

RECROSS - REGAN

1 THE COURT: Counsel.  
2 MR. SMART: Thank you, Your Honor.  
3 RECROSS-EXAMINATION  
4 BY MR. SMART:  
5 Q Mr. Regan, as I understand your notes here --  
6 A Can we clear some of this stuff off first so I have a  
7 place to put my --  
8 Q Sure. Is that enough?  
9 As I understand your notes, you've got a date  
10 that references the date of the project or the date of  
11 the document on the left-hand side, correct?  
12 A That's right.  
13 Q And then you've got a reference which says what the  
14 document is.  
15 A That's true.  
16 Q Correct? And then you've got a description of the  
17 project.  
18 A A very brief description.  
19 Q Then you've got a description of the cost, correct?  
20 A And a breakdown, yes.  
21 Q None of those references has any reference to who  
22 designed the project, correct?  
23 A No, I didn't get in and do a complete set of notes on  
24 each one. This was just to refresh my memory.  
25 Q And some of these projects that Mr. Hagens asked you ¶  
  
1 about, for instance October, 1991, \$63,000 project to  
2 regrade and improve the top of the levee from Lower  
3 Hopper Road I-5 Bridge downstream, first of all, that's  
4 down below the Burlington Northern Bridge, correct?  
5 A That's right.  
6 Q It doesn't have much to do with flood levels in the  
7 Nookachamps.  
8 A Yes.  
9 Q It wouldn't have anything to do with flood levels in the  
10 Nookachamps in 1990 if it was a 1991 project.  
11 A No.  
12 Q You're talking about 1991, right?  
13 A You asked me if it had anything to do with flood levels  
14 in Nookachamps.  
15 Q It wouldn't have any relevance to this case.  
16 MR. HAGENS: Objection, Your Honor, there's a '95  
17 flood as well, Your Honor.  
18 THE COURT: That's fine.  
19 Q Wouldn't have anything to do with damages caused in  
20 1990, which is what this case is about?

21 A That's right.  
22 Q This next one, that's October of 1991 as well, again,  
23 Lower Hopper Road Keyway Project couldn't possibly have  
24 anything to do with flood levels in the Nookachamps in  
25 1990, could it? ¶

1 A That's right.  
2 Q Same with October 21st, 1991, strengthening of levee  
3 project in Avon Bend.  
4 A That's right.  
5 Q That couldn't have anything to do with damages caused in  
6 1990.  
7 A Not in 1990.  
8 Q Now, did you ever make a determination, did you ever  
9 review any document which said who the specific engineer  
10 was that designed any of these projects?  
11 A Never saw a document with an engineer's seal on it.  
12 Q So the answer to my question is you didn't research  
13 that, correct?  
14 A I've looked at a lot of documents, but I never saw a  
15 document with an engineer's seal on it.  
16 Q And are any documents that you reviewed that  
17 specifically had profiles of levees, other than this  
18 1955 document that you say was not sufficient for you to  
19 determine how high it was?  
20 A There was a number of -- we looked at during my  
21 deposition. We had them all on the table at your office.  
22 Q And do you remember who the engineer was on any of those?  
23 A I don't remember right offhand.  
24 Q Again, I was somewhat confused by your testimony because  
25 I think you've testified two different ways, so let's ¶

1 get it straightened out.  
2 With respect to Exhibit 989, do you have that one  
3 in front of you?  
4 A These are all 500s.  
5 Q Would you turn to page 25, which is the discussion  
6 concerning flood levels in the Nookachamps that Mr.  
7 Hagens asked you about.  
8 A Exhibit --  
9 Q 989. I think I actually turned it to the page for you.  
10 A That's 989, right.  
11 Q Now, Mr. Hagens asked you a question whether or not the  
12 Corps of Engineers actually determined what the flood  
13 levels were in the Nookachamps without the project for  
14 various floods, do you remember that testimony?  
15 A That's right.  
16 Q And your testimony was that they had never done that; is  
17 that right?  
18 A I did not say that.  
19 MR. HAGENS: I'll object, Your Honor. That was  
20 not the witness's testimony.

21 MR. SMART: That was my understanding, and let's  
22 get it cleared up.  
23 Q So it's your testimony that with respect to work done  
24 for the 1979 lower levee project that was never built  
25 and with respect to the public hearings that you ¶

1 attended for that project, the Army Corps did, in fact,  
2 determine what the levels would be in the Nookachamps  
3 area for a whole range of floods stemming from the 1975  
4 flood all the way through the hundred year flood; is  
5 that right?  
6 A That's correct, with existing conditions being as they  
7 sat with the levees in place as of --  
8 Q 1979?  
9 A '79.  
10 Q Or shortly before, because you couldn't remember whether  
11 or not they were surveyed 1975 or 1979 or sometime in  
12 between, right?  
13 A It was in between.  
14 Q Okay. And these are the heights that you determined  
15 right here, correct?  
16 A Those are the heights that were determined with the  
17 existing conditions, yes.  
18 Q In fact, those were -- that was the information that was  
19 specifically given to the residents at that time,  
20 correct?  
21 A Definitely.  
22 Q All right. So when they asked what the heights were,  
23 you had the answer because the Army Corps did, in fact,  
24 determine what those heights were, correct?  
25 A With the existing condition, yes. ¶

1 THE CLERK: Exhibit 990 marked.  
2 Q Showing you Exhibit 990, can you identify that, sir?  
3 A This is an a Memorandum for Field Reconnaissance of  
4 Nookachamps Area on Skagit River, Washington, by the  
5 Corps of Engineers, dated 2 February, 1979.  
6 Q Let me do it this way if I could.  
7 MR. SMART: Could I have it remarked, Sally?  
8 Unfortunately I've given him my copy.  
9 Thank you.  
10 Q And the date, sir, again?  
11 A Two February 1999.  
12 Q Was this an Army Corps document relating a field  
13 reconnaissance on the Nookachamps area on the Skagit  
14 that was performed by your Army Corps personnel in  
15 conjunction with the 1979 lower levee project?  
16 A I believe it was.  
17 Q Okay.  
18 A Accomplished by a Mr. Yang.  
19 Q And Mr. Yang is the same person who wrote Exhibit 907,  
20 correct? That was this document?

21 A I'd have to see it. I don't remember the number.  
22 Q 907 was admitted yesterday, and that was a similar  
23 report, where he collected information from residents in  
24 the Nookachamps, including Barbara Austin; is that  
25 right? ¶

1 A That's right.  
2 MR. SMART: I'll offer 990 Your Honor.  
3 MR. HAGENS: No objection, Your Honor.  
4 MR. ANDERSON: No objection, Your Honor.  
5 THE COURT: 990 will enter.  
6 (Whereupon, Defendant's  
7 Exhibit No. 990 was admitted  
8 into evidence.)

9 Q All right. Now, the purpose of 990 was to collect the  
10 information that was used to answer the questions of the  
11 residents in 989, correct?

12 A The memo for record came before 989.

13 Q That's right. So, in other words, the Army Corps had to  
14 go out and collect the information from people in the  
15 Nookachamps to determine how high the water was prior to  
16 the time so they could answer the questions of the  
17 residents in the public meeting; is that right?

18 A That's not really what it states here. It states, "Upon  
19 verbal request from Vernon Cook of Design Branch, a mini  
20 task force was organized for the purpose of collecting  
21 field information and study possible alternatives to  
22 alleviate possible induced damages that could be caused  
23 by the proposed Skagit River project at and downstream  
24 of the Nookachamps area."

