

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

Civil Action No.  
76-0544

-against-

LOCKHEED AIRCRAFT CORPORATION,

Defendant and  
Third-Party Plaintiff

-against-

THE UNITED STATES OF AMERICA,

Third-Party Defendant

Deposition of:

STANLEY A. MORAIN

Monday, October 26, 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 STANLEY R. MORAIN was taken, pursuant to notice, before Albert J. Gasdor, a Notary Public in and for the District of Columbia, commencing at 11:10 o'clock, a.m., Monday, October 26, 1981, in the law offices of Haight, Gardner, Poor & Havens, Suite 1000, 1819 H Street, N.W., Washington, D. C.

APPEARANCES:

On behalf of the Plaintiff:

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On behalf of Defendant Lockheed:

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I N D E X

Monday, October 26, 1981

Washington, D. C.

DEPONENT:

DIRECT EXAMINATION

STANLEY A. MORAIN

3

E X H I B I T S

<u>NUMBER</u>	<u>FOR ID.</u>	<u>TRANSCRIPT REFERENCE</u>
DD-2541	5	5
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DD-2541-3	49	49
DD-2541-4	50	50, 54, 55
DD-2541-5	53	53, 55
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DD-2541-10	54	54, 56
DD-2541-11	54	54, 56
Walker 3-735 & 3-736		61
Tarbell 2-A through Tarbell 2-K		62
Tarbell 3-A through 3-EE		62
Bandy B-1 through B-36		62
B-33		63
B-36		63

E X H I B I T S (continued)

<u>NUMBER</u>	<u>FOR ID.</u>	<u>TRANSCRIPT REFERENCE</u>
3-A		63
3-B		63, 85
3-E		85
3-H		63
10-A		64
10-J		64
0-1		64

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Request for Production:

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Page 29 Line 4

1 Whereupon,

2 STANLEY ALAN MORAIN

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. CONNORS:

7 Q Would you state your name, please.

8 A Stanley Alan Morain.

9 Q Your address, please, home address and then  
10 office address.

11 A [REDACTED] Albuquerque,

12 New Mexico, 87111; and my office address is 2500 Central  
13 Avenue, Southeast, Albuquerque, 87131.

14 Q Doctor, let me show you a document entitled  
15 "Resume for Stanley Alan Morain" produced by counsel this  
16 morning and ask you if you can identify that, please.

17 A Yes.

18 Q What is that document?

19 A It is a summary of my professional activities and  
20 education.

21 Q Is that up to date at the present time?

22 A Not entirely.

1 Q In what way is it not up to date?

2 A I have participated in the months of July and  
3 August in an international evaluation of agricultural remote  
4 sensing.

5 Q Where was that?

6 A Four countries: Ecuador, Sierra Leone, Philippines  
7 and Morocco.

8 Q Are there any publications which you have which  
9 are not listed on that document?

10 A No, sir.

11 Q I call your attention to page 3 --

12 MR. McMANUS: Excuse me. It is clearly reflected  
13 on the resume but so there is no confusion in the record, on  
14 the third page of the resume under "Remote Sensing Publi-  
15 cations, it states under that that the Doctor has listed  
16 the ten most relevant selected from over 35, so I presume  
17 there are 25 others whose actual titles are not listed on  
18 this document.

19 BY MR. CONNORS:

20 Q Is that correct, Doctor?

21 A Yes.

22 Q Where would those publications be listed?

1 A In prior versions of this resume.

2 MR. CONNORS: I will call for the production of a  
3 complete list of the Doctor's publications.

4 I will ask the reporter to mark the document  
5 "Resume for Stanley A. Morain" as Defendant's Exhibit  
6 DD-2541.

7 (Said document marked Defendant's  
8 Exhibit DD-2541 for identification.)

9 BY MR. CONNORS:

10 Q Doctor, other than you have just noted, are there  
11 any other areas in which DD-2541 is not a current resume or  
12 curriculum vitae of your educational activities and background?

13 A No.

14 Q Doctor, when were you first contacted in regard to  
15 this case?

16 A Friday, October 16, 1981.

17 Q Who contacted you?

18 A Lewis, Wilson, Lewis & Jones firm.

19 Q Do you recall specifically who from that law firm?

20 A Doctor Mike Cohen.

21 Q Since that time, have you had an opportunity to re-  
22 view various materials connected with the accident on April

1 4, 1975?

2 A Yes.

3 Q Was your role in this case at anytime explained to  
4 you or was a description given as to what type of testimony  
5 you were expected to give or what areas, and that sort of  
6 thing?

7 A They were outlined briefly by Doctor Cohen.

8 Q What were they?

9 A He requested information on the length of tracks  
10 shown on the landscape, the depth of those tracks.

11 He requested information on the nature of the soils  
12 over which those tracks extended.

13 He requested information on the staining or condition  
14 of the vegetation around the site.

15 Q Is it your understanding that that is the extent  
16 of the subject matter as to which you are to testify?

17 A Yes.

18 Q Have you been able to form an opinion as of this  
19 time with regard to those subjects?

20 A Preliminary opinion.

21 Q In what way is the opinion preliminary?

22 A I have not yet received the photographs I believe

1 I will need to make the necessary measurements.

2 Q Doctor, do you have a copy of your resume in  
3 front of you?

4 A Yes.

5 Q Doctor, looking at DD-2541, under your name,  
6 there is a parenthetical "Certified Photogrammetrist."

7 What is a photogrammetrist?

8 A A photogrammetrist is a person who makes measure-  
9 ments from photography that pertain to landscape conditions  
10 or the quality of the photography.

11 Q When you say "Certified," certified by whom?

12 A The American Society of Photogrammetry.

13 Q How large an organization is that?

14 A Roughly five thousand members in the United States.

15 Q Doctor, what is EarthScan International, Inc.?

16 A EarthScan International is a private consulting  
17 firm established by myself and my wife.

18 Q Is that for purposes of consulting on litigation-  
19 type cases?

20 A Not entirely.

21 Q What is your wife's background in terms of this  
22 organization? Is she similarly qualified to you in the area

1 of photogrammetry?

2 A No, sir.

3 Q Is there any anticipation she would participate  
4 in any of the calculations or basis for any of the opinions  
5 that would be given in this case?

6 A No, sir.

7 Q Without revealing any specific names, is it possible  
8 to tell me who or what type of individuals or organizations  
9 utilize EarthScan International?

10 A Clients usually include or have included govern-  
11 ment agencies involved in forestry, agriculture, land-use  
12 studies; private firms involved in mineral exploration, and  
13 other institutions of higher learning.

14 Q Doctor, there is a reference to remote sensing  
15 in your resume. How do you define remote sensing?

16 A Normally, it is defined as the acquisition of  
17 information and extension of information about natural re-  
18 sources without being in direct contact with those resources,  
19 to include aerial photography and satellite imagery and  
20 other forms of indirect sensing.

21 Q Doctor, there is a reference to testimony before  
22 the House of Representatives, Committee on Science and

1 Technology. I assume it was meeting in Albuquerque in  
2 1980, page 2?

3 A That is correct.

4 Q What was the subject matter of that testimony?

5 A That was testimony on techniques for technology  
6 transfer.

7 Q Doctor, have you ever been in any of the military  
8 services?

9 A No, sir.

10 Q Have you ever been employed by the Air Force?

11 A No, sir.

12 Q Have you ever been in Vietnam?

13 A No, sir.

14 Q Where did you receive your training in photo  
15 interpretation?

16 A University of Kansas.

17 Q Have you ever been employed by the United States  
18 Government?

19 A Only in the capacity of a consultant.

20 Q And those are the ones listed in your resume?

21 A Yes.

22 Sorry. I was employed by the Bureau of Land Management

1 at Riverside when I was 19 years old.

2 Q You will have to excuse me, Doctor, I am kind of  
3 groping in this area since I obviously don't have your  
4 expertise.

5 Are there types of investigations that you do? In  
6 other words, is there a way to catalog various types of in-  
7 vestigations so I don't have to aim my questions all over  
8 the map to try to narrow the field?

9 Am I making myself clear?

10 A I could only speculate.

11 Q What type of investigations can you do in terms of  
12 evaluating ground tracks, the nature of soil composition,  
13 vegetation studies? What types of investigations can you do?

14 MR. McMANUS: Do you mean what he actually does,  
15 looking at maps or pictures, making measurements, or more  
16 of a philosophical-type question?

17 BY MR. CONNORS:

18 Q I am asking what types of investigations can be  
19 done in this area. In other words, you have talked about  
20 the remote sensing and radar and in looking at the resume  
21 there are indications of crop studies, and I assume some sort  
22 of subsurface investigations.

1 MR. McMANUS: Are you asking the various means he  
2 would use to reach a conclusion?

3 BY MR. CONNORS:

4 Q I am not there yet. I am trying to narrow this  
5 down.

6 Now, do you understand my question, Doctor?

7 A In the area of agriculture studies typically in-  
8 clude measurements of crop area, crop production, crop  
9 condition.

10 In the area of forestry, timber volume production,  
11 landscapeability, are examples.

12 In the area of soils, soil-water relations; soil types  
13 as revealed by topography and other genetic factors in soil  
14 evolution.

15 Q Doctor, have you brought any other documents with  
16 you today besides your resume?

17 A Yes, I have a few.

18 Q What did you bring?

19 A With regard to what?

20 Q With regard to this litigation.

21 A I have a few copies of documents that represent  
22 preliminary library work with regard to paddy soils.

1 Q May I see those, please.

2 (Documents handed to counsel.)

3 BY MR. CONNORS:

4 Q Doctor, you have handed me Xerox copies of articles  
5 from six publications. Are these the only documents you have  
6 brought with you?

