred to  
16 previously, have you written any report or partial report as  
17 to any aspect of this accident?

18 A No, sir.

19 Q Can you think of anything else you have reviewed  
20 other than what you have on this list, Exhibit 3?

21 A No, sir.

22 Q Can you tell us, Mr. Cromack, what you have there in



1 that file that you brought with you and, if you can, we will  
2 mark them as we go.

3 A Everything that I have described to you except the  
4 five volumes of John Edwards' deposition and the large number  
5 of photographs and the two color movies.

6 Q Can you produce for us the item that is referred  
7 to as summary of events?

8 A I suspect I can.

9 MR. DUBUC: Let the record reflect Mr. Cromack has  
10 several things stapled together and is removing a couple of  
11 things and I guess producing for us what is described as the  
12 summary of events.

13 BY MR. DUBUC:

14 Q There are some other things attached to that. Can  
15 you tell us what they are?

16 A Yes, sir.

17 That is the collateral investigation of aircraft  
18 accident involving C5A, serial number 68-216, and as I under-  
19 stand, this is a summary of that collateral report.

20 Q You had something else attached to it on the top.  
21 What is that?

22 A That is a sworn statement of Captain Tilford W.  
Harp and a copy of the wreckage diagram.

1 Q On top of that was something else.

2 A Letter - yes, a letter.

3 MR. DUBUC: Is there anything privileged about  
4 that letter, Mr. McManus, or that you are claiming privilege  
5 on? It says, "Mr. McManus," at the top of it, does it not?  
6 Is there any claim of privilege on that letter?

7 MR. McMANUS: No.

8 MR. DUBUC: I would like to mark this entire package  
9 as Cromack Exhibit 4. Do you want to mark a Xerox copy?

10 MR. McMANUS: I would prefer the Xerox copies be  
11 marked.

12 We will mark as Cromack Exhibit 4 the transmittal  
13 letter and the documents attached thereto as Cromack Exhibit  
14 No. 4.

15 [Documents marked Cromack Exhibit No. 4  
16 for identification.]

17 BY MR. DUBUC:

18 Q You indicated you do not have copies of the enlarged  
19 photos.

20 A I don't have copies, period.

21 MR. DUBUC: Can you tell us pursuant to our notice  
22 which photos are being referred to, Mr. McManus?

1 MR. McMANUS: They are all the trial exhibits.

2 BY MR. DUBUC:

3 Q You said you had a medical conference attendance  
4 item. Do you have that with you?

5 A Yes, sir.

6 MR. DUBUC: We will mark this Cromack Exhibit No. 5.  
7 This is attendance at the symposium on March 8, 1980.

8 [Document marked Cromack Exhibit No. 5  
9 for identification.]

10 BY MR. DUBUC:

11 Q You indicated you had some notes regarding the  
12 inspection of the aircraft at San Antonio. Do you have those  
13 with you?

14 A Yes, sir; three pages.

15 MR. DUBUC: We will mark those Cromack Exhibit No.  
16 6, two yellow pages and a white page with cross hatching on  
17 it with some diagrams, dated August 6, 1980.

18 [Document marked Cromack Exhibit No. 6  
19 for identification.]

20 BY MR. DUBUC:

21 Q You also refer to an occupant distribution report  
22 of the troop compartment. Do you have that with you?

1 A Yes, sir.

2 Q That has been previously marked DD-1210.

3 As to the first page and then there is some additional  
4 information on the second page.

5 Did you prepare any portion of this, Mr. Cromack?

6 A No, sir.

7 Q Do you know who did?

8 A No, sir.

9 MR. DUBUC: We will mark that Cromack Exhibit No.

10 7.

11 [Document marked Cromack Exhibit No. 7  
12 for identification.]

13 BY MR. DUBUC:

14 Q There is a reference to general dimensions of C5A.  
15 Do you have that with you?

16 A Yes, sir.

17 Q Would you produce it, please.

18 MR. DUBUC: Copies have previously been marked  
19 DD-1217 and DD-1216.

20 We will mark those Cromack Exhibits 8-A and 8-B.

21 A is DD-1216 and B is DD-1217.

22 [Documents marked Cromack Exhibits Nos.  
8-A and 8-B, respectively, for identification.]

1 BY MR. DUBUC:

2 Q You refer to decoding of NSLRP messages. Do you  
3 have those with you?

4 A Yes, sir.

5 Q Would you produce those, please.

6 MR. DUBUC: We will mark this Cromack Exhibit No.  
7 9 for identification.

8 [Documents marked Cromack Exhibit No. 9  
9 for identification.]

10 BY MR. DUBUC:

11 Q Can you take whatever else is in that file that you  
12 have with you and tell us what it is.

13 A Yes, sir.

14 Photographs.

15 Transcription of John Edwards' testimony.

16 Q Do you have some markings or color markings on that?

17 A Yes, sir.

18 MR. DUBUC: We will mark this Cromack Exhibit No.

19 10.

20 [Documents marked Cromack Exhibit No.  
21 10 for identification.]

1 BY MR. DUBUC:

2 Q Those are your green notations on there?

3 A Yes, sir.

4 Q Was the reason you made those green marks to high-  
5 light things that you thought were of interest to you?

6 A Yes, sir.

7 Q Do they form part of your developing opinion as to  
8 G forces or events that refer to this accident?

9 A They may.

10 MR. McMANUS: Now that you have asked those questions  
11 I have no further objection.

12 BY MR. DUBUC:

13 Q Can you tell us what else is in there, Mr. Cromack?

14 A Correspondence between myself and Doctor Cohen;  
15 Mr. Timm's report.

16 MR. DUBUC: I will ask for production of those but  
17 Mr. McManus will want to look at them.

18 BY MR. DUBUC:

19 Q Are you talking about correspondence between you  
20 and Doctor Cohen and Mr. Timm's report?

21 A Yes, sir.

22 MR. DUBUC: Do you have any problems with me looking

1 at Mr. Timm's report?

2 MR. McMANUS: You already have a copy of Mr. Timm's  
3 report.

4 MR. DUBUC: Let's mark this letter of June 26,  
5 1980 with several attachments as Cromack Exhibit No. 11.

6 [Documents marked Cromack Exhibit No. 11  
7 for identification.]

8 BY MR. DUBUC:

9 Q This is what you received from Mr. Timm with the  
10 attachments?

11 A I assume that they did, yes.

12 MR. McMANUS: You already have those materials.

13 MR. DUBUC: That is Cromack Exhibit No. 11.

14 BY MR. DUBUC:

15 Q What is the next thing you have in your file there,  
16 Mr. Cromack?

17 A Report by Doctor Turnbow.

18 Q Does that have some green markings on it?

19 A Yes, sir.

20 Q Are those yours?

21 A Yes, sir.

22 Q Are those remarks of things to remind you of things

1 you felt were relevant to your developing opinion or compu-  
2 tations or other testimony relative to this accident?

3 A Yes.

4 MR. DUBUC: We will ask for the production of that  
5 and mark that Cromack Exhibit No. 12.

6 [Document marked Cromack Exhibit No. 12  
7 for identification.]

8 BY MR. DUBUC:

9 Q What else do you have there, sir?

10 A The report of John Edwards.

11 Q Are there any margin notes or green interlineations  
12 on that?

13 A No, sir.

14 Q What else do you have there, sir?

15 A Some notes, calculations of mine.

16 Q When were those made, sir?

17 A October 27, 1981.

18 MR. DUBUC: We will mark those Cromack Exhibit No.  
19 13, consisting of three pages.

20 [Document marked Cromack Exhibit No. 13  
21 for identification.]