25 Q Okay. Mr. Cook was the project manager, correct? ¶

1 A He was project manager.

2 Q So prior to the time you finished up the design  
3 memorandum and prior to the time you could answer  
4 questions of the residents about what the effects of the  
5 project would be, Mr. Cook determined that you had to  
6 send a task force or mini task force out to collect the  
7 information, correct? Is that what happened?

8 A No. This document -- there was a public meeting in the  
9 fire station up there where the people were saying hey,  
10 we need to have protection of some sort. It is the  
11 Nookachamps people.

12 Q Yeah.

13 A And this is a result of that, to get the -- we came out  
14 with Alternative 3E, I believe, early on that didn't  
15 have any works, flood control works, in the Nookachamps  
16 area. We went back and reviewed it and made this field  
17 trip, did some more engineering studies, and came out  
18 with the final 3E, which included some flood control  
19 works in the Clear Lake area.

20 Q Okay. Thank you for clarifying that.  
21 So should I understand, then, that after the  
22 General Design Memorandum random was finished, finished  
23 in its -- with various proposals, there were questions  
24 raised by the residents in the Nookachamps and then the  
25 Army Corps organized a mini task force specifically to ¶

1 go out and collect information to address the concerns  
2 of the people in the Nookachamps and answer their  
3 questions, such as these questions that were asked and  
4 answered in the public hearing.

5 A Well, that's true.

6 Q Okay. Now, let's take a look at 9 90 if we could,  
7 please. First of all, I have to be careful not to cut  
8 off my margins here. The verbal request was made by  
9 Vernon Cook from the dine branch. He's the project  
10 manager, correct?

11 A That's what I read.

12 Q And then the field reconnaissance study was undertaken  
13 by Don Thompson from Economics, Bob Newbill, Foundations  
14 and Materials, Wayne Wagner from Hydraulics -- is he  
15 somebody that worked for you?

16 A Yes.

17 Q So, again, you didn't go on this reconnaissance either,  
18 you sent one of your employees, right?

19 A That's correct.

20 Q Glen Stevens from Hydrology, Jack Morris from Real  
21 Estate, and Simon Yang, Civil Design?

22 A Yes.

23 Q Those are all individuals that made up the task force?

24 A I know all of them.

25 Q They were the task force, correct? ¶

1 A For this field trip.

2 Q And what they did was they went out and they collected  
3 specific information from the Nookachamps residents as  
4 to how high the water had been from previous floods,  
5 correct?

6 A Correct. That's basically what it is, yes.

7 Q And in paragraph three it says, "Mr. Don Nelson of the  
8 Skagit County" -- strike that. Mr. Nelson went along  
9 with the group, correct? If you look at paragraph four.

10 A I believe he did. It doesn't specifically say that.  
11 "As told by local residents and Mr. Don Nelson."

12 Q Okay. Mr. Nelson was there as purpose of a guide to  
13 make sure that the task force got to the correct areas,  
14 correct?

15 A That would have been one of his functions.

16 Q In fact, the report says, "Guided by Mr. Don Nelson, a  
17 number of local residents were visited by the  
18 reconnaissance team," right?

19 A Correct.

20 Q "Their views of the flood problems and solutions, as  
21 well as historical flood information, were sought."  
22 A That's true.  
23 Q That's the residents, correct?  
24 A Oh, yeah.  
25 Q Now, Mr. Nelson didn't live in the Nookachamps, did he? ¶

1 A I don't know where Mr. Nelson lives.  
2 Q But, in any event, he was there for a guide and to  
3 provide whatever information he could to assist the Army  
4 Corps task force who was studying the levee project and  
5 proposed solutions, correct?  
6 A Right. He was the flood control engineer for Skagit  
7 County. That was his job.  
8 Q He didn't have the answers, obviously, so they had to  
9 call in the task force of the Army Corps, correct?  
10 A I don't believe the Army Corps would just have Mr.  
11 Nelson tell them how to build a structure. They bring  
12 in their own personnel, and ask Mr. Nelson, along with  
13 everybody else.  
14 Q You would agree that a task force made up of Mr. Don  
15 Thomson, Mr. Bob Newbill, Wayne Wagner, Glen Stevens,  
16 Jack Morris and Simon Yang would have substantially  
17 greater expertise in the business of deciding what  
18 solution should be addressed than Don Nelson, the Skagit  
19 County flood control engineer.  
20 A I'm sure these folks have a broader spectrum of  
21 knowledge than Mr. Nelson, but Mr. Nelson has a focused  
22 knowledge of the Nookachamps.  
23 Q Not as focused as the people who live there, correct?  
24 A I don't believe he did, because as flood control  
25 engineer he should know quite a bit about flood control ¶

1 and flood problems in the Nookachamps area.  
2 Q All right. Now, first of all, if you turn to page two  
3 of the document, the task force went to visit Mr. Moore;  
4 is that correct?  
5 A That's what it says.  
6 Q And Mr. Moore lives on Swan Road?  
7 A Uh-huh.  
8 Q Near Nookachamps Creek, correct?  
9 A That's what it says.  
10 Q And the task force determined that there was a benchmark  
11 elevation of 39.62 feet for high water in 1975; isn't  
12 that right?  
13 A Benchmark does not mean high water mark. Benchmark is a  
14 -- is a known point on the ground that is recorded, and  
15 it is an elevation that you would take off from to  
16 determine high waters, or any other elevation that you  
17 needed. It's not a -- it doesn't say high water mark.  
18 Q I see. Okay. That's a good point.  
19 Based on the benchmark, okay, the determination

20 was made that the 1975 flood reached an elevation of 39  
21 feet at Swan Road, correct?  
22 A That's what it says here.  
23 Q And could you point out Swan Road for the jury, please,  
24 on that.  
25 A Runs right across the valley here. ¶

1 Q Okay.  
2 A Across the low point of the Nookachamps area.  
3 Q So you knew by this collection of data that, based on an  
4 actual observation, that the flood height reached three  
5 nine feet in 1975 at Swan Road, correct?  
6 A That's right.  
7 Q And then the task force visited Mr. Gadbois, correct?  
8 A That's right.  
9 Q And Mr. Gadbois is a plaintiff in this case, correct?  
10 A That's right.  
11 Q Can you point out Mr. Gadbois's property for the jury,  
12 please.  
13 A He's right in this area here, the flood area.  
14 Q So that's right next to Swan Road, correct?  
15 A Appears that it goes -- Swan Road goes right through it.  
16 Q All right. And the document indicates that Mr. Gadbois  
17 -- well, why don't you read it for us, paragraph b  
18 there, please.  
19 A "Mrs. Gadbois was interviewed at the Gadbois meat  
20 business located on the east side of Mud Lake Road about  
21 a thousand feet northwest of the T-intersection with  
22 Swan Road. She indicated that the '75 high water  
23 reached within two inches of the road in front of their  
24 business and was on the porch of Mr. Gadbois, Sr.'s  
25 house located southwest of the T-intersection. Field ¶

1 checks of these elevations points confirmed high water  
2 marks observed on the power pole along the Swan Road."  
3 Q Now, all right. After that the task force visited Mrs.  
4 Ward, correct?  
5 A That's right.  
6 Q Would you read what the task force found about Mrs.  
7 Ward.  
8 A "Mrs. Ward indicated that during the '75 high water  
9 there was seven inches of water on the concrete ground  
10 floor slab of the house, which was estimated -- which  
11 has an estimated elevation of 39 feet. It has elevated  
12 living spaces on the second floor level. However, the  
13 horse barn had about two and a half feet of water.  
14 Based on this information and a field level check, the  
15 1975 high water elevation as located was estimated to be  
16 39.6 feet. The house is well flood-proofed against an  
17 estimated hundred year flood. Photographs of the house  
18 were taken."  
19 Q All right. I take it then that what the task force