7 A With regard to that topic, yes.

8 Q Have you brought any other documents from your  
9 home which you don't have here in this office with you today?

10 A Have I brought any other documents?

11 Q Have you brought any other documents from your  
12 home in either explaining your testimony or working on your  
13 testimony?

14 A Yes, sir.

15 Q What did you bring?

16 A I brought two photographs of the paddy soil condi-  
17 tions in Thailand. I brought a map of soil types in the  
18 vicinity of Saigon.

19 I brought a map of vegetation types in the vicinity of  
20 Saigon -- Xerox reproductions.

21 I have one climatic chart of the City of Saigon.

22 Q Do you have those here in this office now?

1 A Yes, sir, I do.

2 Q May I see those, please.

3 A Here is the map of soils, the map of vegetation,  
4 a photograph of the typical paddy soil, and a typical rice  
5 paddy situation. This is the climatic chart.

6 Q Anything else, Doctor?

7 A No, that is it.

8 Q Doctor, do you have the negatives for these  
9 photographs?

10 A No, I don't. They were produced from slides.

11 Q Do you have the slides?

12 A I have the slides.

13 Q Do you have multiple copies of these photographs?

14 A I have made three of each of the two photographs  
15 you have in front of you.

16 Q Have these maps been produced for us to keep?

17 A You can keep those, yes.

18 MR. MCMANUS: You may have those.

19 BY MR. CONNORS:

20 Q Doctor, did you have any other materials that you  
21 left at your home or office which you had either researched  
22 or prepared regarding this accident?

1 A No, sir.

2 Q Have you previously made calculations or conducted  
3 investigations with regard to crack marks or the nature of  
4 soils in rice paddies?

5 A As to the nature of soils, yes. As to the nature  
6 of tracks, no.

7 Q Have you previously conducted any investigations  
8 regarding the standing or discoloration of vegetation?

9 A Yes, but not on that particular type vegetation;  
10 on other types of vegetation.

11 Q Doctor, what methods do you employ when you con-  
12 duct an investigation of the nature of soil?

13 A Those investigations fall under several categories  
14 physical properties, chemical properties. Normally, one  
15 relies on the convergence of evidence.

16 Q What type of evidence?

17 A Hydrology, topography, landscape position, culti-  
18 vation practices. There are several lines of evidence,  
19 depending upon the situation.

20 Q How do you, as a photogrammetrist, conduct such  
21 an investigation?

22 A I am not sure I understand the question.

1 Q You are trying to determine the physical character-  
2       istics of soil.

3       Have you ever done that in the past?

4 A Yes.

5 Q Could you give me an example of when you have done  
6 this in the past?

7 A The research conducted in Australia in 1967-1968,  
8 as an example, utilized the vegetation and topographic posi-  
9 tion of the vegetation to draw conclusions about the nature  
10 and property of soils in a portion of tropical Australia.

11 Q How did you use this photographic information?

12 A Primarily for the distribution of the soil types  
13 and analysis of drainage conditions, by -- I don't know  
14 exactly how to say it -- by marrying the ecological param-  
15 eters visible on the imagery or known to be present in an  
16 area with their physical manifestation on the image.

17 Q What was the source of the imagery in that case?

18 A In the case of Australia, it was flown by the  
19 Royal Australian Air Force.

20 Q Low-altitude photography?

21 A That is relative. I would say at medium altitude.

22 Q Approximately what height?

1 A It is easier for me to talk in terms of scale.

2 Q I would still like to know the altitude.

3 A I would have to look it up. The scale of the  
4 photography, if I recall, was 1 to 50 thousand scale.

5 Q What other information did you have with regard  
6 to the actual conditions on the ground, other than the  
7 photographs?

8 A Existing maps, climatic data, and in that particu-  
9 lar case a considerable ground effort.

10 Q You were physically on the ground, yourself?

11 A Yes.

12 Q What did the ground effort consist of?

13 A Digging soil pits, taking measurements of the  
14 consistency and nature of the materials as a function of depth.

15 Q Have you been involved in any other studies of soil  
16 characteristics other than the Australian study?

17 A Yes.

18 Q What other studies?

19 A In Thailand, in Bangkok, and also in Kansas and  
20 in New Mexico.

21 Q Did any of these involve rice-paddy-type areas?

22 A In the case of Thailand, yes.

Q What did you utilize in the Thailand study?

1           A    A combination of aerial and satellite images,  
2           existing maps and one or two field excursions.

3           Q    What maps were used?

4           A    World aeronautical charts, the Atlas of Resources  
5           produced by the Thailand Government, particularly soils map  
6           and vegetation map.

7           Q    What did the field excursions consist of?

8           A    Verifying our interpretations.

9           Q    How did you go about doing that?

10          A    We utilized the photographs for delineating areas,  
11          again using this convergence-of-evidence approach and then  
12          going into particular places on the ground to verify what  
13          we had interpreted was, in fact, the case.

14          Q    What did you use to verify this?

15          A    Soil pits again and basically visual observations.

16          MR. CONNORS: I will ask that the record reflect  
17          that Mr. McManus is conferring with the witness at the  
18          present time.

19          MR. MCMANUS: I can confer with this witness anytime  
20          I care to.

21          MR. CONNORS: I just want it on the record.

22          MR. MCMANUS: I intend to confer with him at my

1 pleasure.

2 BY MR. CONNORS:

3 Q Doctor, you mentioned, also, another type of in-  
4 vestigation you had done with regard to vegetation. What was  
5 the nature of that investigation or study?

6 A I am not sure I know which reference you are  
7 referring to.

8 Q I had asked you if you participated before in any  
9 investigations or research regarding the discoloration or  
10 staining of vegetation and you said yes, but not this type  
11 of vegetation.

12 A Basically, woodland vegetation.

13 Q Where was that?

14 A Kansas, Oregon.

15 Q What evidence was used in that study?

16 A Coloration of tree canopy on aerial photography.

17 Q What type of photographs were used in that?

18 A What is referred to as normal color photography,  
19 as well as color infrared photography.

20 Q Was there any follow-up on the ground, as in your  
21 other studies?

22 A No.

1 Q Doctor, have you ever testified before?

2 A No, sir.

3 Q At any depositions?

4 A No, sir.

5 Q This is the first time?

6 A Correct.

7 I am assuming a witness before the House is not similar  
8 to this since I was not sworn in.

9 Q You were not giving sworn testimony at that time?

10 A No.

11 Q You have never given sworn testimony before?

12 A No.

13 Q Doctor, with regard to your resume, you have  
14 listed several panels, committees and selected consultings  
15 over the last five years. Have you retained any of the trans-  
16 cripts of any of those meetings?

17 A The testimony on the House of Representatives is  
18 published.

19 Q Do you remember the approximate date of that, by  
20 any chance?

21 A No.

22 Q Anything else?

23 A How far down this list do you want me to go?

1 Q Anything.

2 A The first item on page 3 resulted in a proposal  
3 which I submitted to the Agency for International Development  
4 They have copies of that.

5 The last item in that section, Selected Consulting,  
6 resulted in a published paper with two other authors on  
7 the use of satellite data for agricultural output.

8 Q The question first related to copies of any  
9 transcripts. Do you have any of those?

10 A I don't have any.

11 Q You don't even have a copy of the House of Repre-  
12 sentatives transcript?

13 A I might be able to find one. It does not pop out  
14 in my mind's eye as to where it might be in my filing system.

15 Q Do you think you might have one?

16 A I might be able to put together one.

17 MR. CONNORS: I would call for the production of  
18 that transcript and I would call for the production of the  
19 testimony before the House of Representatives, Committee on  
20 Science and Technology in March of 1980.

21 I would also call for the production of the pro-  
22 posals just referred to with regard to the Agency for

1 International Development, Science and Technology and Asia  
2 Foundation, "The Contribution of Satellite Data in Estimating  
3 Agricultural Output in Laos."

4 Are you able to produce those, counsel?

5 MR. McMANUS: Not now, of course not.

6 MR. CONNORS: Are you able to get copies and pro-  
7 duce them for us?

8 MR. McMANUS: If the Doctor has them, I am sure  
9 we are able to get copies.

10 MR. CONNORS: Are you willing to do so?

11 MR. McMANUS: I am not willing to say so at this  
12 point.

13 BY MR. CONNORS:

14 Q Doctor, in the area of photogrammetry, are there  
15 standard methods of investigating soil types or the physical  
16 condition of soil?

17 A Yes, indeed. That is not to say everybody agrees  
18 on the standard methods.

1 Q What method do you employ?

2 A With regard to what aspect of soil

3 Q With regard to physical investigation of soil.

4 A I utilize photomorphic or the appearance of regions  
5 on photography combined with topographic position and other  
6 attributes known to be true of an area.

7 Q When you say "known to be true," how do you know  
8 them to be true?

9 A Well, I am referring to climatic data, topographic  
10 information, contour maps, that sort of thing.

11 Q In interpreting a graph, a black and white graph,  
12 what method do you use in interpreting what you see in that  
13 picture to arrive at your conclusions?

14 A There are standard techniques for mensuration,  
15 which is a fancy way of saying measuring, features off photo-  
16 graphs, whether they are color or black and white.

17 Q What are you measuring? What are you coming up  
18 with an actual measurement of? Would it be the distance between  
19 two points, or is there something else you are measuring?

20 A I am not quite sure I am with you.

21 Q You used the term "measurement." A lay person may  
22 think in terms of a ruler and a measurement. Is there some

1 other method by which you can measure that soil by looking  
2 at that photograph?

3 A Yes.

4 Q What would that be?

5 A One can measure lengths, heights and widths as a  
6 function of the scale of the photograph.

7 Q Can you measure depths?

8 A Yes.

9 Q Anything else?

10 A I am attempted to say yes, but I am not sure what  
11 you are referring to.

12 Q Is there something else you can use to measure a  
13 photograph other than a linear measurement?

14 A You can measure crop production. You can measure  
15 board feet of timber. You can measure the areas of cover  
16 types, vegetation.