1 BY MR. DUBUC:

2 Q What else do you have?

3 A Report of James Gaume.

4 Q Are there any notes or green markings in that report?

5 A No, sir, not by me.

6 Q Have you read it yet?

7 A Yes.

8 Q May I see it?

9 A Yes, sir. That last page is loose.

10 Q What else do you have in your file there, sir?

11 A It looks like some analogue printout of the MADAR  
12 data.

13 Q Are there any notes on that?

14 A No, sir.

15 Q What else do you have?

16 A Digital printout of what is evidentially MADAR data.

17 Q Are there any notes on that?

18 A No.

19 Q Any green interlineations or anything?

20 A Not by me.

21 Q Does that consist of your entire file on this  
22 accident?

1 A Excluding what I told you earlier.

2 Q You don't have any notes of any of your conversations  
3 or consultations between March 1980 and yesterday?

4 A Yes, what is in the file.

5 Q You don't have any other notes?

6 A Other than what you have, this is the whole file.

7 Q You don't have anything in your office or bag or  
8 hotel room?

9 A This is my complete file with the exception of those  
10 five volumes of John Edwards' deposition.

11 Q You have received no testimony, for example, or  
12 statements from any of the occupants of the troop compartment?

13 A That is correct.

14 Q Or any of the occupants of the cargo compartment?

15 A That is correct.

16 MR. McMANUS: Here are notes from the medical work-  
17 shop and memorandum between Mr. Cromack and Mr. Timm and travel  
18 itinerary.

19 MR. DUBUC: We will mark the notes during the work-  
20 shop Cromack Exhibit No. 14, March 8, 1980 workshop.

21 [Notes marked Cromack Exhibit No. 14  
22 for identification.]

1 MR. DUBUC: As Cromack Exhibit No. 15, we will  
2 mark the memorandum of Mr. Timm transmitting photographs of  
3 June 8, 1980.

4 [Document marked Cromack Exhibit No. 15  
5 for identification.]

6 MR. DUBUC: And travel itinerary and a handwritten  
7 note which looks to be part of it we will mark as Cromack  
8 Exhibit No. 16, two pages.

9 [Documents marked Cromack Exhibit No. 16  
10 for identification.]

11 MR. DUBUC: I gather there is some correspondence  
12 to which you are claiming some privilege. Will you describe  
13 it.

14 MR. McMANUS: I will give you, as we have in the  
15 past, information and dates of letters.

16 This is a letter from Mr. Cromack dated September 28,  
17 1981.

18 MR. DUBUC: To whom?

19 MR. McMANUS: To Michael Cohen, Lewis, Wilson, Lewis  
20 & Jones, Limited, 2054 North 14.

21 A letter to Mr. Cromack dated September 22, 1981.

22 MR. DUBUC: From whom?

MR. McMANUS: It is from Michael Cohen.

A letter dated September 5, 1981 to Mr. Cromack

1 from John Fricker.

2 A note of a call between Michael Cohen and Mr.  
3 Cromack dated 7-14-81.

4 A letter to Michael Cohen from Robert Cromack dated  
5 August 13, 1980.

6 A letter to Michael McManus from Mr. Cromack dated  
7 July 25, 1980.

8 A letter --

9 MR. DUBUC: That was Cromack to you?

10 MR. McMANUS: That is correct.

11 A letter to Mr. Cromack from Michael McManus dated  
12 July 16, 1980.

13 A letter to Mr. Cromack from Michael McManus dated  
14 June 19, 1980.

15 A memoradnum to Lena from Barbee Cromack, Mr. Cromack,  
16 dated 6-17-80.

17 A letter to Mr. Cromack from Michael McManus dated  
18 May 29, 1980.

19 A notation of telephone conversation between Michael  
20 Cohen and Mr. Cromack dated 4-18-80.

21 A telephone note between Mr. Cromack and Michael  
22 Cohen dated 3-14-80.

1 Letter to Mr. Cromack from Mr. Cohen dated 3-1-80.

2 MR. DUBUC: 3-1?

3 MR. McMANUS: Right. That is signed Mary Ann  
4 Lazarus, dated 3-1-80.

5 This is a note of telephone conversation between  
6 Michael Cohen and Mr. Cromack dated 2-13-80.

7 BY MR. DUBUC:

8 Q Mr. Cromack, in those letters Mr. McManus has  
9 just described, do those contain any description or factual  
10 materials as opposed to requests being made or items being  
11 transmitted -- factual material related to this accident?

12 A Not to my knowledge.

13 Q Factual summaries?

14 A No.

15 Q When were you first asked to give any opinion in  
16 this case?

17 A Are you asking when I was retained?

18 Q I am asking you whether it was at the time you were  
19 retained or sometime between then and now you were asked to  
20 give any opinions as to any aspects of this case?

21 A I don't recall.

22 Q Prior to the computations you made yesterday with

1 respect to G forces, have you expressed any opinions either  
2 in writing or orally?

3 A Yes.

4 Q What were those opinions?

5 MR. McMANUS: I object to that and instruct him  
6 not to answer.

7 You can ask him what opinions he might have now but  
8 what he might have discussed with counsel I don't think is  
9 appropriate.

10 MR. DUBUC: Are you directing him not to answer?

11 MR. McMANUS: As you phrased it.

12 MR. DUBUC: I am asking him if he rendered any  
13 opinions.

14 BY MR. DUBUC:

15 Q Mr. Cromack, have you ever been asked to give an  
16 opinion as to the effects of decompression on the occupants  
17 in the troop compartment of this accident?

18 A No, sir.

19 Q Have you been asked to give any opinion with respect  
20 to the effects of hypoxia on any of the occupants in the troop  
21 compartment?

22 A No, sir.

1 Q Have you been asked to give an opinion as to the  
2 psychological effect or trauma effect on the occupants of the  
3 troop compartment?

4 A No, sir.

5 Q Have you formed any such opinions?

6 A No, sir, not in those regards.

7 Q Have you been asked to give an opinion as to the  
8 operative G forces on the occupants of the troop compartment  
9 of this airplane?

10 A Yes, sir.

11 Q Have you been able to formulate such an opinion as to  
12 the G forces operating on the occupants in the troop compart-  
13 ment?

14 A No, sir.

15 Q Have you been asked for a similar opinion on the  
16 G forces on the occupants of the cockpit or the crew compart-  
17 ment on this aircraft?

18 A Only in a general sense, not specifically.

19 Q Have you formed any such opinion?

20 A No, sir.

21 Q Have you been asked to give any opinion as to the  
22 operative effect of G forces on any of the occupants of the  
cargo compartment in the airplane involved in this accident?

1 A Only in a general sense.

2 Q Have you formed such an opinion?

3 A No, sir.

4 Q What do you mean in a general sense?

5 A In that the people who retrained me asked if it was  
6 possible to ascertain the deceleration environment for the  
7 occupants of the aircraft.

8 Q Have you been asked to comment or give an opinion  
9 on the deceleration of the environments of the occupants  
10 of the aircraft by area or generally?

11 A The question was couched in such a way that I  
12 interpreted it to mean in as much detail as I could and I  
13 interpreted that to mean by location, if possible.

14 Q That would be location in different areas in the  
15 aircraft?

16 A Yes, sir.

17 Q That is the way you understood it?

18 A Yes, sir.

19 Q Have you done that?

20 A No, sir.

21 Q So you have no opinion on that?

22 A Not yet. I am working on it.



1 Q You say you are working on it. What are you doing  
2 in order to formulate that opinion that you have not already  
3 done?