20 found by visiting Mrs. Ward, another resident, who is  
21 not a plaintiff in this case, was that she had taken  
22 steps to flood-proof her house against a hundred year  
23 flood, but even so, they could determine from high water  
24 marks that the 1975 flood had reached an elevation of  
25 39.6 feet. ¶

1 A It's estimated to be about 39 feet, right.  
2 Q When the Army Corps estimates something, they estimate  
3 just as close as they can get it?  
4 A I would say that.  
5 Q The people who were out on this task force were experts  
6 in performing this kind of work?  
7 A There was no surveyors on this list. I'll tell you how  
8 it was surveyed. It was surveyed, they went out and did  
9 some rough survey elevations. It's not a survey in  
10 mark. That's why they say approximate.  
11 Q Well --  
12 A It's probably close, it's probably close.  
13 Q Within -- within how many inches, let's say.  
14 A Within three or four inches, plus or minus.  
15 Q Within three or four inches, this much, you believe this  
16 information is accurate?  
17 A I would say that's right.  
18 Q All right. Then the task force went and visited Mr. Ken  
19 Johnson, right?  
20 A That's right.  
21 Q Mr. Ken Johnson was a former plaintiff in this case and  
22 a member of the Skagit County Flood Control Advisory  
23 Committee?  
24 A Yes.  
25 Q He's also a diking commissioner? ¶

1 A I believe he was.  
2 Q Mr. Johnson's farm, we earlier indicated, was located in  
3 this area right here?  
4 A It's right in the bend there, right.  
5 Q All right. Would you read to the jury, please, what the  
6 task force found about Mr. Johnson's farm.  
7 A "Discussion with Mr. Ken Johnson on his dairy farm  
8 revealed that in the 1951 flood his father had housed  
9 the cattle on the second floor of the barn."  
10 Q Let me stop you there. Why would they do that?  
11 A Get them out of the water.  
12 Q Is that because the barn flooded?  
13 A Certainly would have to assume that.  
14 Q Okay. Continue on.  
15 A Or expected to be flooded, one or the other.  
16 Q Continue on then, please.  
17 A "Since then the herd required to operate a viable dairy  
18 farm has grown steadily from the maximum number of 80  
19 head that Mr. Johnson's father owned to the present herd



20 of 300, with 150 milk cows, 130 of which are being  
21 milked. This increase in herd size also precludes the  
22 possibility of neighboring farms assisting each other by  
23 providing temporary shelter or high ground during  
24 floods. Besides, the moving of cattle during floods is  
25 extremely difficult and causes unrest and a loss of milk ¶

1 production. Each relocation takes about a week. During  
2 the 1975 high water, Mr. Johnson had accommodated the  
3 cows on high ground near the machine shed and on the  
4 front lawn of his house. He felt that was needed" --  
5 excuse me. "He felt what was needed was some simple  
6 milking facility with concrete slab and overhead  
7 shelters to accommodate milking each cow at least once  
8 every 24 hours to avoid damage to cow's health and  
9 capacity for future milk production. A cattle pad of  
10 one and a half to two acres in size will be needed to  
11 accommodate 300 cows during a flood, based on the  
12 minimum need of the" -- excuse me, "the 50 square feet  
13 per cow or 8-foot by 16-foot space per three cows.

14 Q Okay. Let me stop you there. I take it then that the  
15 size of the herd on the Johnson dairy farm had increased  
16 from 80 head to 300 head between 1951 and 1975; is that  
17 correct?

18 MR. HAGENS: Your Honor, which may be true, but  
19 it's well beyond the scope of the direct examination.

20 THE COURT: I tend to agree with that.

21 MR. SMART: Well, Your Honor, it's tied in with  
22 this business of the elevations, which are in the very  
23 next sentence.

24 Q Why don't you --

25 THE COURT: If you say so. Maybe you should do ¶

1 the tying in, because I don't understand what --

2 MR. SMART: The point, Your Honor, is that the  
3 reason why these farmers know where the high water marks  
4 are is because they're very concerned about the cattle,  
5 and the cattle barn is the mark -- you can see -- let me  
6 tie it in this way.

7 MR. HAGENS: Then I have an objection as to  
8 relevancy, because we're talking about the induced  
9 flooding caused by the existing levee system, not about  
10 what's happening out there in the flood plain. This  
11 whole case focuses on that area, and here again we're  
12 talking about total flood height, not about the part  
13 that causes our client the problem, Your Honor, so I  
14 have a relevancy objection as well then, Your Honor.

15 THE COURT: Counsel.

16 MR. SMART: Your Honor, Mr. Hagens specifically  
17 brought up Exhibit 989 on his redirect-examination and  
18 specifically asked the witness about the water levels  
19 that were determined in the information given by the

20 Army Corps in 1979 to the residents, and the purpose for  
21 this examination is to determine how the Army Corps got  
22 that information and who they got it from, which are the  
23 very plaintiffs in this case, so that's highly relevant  
24 to --  
25 THE COURT: Move ahead with it. ¶

1 Q Okay. Could you read the next sentence there, starting  
2 with "Mr. Johnson."  
3 A "Mr. Johnson indicated the high water level on the milk  
4 barn (see photographs). Based on this information and  
5 contour map, available natural ground elevation near the  
6 milk barn is about 39 feet. High water elevations were  
7 estimated to be 41.7 feet for the 1951 high water and  
8 39.8 feet for 1975.  
9 Q So let me stop you just there for a second, please.  
10 Based on the task force sent out by the Army Corps in  
11 1979, they were given specific elevation of 41.7 feet  
12 for the height of the high water in 1951, correct?  
13 A That's right.  
14 Q So that when you testified earlier in answer to my  
15 questions about whether or not you had any information  
16 concerning the high water in 1951, you answered that it  
17 couldn't be determined. I take it that that answer did  
18 not include information that could be derived from the  
19 Army Corps field report of Mr. Yang; is that correct?  
20 A This is one point, yes.  
21 Q Well --  
22 A There may be another point or two on here, but I -- my  
23 understanding of your question is throughout the valley.  
24 Q Oh, no. My question was very clear, sir. My question  
25 was, was there any way for you to determine what the ¶

1 heights of the water were in 1951, and you told me, did  
2 you not, sir, that it would be impossible. And, in  
3 fact, we had Exhibit 981, where I specifically asked you  
4 about the 1951 flood and you answered for all of these  
5 various properties it was not known. Didn't you answer  
6 that question that way?  
7 A I answered it that way, right.  
8 Q But, in fact, the Yang report had specific information  
9 from which you could determine at least some points at  
10 some properties in the Nookachamps very precisely and,  
11 in fact, your Army Corps people did, and the task force,  
12 go out there and determine these heights with -- well,  
13 to a degree of accuracy of three or four inches,  
14 correct?  
15 A You're probably right, yes.  
16 Q Now, let's continue on if we could, please. Immediately  
17 after that the task force identified that the estimated  
18 water levels were 42.5 feet for a hundred year flood  
19 without the project, correct?