17 Q You are still talking about an aerial measurement or  
18 quanted per given area?

19 A Yes. You can measure volumes, as, for example, in  
20 highway construction where material has to be moved from this  
21 position to that position.

22 Q How would you measure a depth?

1       A    By a convergence of evidence, the geometry of the  
2 image, shadows, and other phenomenon such as that.

3       Q    What other evidence would need to converge other  
4 than the photograph itself?

5       A    Soil type.

6       Q    How would you get that?

7       A    By, again, knowing something about the topography,  
8 the specific area involved, its landscape position, the way  
9 it appears on the photograph. I think those are the main  
10 clues.

11      Q    What sources do you use for that sort of information?

12      A    Typically maps, photographs.

13      Q    You mentioned shadows. How do you use those in  
14 determining depth?

15      A    The most common way is to know the parameters of  
16 the camera, the height of the aircraft, the angle of the phot-  
17 graph and the position of the sun, and working out the geometry  
18 of those parameters with regard to the photo appearance of a  
19 phenomenon on the ground.

20      Q    You also mentioned the geometrics of the photograph  
21 for the feature itself. How would that be done?

22      A    One needs to know the focal length of the camera for

1 making precise measurements, let's say, to an inch or so, again  
2 depending upon the scale of the photograph because the focal  
3 lenght controls the scale of the photograph together with the  
4 height of the airplane.

5 Q Is there any other information you need to utilize  
6 the geometry of the photograph?

7 A I think those are the main items.

8 Q Is there a particular quality of photograph that you  
9 need to do this sort of calculation?

10 A It shouldn't be blurry.

11 Q Do you need different views of a given subject matter  
12 to make those sorts of calculations?

13 A It depends on the subject matter.

14 Q I have been struggling here to try to get something  
15 on the methodology that your profession employs, Doctor.

16 Is there anything in the ten articles you listed  
17 in your resume or the other 25, the list of which we have  
18 called for the production, which is used in your field?

19 A No, I rarely get into the methodology. I use the  
20 standard techniques.

21 Q Doctor, you said that not everyone might necessarily  
22 agree with the methodology used and I asked you to give me

1 what you used and then we went into the discussion we just  
2 had.

3 What other types of methodology might be possible  
4 which you yourself might not employ?

5 A With regard to air photo interpretation?

6 Q Yes, of the condition of soil.

7 A I can't think of any. I am not able to respond to  
8 that.

9 Q The methods we have just been discussing which you  
10 say you utilize, are they the standard ones in your field?

11 A Yes.

12 Q Are they set forth in some sort of manual or text-  
13 book for the photogrammetrist?

14 A There are several textbooks.

15 Q What would examples of textbooks where that  
16 methodology could be found?

17 A Avery, Eugene, Photo Interpretation, I believe, is  
18 the title of it.

19 American Society of Photogrammetry, Manual of  
20 Photogrammetry; American Society of Photogrammetry, Manual  
21 of Color Arial Photography; the American Society of Photo-  
22 grammetry, Manual for Remote Sensing.

1 Q Any others?

2 A Those are the ones that come immediately to mind.

3 Yes, there are others.

4 Q Have you either participated in or made any contribu-  
5 bition to any of the three manuals you have referred to  
6 published by the American Society of Photogrammetry?

7 A Yes.

8 Q In what areas have you contributed?

9 A The chapter on soils in the Manual of Remote  
10 Sensing.

11 Q Anything else?

12 A There is one other contribution. I don't recall  
13 it offhand. I would have to go back to the table of contents.  
14 There were two chapters.

15 Q Is your name listed as the contributor for those  
16 chapters?

17 A Yes.

18 Q In Remote Sensing and the chapter on soils in  
19 the Manual on Remote Sensing that we have just been talking  
20 about, what methodology is referred to in there?

21 A Essentially the methodology that I have been  
22 describing to you here.

1 Q Does that also include radars?

2 A There is some radar work in there, yes.

3 Q Anything besides radar and photosensing means?

4 A Yes.

5 Q What would be the other means?

6 A I am not sure I understood your question.

7 Q Were there any other methods besides photographic  
8 means and radar?

9 A Not beyond the scope of what we have been discussing.

10 Q Do you have copies of those chapters which you have  
11 contributed?

12 A Not in their published form.

13 Q Do you have earlier drafts?

14 A I don't know, to be honest.

15 Q You don't know what form they are in or you don't  
16 know what you have?

17 A I don't know what I have because not only have I  
18 changed locations but my office has been recently remodeled and  
19 a lot of my materials were all drafts and they were sent to  
20 an editor who then edited all that material and merged it with  
21 other material from other authors, and I frankly don't know  
22 if I could find or if I even retained the rough drafts for a

1 lot of that material.

2 Q Is it possible for you to look for those?

3 A Of course.

4 MR. CONNORS: We would call for their production.

5 MR. McMANUS: The answer on that is no, or perhaps,  
6 more appropriately, I would object.

7 BY MR. CONNORS:

8 Q Doctor, you indicated that you had also participated  
9 in studies or investigations on the staining or discoloration  
10 of vegetation in Kansas; is that correct?

11 A Yes.

12 Q Could you describe for us the methodology which you  
13 use in that sort of investigation as to the staining or  
14 discoloration of vegetation?

15 A Visual observations on aerial photographs.

16 Q What type of vegetation was involved in that study?

17 A Woodland vegetation primarily, tree foliage and  
18 also burned areas of agricultural crops.

19 Q What types of photographs did you have available  
20 to you in that study?

21 A I had available what are referred to as low altitude  
22 obliques and low altitude vertical aerial photos.

1 Q Black and white or color?

2 A Color.

3 Q Any infrared?

4 A Yes, some infrared.

5 Q How do you use a black and white photograph to  
6 determine a staining or discoloration of vegetation?

7 A By the comparison of its tone with the surrounding  
8 areas.

9 Q If it is darker, therefore, it is stained?

10 A Essentially.

11 Q Is it possible to do any determination of grade  
12 assurance of discoloration?

13 A In my opinion, yes.

14 Q With black and white photographs?

15 A If you have a large enough area. It depends on  
16 what your purpose is.

17 Q What was your purpose in that study?

18 A In which study?

19 Q The study in Kansas.

20 A There were two, one on the tree crowns and one in  
21 the burned over areas.

22 Q Let's take the tree crowns?

1 A That is the top of the tree.

2 Q What was the purpose of that study?

3 A To see if we could distinguish between species  
4 of trees by their color variations.

5 Q On black and white photographs?

6 A On color photographs and color infrared.

7 Q Did you need the infrared photographs to do that?

8 A We didn't need it. We can see differences in the  
9 color photography.

10 Q Sufficient for purposes of that study?

11 A As I recall, it was an experiment. We were trying  
12 to determine how much information could be gotten.

13 Q What were the results in terms of the color photography

14 A The results are that at certain times of the year it  
15 is possible to distinguish certain species by virtue of their  
16 color variations and at other times of the year it is not  
17 possible.

18 Q Is it possible to determine species from black and  
19 white photographs?

20 A Very difficult.

21 Q Is it possible at all?

22 A Yes.

1 Q Under what conditions?

2 A By conditions of the convergence of evidence again  
3 using the known ecology of certain species and comparing known  
4 ecology with the position on the landscape one can interpret  
5 quite accurately for certain species.

6 Q When you are talking convergence of evidence, you  
7 are talking about something other than simple photographs.  
8 You are talking about outside sources?

9 A Yes, sir.

10 Q The second study referred to is the burned-over  
11 area. Would you describe the purpose of that study?

12 A Simply to measure the areas burned.

13 Q Was there a forest fire of some sort?

14 A No, this was in crop lands.

15 Q What sort of crops?

16 A Wheat in Kansas and rice in Thailand.

17 Q What type of photography was used?

18 A In the Kansas experiment, color photography; and  
19 in the Thailand experiment, satellite imagery.

20 Q Was any infrared used in that case?

21 A Yes, but a different type.

22 Q What type?

1 A It wasn't color infrared. It is what is referred

2 to as Channel Seven on the land set satellite image, which  
3 is a black and white infrared.

4 Q In the Kansas study, were you simply trying to

5 determine the area that had been burned?

6 A Yes, sir.

7 Q Do you know what the cause of the fire was in that  
8 case?

9 A Yes, the famers deliberately burned the fields.

10 Q In the Thailand studies, what were you trying to  
11 determine?

12 A The same thing.

13 Q And what was the source of the fire in Thailand?

14 A The same thing.

15 Q You said you had Channel Seven black and white  
16 infrared photography in Thailand?

17 A Yes.

18 Q What other types of photography did you have?

19 A For that particular study that was the main input.

20 Q You used exclusively satellite photgraphy for that  
21 study?

22 A I also happened to have some low altitued oblique

1 photography that I personally took.

2 Q Were you also on the ground in that case?

3 A I was on the ground in that area but not for that  
4 reason.

5 Q Is the methodology in interpreting satellite  
6 photography different from that used in other black and white  
7 or infrared technology?

8 A Would you repeat that?

9 Q Is the method to interpret satellite information  
10 of any kind different from interpreting photographs taken at  
11 a lower altitude?

12 A Not if you are using nonvisual means.

13 Q Nonvisual means would mean radar?

14 A No. I meant to imply there is a lot of research  
15 work being done using computers and digital imaging process  
16 techniques, process techniques which I do not employ.