4 A I am reviewing new data.

5 Q What data are you going to review? Do you mean  
6 data in addition to Exhibit 3?

7 A What is Exhibit 3?

8 Q The list you have in front of you. Does that  
9 include the new data that you are referring to?

10 A Yes, sir.

11 Q What on that list would you classify as new data?

12 A The photographs were just made available to me, for  
13 one thing.

14 Q Which photographs? We have several photographs  
15 referred to here.

16 A The photographs listed under a large number of color  
17 and black and white photos five by seven and two movies of  
18 accident site and investigation.

19 Q Is that the only new data you are referring to?

20 A There is some additional data that I did not have  
21 previously.

22 Q Which you refer to as new data or at least you

1 consider it new to you?

2 A Yes.

3 Q Which items are those?

4 A The general dimensions of the C5A, a detailed  
5 description of the occupant distribution in the troop com-  
6 partment. Those are essentially the new data, quote, unquote.

7 Q That is what you are going to use?

8 A And anything else that becomes available to me.

9 Q Have you asked for anything else?

10 A Yes, sir.

11 Q What?

12 A I have asked for copies of the photographs to be  
13 sent to me. I have asked for a description of the injuries  
14 sustained by the occupants at different locations.

15 I have asked for information on the character of the  
16 ground and the dimensions of furrows that were made in the  
17 ground by the C5A as it crashed.

18 Q Anything else?

19 A Other things will probably come to mind, but those  
20 are the things I recall off the top of my head.

21 Q You are going to need to study this data in order  
22 to form an opinion as to the effects of the deceleration of

1 the occupants in the troop compartment and cargo compartment?

2 A Yes, sir.

3 Q How long do you think it will take you to do that?

4 A Do you mean once I receive the materials?

5 Q Yes.

6 A I have not given too much thought to that at this  
7 point.

8 Q Have you been asked to be prepared to testify at  
9 a trial that is scheduled to commence next week?

10 A I was made aware that the trial is starting next  
11 week and I have been asked to testify.

12 Q Have you set aside time to do that?

13 A I have not checked my calendar.

14 Q Having been asked, you still don't know whether  
15 you are available?

16 A That is correct.

17 Q Do you have other commitments next week?

18 A We have not set a time for my availability and my  
19 calendar is back in Tempe, Arizona.

20 Q If you received the photographs by the end of this  
21 week, how long will it take you to finish your studies and  
22 formulate opinions?

1 A There are many, many photographs. There are other  
2 data needed besides the photographs. It depends on when these  
3 data are all made available.

4 Q You said the other data was the photographs, the  
5 description of the injuries to the occupants and the dimensions  
6 of the furrows on the ground and some information about the  
7 characteristics. Those are the items?

8 A Yes, sir.

9 Q Have you had a chance to confer with Mr. Morain yet,  
10 the geologist?

11 A No, sir.

12 Q Have you seen any reports from him?

13 A No, sir, I have not.

14 Q Have you seen any testimony from him?

15 A No, sir, I have not.

16 Q Are you scheduled to talk to him?

17 A No, sir, I am not.

18 Q Are those the other data you are referring to that  
19 you need?

20 A Those are some of the data.

21 Q What will be your method of approach? Will you do  
22 the study and analysis necessary to form the opinions you have

1 been asked to give on the occupants of the airplane?

2 A I would approach this on a number of different  
3 bases. I would approach it on an energy basis. I would  
4 approach it on a conservation momentum basis.

5 Q What was that?

6 A Conservation of momentum and on the basis of the  
7 equivalency of impulse and the change in momentum. There  
8 may be other techniques I would use as I get into it but those  
9 are things that engineers have to assess and make determin-  
10 ations of as they progress through a complicated problem  
11 such as this.

12 I can imagine that other techniques I would use would  
13 be evaluation of the structures where I have information on  
14 the structural failure; evaluation of injury data in relation  
15 to human tolerance, and in relation to where and how these  
16 people were seated, oriented when the impacts occurred.

17 There may be other procedures that I would follow  
18 as I went through this analysis that would become clear to me  
19 as interim results became available.

20 Can we take a break for a second?

21 [Whereupon, a short recess was taken.]

1 BY MR. DUBUC:

2 Q Mr. Cromack, you have mentioned an energy approach  
3 to solving the problem as a basis for your opinion and decel-  
4 eration effect of occupants on the aircraft. What do you  
5 mean by that?

6 A Estimating the work done on an object as it moves  
7 through some course of events can be equated to the change  
8 in kinetic energy of that body. If the body moves on  
9 essentially a horizontal plane, estimates can be made of  
10 the change in velocity if the initial velocity is known.

11 Q What was the initial velocity of this airplane at  
12 the time of landing?

13 A I understand its initial velocity was 270 knots.

14 Q What would the stored kinetic energy be on the  
15 aircraft at the time of landing?

16 A I don't know. You took my paper away from me.

17 Q We will come back to that. You mentioned a con-  
18 servation of momentum.

19 A Yes.

20 Q What does that mean?

21 A Momentum is a character of any body in motion. It  
22 is a function of its mass and its speed. There are certain

1 laws that govern the way the momentum of bodies change.

2 Q How does that have relevance to formulating an  
3 opinion as to deceleration on the occupants of the aircraft?

4 A By selecting the appropriate parameters to substi-  
5 tute into the appropriate equations, one can make some  
6 estimates of the velocity change and the velocity after certain  
7 events have occurred.

8 Q Have you done some of the work with respect to  
9 the energy approach already?

10 A Not to any extent.

11 Q You have not computed the kinetic energy stored  
12 in the aircraft?

13 A I have computed the kinetic energy of that air-  
14 craft at the point that it had a speed of 270 knots.

15 Q Have you made any observations as to whether that  
16 energy was dissipated instantaneously in terms of a potential  
17 terminal velocity or would it have been dissipated under the  
18 facts already known to this time?

19 A What do you mean terminal velocity?

20 Q Terminal impact, instantaneous.

21 A What do you mean by terminal impact?

22 A Maybe the question was not well phrased. Let me try

1 it again.

2 Have you formed any opinion as to whether the stored  
3 kinetic energy of this aircraft at the time of the second  
4 landing, which is the subject of this record there, was dissipated over a period of time or a short period of time?

6 A Kinetic energy is not stored. It is a property.

7 Q Let's put that assumption into the question.

8 One factor is kinetic energy, which, I understand,  
9 is a function of mass and velocity; is it not?

10 A Yes, sir.

11 Q You have computed that; have you not?

12 A Yes, sir.

13 Q Have you come to any conclusion as to whether that  
14 was dissipated instantaneously or in a very short increment  
15 of time or in accident parlance in period of time?

16 A I am of the impression that the kinetic energy was  
17 used throughout the sequence of its collision with the ground,  
18 although I have not worked out a protocol yet, probably,  
19 practical protocol for how it was done.

20 Q That is something you are still working on as part  
21 of your study, protocol; is that correct?

22 A Yes, an energy dissipation protocol.



1 Q You also mentioned equivalency of impulse and change  
2 of momentum. What does that mean?

3 A Any body that is in motion, any object in motion  
4 that has mass has a character of having momentum. The  
5 momentum wouldn't change unless and until that body is acted  
6 upon by some impulsive force, a force that extends through a  
7 period of time. It is that equivalency that I would study if  
8 I could generate enough usable data from these new photographs  
9 and other information that might become available.