20 A That's right.  
21 Q Forty-four feet for a hundred year flood with the  
22 project?  
23 A That's right.  
24 Q Now, what else did Mr. Johnson say? Continue reading if  
25 you would, please, sir. ¶

1 A Okay. About the middle, where it starts out, "Mr.  
2 Johnson also," is that where you want me to start  
3 reading?  
4 Q Yes.  
5 A "Mr. Johnson also indicated that the 1975 high water  
6 came within two and a half feet of the first floor of  
7 his house, but various essential machinery and  
8 facilities such as electric pumps, water heaters,  
9 furnaces, et cetera, were all above the 1951 high water  
10 level which is the level of protection he would prefer."  
11 Q Okay. Let me stop you there. When Mr. Johnson said  
12 that he would prefer a level of protection above a  
13 certain level, is that protection from the project that  
14 he's talking about?  
15 A I don't know what he's talking about. He'd like to be  
16 protected by something, some means is what I would  
17 gather from that.  
18 Q But, in any event, the task force collected information  
19 that Mr. Johnson knew what the high water level was in  
20 1951 and had made some sort of determination about what  
21 level of protection that he would prefer?  
22 A That's right. That's right.  
23 Q Continue on, if you would, please, sir.  
24 A I lost my place here. Okay.  
25 "Mr. Johnson also discussed flood history of the ¶

1 area. He indicated that during the 1975 high water only  
2 one home had water in the first -- in the first floor  
3 and in 1951 three homes had flooding of the first floor  
4 that was consistent with the field observations that  
5 most homes were floodproofed to at least a ten-year  
6 event. He had also rejected the idea of a ring diking  
7 around the farm facility since it will be costly,  
8 involving extensive diking and offer little security due  
9 to constant fear of breaching of the dike which would be  
10 disastrous. He echoed opinion of some of the other  
11 locals -- local residents that the Burlington Northern  
12 Bridge was a major bottleneck."  
13 Q So the task force acquired information that at the  
14 Johnson property, located here, in 1951, three homes had  
15 flooded over the level of the first floor and one home  
16 in 1975 had flooded; is that correct?  
17 A I believe -- I don't know where the homes are that he  
18 means here. They could have been anyplace. I don't  
19 know. He didn't state where they were, but he did say

20 one in three.  
21 Q And then the task force visited the Austin's property.  
22 A That's true.  
23 Q The Austin's property is up in this area.  
24 A That's right.  
25 Q Here, correct? ¶

1 A That's correct.  
2 Q In Clear Lake. And its elevation is approximately the  
3 same elevation as the Stakkeland property, is it not?  
4 A I can't say that.  
5 Q Do you know?  
6 A I'd have to look at the map.  
7 Q Sure. Go ahead.  
8 A It's not on here. It's on the other sheet.  
9 Q Let me get it for you.  
10 A The Clear Lake area is a contour that runs basically  
11 around northwest of Clear Lake, elevation 40. The  
12 Austin's property is down -- I believe it's those little  
13 black spots on there. It could be -- it would be less  
14 than 40 but -- about 35. It's somewhere in that area.

15 Q Between 35 and 40?  
16 A That's right.  
17 Q All right. Now, what did the task force determine from  
18 Mr. and Mrs. Austin?

19 MR. HAGENS: Your Honor, I'm going to renew my  
20 relevancy objection. They're not plaintiffs in the  
21 case. I'm not saying she might not come and testify,  
22 but this seems to be wide of what I was -- asked this  
23 witness about, Your Honor.

24 MR. SMART: Your Honor, again, Mr. Hagens  
25 specifically brought up the question and answers ¶

1 regarding Nookachamps Creek and the local residents in  
2 Exhibit 989, which is the public meeting for the 1979  
3 proposed project. This document is the information and  
4 where the information came from that led to the Corps's  
5 response to the Austins.

6 THE COURT: You may proceed.

7 MR. SMART: Thank you.

8 Q Go ahead, if you would, please, sir, and read paragraph  
9 e.

10 A "Mr. and Mrs. Don Austin told about having three inches  
11 of water in their house in '51 and in 1921 water was up  
12 to the window sills (about two feet of water in the  
13 house.)"

14 Q Let me stop you there again. Two feet of water in the  
15 Austin house, which is in this location right here, in  
16 the 1921 flood?

17 A That's what it says.

18 Q And that's much higher than the elevation of any  
19 flooding in either 1975 or 1990, correct?

20 A It may well be.  
21 Q Well, did you ever --  
22 A It is here, but they talk about the elevation of the  
23 house. I've been in their house and it appeared to me  
24 that it may have been raised. I can't say that for  
25 sure. I didn't ask them, but it appeared the house was ¶

1 up high.  
2 Q Well --  
3 A I can't say that, you know, in 1921 was the house at the  
4 same elevation it is in 1990.  
5 Q But you told me in answer to my questions concerning  
6 Exhibit 981, one, that it would be impossible to  
7 determine any of these elevations for a flood back in  
8 1921 or 1951, and yet you had this specific information  
9 with specific benchmarks on a house from the Austins  
10 because your task force went out and secured it, didn't  
11 you?

12 MR. HAGENS: I'm going to object to the form of  
13 the question. The exhibit to which he referred, if I  
14 may have it, dealt with Halverson, DeVries and  
15 Stakkeland, Your Honor. Didn't deal with Mrs. Austin,  
16 didn't deal with Mr. Johnson, and now he's asking  
17 questions about three others and saying, well, there was  
18 information there, you should have had it with respect  
19 to these folks.

20 MR. SMART: I'm getting to that, Your Honor.

21 MR. HAGENS: I think that is misleading. I  
22 object to the question as lack of foundation.

23 THE COURT: Counsel, my understanding is you are  
24 going back to the same people that have been referenced  
25 in that public meeting. ¶

1 MR. SMART: Exactly. And the point here, Your  
2 Honor --

3 THE COURT: Apparently you're outside that scope  
4 at this point.

5 MR. SMART: The point here, Your Honor, it's very  
6 easy to determine, just by taking an elevation at the  
7 Stakkeland property and comparing it to the high water  
8 mark at the Austin property, to get an elevation --

9 THE COURT: All that may be well and good. It's  
10 a scope objection and I'm sustaining it.

11 Q Why don't you go on, Mr. Regan, and tell what you  
12 learned from the Austins.

13 A "In 1975 the water level was at the third of the four  
14 concrete block steps leading from the walk to the porch  
15 (about one foot below the floor of the house or two feet  
16 above the walk and five feet above the field to the west  
17 of the house.) They told about hearing the roar of the  
18 water coming up the east fork of the Nookachamps Creek  
19 at the Highway 9 bridge which is a serious constriction

20 point. Mrs. Austin realized they're in the flood area  
21 but still like their house and surroundings."  
22 Q I take it they indicated they didn't want to move; is  
23 that right?  
24 A I believe that would be a fair conclusion to draw from  
25 this. ¶

1 Q Okay. And would you then -- finish reading the  
2 information concerning the paragraph and what the  
3 Austins' concerns were.  
4 A Okay. "The Austins' main concern about the Skagit levee  
5 project are, one, will the project increase flood levels  
6 on their property by leaving off other former outlets  
7 that could have offered relief to their area (e.g.  
8 Samish and Burlington area.)" And goes on and says,  
9 "(Burlington dikes were breached, offering some relief  
10 in 1951 high water." And, two, "She is concerned about  
11 what frequency flood would they begin to sustain induced  
12 damages."