17 Q How large an area were you surveying in Thailand  
18 with the use of satellite photograph?

19 A With the satellite, my recollection is four or five  
20 provinces. I don't know what the total acreage would be.

21 Q What is your resolution on that type of photography?

22 A On the satellite photography, 80 meters.

1 Q With that you were measuring areas that had been  
2 burned; is that correct?

3 A That is correct.

4 Q How accurate were the calculations?

5 A My recollection is about 90 percent.

6 Q How were they confirmed?

7 A Against data collected by the Thailand Government  
8 agencies on areas burned in each province.

9 Q They were physically on the ground and measured the  
10 areas and then compared with the satellite data?

11 A I do not know how they collected their data.

12 Q The discolorations that you have referred to so far  
13 have involved burning of crops. Have you ever been involved  
14 in any studies relating to discoloration from sources other  
15 than fire?

16 A No.

17 Q Have you done any research --

18 A In cropland, that is. The discoloration and the  
19 tree crowns is not due to fire.

20 Q That is due to natural discoloration and change of  
21 species?

22 A Some of it is also related to insect damage and stress.

1 Q Any other areas?

2 A No.

3 Q Are you aware of any studies which have looked at  
4 discoloration of vegetation other than the types you just  
5 referred to, that is, either burning from fire or natural  
6 species differences or insect damage?

7 A Am I aware of any other such?

8 Q Yes.

9 A Yes.

10 Q What would those be?

11 A The results of defoliants, primarily defoliants,  
12 herbicides.

13 Q What such studies are you referring to?

14 A I am referring to any specific study. I am referring  
15 to my recollection of photographs I have seen of such phenomenon.

16 Q Doctor, I am now going to show you a photograph  
17 which we have marked as Defendant's Exhibit DD-2541-1  
18 and ask you if you can identify that, please.

19 [Document marked Defendant's Exhibit

20 DD-2541-1 for identification.]

21 THE DEPONENT: Yes, I can identify that.

1 BY MR. CONNORS:

2 Q What is that?

3 A Those are rice paddies in the vicinity of Bangkok  
4 in Thailand.

5 Q Who took that photograph?

6 A I took it.

7 Q When did you take that photograph?

8 A It was either in 1973 or in 1975.

9 Q Are those the two times you have been in Thailand?

10 A I have been there several times but my recollection is  
11 it had to be one of those two times.

12 Q You indicated that you brought this photograph to  
13 show the typical rice paddy area.

14 A No, I did not bring it today for that purpose.

15 Q This photograph was produced to us in conjunction  
16 with a series of other documents which you handed over when I  
17 asked you for any documents referring to this litigation. What  
18 was the purpose of that photograph in that group?

19 A At the time I made it I was not sure it had any  
20 purpose. The purpose I had for it was to show the nature of  
21 the dikes around the paddies.

22 Q This was for purposes of explaining this here today

1 or just for your own convenience? In other words, why did  
2 you select this picture to include with the others?

3 A On my previous visit to review these photographs, the  
4 question of the dikes around the paddies came up, but I didn't  
5 see any ground photograph of paddies in the vicinity of this  
6 particular incident so I pulled this out of my files as a  
7 means of having a ground photograph typical of a rice paddy  
8 situation.

9 Q Is it your opinion that the construction of rice  
10 paddies are the same in Thailand as they are in Vietnam?

11 A Yes, it is.

12 Q Doctor, I would now like to show you a photograph  
13 we have now marked as Defendant's Exhibit DD-2541-2 and ask  
14 you if you can identify that.

15 A Yes.

16 [Document marked Defendant's Exhibit  
17 DD-2541-2 for identification.]

18 BY MR. CONNORS:

19 Q What is that?

20 A That is a photograph of the soil profile for rice  
21 paddy soil in Thailand.

22 Q When would this have been taken?

1 A At the same time the other photograph was taken,

2 either in 1973 or 1975.

3 Q The perspective on this picture is a little bit

4 difficult for me to understand. The correct way to view this  
5 would be with the person's foot above the hand and the hand  
6 pointing downward.

7 A That is correct.

8 Q There is a dark shadowy area at the bottom. What  
9 is that?

10 A This is a soil pit and it extends down there and in  
11 the shadows you can barely see the bottom of it and this is  
12 a shadow from the other side.

13 Q Approximately how deep is that pit?

14 A I would think three feet.

15 Q Can you tell approximately how high up that shadow  
16 appears or how much of the pit it is covering, approximately?

17 A Approximately a third.

18 Q There is a medium brown colored soil above the  
19 shadow. To your knowledge, is that type of soil and coloration  
20 consistent through to the bottom of the pit?

21 A To my recollection, yes.

22 Q There is a lighter band of soil just above that. Do

1 you know what that is or what is reflected in that coloration?

2 S: A It is a clay layer.

3 Q Approximately how deep below the surface is that?

4 A Approximately a foot.

5 Q Then there is a darker level of soil above that.

6 What does that consist of?

7 A It is a combination of silt and clay.

8 Q Is there another layer of soil above that?

9 A Yes.

10 Q What is that?

11 A Silt but with lesser amounts of clay.

12 Q The dark band you say was primarily silt and clay.

13 About how deep is that?

14 A I would think four inches, perhaps five inches.

15 Q How deep would the layer of silt and clay above  
16 that be?

17 A It is difficult to tell because in the process of  
18 digging the pit we don't know how much of this is the original  
19 soil surface but it looks like another four or five inches.

20 Q How much silt would that be in a normal rice paddy?

21 A About this, not much.

22 Q How much water would generally be above the silt

1 layer?

2 A How much water might accumulate above that?

3 Q Yes.

4 A It would vary depending on the topographic position  
5 but several inches.

6 Q Is this the normal type of methodology you would  
7 use in looking at a soil condition to dig a pit like this?

8 A For certain kinds of studies, yes.

9 Q What particular types of studies?

10 A Particularly soil and genetic studies where you are  
11 interested in how the soil formed, and what its primary physical  
12 condition might be.

13 Q I believe you said your first contact with this case  
14 was on August 16, 1981 at which time you received a telephone  
15 call from Doctor Michael Cohen; is that correct?

16 A That is correct.

17 Q Is that the time when he indicated to you that he  
18 wanted you to conduct a study or prepare testimony with  
19 regard to the nature of soils, the length of track marks in  
20 soils and the standing of vegetation at the accident scene?

21 A No, sir.

22 Q Were there subsequent conversations with Doctor Cohen?

1 A That is correct.

2 Q How many conversations approximately have you had  
3 with him?

4 A I met with him on Monday the 19th.

5 Q Where was that meeting?

6 A Here.

7 Q Between the 16th and the 19th, did you have any  
8 contact with any members of plaintiff's expert team or  
9 attorneys?

10 A No, sir.

11 Q Were any facts regarding the accident provided  
12 to you in the first conversation with Doctor Cohen on  
13 October 16, 1981?

14 A That again is relative. He gave me a brief resume  
15 of why he was interested in my knowledge, and it was pure  
16 happenstance that I was going to be in Washington that day  
17 on another matter and he asked if I might drop by the office  
18 and look at those materials.

19 Q Were you in Washington on the 16th?

20 A No, on the 19th.

21 Q During that first phone call did he provide you  
22 any facts regarding the accident itself?

1       A    I don't know what a fact is. He merely indicated  
2        that there was a case in question that he wanted me to look  
3        at and review some photographs without giving me really any  
4        information and asked if I would be interested in making  
5        some measurements.

6       Q    Where did you meet with him on the 19th?

7       A    At the offices of the Lewis firm.

8       Q    Did he provide you with any written materials at  
9        that time?

10      A    No, sir.

11      Q    Did he provide you with any oral descriptions of  
12       the circumstances surrounding the accident?

13      A    Yes.

14      Q    What did he tell you?

15      A    That there had been an accident with a C5A air-  
16       craft in which there were some casualties and that he was  
17       hoping that I could provide some information on --

18            MR. McMANUS: You don't need to help him with  
19       anything but facts, no other discussion or opinions. Any  
20       facts that were given to you about the accident you can give  
21       them to Mr. Connors.

22            THE DEPONENT: I don't have any facts if that is

1 the case.

2  
3 MR. McMANUS: Counsel understands that Doctor  
4 Morain's participation in this case has already been indicated  
5 this morning. He has not been called, will not be called  
6 as a fact witness as to the circumstances surrounding the  
7 crash of the C5A, such as the door blowing off and things of  
that nature.

8 BY MR. CONNORS:

9 Q Doctor, was anyone with Doctor Cohen when he met  
10 with you?

11 A Yes.

12 Q Who was that?

13 A Frankly, I don't remember his last name.

14 Q Was it one of the attorneys from the Lewis firm?

15 A There was an attorney there for a few moments but  
16 I did not carry on a discussion with him.

17 Q You don't know if the other person was an attorney?

18 A No, I don't.

19 Q Did the other person participate in the discussion?

20 A We viewed the film.

21 Q To get back to my prior question, you indicated that  
22 he did not give you any facts regarding the accident. He

1 didn't give you any distances or measurements, nothing at all?

2 A No.

3 Q Doctor, you indicated you viewed a motion picture  
4 film at that time?

5 A That is correct.

6 Q One film?

7 A No, there were two, if I recall.

8 Q Did you look at any still photographs?

9 A Yes, I did.

10 Q Color and black and white?

11 A Yes.

12 Q Were these photographs identified to you with any  
13 designations as to how they were to be referred to?

14 A No.

15 Q Did someone simply put a pile of photographs in  
16 front of you and say, "This was an accident," or "This was  
17 previously marked plaintiff's exhibit?"

18 A No. This is all new to me.

19 Q What size photographs were you shown?

20 A The same size that you have there.

21 Q Approximately five by seven?

22 A Approximately.

1 Q Were you shown any eight-by-tens?

2 A No.

3 Q Do you recall approximately how many photographs  
4 you would have been shown?

5 A There were many more there than I actually went  
6 through. I would think a couple of hundred.

7 MR. CONNORS: We had previously requested from counsel  
8 that the photographs that Doctor Morain was shown should be  
9 brought to the deposition and I understand they have not been.