10 Q How are you going to generate that data?

11 A The approach that I would like to take initially  
12 is to look at the amount of dirt that was moved by the air-  
13 plane as it impacted the ground. That would represent work  
14 done, and I would attempt to equate that work done to the  
15 change in kinetic energy.

16 Q Anything else?

17 A That is a start.

18 Q Is that the only step?

19 A That is a pretty big step because it involves a lot  
20 of analysis. It is going to take some time to arrive at some  
21 possible answers.

22 Q How do you propose to determine the amount of dirt

1 moved by the aircraft?

2 A I will have to make some estimates of the volume  
3 of dirt moved by the new photographs that have been made  
4 available.

5 Q Have you done that before?

6 MR. McMANUS: In this case?

7 MR. DUBUC: In other cases.

8 THE DEPONENT: No, but it is not a mysterious  
9 technique.

10 BY MR. DUBUC:

11 Q But you have never done it before?

12 A Well, yes. I have done that sort of thing before.

13 Q How did you do it before?

14 A Dirt has certain physical properties. It weighs  
15 so much per cubic foot, so many pounds per cubic foot between  
16 a reasonable set of limits. One can estimate the amount of  
17 weight furrowed out of the ground or dirt moved over the  
18 ground and can make some estimates of the distance that that  
19 dirt was moved and thereby calculate the work done to move it  
20 and equate that to the change in kinetic energy and make  
21 calculations on post-impact velocity at various increments  
22 as we progress down through the dikes and the ground, and one

1 thing and another.

2 Q What would you have to know about the dirt to do  
3 that?

4 A How much it weighed.

5 Q Anything else?

6 A Well, how much it weighed.

7 Q Is that it?

8 A And how far it was moved.

9 Q Is that all?

10 A In a crude sense

11 Q In a crude sense?

12 A Yes.

13 Q You say you have done this before? Was this an  
14 analysis of some kind?

15 A I have done engineering calculations where that  
16 sort of thing is used in many, many cases.

17 Q What case specifically? What were the circumstances  
18 where you measured kinetic energy by the amount of dirt used?  
19 Can you tell us one?

20 A I don't recall any. I have made engineering  
21 calculations but not necessarily related to cases.

22 Q Let's just take cases.

1 MR. McMANUS: Do you mean court cases?

2 MR. DUBUC: Court cases or consultations regarding  
3 accidents where he has actually computed the amount of dirt  
4 moved in order to determine kinetic energy and work done.

5 MR. McMANUS: You are eliminating any other sort  
6 of assignments or consultations he has done outside of  
7 accidents?

8 MR. DUBUC: First, let's just take that.

9 THE DEPONENT: Not that I can recall offhand.

10 BY MR. DUBUC:

11 Q Can you recall any instances where you have  
12 attempted to determine the amount of dirt moved and, therefore,  
13 the kinetic energy utilized in doing the work to move it from  
14 photographs in the past at any time?

15 A Not offhand.

16 Q So this may be one of your initial ventures into  
17 that process. Would that be a fair statement, doing it from  
18 photographs?

19 A No, not from that process because that process is  
20 a fairly standard technique that is used. I have used it.

21 Q My question is, would this be an initial venture  
22 on your behalf in doing that kind of computation as to amount

1 of dirt moved to determine kinetic energy based solely upon  
2 photographs, when you have not had an actual opportunity to  
3 measure or inspect the scene itself?

4 A Probably not, but I can't recall anything.

5 Q You cannot recall any specific time when you have  
6 done that?

7 A That is correct.

8 Q Have you consulted in connection with accident  
9 cases in the past?

10 A Yes, sir.

11 Q Do you know approximately how many?

12 A No, I don't keep tabs of those sorts of things.

13 Q Would it be 10, more than 10, less than 10?

14 A It would probably be something on the order of a  
15 couple of hundred for litigation purposes.

16 Q That is what I was referring to.

17 A And just plain investigating accidents and doing  
18 dynamics on them it is probably several hundred, possibly  
19 several thousand.

20 Q Several thousand cases?

21 A Yes, sir.

22 Q You say about two hundred of them have been in  
litigation?

1 A Something fewer than two hundred.

2 Q How many of those were airplane accidents?

3 A I have not done any airplane accidents in litigation.

4 Q Is this the first one?

5 A Yes.

6 Q Any airplane accidents in consultation regarding  
7 dynamics, and I am talking G forces?

8 A I have done some work in aircraft dynamics, yes.

9 Q I see that from your resume. You worked for General  
10 Dynamics for a while.

11 A Yes, sir.

12 Q Did you work on any accident investigations?

13 A No, sir, not at General Dynamics.

14 Q Did you work at any accident investigations,  
15 airplane accidents, while you were at International Harvester?

16 A No.

17 Q How about while you were in the military?

18 A Not specifically.

19 Q You were in the military police?

20 A Yes, sir.

21 Q You were in the military for approximately nine years?

22 A Yes, sir.

1 Q Did you do any accident investigation involving  
2 aircraft at Albrighton Engineering?

3 A No, sir.

4 Q How about at Consultants, Dallas, Texas and Tempe,  
5 Arizona relative to Collins Radio?

6 A Not with Collins Radio.

7 Q How about at the Arizona State University?

8 A I studied accidents at Arizona State University.

9 Q Was that a course you took there?

10 A No, sir, I had a research job with the engineering  
11 foundation there. It was involved in crash worthiness of  
12 aircraft and passenger seats.

13 Q Did you actually investigate any accidents or was  
14 it all theoretical?

15 A It was all after the fact, studying accident data  
16 and investigations for other folks, much in the manner that I  
17 am doing here.

18 Q Do you know Doctor Turnbow?

19 A Yes, sir.

20 Q Did you study under him at Arizona State University?

21 A Yes, sir.

22 Q How long did you study under Doctor Turnbow?

1 A Doctor Turnbow was on my graduate committee.

2 Q This was in connection with your master's program?

3 A Yes, sir.

4 Q What was your thesis or dissertation in?

5 A The thesis had to do with the study of stress  
6 concentration factors and aluminum spec numbers when subjected  
7 to loads of high loading rates.

8 Q Did it have anything to do with the aircraft seats  
9 of anything?

10 A Yes, sir.

11 Q Was that ever published?

12 A As a thesis it was.

13 Q Do you have a copy of that still?

14 A Probably somewhere around the house.

15 Q Could you get us a copy of that?

16 MR. DUBUC: Would you have any objection to that?

17 MR. McMANUS: If he can find it.

18 BY MR. DUBUC:

19 Q Did you say Doctor Turnbow was on the committee  
20 that tested that thesis?

21 A Yes, sir.

22 Q Did you have any other involvement with Doctor Turnbow?



1 A We used to go fishing.

2 Q He, in fact, has done a lot of work in the crash  
3 worthiness of seats, aircraft and every component of air-  
4 craft, has he not?

5 MR. McMANUS: I object to the form of that question.

6 You can go ahead and answer.

7 THE DEPONENT: He has done a lot in the crash  
8 worthiness field.

9 BY MR. DUBUC:

10 Q In your opinion, he is an expert in the area of  
11 aircraft crash worthiness?

12 A I would say yes. He has made as many contributions  
13 as others.

14 Q Do you consider yourself of equal expertise as  
15 Doctor Turnbow?

16 A In what respect?

17 Q For example, in determining with respect to an  
18 aircraft accident the deceleration effects on the occupants  
19 of the aircraft?