13 Q And that's induced damages by the project, correct?

14 A I believe that's what she means.

15 Q Okay.

16 A "She shared with other local residents the misconception  
17 that the two feet of additional water we," meaning the  
18 Corps I believe, "projected for the hundred year flood  
19 can be expected for all flood events. She also had  
20 questions about the accuracy of our study methods and  
21 prediction of high water levels. More study of the  
22 possible induced damages -- more study of the possible  
23 induced damage water levels for various flood events is  
24 urged by this reconnaissance team. Team members also  
25 suggested that due to his familiarity with the area, Don ¶

1 Nelson of the Skagit County engineer's office could  
2 provide additional input. Therefore he should be asked  
3 to review these field notes."

4 Q All right. And then, based on the information  
5 collected, did the Army Corps then go back and answer  
6 these questions in a written form as a result of the  
7 public -- or at the public meeting in July of 1979?  
8 Referring to 989.

9 A I believe that's right.

10 Q Okay. Now, one other point, sir, that can be answered I  
11 think by this particular document, and that's this. You  
12 earlier indicated, I think, what the storage capacity of  
13 the Ross and Baker Lake Dams is, didn't you?

14 A Indicate --

15 Q The storage capacity?

16 A I didn't get into storage capacity.

17 Q Isn't it on the order of two or 300,000 acre feet?

18 A I can't say that. I don't know.

19 Q Is that -- did you ever investigate it?

20 A It could be in that order, I agree, but it could be out  
21 of that order a little bit, too.  
22 Q Which way? Could be more?  
23 A Could be less. I don't know.  
24 Q In any event, the Nookachamps/Clear Lake area only has  
25 35,000 acre feet of storage; is that right? ¶

1 A That's correct.  
2 Q And you reported that to these residents, correct?  
3 A Well, this 35,000 acre feet of storage that floods,  
4 right.  
5 Q Okay.  
6 A It varies by what flood you've got, of course.  
7 Q But with the dams on the upriver storage, they can be  
8 controlled so you can use as much of it as you have  
9 capacity for, correct?  
10 A They go through an operating procedure where they try to  
11 maximize the use of it, right.  
12 Q Now, you said you had been in the Austins' house?  
13 A Yes, I have.  
14 Q Was that for purpose of doing work on this particular  
15 case?  
16 A Yes.  
17 Q Did the Austins verify that they had told the Army Corps  
18 of Engineers this information that's contained in 990  
19 and 989?  
20 A I don't believe that they told me that. I've seen this  
21 document before.  
22 Q Did you never ask them then what the specific flood  
23 levels were that were experienced in their property or  
24 the surrounding area?  
25 A Right. They showed us where the 1990 flood was. ¶

1 Q Excuse me. I didn't mean to interrupt.  
2 A Yeah. They pointed. It was very obvious. They pointed  
3 it out on the wall. There it was, a stain.  
4 Q Let's talk about the 1975 flood, did you ask them where  
5 the 1975 flood levels were?  
6 A Yes.  
7 Q Did you ask them where the 1951 flood levels were?  
8 A No, we were not interested in '51. There was not data  
9 -- to come up with an elevations in the '51 flood to do  
10 us any good.  
11 Q How do you know if you didn't ask them?  
12 A I believe '51 was discussed but we never really got --  
13 and used that, I guess is what I'm saying.  
14 Q That's right. There was data out there that you could  
15 have gone to get, but you weren't interested it at that  
16 time?  
17 A There wasn't enough of it.  
18 Q How do you know if you didn't ask?  
19 A We did ask.

20 Q Well, did you --  
21 MR. HAGENS: I think he ought to be allowed to  
22 finish his answer, Your Honor. He said he did ask.  
23 Q That was the answer to the question.  
24 A We did survey it.  
25 Q You did ask. Did you write down the information ¶  
  
1 anywhere?  
2 A No.  
3 Q It's not even in your notes, is it?  
4 A I don't believe so.  
5 Q So you didn't make any effort then to determine, on a  
6 Nookachamps-wide basis, what the flood levels were from  
7 the 1951 flood by going and talking to the residents who  
8 might have lived through it, did you?  
9 A No.  
10 Q But that's something that residents who moved in there  
11 could do. They could go talk to old timers who lived  
12 through the 1951 flood and find out where the high water  
13 was.  
14 MR. HAGENS: Objection as to lack of foundation  
15 as to what residents could or couldn't do. Calls for  
16 speculation.  
17 THE COURT: It does call for speculation.  
18 MR. SMART: Mr. Hagens has asked that question on  
19 numerous occasions.  
20 MR. HAGENS: I didn't ask that question.  
21 THE COURT: It calls for speculation.  
22 Q Let me ask you this way, sir. Do you have an opinion  
23 whether or not a prospective purchaser could ask other  
24 residents, old-time residents, about what the water  
25 levels were in order to find out where they were on any ¶

1 of these pieces of property?  
2 A I don't see why they couldn't. We all talk to each  
3 other.  
4 Q And that's exactly what the Army Corps did when it went  
5 out -- when the mini task force went out there to  
6 conduct the survey is they asked the old timers where  
7 the water was.  
8 A That's true.  
9 Q At least for 1990 and 1975?  
10 A That's true.  
11 Q And you asked about 1951, but simply didn't write down  
12 the information?  
13 A That's right.  
14 MR. SMART: No further questions, Your Honor.  
15 THE COURT: Mr. Anderson?  
16 RECROSS EXAMINATION  
17 BY MR. REGAN:  
18 Q Mr. Regan, yesterday counsel asked you about some of the  
19 Corps of Engineers studies that have been done and the



20 fact that they have to be sponsored by local government.  
21 A That's right.  
22 Q And you indicated that the county and the State of  
23 Washington sponsored these studies.  
24 A My understanding of the Corps project, a local sponsor  
25 has to be identified. He has to ask. The local sponsor ¶

1 for the -- for the General Design Memo project, the 1979  
2 General Design, was the Skagit County. They asked for  
3 it.  
4 Q That's right. The 1979 General Design Memorandum dealt  
5 with structural proposals on the Skagit River?  
6 A A project, yes.  
7 Q A project to build levees?  
8 A A structural project, yes.  
9 Q Previous efforts by the Corps of Engineers had also  
10 involved structural proposals, the 19 -- I think it was  
11 '65 or '63.  
12 A '62, '63, Avon Bypass. Right. That was a structural  
13 proposal.  
14 Q 1930s Army Corps of Engineers involved structural  
15 proposals for the Avon Bypass?  
16 A It started in the thirties and culminated in the sixties  
17 on Avon Bypass, yes.  
18 Q The 1967 study, this was in Exhibit 512, the Flood Plain  
19 Information Study, was requested by the State of  
20 Washington, Department of Conservation?  
21 A That's a study. That's right, that's a study.  
22 Q That doesn't include any structural proposals, does it?  
23 A No, this is information. This is providing anyone who  
24 wants to read it information on floods as the ground  
25 sits the day the work was done. ¶

1 MR. SMART: Your Honor, I don't know where we're  
2 going with this and I don't want to unfairly restrict  
3 Mr. Anderson, but it's clearly outside the scope of  
4 redirect.

5 MR. ANDERSON: I don't think that's correct at  
6 all, Your Honor. Mr. Hagens yesterday asked if the --  
7 who -- that the Corps of Engineers had to have a  
8 sponsor. The witness testified that they did have to  
9 have a sponsor. I think I'm entitled to inquire of him,  
10 if he says that the State sponsored something, what it  
11 is the State sponsored.

12 MR. SMART: There's no dispute whatsoever who the  
13 sponsor was. The document's been testified to two or  
14 three times.

15 THE COURT: I'll allow it.

16 Q The 1967 study was a flood information study, it was to  
17 advise of the flood hazard, not to proposed any  
18 structural projects.