10 MR. McMANUS: As I advised you before off the  
11 record, Doctor Morain had the opportunity to look at all of  
12 the photographs that we have which are the same photographs,  
13 I presume, that you have unless you have more additionally  
14 that have not been produced to us.

15 MR. CONNORS: I understand he has been shown all  
16 of the photographs in plaintiff's possession?

17 MR. McMANUS: I am not going to represent that he  
18 has looked at every single photo because he just said there  
19 were many more that he had the opportunity to look at that  
20 he did not look at. All of the pictures we had were made  
21 available to him and the two movies as he has already indicated  
22 he was shown.

1 : BY MR. CONNORS:

2 Q Doctor, do you recall if the photos you were shown  
3 bore any identifying numbers?

4 A On the back side.

5 Q Do you recall what those were?

6 A No.

7 Q Did you make any notations while viewing the movies  
8 or viewing the photographs?

9 A No.

10 Q Did you take any notes when reviewing this matter  
11 with Doctor Cohen?

12 A No, sir.

13 Q Did you take any notes at all?

14 A I was there purely at his request to view the  
15 materials and he was going to send me some materials which  
16 I have not yet received.

17 Q Can you identify what materials he is sending to  
18 you?

19 A Since I have not received them, I don't know how  
20 he might identify them.

21 Q Did he tell you of what substance they were? Would  
22 this be documentary evidence or photographs?

1 A I selected thirty or so and he was going to have  
2 those reproduced and sent to me.

3 Q They were still photographs?

4 A Yes.

5 Q Black and white or color?

6 A Both.

7 Q Is he sending you a copy of the film?

8 A We have not discussed that.

9 MR. McMANUS: A copy of the movie?

10 MR. CONNORS: Yes.

11 BY MR. CONNORS:

12 Q We have not discussed it.

13 Q How many times have you seen the movie?

14 A The shorter movie I had seen three times.

15 Q And the longer one?

16 A Once, as I recall.

17 Q When were you shown those?

18 A The longer movie I saw on the 19th together with  
19 the shorter one, and I saw the shorter one again this morning.

20 Q Have you had any meetings since the 19th?

21 A No.

22 Q Have you seen any photographs since the 19th?

1 A No.

2 : ~~517~~ Q You had another meeting this morning prior to  
3 coming to the deposition?

4 A Yes.

5 Q Who was present at that meeting?

6 MR. McMANUS: Me.

7 BY MR. CONNORS:

8 Q You reviewed the shorter film again?

9 A That is correct.

10 Q Did you look at any pictures?

11 A Yes, sir.

12 Q The same pictures you looked at before?

13 A Yes, sir.

14 Q Doctor, let me show you what has been marked  
15 Defendant's Exhibit DD-2541-3 and ask you if you can identify  
16 that, please.

17 [Document marked Defendant's Exhibit

18 DD-2541-3 for identification.]

19 THE DEPONENT: Yes.

20 BY MR. CONNORS:

21 Q What is that, please?

22 A It is an annual curve of temperature and precipitation

1 for four cities around the world, one of which is Saigon.

2 Q From where is this derived?

3 A It is derived from a standard textbook on climatology.

4 Q Do you know the name of that textbook?

5 A Critchfield.

6 Q How do you spell that?

7 A C-r-i-t-c-h-f-i-e-l-d.

8 I believe the title of it is Climatology.

9 Q Was this Xerox a copy by you as part of your  
10 research prior to this case?

11 A Yes.

12 Q Approximately when did you do this?

13 A I did this perhaps the 21st.

14 Q Doctor, I would like to show you a document which  
15 has been marked as Defendant's Exhibit DD-2541-4 and ask you  
16 if you can identify that, please.

17 [Document marked Defendant's Exhibit

18 DD-2541-4 for identification.]

19 THE DEPONENT: Yes, I can. It is a map of vege-  
20 tation types in the vicinity of Saigon.

21 BY MR. CONNORS:

22 Q Doctor, there are what appear to be crayon

1 colorations of this chart or map. Who put that color on  
2 ~~on~~  
3 there?

4 A That was done by another member of our consulting  
5 firm.

6 Q What does the color represent?

7 A There is a legend on the second page of the exhibit  
8 which indicates which categories are shown in that particular  
9 area.

10 Q The copy was made in black and white on some  
11 copying machine. Is the colored version your only copy of  
12 that?

13 A At the moment, yes.

14 Q Doctor, where was this map obtained?

15 A This map was obtained at the map library at the  
16 University of New Mexico Library.

17 Q What map is this? In other words, how is it  
18 identified? Is it from a book, a catalogue, a file of maps?

19 A It is one to one million scale sheet map of  
20 vegetation types in South Vietnam.

21 Q Is that published by someone?

22 A I don't recall who, but yes. It is a French  
23 publication, if I recall.

1 Q Do you recall when the data reflecting the map  
2 would have been obtained?

3 A I don't but I can get that information.

4 Q Are you able to leave the color vision of that  
5 with us?

6 MR. McMANUS: No.

7 MR. CONNORS: Even temporarily so we can obtain a  
8 coloration or a color Xerox of it?

9 MR. McMANUS: How long will it take?

10 MR. CONNORS: I don't know.

11 MR. McMANUS: If it is just this afternoon, sure.

12 MR. CONNORS: I can't promise that because I don't  
13 know if we can Xerox in color.

14 MR. McMANUS: The Doctor is going back to Albuquerque  
15 this afternoon. You have a university two blocks away from  
16 which you can probably get the same map.

17 BY MR. CONNORS:

18 Q Doctor, do you have facilities to make color Xerox  
19 copies?

20 A The university does. I do not.

21 MR. CONNORS: Can we take it and see if we can run  
22 it by the afternoon? If not, he can obtain a copy and return

1 it to us.

2 BY MR. CONNORS:

3 Q Doctor, let me show you a document which has been  
4 marked as Defendant's Exhibit DD-2541-5 and ask if you can  
5 identify that, please.

6 [Document marked Defendant's Exhibit  
7 DD-2541-5 for identification.]

8 THE DEPONENT: Yes, I can.

9 BY MR. CONNORS:

10 Q What is that, please?

11 A It is a map of the soil types in the vicinity of  
12 Saigon.

13 Q And the colorations are again represented in the  
14 legend of the second page?

15 A That is correct.

16 Q Do you recall where this map was obtained?

17 A This was also obtained at the map library of the  
18 University of New Mexico.

19 Q Do you recall what would be the publication source  
20 for this?

21 A It is in the same series as the vegetation map.

22 Q Doctor, I would now like to show you a series of

1 of documents marked Defendant's Exhibits DD-2541-6 through  
2 11 and ask if you can identify these for us, please.

3 [Documents marked Defendant's Exhibits  
4 DD-2541-6 through DD-2541-11, respectively  
5 for identification.]

6 THE DEPONENT: Yes, I can.

7 BY MR. CONNORS:

8 Q Would you identify these and refer to them by the  
9 dashed number at the bottom of the page.

10 MR. McMANUS: Do you want them in numerical order?

11 MR. CONNORS: Yes, please.

12 THE DEPONENT: Would you like a generic explanation?

13 BY MR. CONNORS:

14 Q First, are these the articles which you copied in  
15 conjunction with your research regarding this matter?

16 A Preliminarily, yes.

17 Q Doctor, we have to send these colored maps out for  
18 copying. Let me just ask you a question.

19 Let me show you DD-2541-4 and ask if you could  
20 look at the legend and the coloration on the map and tell us  
21 what is indicated by the coloration which would be appropriate  
22 or identified with the area of the accident.

1 A I don't have the coordinates for the accident so I  
2  
3 don't know exactly where in this area.

4 Q You have not identified that at all?

5 A No, sir.

6 Q Would the same be true of the area on DD-2541-5?

7 A That is correct.

8 Q Doctor, just so I know, on the -4 exhibit, what  
9 would the large red area refer to?

10 A Those are areas of rice fields.

11 Q What does the area of yellow indicate?

12 A They are given here as rubber plantations primarily

13 Q And the dark blue areas?

14 A Presumably from their location they are mangroves,  
15 swamp area.

16 Q And the green area?

17 A Dense forest.

18 Q Looking at DD-2541-5, what would the red areas be  
19 on this particular map?

20 A Undifferentiated alluvial soils as given by the  
21 legend.

22 Q And the medium blue area?

A Medium blue, acid sulphate soils.

1 Q And the yellow area?

2 A They are referred to low humic gley.

3 Q What is that?

4 A It is essentially the kind of soil as portrayed  
5 in one of the prior exhibits.

6 Q One of the photographs?

7 A Yes, DD-2541-2.

8 Q Doctor, could we return now to DD-2541-6 through  
9 -11. Were all these articles you copied in connection with  
10 your research in this area?

11 A Yes.

12 Q All these pertain to research regarding the accident  
13 scene?

14 A Not necessarily.

15 Q Which ones would not pertain to the accident scene?

16 A I don't know because I don't have the coordinates.

17 Q You don't even know the exact location of the acci-  
18 dent?

19 A No. These are references to soils and soil types  
20 that are represented in that area around Saigon but I don't  
21 know yet which soil type to focus on.

22 Q Would it be correct that all of these articles were

1 selected by you as just general background?

2 A That is correct.

3 Q Are you familiar with the authors of the various  
4 articles?

5 A Some of them.

6 Q Do you regard them as authorities in the field?

7 A Yes.

8 Q Doctor, you said that you selected approximately  
9 thirty photographs of the accident scene which you thought  
10 might be relevant.

11 A That is correct.

12 Q Do you recall what was depicted in those scenes?

13 A They are almost exclusively low altitude oblique  
14 photographs showing rice fields with tracks across some of  
15 the rice fields, and in a few cases photograph, again, low  
16 altitude oblique photographs of parts of the wreckage.