20 MR. McMANUS: Are you asking him if he thinks he  
21 is good as Doctor Turnbow?

22 I object to that question. It is not a relevant  
question and I instruct him not to answer. We are not

1 here to compare subjective relative opinions about the  
2 qualifications of various experts.

3 MR. DUBUC: Do you press the objection and still  
4 instruct him not to answer?

5 MR. McMANUS: Yes.

6 BY MR. DUBUC:

7 Q Did you work with Doctor Turnbow on any experiments  
8 or simulated crash when you were at the University of Arizona?

9 A In fact, I did.

10 Q Under his direction?

11 A Well, yes and no.

12 Q What does that mean, sir?

13 A I went to work for a small firm at Tempe, Arizona  
14 when I first went back to school and designed an acceleration  
15 test device for use in evaluating occupant restraints,  
16 restraint systems and aircraft passenger seats and one thing  
17 and another; subsequently built the device and sold it to  
18 the organization that was doing research in aircraft crash  
19 worthiness and who had funded research at the University and  
20 Doctor Turnbow was the manager of one of those research  
21 contracts.

22 I subsequently became a consultant to the firm that

1 I was working for, and a student at the University and an  
2 employee of the University assigned to Doctor Turnbow in  
3 that particular pgroom, so I had input on both sides, from  
4 both ends of the study.

5 Q You were employed by the University and worked  
6 under Doctor Turnbow?

7 A Yes, sir. That was in 1964 through 1966.

8 Q Other than that, did you do any aircraft investi-  
9 gation at Southwest Research Institute?

10 A Accident investigation of aircraft?

11 Q Yes, sir.

12 A No, sir, not specifically. Of course, dynamics,  
13 which is my field, is related to that.

14 Q Mr. Cromack, you attended the University of Texas  
15 undergraduate school?

16 A Yes, sir.

17 Q Is that while you were in the military?

18 A Yes, sir.

19 Q Did you attend nights?

20 A No, sir.

21 Q Did you attend part-time?

22 A No, sir, I was full-time.

1 Q Is that a four-year program, business administration?

2 A The business administration is a four-year program.

3 Q And you completed it over the period 1951 to 1956?

4 A Yes, sir.

5 Q Did you repeat any subjects?

6 A I may have. I changed from engineering to business  
7 administration during that period.

8 Q So that delayed your graduation with your class?

9 A Yes, sir.

10 Q Did you flunk any subjects?

11 A I don't recall.

12 Q Why did you change from engineering to business?

13 A I wanted to get into the industrial engineering  
14 end and industrial engineering was a curriculum that was  
15 not offered under the engineering school in those days. It  
16 was offered as a course called engineering route through  
17 business administration, and that was under the business  
18 school.

19 Q Then you worked for General Dynamics before you  
20 went back to complete your engineering training?

21 A Yes, sir.

22 Q You did not work as an engineer but as a spec writer

1 at General Dynamics; is that right?

2 A That is right. It was actually an engineering  
3 administration job. It was in the engineering department but  
4 it was not the equations type engineering work. It was  
5 engineering writing.

6 Q You attended the University of California, 1969,  
7 for a course on medical engineering?

8 A Yes, sir.

9 Q What was the duration of that course?

10 A I believe it was two weeks.

11 Q A two-week course?

12 A Yes, sir.

13 Q How about the Armed Forces Institute of Pathology.  
14 What was the duration of that course?

15 A I think it was a week.

16 Q Have you ever attended any accident investigation  
17 schools, aircraft accident investigation schools?

18 A Aircraft, I don't think so.

19 Q You mentioned you have testified and consulted  
20 in litigation cases. Did you testify in any cases in 1981?

21 A Just accident litigation?

22 Q Yes, sir.

1 A Yes, sir.

2 Q What was the last case you testified in?

3 A I don't recall.

4 It was probably out in California. Once I finish  
5 these, I tend to forget these.

6 Q Where in California?

7 A Los Angeles.

8 Q When was that?

9 A A month or so ago.

10 Q Either August or September?

11 A Probably.

12 Q Do you remember what court?

13 A No, I don't.

14 Q You don't remember what the case was about?

15 A It was an auto accident.

16 Q What were you asked to do in that case?

17 A The reconstruction, I guess. I don't recall.

18 I am always asked to do reconstructions or biomechanics or  
19 that sort of thing.

20 Q Was this a case of injury or death or what?

21 A Probably. That is mostly what I get involved in.

22 Q Do you keep any copies of any your testimony?

1 A In trial, no, sir, I never see that.

2 Q How about depositions?

3 A There may be one or two around somewhere but I  
4 don't know if I could turn them up.

5 Q Was your deposition taken in the Los Angeles case  
6 in which you testified a month or two ago?

7 A Probably.

8 Q Did you work for an attorney?

9 A Yes.

10 Q Do you remember his name?

11 A It would have been Jack Otto.

12 Q Jack Otto?

13 A Yes.

14 Q Were you consulting with an attorney who was  
15 representing plaintiffs or defendants?

16 A Defendants.

17 Q Is Jack Otto in Los Angeles?

18 A Yes.

19 Q Have you worked for him before?

20 A Yes.

21 Q Approximately how many times?

22 A I don't know.

1 Q Several times?

2 A Yes.

3 Q Does he usually represent defendants?

4 A Yes.

5 Q Prior to that time, do you recall the case before  
6 that in 1981?

7 A No, I really can't. It is too hard for me to  
8 remember the ones when I am finished.

9 Q Have you consulted in any cases with attorneys  
10 for plaintiffs?

11 A Occasionally.

12 Q Would you say you consult more for defendants or  
13 plaintiffs?

14 A Defendants.

15 Q Are you being paid or compensated for your consul-  
16 tation in this case?

17 A Yes, sir.

18 Q Are you being paid by the hour or the day?

19 A By the hour.

20 Q How much do you get paid by the hour?

21 A Engineering charges \$65 an hour and deposition  
22 and testimony time, \$80 an hour, and travel time when I am  
not working is \$30 an hour plus all reasonable expenses to  
include travel, room and board that are paid out by me.



1 Q Deposition and trial is \$80?

2 A Yes, sir.

3 Q Have you any idea how many hours you have on this  
4 case so far?

5 A No, sir.

6 Q Do you keep track of that?

7 A Somewhere. My secretary does that.

8 Q Have you published any articles with respect to,  
9 for example, the energy approach to assessing deceleration  
10 to occupants of aircraft?

11 A No, sir.

12 Q Have you published any articles with respect to  
13 the conservation of momentum in connection with calculating  
14 deceleration of occupants of aircraft?

15 A No, sir.

16 Q Have you published any articles on equalizing of  
17 impulse changeable momentum and the effect of deceleration  
18 on occupants in aircraft?

19 A I keep saying no but there are articles and reports  
20 that I have prepared that use those principles and concepts.  
21 I would have to say those are related to this particular  
22 problem.

1 Q Are any specifically related to aircraft?

2 A Yes, sure.

3 Q The articles?

4 A Yes, I am sure they are.

5 Q Do you have those listed in here?

6 A Yes. They would have to be read individually for  
7 someone to extract information.

8 Here, I am talking about techniques, not about  
9 the specific subject.

10 Q Would you be able to look at that CV, which has  
11 been marked, and tell us which articles those would be?

12 A Not without going back and reviewing some of the  
13 articles probably.

14 Q Have you published any articles or written any  
15 papers on the methodology you have described of using the  
16 amount of dirt moved in kinetic energy in order to determine  
17 how much kinetic energy and work was done as the result of  
18 an aircraft accident or an automobile accident?