19 A Absolutely right.

20 Q Are you aware of any other studies or the things similar  
21 to the General Design Memorandum that the State  
22 sponsored?  
23 A For all my time with the Corps I can't remember anything  
24 the State has sponsored.  
25 Q So the 1967 Flood Plain Information Study is the only ¶

1 thing that you can recall or that you're aware of that  
2 the State sponsored?

3 A Right. An information study, right. That's the only  
4 thing I can remember.

5 MR. ANDERSON: That's all I have, Your Honor.

6 A Thank you.

7 THE COURT: All right.

8 MR. HAGENS: One question, Your Honor, if I  
9 might.

10 REDIRECT EXAMINATION

11 BY MR. REGAN:

12 Q Do you have to have the old people before you can ask  
13 them about the flood history of a region?

14 A Somebody has to know them, right.

15 MR. HAGENS: That's all I have, Your Honor.

16 THE COURT: All right, counsel.

17 MR. SMART: None here, Your Honor.

18 THE COURT: Mr. Regan, you may step down.

19 THE COURT: Rather than revving up another  
20 witness for three or four minutes, we'll just take our  
21 break at this point. We have a civil presentation at  
22 one o'clock, so we'll be reconvening at 1:30, so I'd ask  
23 you to be back in the jury room, if you could, by 1:25  
24 and we'll start up again then.

25 All right. Thank you. ¶

1 (Noon recess was taken.)  
2 AFTERNOON SESSION

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1 (Whereupon, the following  
2 occurred in the  
3 presence of the jury:)  
4 THE COURT: Counsel, just a moment, before we  
5 start, we're going to get the juror's note pads.  
6 All right, sir, if you'd step forward, please.  
MR. HAGENS: Dr. Mutter.

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7 DOUGLAS G. MUTTER called in behalf of the  
8 plaintiff, being first duly  
9 sworn, testified as follows:

10 DIRECT EXAMINATION

11 BY MR. HAGENS:

12 Q Would you state your name, and spell it, please, and  
13 also --

14 THE COURT: Actually just one moment. We're just  
15 handing out the last of the pens.

16 Q Would you please state your name, spell it for the Court  
17 Reporter, and your business address.

18 A My name is Douglas Gerald Mutter, M-u-t-t-e-r. And my  
19 business address is 16300 Christenson Road, Suite 350,  
20 Tukwila, Washington.

21 Q And by whom are you currently employed?

22 A I'm employed by Northwest Hydraulic Consultants.

23 Q Before we get into your role in the firm, can you tell  
24 the jury a little bit about your firm. For instance,  
25 how many offices does it have? ¶

1 A We have two offices in the western United States,  
2 Seattle and Sacramento, California, two in western  
3 Canada and two overseas.

4 Q And how long has your company been in business?

5 A Since 1972.

6 Q How many employees does it have?

7 A Approximately 75.

8 Q And does it have any specialities?

9 A Our firm is focused on hydraulic engineering,  
10 hydrology, hydraulics, river engineering and  
11 sedimentation. That's all we do.

12 Q And can you tell us a little bit about the 70 employees,  
13 what do they do?

14 A Well, there are approximately 15 principals in the firm  
15 who are specialists in various areas that I just  
16 mentioned, river engineering or sedimentation, for

17 example. And they're supported by staff engineering  
18 professionals, and also technicians and clerical staff,  
19 so we do work at a variety of levels in the firm.  
20 Q Okay. And can you give the jury some idea of your  
21 clients, the clients you've served over the years, Dr.  
22 Mutter?  
23 A Certainly. We do a considerable amount of work for  
24 government of one sort or another, in particular the  
25 U.S. Army Corps of Engineers, Federal Emergency ¶

1 Management Agency. We do some legal work, State of  
2 Washington, for example, and the Justice Department,  
3 U.S. Justice Department, as well as counties and local  
4 governments.

5 Q And what is your role at the firm?  
6 A Well, I wear two hats. I'm a specialist in one of our  
7 areas of interest, river engineering, and I'm also  
8 involved in management with the firm.

9 Q And what's your role in management position?  
10 A I manage the U.S. operations of our company, which  
11 amounts to the northwest and California offices that I  
12 mentioned.

13 Q Has your company received any awards or commendation  
14 from any of the governmental clients?

15 A We have. We've been fortunate enough to be commended  
16 for our work by both the Army Corps and FEMA.

17 Q And have you qualified as an expert in hydraulic  
18 engineering in the past?

19 A Yes.

20 Q And you were retained in this litigation by plaintiffs;  
21 is that correct?

22 A That's correct.

23 Q Can you give the jury some idea of your educational  
24 background. How does one become a hydraulic engineer,  
25 for instance? ¶

1 A Well, I can describe the path I took. Received a  
2 Bachelors and Masters Degree at the University of  
3 Alberta, undergraduate degree in civil engineering and a  
4 Master's Degree in -- also in civil engineering, with a  
5 specialty in hydraulics, river engineering. PhD at  
6 Colorado State University, also in civil engineering,  
7 with a specialty in river engineering and sediment  
8 transport, and all of my experience has been in the same  
9 field, water resources in one way or another.

10 Worked first as a government employee with the  
11 Water Resources Agency, Provincial Government, and for  
12 the past 20 some years I've worked with Northwest  
13 Hydraulics on river engineering-type work, flood plain  
14 studies and so on.

15 Q Are you a licensed civil engineer?

16 A Yes, I am.

17 Q Have you ever taught hydraulics at any college or  
18 university?  
19 A As a graduate student, yes.  
20 Q At where?  
21 A Colorado State and University of Alberta, both.  
22 Q When did you join the company, Northwest Hydraulics?  
23 A 1973.  
24 Q And your capacity when you joined the company?  
25 A I was a junior engineer. ¶

1 Q And your current capacity?  
2 A I'm President of the U.S. corporation subsidiary that  
3 operates in the U.S..  
4 Q Do you recall approximately when you were contacted by  
5 plaintiffs, or attorneys for the plaintiffs in this  
6 case, do you recall?  
7 A Almost five years ago. I believe it was April of 1992.  
8 Q Okay. And were you subsequently retained?  
9 A I was, yes.  
10 Q By the way, did the Skagit County try to retain you as  
11 well in this litigation?  
12 A Yes, they did.  
13 Q And were you subsequently retained by plaintiffs in this  
14 case? You were hired in this case to look at the  
15 various problems they asked you to look at?  
16 A Yes, I was.  
17 Q What was the financial arrangement? Would you basically  
18 tell the jury what the financial arrangement was?  
19 A We were hired on a time and materials basis and an  
20 hourly fee.  
21 Q What were you asked to do?  
22 A We were asked to investigate the flood event of  
23 November, 1990, in the Skagit River, and to offer a  
24 technical opinion as to whether or not the levee system  
25 along the Skagit River affected flood levels in the ¶

1 Nookachamps area.  
2 Q Okay. And were there any restrictions or limitations on  
3 your assignment?  
4 A No. We were asked for an independent opinion,  
5 essentially.  
6 Q Were you given a free hand in how you went about  
7 assessing the impact of the existing levee system in  
8 Skagit County?  
9 A I would say so.  
10 Q Will you tell the jury a little bit what you did in  
11 furtherance of that assignment. What are some of the  
12 first things that you did in furtherance of that  
13 assignment?  
14 A Well, initially reviewed the complaint to make sure we  
15 understood the issue, what was being asked of us. We  
16 assembled all the available information, historical