17 Q Do you know if they include photographs of both  
18 the first and second impact areas?

19 A As I understand it, yes.

20 Q You understand the plane touched down first on one  
21 side of the river, then crossed the Saigon River and then  
22 touched down on the other side of the river?

1 A I understand that.

2 Q Did you select photographs of both sides?

3 A Yes, I did.

4 Q Was the topography of the land the same on both  
5 sides of the river?

6 A I am hesitating only because the immediate answer  
7 is yes. I would like to investigate a little bit further.

8 Q My question was, are there rice paddies on both  
9 sides of the river?

10 A Yes.

11 Q Were the touchdowns on both sides in rice paddies?

12 A Yes.

13 Q Would the touchdown apply to both sides or why  
14 would there be a distinction?

15 A There may be a distinction in the soil-water  
16 relationships on one side as opposed to the other side.

17 Q How would you determine that?

18 A By the presence or absence of water on the surface  
19 where visible.

20 Q Would you explain that.

21 A On the east side of the river, as I understand the  
22 path that this aircraft took, appears to have less water than

1 appears on the west side.  
2

Q Is that based on the photographs?

A That is correct.

Q How do you determine that from looking at the  
5 photograph?

A By visual analysis of where the water is.

Q In other words, if you see standing water, then  
8 there is more water than if you don't see it?

A That is correct. That is essentially it.

Q Does that depend at all on the period of cultivation  
10 of the rice?

A It could. It could also depend on the topographic  
12 condition. There may be a very slight slope on the east side  
13 leading into the river.

Q Have you been able to do any studies at all about  
15 this area to date?

A Not a specific site, no.

Q You don't really have any specific information about  
18 either side of the river at this point; is that correct?

A Since I don't know the location, no, I don't.

Q Doctor, in viewing the motion picture or either the  
21 motion pictures, were you able to identify any scenes or  
22

1 frames which are of particular significance in determining  
2 the issues you have been asked to address?

3 A There are some that are better than others.

4 Q If I showed you the movie, would you be able to  
5 say, "This is significant for this reason and this is not"?

6 A There would be some that would be more helpful to  
7 me in fulfilling my requests, but until I study them, I can't.

8 Q In fulfilling the request of Doctor Cohen and  
9 plaintiffs' counsel, will you be making your calculations  
10 from the motion picture film or from the photographs that  
11 you have requested?

12 A I suspect the photographs would be more useful to  
13 me.

14 Q Doctor, if I showed you the photographs, is it  
15 possible for you to recreate the ones you have selected for  
16 closer examination?

17 A In some instances, yes.

18 Q Doctor, let me show you a series of 42 photographs  
19 which have previously been marked at depositions. On the  
20 back of these photographs there are numbers usually in the  
21 upper right-hand corner. It is our understanding that these  
22 were all part of the Walker 3 Exhibit, and that the numbering

1 in the upper right-hand corner would be part of the exhibit  
2 number. For example, it would be 3- and then the number.  
3 Would you go through these for me and indicate any of them  
4 which you believe you had selected for further review and  
5 simply refer to it by the number on the back and we will  
6 assume that is Walker 3- whatever number you say?

7 A 735, 737.

8 Q Those are the only two numbers out of that group?

9 A That is correct.

10 Q Doctor, do you recall if you selected more color  
11 or black and white photographs?

12 A I suspect there is more color there.

13 MR. McMANUS: Once we get them reproduced, I will  
14 be more than happy to sit down with you and match them up.  
15 We are trying to get them reproduced today. As you know, the  
16 Government did not provide us but one copy of each and in  
17 many instances they were very, very late in giving us the  
18 copies they promised.

19 MR. CONNORS: We don't know how long that will take.  
20 This gives us something to work with.

21 BY MR. CONNORS:

22 Q The next group of photographs are Tarbell Exhibits.

1 Would you refer to those and give us the numbers.

2 You have seen none of those?

3 MR. McMANUS: He did not say that. You asked if  
4 those are the ones he has chosen to be reproduced.

5 MR. CONNORS: I will strike my last question.

6 BY MR. CONNORS:

7 Q Are any of Tarbell 2-A through 2-K the photographs  
8 which you selected to be reproduced?

9 A No, sir.

10 Q Next is a series again of Tarbell Exhibits 3-A  
11 through 3-EE. Would you briefly refer to those and refer to  
12 the numbers on the back and pictures you have requested to be  
13 reproduced.

14 A T-3-E is possible.

15 T-3-G, T-3-H, T-3-K, T-3-T or something very similar  
16 to it. I think if you take that last number it looks like  
17 T-3-AA, T-3-CC.

18 Q Are those the only photos that you have requested?

19 A Yes.

20 Q The next group of color photographs are listed as  
21 Bandy B-1 through B-36. Again, the numbers are on the back.  
22 Again, would you indicate which numbers you requested copies

1 of.

2 A B-33. I have seen this picture so many times, I  
3 just don't know whether I have picked it out or not, and  
4 B-36. Again, I have seen it many times. I don't know if I  
5 picked it out.

6 Q Doctor, I am now going to show you what has been  
7 previously been marked as Plaintiffs' Series 3 photographs  
8 and ask if you have seen any of these.

9 A If I have seen them or if I selected?

10 Q First off, if you have seen it, and as you go  
11 through, identify any you have seen or requested reproduction.

12 A That looks familiar. I have not ordered it. That  
13 is 3-A.

14 The same with 3-B.

15 That is what I need.

16 Q You are referring to the chart, 3-H?

17 A Yes. It gives me the location. I have not seen  
18 that but it would help immensely.

19 Q Let me show you what has been marked as the Plaintiffs  
20 Exhibit 10 Series of photographs and ask you if you would  
21 again look through those and tell me what, if any, of those  
22 you have seen and which, if any, you have requested production

1 of.

2 A 10-A looks familiar to me but I have not selected  
3 it.

4 10-J looks familiar but I have not selected it.

5 MR. CONNORS: Because of the large number of black  
6 and whites which have not been broken out in any way, I will  
7 not ask the Doctor to go through the two sets.

8 MR. McMANUS: I told you I would be happy to match  
9 them up.

10 BY MR. COMMORS:

11 Q I would like to run the two films. Unfortunately  
12 there is no way to identify frame by frame and if you could  
13 just indicate by reference to a point what you are referring  
14 to in terms of the type of things you have been asked to do  
15 and which frames, et cetera, are significant in that regard,  
16 I would appreciate that.

17 A The first picture I am going to show is the short  
18 film. I understand it is approximately 156 feet and has  
19 previously been identified as 0-1.

20 [Whereupon, the film was shown.]

21 BY MR. CONNORS:

22 Q Are we now flying over a rice paddy area, Doctor?

1 A Yes, we are.

2 This looks to be somewhat drier, very little stand-  
3 ing water in those tracks. It looks to be getting water now  
4 because there is more standing water.

5 There is a paddy with some water in it.

6 Q Let me stop this briefly.

7 Doctor, are there any indications of the picture we  
8 have just seen which would indicate the aircraft touched down  
9 more than one place?

10 A It looks like to me like there may be a couple of  
11 places in there.

12 Q Are you able to identify them for me if I run the  
13 film back?

14 A I can try.

15 MR. McMANUS: The record should reflect the Doctor  
16 has moved up to the movie screne. We are now waiting for the  
17 film to be rerun, presumably to its beginning. I should say  
18 rewound.

19 BY MR. CONNORS:

20 Q Do we need to go back any further, Doctor?

21 A I don't believe so.

22 There is one, possible, here, here, obvious, possibly  
there, there. I am so close to the screne it is hard to tell,  
but that is a possibility, possible, there, possible, possible,

1 there. There is one. I can't really tell.

2 There is something there.

3 Here is one going through here.

4 Q Those would be areas where you think the plane  
5 touched down again?

6 A Is that what you asked me?

7 Q Yes.

8 Were the areas you pointed out areas which you  
9 thought indicated were areas where the plane touched down  
10 again?

11 A Yes.

12 MR. McMANUS: Was the Reporter taking down all the  
13 time the Doctor's possibles?

14 THE REPORTER: Yes.

15 BY MR. CONNORS:

16 Q Now the same question applies to this side of the  
17 river, things of significance to you and areas of impact.

18 A I think this is obvious.

19 Q The dike.

20 A I don't see it now. These two.

21 MR. McMANUS: The Doctor is pointing to tracks  
22 leading up to the troop compartment and, two, the flight deck.

1 BY MR. CONNORS:

2 Q Doctor, is the area being shown by this one the second  
3 side of the river all rice paddy area?

4 A This area on to what appears to be the west of the  
5 site is not rice paddy. It is rice paddy along the river up  
6 to a certain point and then one gets into other types of  
7 vegetation.

8 Q Do you know what other kinds?

9 A I will have to look at the photographs more carefully  
10 to be able to say.

11 Q Do you know which is the troop compartment in the  
12 area being told?

13 A I have been told this is a troop compartment.

14 Q Is that in a rice paddy?

15 A It looks like there is a dyke here. I am not sure  
16 what this is.

17 Q Doctor, there are brown areas shown amongst the  
18 green there. Are they the discolored areas you have been  
19 asked to address?

20 A Yes.

21 Q Do you have any indication what those are?

22 A I have not had a chance to look that carefully at

1 the photographs yet.

2 Q Do I understand that your testimony is that there  
3 are insufficient track marks to show a continuous slide of  
4 the troop compartment from the area of the second side of  
5 the river where it impacted and then up to its final resting  
6 place?

7 A That is my assessment, yes.

8 Q That is what you regard as you preliminary assess-  
9 ment, then?

10 A That is correct.

11 [End of first film.]

12 BY MR. CONNORS:

13 Q I am now showing the second movie, which I don't  
14 believe bears an exhibit number at the present time. This is  
15 the longer of the two movies produced by the Government.