19 A Again, yes, in the sense that the technique is  
20 applicable, but no, not specifically as related to aircraft.  
21 There would be some more specifically applicable reports when  
22 you consider automotive type collisions, but I would have

1 trouble going back and picking them out of many, many --

2 Q Could you take them out of the list attached to  
3 your CV?

4 A No. That CV is fairly brief. There are some 205  
5 multidisciplinary accident investigation reports which are  
6 60, 80, 120 pages thick with detailed calculations in them  
7 and most of them were done by me, either directly or under  
8 my supervision.

9 Q You mentioned some pictures. Have you looked at  
10 these 800 pictures?

11 A I did not count them, but there were two boxes full  
12 of pictures. Some of them were duplicates and some of them  
13 were not applicable to this wreck.

14 Q Some of these you saw a year ago. Would some of  
15 these be some you have seen a year ago?

16 A I saw some pictures that were blown up on large  
17 boards, and they were black and white. They may have been  
18 these pictures but I cannot recall specifically. They  
19 were similar to these but I could not tell you today whether  
20 they were the same pictures. They were not much more illus-  
21 trative, if as illustrative as these.

22 Q How about the pictures you have looked at recently.

1 Were any of those of any particular significance?

2 A Absolutely.

3 Q Can you tell me which ones were of significance to  
4 you?

5 A I would have to go through them and sort them out  
6 to tell you that.

7 MR. McMANUS: For counsel's information, Mr. Cromack  
8 has selected certain pictures to be reproduced. We will  
9 identify those for you in some way I am sure the parties  
10 can work out to match up your numbering system with whatever  
11 ours might be. Those are in the process of being reproduced  
12 at his request.

13 MR. DUBUC: That is not going to help me much as  
14 far as cross examining him.

15 MR. McMANUS: I am referring to pictures from  
16 the several hundred pictures that have just been recently  
17 produced by the Government.

18 MR. DUBUC: Do you mean over a month ago?

19 MR. McMANUS: I did not say that. That is your  
20 comment, not mine.

21 BY MR. DUBUC:

22 Q You say there are some specifically that have been

1 picked out by you. Would you recognize which ones you have  
2 picked out?

3 A I would recognize a stack of pictures --

4 Q Would you look through this stack and tell me if  
5 any of them which Mr. McManus referred to appear in that  
6 group?

7 MR. McMANUS: Are these reproductions of some of  
8 the smaller ones?

9 MR. DUBUC: Yes. They all have numbers on the  
10 back.

11 THE DEPONENT: These are sure a lot sharper than  
12 the ones we had. The detail on these is supergood relative  
13 to the ones we have.

14 BY MR. DUBUC:

15 Q I appreciate that but what I am looking for is for  
16 you to identify any that you consider within the group that  
17 you have asked to be reproduced for your study.

18 Are those some of the ones you have asked to be  
19 reproduced?

20 A I can't tell you whether these are the same as  
21 the ones I have asked for but these are ones that would be  
22 important to me. I would like to note these are much clearer  
than the ones I have seen.

1 Q Would you take a look at the rear of those and  
2 tell us which numbers those are so we can have those  
3 identified.

4 A T4A, T4B, and this one has two numbers, 14C and T4D;  
5 T4E, T4G, T4H, T4I, T4J, T4K, T4L, T4M, T4O, T4P, T4Q, T4R,  
6 T4S; T4AA, T4BB, T4DD, T4EE, T4FF, T4GG, T4HH, and T4II.

7 Q Are there any black and white you have asked to  
8 have reproduced?

9 A Yes, sir. Realize the ones I have just mentioned  
10 may or may not be specifically ones that I have asked for  
11 but they are ones that I would think would be important to  
12 me in an analysis. They are like the ones I would ask for.

13 Q What, if any, significance to you does T4G have?

14 A I don't know yet.

15 Q You wouldn't know the answer to that question if  
16 I asked you about any of these?

17 A No.

18 Q What was the criteria upon which you picked the  
19 pictures?

20 A The photographs showing the accident, the ruts  
21 and so on.

22 Q Did you see one of those about a year ago?

1 A I don't recall whether I saw that one or not. I  
2 saw some photographs that were of rather poor quality. The  
3 ones we have recently received are of higher quality and  
4 yours are even of higher quality.

5 Q Had you seen one like this?

6 A No.

7 Q You would not recall one way or the other?

8 A Not specifically.

9 Q You would not be able to tell me the significance  
10 of any of these photographs to you at this time; is that  
11 correct?

12 A Not until I study them.

13 Q Would any of these photographs be among those that  
14 you asked that copies be made?

15 A They might.

16 Q Have you seen small colored photographs like these?

17 A All I can see is the back of them.

18 Q Look at those and tell me if any of those would be  
19 of significance as far as your selection is concerned.

20 A This looks like at least some of these involve  
21 some other accident.

22 Q You have selected some. Can you tell us which ones?

1 Would these be the ones you would ask for copies or, in fact,  
2 they have asked for copies?

3 A These are ones that would interest me: B-28,  
4 B-29, B-30, B-31, and B-31 has an L-14 and L-15 on the back;  
5 B-32 looks like it has been scribbled through. It looks  
6 like a "2."

7 Q It looks like 32.

8 A B-32, B-33 darker, B-34, B-34 is darker; B-35 with  
9 an L-19 on it, and B-36.

10 Q Would you be able to tell me what, if any, signifi-  
11 cance would those have to you at this time?

12 A No, sir.

13 Q Were there any black and whites that you asked for  
14 copies of?

15 A Yes.

16 Q Would any of these be within that group?

17 A Number 341 might have.

18 Q Other than determining or preparing an opinion as  
19 to the deceleration effects of occupants on the aircraft,  
20 have you been asked for any other opinion, for example,  
21 whether there was any fire in any component of the aircraft  
22 or anything of that kind?



1 MR. MCMANUS: That is two questions.

2 BY MR. DUBUC:

3 Q Any other question, such as whether there was a  
4 fire in any portion of the aircraft?

5 MR. MCMANUS: Are you asking him if he has been  
6 asked to give an opinion about fire?

7 MR. DUBUC: Yes, that is right.

8 THE DEPONENT: No, I have not been asked to give  
9 any opinion about fire.

10 BY MR. DUBUC:

11 Q The only opinion you have been asked to work on  
12 is the deceleration effects on occupants? Is that correct?

13 A I have been asked -- well, no.

14 Q What additional opinions have you been asked to  
15 formulate, other than in addition to the deceleration effect  
16 on occupants of the aircraft?

17 A Would you restate that? You keep running it to-  
18 gether and I am having trouble.

19 Q What, if any, additional opinions, Mr. Cromack,  
20 have you been asked to give other than the one you have  
21 described of the deceleration effect on occupants of this  
22 aircraft?

1 MR. MCMANUS: I object to the form of that question

2 Go ahead and answer it, if you can.

3 THE DEPONENT: I am not sure you are stating cor-  
4 rectly what you told me earlier. I was asked to look at  
5 the deceleration environment for the occupants and try to  
6 define that environment and discuss that in relation to the  
7 occupants, themselves.

8 Now, I have been asked to specifically look at the  
9 data that are available with the idea of giving and express-  
10 ing an opinion as to whether or not there are adequate data  
11 to adequately define that environment.