17 information, government reports, all of the documents  
18 that had been produced in the legal case from both  
19 plaintiffs and defendants that we could review to get  
20 the background on the case. We made a preliminary  
21 assessment, a manual calculation or estimate as to what  
22 the effect of the levees on flood levels in the  
23 Nookachamps might be.  
24 Q Why don't you just stop there for a moment. Explain to  
25 the jury what you did in that regard. ¶

1 A Well, using approximate methods, let's call them,  
2 Empirical methods and manual calculations, we estimated  
3 the depth of flow in the Skagit River for the 1990 peak  
4 discharge rate both with and without the levee system,  
5 and admittedly this was an estimate, but it allowed us  
6 to determine within reasonable limits whether to expect  
7 that there was an effect from the levees or not and  
8 whether it be justified to proceed and work with more  
9 sophisticated approaches to fine-tune our estimate.  
10 Q What did your preliminary calculations reveal?  
11 A My own estimate was that the effect could be as great as  
12 four feet.  
13 Q This was a mathematical calculation, was it?  
14 A That's correct.  
15 Q You indicated you reviewed documents that had been  
16 produced in the case by both parties. Did you review  
17 any depositions that had been produced?  
18 A Yes.  
19 Q Have you continued to review documents and depositions  
20 as they've become available?  
21 A Yes.  
22 Q Did you review the General Design Memorandum that was  
23 put together by the Army Corps of Engineers in 1979?  
24 A Yes.  
25 Q Now, you said you assembled some historical data. Over ¶

1 what period of time was this historical data assembled,  
2 that is it covered what period of time?  
3 A Well, it began from the turn of the century. I believe  
4 the earliest reports that I reviewed were created in the  
5 early 1920's, but they covered a period of time back to  
6 the turn of the century and, of course, we reviewed data  
7 right up to the present day.  
8 Q What was the purpose of of reviewing this historical  
9 data?  
10 A Primarily to get a feel for the background, how the  
11 system works, how the Skagit River behaves during a  
12 flood, and what changes have taken place over time.  
13 Q All right. Have you reviewed the flood level reports as  
14 well?  
15 A Yes.  
16 Q And what data do you turn to for that, to determine, you

17 know, what the history of flooding has been in the  
18 region?  
19 A Primarily we got that information from published records  
20 from the U.S. Geological Survey.  
21 Q People in your field typically rely upon that data?  
22 A Yes, that's correct.  
23 Q Okay. Did you conduct any kind of field investigation  
24 or surveys as part of your assignment?  
25 A We did both. We made a site reconnaissance to make sure ¶

1 we were familiar with the area and to visit with various  
2 of the plaintiffs to hear their descriptions of what  
3 occurred in November, 1990, and subsequent to that we  
4 also made our own field surveys of high water marks and  
5 some other interesting --  
6 Q When you say an field survey, is this getting transoms  
7 out and taking survey measurements, or is it just visual  
8 observations?  
9 A No. We used leveling equipment and actually determined  
10 elevations of a limited number of high water marks.  
11 Q Okay. And then did you construct a -- what is called an  
12 a numerical model?  
13 A Yes.  
14 Q And can you tell the jury a little bit -- kind of give  
15 them an overview of what was involved there.  
16 A Well, quite simply, a numerical model in this case was a  
17 computer program which embodies the rules of  
18 engineering, hydraulics and mathematics, and allows us  
19 to predict flood levels and patterns using the computer  
20 model.  
21 Q Go ahead.  
22 A It has some basic data that we use to construct it, and  
23 we impose some flow conditions, for example, and it's  
24 capable of computing and telling us what the elevations  
25 of the water surface would be at various points in the ¶

1 study area.  
2 Q Okay. And will it also tell you what the differences  
3 are at various points with and without certain  
4 topographical adjustments?  
5 A Yes, that's correct.  
6 Q Is this a commonly accepted methodology by hydraulic  
7 engineers?  
8 A Yes, it is.  
9 Q Have you used it in other assignments?  
10 A Yes.  
11 Q Is this state of the art approach or the best hydraulic  
12 engineers can do these days, or is it something less  
13 than that?  
14 A It's -- the particular approach that we took is quite  
15 sophisticated.  
16 Q Okay. So you've given them an overview. Then did you

17 also undertake to present the results of that work on a  
18 graphic basis?  
19 A Yes, we summarized the results. As I mentioned, we  
20 computed results at a large number of points in the  
21 study area, so we summarized those both graphically and  
22 in a tabular fashion.  
23 Q How long did it take to put this model together, can you  
24 tell the jury that?  
25 A We worked for, I would estimate, between 500 and a ¶

1 thousand hours over a period of perhaps six months to  
2 assemble the model.  
3 Q And the data that went into the computer was acquired  
4 from where?  
5 A A variety of sources. For example, we used topographic  
6 mapping produced by U.S. Geological Survey and the U.S.  
7 Army Corps of Engineers. They also furnished levee  
8 profile surveys.  
9 Q Who's they?  
10 A I'm sorry, the U.S. Army Corps of Engineers.  
11 Q What about the surface roughness, that sort of data, if  
12 any, was that included in the computer model?  
13 A That was included in the computer model, and that was  
14 something we estimated using engineering judgment.  
15 Q Maybe you ought to give the jury a quick -- we'll come  
16 back to this in quick detail in a moment, but maybe you  
17 ought to give the jury a quick overview of what surface  
18 roughness is all about.  
19 A Certainly. Surface roughness is actually quite simple.  
20 It's about what it sounds like. When water is  
21 attempting to flow in the river channel or over the  
22 flood plain, it encounters resistance, something that  
23 tries to prevent it from flowing downstream, and you can  
24 imagine if the surface texture is very rough or if  
25 there's a lot of vegetation in place, then the water ¶

1 would have a difficult time moving downstream. If it's  
2 very smooth, then it would find it easier to move  
3 downstream.

4 There is a parameter or series of parameters that  
5 engineers estimate and use to describe this roughness  
6 which translates to the resistance of flow, so it's one  
7 of the basic parameters of the model.

8 Q And how did you put the downstream conditions into the  
9 model that you folks prepared? Where did you get the  
10 information for that?

11 A The downstream condition which we imposed as a boundary  
12 condition, so-called, was provided by the U.S.  
13 Geological Survey records at the gauging station at the  
14 Riverside Bridge vicinity.

15 Q That's in Mount Vernon?

16 A It is.



17 Q Did you put any -- well, let's call it rating curve  
18 information? Maybe you ought to stop and tell the jury  
19 what a rating curve is, but was that information used at  
20 all in your computer modeling?  
21 A That essentially furnished the downstream boundary  
22 conditions, and it's, very simply, a relationship  
23 between the rate of flow going downstream, how many  
24 cubic feet per second we're going downstream and how  
25 high the water level got, and that's a relationship ¶

1 study by USGS by field measurements. They go out and  
2 use meters to make measurements and establish this  
3 curve.

4 Q Okay. So you did a review of the historical data. You  
5 did some preliminary work to determine if the model was  
6 justified. You reviewed all those preliminary  
7 historical documents, did you not?

8 A Yes.

9 Q And did you then arrive at a number of opinions relative  
10 to how the hydraulics affect or the levees affect the  
11 Nookachamps/Clear Lake area?

12 A Yes, I did.

13 Q Would you give the jury an overview of your opinions in  
14 that regard.

15 A Very well. In my work on this case I came to five basic  
16 opinions I'd like to share with you. The first is that,  
17 in my opinion, the existence, the presence of the Skagit  
18 County levee system caused flood levels in the  
19 Nookachamps area to be higher than they would have been  
20 if the levee system weren't there.