16 Again, Doctor, my question is, when you see the areas  
17 of the accident scene, could you identify areas which you  
18 think are significant which would indicate contact of the air-  
19 craft with the ground on the first side?

20 A I have only seen this movie once. I have not had a  
21 chance to study it at all.

22 There is the same one we saw in the previous movie.

1           These are skid marks leading up to a piece of the  
2           wreckage.

3           Q     Doctor, the colorations in these films vary even in  
4           different segments. Is that due to the processing?

5           A     It could also be true with regard to the camera  
6           angle to the sun and it could in the original film as well as  
7           in the processing of the film.

8                   There is something here.

9                   This looks like much the same film we had before.  
10                  It could even be a duplicate of it.

11                  There are possible ones there and these are very  
12                  obvious tracks going through the dyke, rather deep gouges  
13                  here and perhaps a couple on the other side there.

14                  Maybe a couple there.

15                  There are possible through the dyke.

16                  There may be one there and possibly one there.

17                  One filled with water here, and possibly some more  
18                  through here.

19                  The obvious ones are through here, that one, possible,  
20                  and then this one and then this one leading up to the two  
21                  main pieces of wreckage. That might have been one there.

22                  This is all new film to me. I have never seen this

1 before.

2 Do you want an instant analysis?

3 Q You have never seen this portion of the film before?

4 A I have never seen this portion of the film before.

5 MR. CONNORS: The Doctor is referring to a section  
6 which appears to be my understanding of the first impact side.

7 BY MR. CONNORS:

8 Q We are now in an area which I believe is on the  
9 second impact side.

10 Have you seen any of this footage, Doctor?

11 A No, sir.

12 Q Are the track marks, which are now being seen in the  
13 film, the same as you saw before?

14 A This particular segment I have seen because I saw  
15 this happen before unless it is duplicated somewhere.

16 Q Have you seen this section before?

17 A I have seen that area before on other segments of  
18 film.

19 Q But not in motion picture?

20 A I know the area. I don't know that I saw that  
21 particular few feet of film.

22 Q Have you seen this portion?

1 A If not this, I have seen something very similar  
2 to it.

3 Q Have you seen this portion?

4 A Yes, I have.

5 Q Doctor, are you able to tell us from the sequence  
6 we are looking at now whether there are any burned-over areas  
7 around the troop compartment?

8 A I see some obvious discoloration. I see some areas  
9 here that might have been burned. I would need to study it  
10 more carefully.

11 Q Do you see the orange or brown discoloration?

12 A Do I see it?

13 Q Yes.

14 A Yes, I do see it.

15 Q Do you have any opinion preliminary or theorize as  
16 to what could cause that?

17 A Yes.

18 Q What would cause that?

19 A It may be an effect similar to herbicide or weed  
20 killer. If there were full round about, it might have either  
21 stained or killed the vegetation.

22 MR. McMANUS: For the record, it should be noted

1 that the Doctor was referring to the area immediately surround  
2 ing the troop compartment.

3 MR. CONNORS: That is the flight deck.

4 MR. McMANUS: But your question was directed to the  
5 area around the troop compartment.

6 BY MR. CONNORS:

7 Q How long would it take for that discoloration to  
8 occur, Doctor?

9 A I am not competent to answer that.

1 Q Doctor, you qualified your answer with regard to  
2 the possible effects of fuel. Is that a preliminary opinion?

3 A Yes.

4 Q Have you seen this sequence of film before, Doctor?

5 A Yes, it does look familiar to me.

6 Q Are there any areas of significance in this segment?

7 A This area appears to be a darker, perhaps burned  
8 area compared to these more reddish-brown areas.

9 Q You are comparing the area around the wings and  
10 around the troop compartment and the cockpit area?

11 A Yes, and I also see some very dark areas around  
12 this thing you are calling a troop compartment that may be  
13 different from the staining farther out.

14 MR. MCMANUS: Mr. Connors, can you tell me, have  
15 the parties been able to directly compare copies of the  
16 movies furnished to us respectively by the government?  
17 Has our movie been put next to yours and run simultaneously  
18 to see if they are the same?

19 MR. CONNORS: I don't believe that has ever been  
20 done. I understand the films were duplicated by an outside  
21 house and returned to the parties in a random order. I don't  
22 know anything other than that.

1                   I can tell you this: I saw the film -- I saw the  
2 shorter film but I can't say when the longer film was shown  
3 but it is my understanding they are all identical, though.

4                   BY MR. CONNORS:

5                   Q     Doctor, could you describe for us, please, the  
6 construction or geographical terrain features of a rice  
7 paddy?

8                   A     Basically, in rice culture -- first of all, land  
9 holdings are traditionally small because they are operated  
10 by individuals on a more or less subsistence basis for the  
11 most part. There are obviously larger areas for commercial  
12 rice and typically the area surrounding a given paddy is  
13 diked so that it will hold water, and at the beginning of  
14 the growing season when there is sufficient moisture the  
15 animals, whether they are bullocks or oxen or whatever, are  
16 put onto this field and their hoof action tends to turn it  
17 into a muddy consistency, and when there is sufficient  
18 moisture and sufficient consistency, the growers, the rice  
19 paddy farmers, will transplant rice plants from a seed bed  
20 into that paddy field.

21                   As the growing season progresses, the rice grows, the  
22 water continues to remain. It is visible at the surface.

1 The field is actually flooded and the depth of flooding is  
2 indicated by how high those dikes are.

3 Q Do the water levels change?

4 A Yes.

5 Q For what reasons?

6 A The water table is fluctuating beneath the surface  
7 as a function of rainfall or other factors.

8 Q Doctor, I was really asking more along the lines  
9 of the physical features of the rice paddy area, the dike  
10 construction, the water, the silt, various levels.

11 Could you describe that for us, please.

12 A I will try. I am not sure I understand what you  
13 are asking.

14 The field is ringed by a dike that is made up of im-  
15 pervious clay material so that it will hold water. There is  
16 a subsurface layer of clay or hardpan that prevents the down-  
17 ward movement of water in that paddy.

18 In some areas the paddies are irrigated. If there is  
19 not sufficient rainfall, one irrigates the paddy, physically  
20 allowing water to run in there and then closing off the dike  
21 and trapping the water. In other areas where there is  
22 sufficient rainfall or where tidal movements impede the

1 natural drainage of subsurface water into the ocean, then  
2 that is another kind of flooding action.

3 Q Doctor, what is the size of the dikes which sep-  
4 arate one rice paddy from another in land such as we have  
5 just been looking at on the film in Vietnam?

6 I am not talking about terraced land. On flat land,  
7 how large are they?

8 A Typically, 6 to 10 inches.

9 Q Those are clay?

10 A For the most part.

11 Q What is the consistency in terms of weight-bearing  
12 capability?

13 A Weight-bearing?

14 Q Yes.

15 A It depends on how much moisture it has in it.

16 Q You say it could be 6 inches to a foot high?

17 A Yes.

18 Q And how wide?

19 A Probably as wide, maybe 12 to 15 inches, some-  
20 thing like that. It depends on how you measure it and where  
21 you take your measurements.

22 Q Beneath the water level, what is the first type

1 of soil you are going to encounter?

2 A Beneath the water level?

3 Q Yes.

4 An impervious layer, usually of clay.

5 Q You say there is no silt?

6 A What has happened over the years is that this  
7 movement of water up and down has percolated a lot of the  
8 clay downward where it accumulates and it forms this im-  
9 pervious layer that water cannot penetrate or it penetrates  
10 very slowly.

11 Q Do I understand your testimony to be there is no  
12 soil above this clay?

13 A Yes.

14 Q You have the water level showing on the dike,  
15 showing in the rice paddy?

16 A At the surface?

17 Q Yes.

18 A Right.

19 Q As you go down, how deep will the water be before  
20 you hit some soil?

21 A It depends on the stage of the growing season and  
22 the variety of rice. I would think in the area we are looking

1 at here it could be 4 to 6 inches deep.

2 S-  
2 Q What type of soil would you first encounter?

3 A You will run into a silty material that has some  
4 clay in it.

5 Q What is the consistency of that? Is it saturated  
6 with water?

7 A Of course. There is water sitting on top of it.

8 Q How deep is that layer?

9 A It varies -- 4 to 6 inches.

10 Q What is the next layer of material you would find?

11 A Probably a zone that is referred to as a B-1  
12 horizon in a typical profile. It is mostly clay with some  
13 silt and still has some permeability. It may be modeled,  
14 which means it has flecks of different color on it.

15 Q How deep is that layer?

16 A It is also variable but 4 to 6 inches again.

17 Q What is the next level?

18 A A clay layer, as a rule.

19 Q How deep is that?

20 A It may be several inches thick.

21 Q What is below that?

22 A Normally, below that you will get into a thicker,

1 deeper horizon of silty clay, alluvial material that has  
2 been deposited in the past by the river, itself, or along  
3 the flood plain and it, too, may have some different model  
4 colors in it.

5 Q How deep are we now?

6 A That, of course, depends on the area -- anywhere  
7 from a few feet to 10 or 20 feet or even deeper.

8 Q Doctor, if an aircraft had slid along on top of  
9 a rice paddy area, as we have been discussing, what sort  
10 of track marks would you expect to see?

11 A I can't really answer that.

12 Q Why not?

13 A This is the first example I have seen of an air-  
14 craft of any sort skidding along or doing anything on a rice  
15 paddy. I can only talk about how long they are and how deep  
16 they are and what might happen on another occasion is not  
17 for me to say.

18 Q Have you been able to do any calculations at all as  
19 to the depth of the track marks?

20 A Not yet.

21 Q Are you able to tell from looking at photographs of  
22 an area such as this what level of materials the track marks

1 penetrated?

2 A I have a preliminary opinion.

3 Q What is that opinion?

4 A It looks to me like these tracks have gone through  
5 the surface silt and perhaps that second layer of silty  
6 clay.