12 If there are adequate data, I have been asked to make  
13 whatever calculations I can in as much detail as I can to  
14 define the deceleration environment, and if there are not --  
15 well, whether there are or are not, to make an assessment  
16 of any other analyses that may be available concerning that  
17 deceleration problem.

18 Q Have you been asked specifically to critique any  
19 of the expert opinions given by some of the defendant's  
20 experts, for example, Doctor Turnbow?

21 A What do you mean by "critique"?

22 Q Comment upon whether or not the computational

1 analysis is correct, whether he had sufficient data to do  
2 it, and so on?

3 A In a sense, I think I have, yes.

4 Q Have you been asked to do the same with respect to  
5 Mr. Edwards' computations?

6 A Let's say I have been asked to look at the analyses  
7 by any other person, not necessarily Doctor Turnbow or Mr.  
8 Edwards, but anybody who might have done a dynamic analysis  
9 of the crash, of the airplane crash.

10 Q You have specifically been given copies of Mr.  
11 Edwards, Doctor Gaume, Doctor Turnbow, and Mr. Jablonsky.  
12 Have you been asked to comment on them?

13 A Not by specific individuals but, if these indi-  
14 viduals have calculations in their reports, I would assess  
15 those calculations.

16 I understand it to be my task to do that.

17 Q Have you been asked to do anything else or render  
18 any other opinions?

19 A I have just told you what I have been asked so far.

20 Q I have some additional pictures here. Could you  
21 tell me whether any of these were within the group you asked  
22 to be reproduced so that you could study their possible

1 significance?

2 A This one is printed backwards.

3 These would be ones that I might find some interest in.

4 Q Would you read the numbers of those, please.

5 A T3C, T3D, T3E, T3G, T3H, T3I, T3K, T3L, T3M, which  
6 has an L234 on it; T3N, and it has an L6 on it; T3O, which  
7 has an L20 on it; T3R, with an L18; T3T, with an L17; T3U  
8 with an L5; T3V, T3W, same as T3I; T3X with an L4 on it;  
9 T3Y, T3X, T3Z, T3BB, T3CC, T3DD, T3EE.

10 Q Would you be able to tell me the significance of any  
11 of those photographs?

12 A Not at this point.

13 Q I have some black and white photographs. Would  
14 you do the same thing with those for me, please.

15 A 734, 735 --

16 Q These are the ones of significance.

17 A 736, 737 -- incidentally, these have some other  
18 numbers on them. I assume that is enough to identify  
19 them. Is that correct?

20 Q It should be. If there is another number, give  
21 us those, too.

22 A 734 there was a D1311-1.

1 735 is D1311-2; 36 is -3; 37 is D1311-4; 307 is a  
2 D1311-5; 740 -- is that a 1 or 7?

3 Q 741.

4 A It also has a D number on it. 741 and it has  
5 D1311-6 on it.

6 746 with a D1311 -7.

7 745 with a D-1311 -8.

8 301, D1311-9.

9 339 with a D1311-10.

10 340 with a D1311-11.

11 758 with a D1311-12.

12 74 with a D1311-13.

13 335, D1311-14.

14 763, D1311-15.

15 760, D1311-60.

16 196, D1311-17.

17 83, D1311-18.

18 761, D1311-19.

19 762, D1311-20.

20 757, D1311-21.

21 316, also with an X-45 and D1311-22.

22 250, D1311-23.

1 300, with a D1311-24.

2 189 with a D1311-25.

3 316 with a D1311-26.

4 296 with a D1311-27.

5 187, D1311-31.

6 317, D1311-38.

7 857, D1311-34.

8 318, D1311-41.

9 218, D1311-42 or 92.

10 I suppose it is 42.

11 Q Would you be able to tell me the significance  
12 of any of these as to your computations?

13 A Not until I have had a chance to examine them in  
14 more detail.

15 Q We have marked your computations Cromack Exhibit  
16 13.

17 BY MR. DUBUC:

18 Q Are these the computations you made this morning?

19 A Yes.

20 Q This consists of three sheets; is that correct,  
21 sir?

1 A Yes.

2 Q The third sheet is data on occupants and there are  
3 several blanks.

4 Can you tell us what the significance of that is?

5 A It is just an outline that I prepared to define  
6 some of the information I thought I might be able to use.

7 Q Is that information going to come from this Occu-  
8 pant Summary which is also part of this file that you showed  
9 us earlier that was attached to the diagram and marked Cromack  
10 Exhibit 7?

11 Is that where that information will come from?

12 A Partly.

13 Q Where is the rest of it going to come from?

14 A From Mr. Lewis' office.

15 Q They are going to provide you with some additional  
16 information?

17 A Yes, sir.

18 Q Have you specified what that should be?

19 MR. MCMANUS: I think he gave that to you earlier.

20 BY MR. DUBUC:

21 Q Have you asked for any additional information on  
22 occupants from Mr. Lewis' office?

1 A Yes.

2 Q What is that, other than what is in this Exhibit 7  
3 on occupants?

4 A Yes.

5 Q What information have you asked for?

6 A Injury data.

7 Q You don't have that yet --

8 MR. MCMANUS: We do not have it all, as you might  
9 be aware, from the government.

10 BY MR. DUBUC:

11 Q Do you have any injury data on the occupants at  
12 this time?

13 A Not sufficient data.

14 Q Have you given any further specifications other  
15 than to ask for injury data on the occupants of the troop  
16 compartment?

17 A Not yet.

18 Q Are you going to specify the data you need or is it  
19 going to be provided under that general description on  
20 selection by someone at the Lewis office?

21 A I will probably have some further conversations  
22 with people in Mr. Lewis' office.



1 Q Have you requested any injury data on persons in  
2 any other part of the airplane other than the troop compart-  
3 ment?

4 A Not at this stage.

5 Q That is what you are concentrating on at this  
6 point; is that correct?

7 A That is the first step.

8 Q Back to Cromack Exhibit 13. What does this compu-  
9 tation represent, sir?

10 A Just a very gross, crude analysis of the work in  
11 energy, based on some assumptions that were made by some  
12 of your experts --

13 Q Any specific excerpt?

14 A -- but using some figures that I feel are more  
15 realistic.

16 Q Do you feel figures used by defendant's experts  
17 are unrealistic?

18 A Yes, sir.

19 Q Which ones?

20 A I think the length of the wheel mark in the ground  
21 that was used, for example, by Mr. Edwards in his energy  
22 calculation is not realistic.

1 Q Anything else?

2 A I have not had a chance to review all of their  
3 work yet, nor have I had a chance to do anything more than  
4 these cursory analyses.

5 Q I see a reference on Cromack Exhibit 13 to 0.77  
6 G's. What does that refer to?

7 A That was just the number that was calculated out  
8 from the formulas that were used in this analysis. It does  
9 not necessarily represent what the actual environment of  
10 acceleration was.

11 Q What were the assumptions in these formulas? I  
12 see a figure of 250,000. What is that?

13 A That is the number that I extracted from, I think,  
14 the Edwards' deposition -- not the Edwards' deposition  
15 but the Edwards' report about the fracture force for a rear  
16 landing gear on the left side.

17 Q What does the 270 feet represent?

18 A That is a number I picked off the wreckage diagram.  
19 That represents the furrow length as best as I can determine  
20 it from that landing gear.

21 Q You have some foot-pound figures here at the top.  
22 What does that represent?

1 A That represents the work done by that gear on the  
2 ground under the assumptions that were made here.

3 Q Is that on the first impact or the second?

4 A I don't know when it is. It is just to fracture  
5 a gear off. If you take a static force of 250,000 pounds  
6 and you apply that in a triangular fashion, the energy under  
7 that force deflection curve is the work done and that is  
8 all that represents. I don't think it necessarily repre-  
9 sents a real situation.