7 Q That is the B-1 horizon, or above that?

8 A You could call it B-1. It may still be in the very  
9 surface area.

10 Q What evidence would you look for to determine  
11 whether there had, in fact, been a continuous slide?

12 A I would look for track marks.

13 Q In your opinion, are you saying there are not con-  
14 tinuous track marks?

15 A That is correct.

16 Q With regard to all of the opinions we have been  
17 using here, there is a term, "reasonable scientific certainty."  
18 Are you familiar with that term?

19 A Yes.

20 Q Do any of the opinions which you have at the  
21 present time rise to the level of scientific certainty or  
22 reasonable scientific probability?

1 A Yes.

2 Q They do?

3 A Yes.

4 Q Which opinion?

5 A The opinion that the track marks are at least  
6 deep enough to have penetrated into the level of the percolation  
7 water table so there is percolation out of the perked  
8 water table into the tracks, themselves. The tracks are  
9 filled with water in some cases.

10 Q But not all cases?

11 A That is correct.

12 Q What would the difference be?

13 A Probably a difference in the height of the water  
14 table.

15 Q Is your opinion that there are not tracks, not  
16 continuous tracks to a reasonable scientific certainty?

17 A Based on my observations.

18 Q If you are able to state this to a reasonable  
19 scientific certainty, why do you have to make a further  
20 study of the pictures?

21 A Their intended use is not known to me.

22 Q I would like to clarify one thing: On the

1 percolation level, if that water above or below the clay  
2  
3 layer?

4 A It is above the clay layer.

5 Q Are you able to state at the present time whether  
6 the discoloration that you pointed out to us in the film  
7 surrounding the troop compartment is the result of any chem-  
ical substance?

8 MR. McMANUS: What do you mean, "chemical"?

9 MR. CONNORS: Any chemical.

10 MR. McMANUS: Are you including fuel as a chemical?

11 MR. CONNORS: Yes.

12 BY MR. CONNORS:

13 Q Are you able to state at the present time that  
14 the discoloration that you pointed out to us as we viewed the  
15 film, that discoloration being the one around the troop com-  
16 partment, was caused by a chemical, either fuel or any other  
17 kind of chemical as opposed to a natural process?

18 A At this stage in my review of the materials, all  
19 I can state for certainty is that there is an obvious cor-  
20 relation between the location of the pieces of wreckage  
21 and this discoloration.

22 I need further time to look at the photographs to state

1 anything beyond that.

2 Q Have you ever seen that sort of discoloration  
3 before? I am talking about the color of discoloration, the  
4 type and not necessarily what you might now conclude to be  
5 the cause.

6 A No, I really haven't.

7 Q What sort of examination or study would you have  
8 to conduct to determine or to reach an opinion regarding  
9 the cause of the discoloration?

10 A You used the word "cause." Not being a plant  
11 physiologist, I am not really competent to answer that  
12 question as to cause.

13 The pattern of discoloration that could be further  
14 interpreted as to cause is more along the lines of what I  
15 think I can contribute.

16 Q As I understand it, you are stating that you are  
17 not competent to determine the cause of that discoloration;  
18 is that correct?

19 A Within limits, you are correct.

20 Q What are the limits?

21 A There is a difference between chemical and burning  
22 discoloration and physiological death. You can tell the

1 difference between burn patterns and other kinds of stains,  
2 but I have not had time to study these, so I don't know.

3 Q Are you able at this present time to identify any  
4 burned areas around the troop compartment to a reasonable  
5 scientific certainty?

6 MR. MCMANUS: Apart from what he indicated when we  
7 saw the movies.

8 MR. CONNORS: He qualified areas of being darker and  
9 I am asking him now as to a reasonable scientific certainty  
10 he has an opinion whether any of the areas around the troop  
11 compartment were burned.

12 MR. MCMANUS: I think you are mischaracterizing  
13 what he said when we were looking at the movie but the Doctor  
14 can respond.

15 THE DEPONENT: As of this moment, pending further  
16 study, I am not able to say as to pattern or color what sur-  
17 rounds the troop compartment.

18 Q Doctor, in making your determinations as to the  
19 patterns of the discolorations around the troop compartment,  
20 what will you be utilizing or relying upon?

21 A I have a couple of photographs.

22 Q Color photographs?

1 A Color photographs.

2 Q Are they the ones we went over and you  
3 identified?

4 A No, sir.

5 Q Different color photographs?

6 A Yes.

7 MR. McMANUS: I told you I am going to get those  
8 for you.

9 MR. CONNORS: It is my understanding I have  
10 shown the Doctor all the color photographs that we  
11 have.

12 BY MR. CONNORS:

13 Q Doctor, let me show you Exhibits 3B and 3E, which  
14 are color photographs, 8 by 10's, 3B showing the troop  
15 compartment and 3E showing the entire area enclosing the  
16 troop compartment, cockpit area and the wing area.

17 I will ask you to look at those photographs.

18 A Yes.

19 Q In making your calculations regarding the areas  
20 of discoloration and the type of discoloration, would you  
21 be able to use those two photographs to reach your con-  
22 clusions?

1 MR. MCANUS: Solely?

2 BY MR. CONNORS:

3 Q Start out solely.

4 A Solely, no.

5 Q What else would you need?

6 A I would need more of a close-up of the vegetation  
7 around the troop compartment.

8 Q Have you been provided any close-ups of the vege-  
9 tation around the troop compartment?

10 A I selected one this morning.

11 Q Would you look through the Tarbell-3 series and  
12 see if the one you just referred to is in there.

13 A No.

14 Q Would you briefly look through the Bandy series  
15 and see if it is in there.

16 A No.

17 Q Was the other photograph you were referring to a  
18 color photograph?

19 A Yes.

20 Q And you say you identified when we went through  
21 these earlier?

22 A I don't recall seeing it. Frankly, I have seen so

1 many pictures, I cannot recall immediately. I don't recall  
2 seeing that photograph in your series this morning.

3 Q Doctor, to the best of your recollection, what  
4 does this other photograph show?

5 A It is a quite detailed photograph showing indi-  
6 vidual grass or stalks of grass and the pattern of coloration  
7 on those. I believe the troop compartment is in the back-  
8 ground, somewhat out of focus.

9 Q Doctor, with regard to the issue of whether or not  
10 there was a continuous slide or not, you indicated that you  
11 looked for track marks showing water in them and there could  
12 also be track marks without water; is that correct?

13 A Yes, sir.

14 Q How are you able to determine the track marks if  
15 water is not present?

16 A By their physical appearance. There is an obvious,  
17 for want of a better word, gouge in the soil with some  
18 materials thrown up on the sides.

19 Q What is your experience with aircraft accident  
20 investigations?

21 A Zero.

22 Q Have you looked at any exhibits or diagrams of

1 the accident area other than what might be shown in the  
2 photographs?

3 MR. MCMANUS: And the movies.

4 BY MR. CONNORS:

5 Q And the movies.

6 A I have only one diagram. I don't know who pro-  
7 duced it. It shows the initial touchdown and it spread  
8 over the debris.

9 Q Is that a triangular-shaped diagram?

10 A That is correct.

11 Q How long do you estimate it will take you to  
12 complete your calculations?

13 A In the interests of my own time, I am hoping it  
14 can be done in a matter of a couple of weeks.

15 Q Has anyone told you that the trial of this case is  
16 starting next Monday?

17 A Next Monday?

18 Q A week from today.

19 A No.

20 Q Have you been asked to testify?

21 A No.

22 Q Have you been formally retained as an expert in

1 this case?

2 A Yes.

3 Q Are you being compensated for your services?

4 A Yes, sir.

5 Q What is the rate of compensation?

6 A I can tell you the rate that was mentioned.

7 Seventy-five dollars an hour.

8 Q Is that what you understand your compensation is?

9 A That is correct.

10 Q Have you been asked to prepare your calculations  
11 by a certain time?

12 A No.

13 Q You say it will take you several weeks to complete?

14 MR. McMANUS: He did not say that. He said in  
15 the interest of his own time he hoped to be able to get it  
16 down in the next couple of weeks. He did not say it was  
17 possible to have it done in any period of time.

18 BY MR. CONNORS:

19 Q If you sat down and started working on the cal-  
20 culations, how long would it take you to do them?

21 A If I had the photographs in hand, a week perhaps.

22 Q Do you have any idea when you are to get the

1 photographs?

2: A I understand they are in the process now.

3 Q Of being duplicated?

4 A That is correct.

5 Q But you don't have them yet?

6 A No, sir.

7 Q Doctor, do you need your originals of the Exhibits  
8 DD-2541-4 and -5, or would the reproductions be satisfactory?

9 MR. McMANUS: No, he wants the originals.

10 MR. CONNORS: I asked the Doctor.

11 MR. McMANUS: We want them back.

12 THE DEPONENT: As a matter of fact, I really do  
13 need the originals, simply because the color reproductions  
14 are not exact.

15 BY MR. CONNORS:

16 Q The originals bear the original deposition stamp.

17 MR. CONNORS: That is all. Thank you.

18 (Whereupon, the deposition concluded at 2:20  
19 o'clock p.m.)

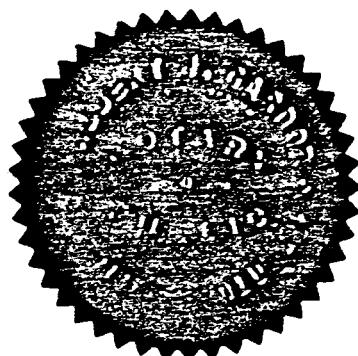
CERTIFICATE OF NOTARY PUBLIC/REPORTER

UNITED STATES OF AMERICA )  
- 525 ) 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 day of October, 1981.



Albert J. Gasdor.

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

My Commission expires:

July 31, 1985