10 Q You have another figure of 449.467 feet per second.  
11 What does that represent?

12 A That represents the final speed of a vehicle if  
13 you subtract the work done in removing that landing gear  
14 from the kinetic energy that the vehicle had prior to the  
15 instant it impacted the ground.

16 Q That also gives the landing gear, does it not?

17 A What does?

18 Q That computation you just mentioned, energy neces-  
19 sary with respect to the energy on landing.

20 A The energy I calculated is the energy associated  
21 with a 451,000 pound mass moving at a speed of 405 feet per  
22 second.

1 Q Is that the assumed weight of the aircraft that  
2 you used?

3 A I think I just picked that out of Mr. Edwards'  
4 report.

5 Q Do you consider that accurate or inaccurate?

6 A I have not made that assessment yet. I don't know.

7 Q You have another figure of 5.327. What does that  
8 represent?

9 A It represents the Delta V and the 449.67.

10 Q Rounded to what? Relative to what?

11 A A speed change of an object weight weighing  
12 451,000 pounds moving at a speed of 455 feet per second  
13 reduced by an amount of 33.75 million-foot pounds.

14 Q At the bottom you have 8.92 feet per second.  
15 What is that?

16 A That is just a number that is calculated out to  
17 estimate an average deceleration throughout a period of  
18 time of .597 seconds.

19 Q What period of time does that pertain to as it  
20 relates to this accident?

21 A That represents the time that it takes an object  
22 to move 270 feet and drop an average, while traveling at an

1 average velocity of 452.5 feet per second.

2 Q Where does the 270 feet come from in your assump-  
3 tions? Is that based on a figure you have seen somewhere?

4 A That is the number I explained to you earlier I  
5 extracted from the damage wreckage diagram.

6 Q As far as your knowledge, what does that number  
7 represent on the wreckage diagram, 270 feet?

8 A The length of a contact of a gear with the ground.  
9 in various stages of collapse.

10 Q You have 757.8 feet per second, and 23.53 G's.  
11 Those are both crossed out. Why were they crossed out?

12 A Because they were wrong. I made a mistake.

13 Q What does the 0.277 G's again represent; average?

14 A The average deceleration.

15 Q Over the 270 feet?

16 A Yes.

17 Q If the distance were longer, would the average  
18 G's be lower?

19 A I would have to go back and calculate that. It  
20 would depend on other factors.

21 Q Isn't time of onset one of the effective ways of  
22 measuring G?

1           A     If the path were longer, then the time would be  
2 longer.

3           Q     And the G's would be lesser?

4           A     The G's would be lower.

5           Q     The second page of your calculations you have some  
6 additional numbers, one ending with 450 feet per second.  
7 What does that mean?

8           A     That is a check on the previous calculations.

9           Q     You have reviewed Doctor Turnbow's report, which  
10 is Cromack Exhibit 12; is that correct?

11          A     Yes, sir, I have looked at it.

12          Q     I see that our copy did not get the green portions  
13 copied. Could you get your copy of that out, please? This  
14 is Doctor Turnbow.

15          A     Yes, sir.

16          Q     To try to save some time here, and I gather you  
17 are getting short of time, can we agree to give him one of  
18 these back so that we can conform ours to that?

19               MR. MCMANUS: Yes.

20               BY MR. DUBUC:

21          Q     You have some green things marked. Were these  
22 areas where you disagree with Doctor Turnbow?

1 A No.

2 Q I guess you have some items on the first page  
3 which are items what?

4 A 2 and 3.

5 Q Is there anything in Doctor Turnbow's report that  
6 you disagreed with specifically?

7 A Disagree with in what sense?

8 Q As to his conclusions, calculations.

9 A His calculations look good, but I would not agree  
10 with it if he said that that represented the deceleration en-  
11 vironment for individuals or for the aircraft.

12 Q Why do you say that?

13 A Because an airplane, car or anything else struc-  
14 tured like this is not going to have a uniform deceleration  
15 in the real sense.

16 Q Doctor Turnbow has also expressed an opinion as to  
17 peak G's. Did you notice that in there?

18 A Yes, sir.

19 Q He used a factor of 3 adding to the average G's  
20 as computed.

21 A Yes, sir.

22 Q Have you ever had experience with that factoring

1 formula or theory?

2 A I think that is just a rule of thumb what he has  
3 developed, but I don't necessarily agree with that. I want  
4 to study it first.

5 Q Do you disagree with it?

6 A I would not agree with it without further confirm-  
7 atory data.

8 Q In the course of your experience, have you seen such  
9 factors applied to average G-forces in order to determine  
10 peak G-forces that might have been effective at a given time  
11 on the occupants of a vehicle?

12 A Yes. You see all kinds of criteria that are used  
13 by people to develop a rule of thumb for establishing decel-  
14 eration levels.

15 Q Have you used such rules of thumb?

16 A Not for making an assessment of injury where we  
17 have a problem as important as this.

18 Q Haven't you testified before as to such rules of  
19 thumb?

20 A I don't usually testify as to rule of thumb.

21 Q Haven't you given testimony where you have used  
22 rules of thumb in such as factoring average G's or peak G-s



1 as part of your theory and conclusions?

2 A I don't use rules of thumb. I try to find test  
3 data and use a more analytical approach to defining these  
4 environments.

5 Q Is your answer you have never so testified?

6 A I think I just answered that. I said I try to  
7 find more analytical data. I don't recall using rules of  
8 thumb per se to testify from.

9 MR. DUBUC: I am not closing this deposition, and  
10 we do have several exhibits and notes of Mr. Cromack that  
11 he has produced that were just Xeroxed during the course of  
12 the deposition. We have covered some but I have not been  
13 able to cover all and, of course, we cannot close the  
14 deposition.

15 I will have to move to preclude his testimony.

16 Also, he has told us he has not completed the study,  
17 so I will make the motion that, so far as I am concerned,  
18 the deposition is not closed.

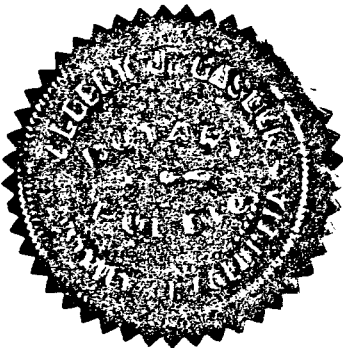
19 (Whereupon, the deposition was suspended at  
20 4:05 o'clock p.m.)

UNITED STATES OF AMERICA                   )  
   ) ss.  
DISTRICT OF COLUMBIA                   )

I, ALBERT J. GASDOR, a Notary Public in and for the District of Columbia, the officer before whom the foregoing deposition was taken, do hereby certify that the witness whose testimony appears in the foregoing deposition was duly sworn by me; that the testimony of said witness is a true and accurate transcription of the stenographic notes taken by me and thereafter reduced to written form by me and/or under my direction and supervision.

I further certify that I am neither counsel for, related to, nor employed by any of the parties to this action in which this deposition was taken; and, further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this litigation.

IN WITNESS WHEREOF, I have hereunto set my hand  
and affixed my notarial seal this 27<sup>th</sup> day of October,  
1981.



Robert J. Gardner

Albert J. Gasdor  
Notary Public in and for  
the District of Columbia

My Commission expires:  
July 31, 1985