21 In the November 25th, 1990, flood event, my  
22 analysis indicates that flood levels were higher as a  
23 result of the presence of the levees by amounts ranging  
24 from a foot and a half to four feet, depending on the  
25 location in the study area. ¶

1 Q Depending upon the plaintiff's location, you're talking  
2 about?

3 A Yes, that's correct. My second opinion is that this  
4 occurrence, this effect that the levee has had on flood  
5 levels in the Nookachamps, is not something that happens  
6 just once, it's not a rare occurrence. In fact, by my  
7 analysis, it's occurred 15 to 20 times in the last 50  
8 years, and it's clearly something that recurs and is  
9 chronic. It can be expected to occur again in the  
10 future. It's my opinion if the levees didn't exist,  
11 during significant flood event the flow, rather than  
12 being confined in a narrow corridor between levees,  
13 would be allowed to spread out on the valley floor of  
14 the Skagit River and would flow at shallow depth  
15 resulting in lower flood levels than occur in the  
16 present day.

17                   It's my opinion that the local run-off, such as  
18 from Nookachamps Creek, for example, and other local  
19 drainages was very small in relation to the amount of  
20 water that was going down the Skagit River itself and  
21 the local drainage had essentially no effect on flood  
22 levels in the Nookachamps area.  
23                   And, finally, it's my opinion that the Skagit  
24 County levee system has, over time, undergone a great  
25 many changes and improvements that have strengthened it ¶

1 with respect to it's ability to withstand erosion and  
2 seepage such that it's much less prone today to collapse  
3 or to be eroded than it was in years past.

4                   In my opinion, had these improvements not been  
5 made to the levee system and had flood fight activities  
6 not been carried out in November, 1990, the 25th of  
7 November, in my opinion it's more likely than not that  
8 the levee system would have failed either through  
9 erosion or collapse and there would have been a  
10 subsequent lowering of flood levels up and down the  
11 Skagit River that would have reduced the flood impact to  
12 residents up and down the river, including plaintiffs in  
13 the Nookachamps area.

14 Q               Okay. Let's go to your very first opinion, that the  
15 levee system caused the 1990 flood levels in the  
16 Nookachamps to be higher by amounts ranging from one and  
17 a half to four feet. And the basis of that opinion is  
18 what, Dr. Mutter?

19 A               The basis of that opinion is essentially our modeling  
20 analysis.

21 Q               Okay. And to -- I wonder if we can just maybe, in a  
22 perhaps a little bit more detail -- how do you put the  
23 topographical information into the computer that  
24 generates this result, for instance?

25 A               We furnished between four and five thousand points in ¶

1 the study area elevation information so you can picture  
2 -- actually 48 hundred points on the ground throughout  
3 the study area, which we furnished the computer program  
4 information about the elevation of the topography.

5 Q               Okay. And what about the levee profile as such, what  
6 was the source for that data?

7 A               That came from two sources. I think I mentioned earlier  
8 one was topographic mapping provided by the Army Corps  
9 of Engineers, as well as specific top of levee profile  
10 survey.

11 Q               Okay. And the resistance data, I think you mentioned  
12 that there was some data on that. Can you be a little  
13 bit more specific as to the source of that information  
14 as it went into the computer model.

15 A               That information came from engineering judgment. We  
16 observed the appearance of the river channel and flood

17 plains and, based on experience, estimated the roughness  
18 values.  
19 Q Okay. And was that up and down the river, or just  
20 certain locations? Where did you estimate those values?  
21 A It was estimated at essentially every point in the study  
22 area in the model.  
23 Q And what was the study area of the model?  
24 A It extended, as we mentioned, from the downstream limit,  
25 was somewhat downstream, slightly downstream of the ¶

1 Riverside Bridge. It actually extended down to the Big  
2 Bend area and extended upstream beyond Sedro Wooley,  
3 beyond the Highway 9 Bridge.  
4 Q And those were the points that you put in the  
5 topographical area?  
6 A In the entire reach between those two appointments,  
7 that's correct.  
8 Q The rating curve data, the source for this, the  
9 hydraulic data that showed you the relationship between  
10 flow and elevations, again, where did you get that data?  
11 A We obtained that directly from U.S. Geological Survey.  
12 Q Did you also have to map out the plaintiffs' locations  
13 as best you understood them?  
14 A Yes.  
15 Q Where did you get that data?  
16 A That came from plat maps and street maps, essentially.  
17 Q Okay. What did you do with the model once you had it  
18 constructed? Did you undertake to calibrate it at all?  
19 A Yes, we did.  
20 Q Would you explain to the jury what your calibration  
21 procedure was to assure yourselves that this model was  
22 going to produce accurate results?  
23 A Well, again, the purpose of the model is to predict  
24 water surface elevations and flow directions, flow  
25 patterns, and what we did was simulate something that ¶

1 was known, something that had been observed, mainly the  
2 1990 flood event, so we imposed -- having constructed  
3 the model, we imposed the known 1990 flood discharge and  
4 compared the computer model's predictions of water  
5 surface elevations with high water marks that had been  
6 observed during and after the flood event to make sure  
7 that we were within reasonable agreement of what had  
8 actually been observed in the field.  
9 Q Did you also run '75, 1975 event through as a form of  
10 calibration?  
11 A Yes, we did. Well, the first step simulating the 1990  
12 event was the calibration, and I should explain that  
13 there was tuning involved in adjusting the roughness  
14 values we spoke of earlier until there was adequate  
15 agreement between the model's predictions and what was  
16 observed in the field, but, having done that, it's a

17 standard procedure to test the reliability of the model  
18 by applying another flood, which we used the 1975 flood  
19 discharge, and hands-off retuning the model, seeing how  
20 -- what kind of job it did at predicting water surface  
21 elevations from 1975, and we found it did an adequate  
22 job of that also.  
23 Q The idea of doing that is what kind of a check on the  
24 accuracy of your model?  
25 A That's correct, to build confidence that the model was ¶

1 reliable.  
2 Q Okay. And so you compare the results of the model with  
3 the known statistical information that you get from the  
4 USGS and for the 1975 flood; is that correct? In part  
5 anyway?  
6 A Actually we compared the results of the 1975  
7 verification run, the check run, with high water marks  
8 that had been observed by the Army Corps of Engineers in  
9 1975.  
10 Q Okay. And did you find that they matched or didn't  
11 match?  
12 A We found that they matched adequately.  
13 Q Okay. And then -- okay. Having done the preliminary  
14 calculation to estimate the flow, having done this model  
15 that took you six months and 500 to a thousand hours to  
16 put together, and having calibrated the model as you've  
17 told the jury, what did you do with the model after  
18 that?  
19 A Well, we had let's call it a base line condition, a  
20 simulation of the 1990 flood event for existing  
21 conditions as they were observed on the 25th of  
22 November. We modified the model to remove the levee  
23 system only to see what the effect of removing the  
24 levees would be on flood levels in the Skagit River, so  
25 we had a second lower water surface solution that we ¶

1 could compare directly with the 1990 existing condition  
2 and determine what the impact of the levees was on flood  
3 levels in 1990.  
4 Q Okay. Let me see if I understand. You removed the  
5 levee system from the Skagit -- from the levee system,  
6 Exhibit 199, from the flood plain, so to speak; is that  
7 correct or incorrect?  
8 A Removed all of the levee system, wherever it happened to  
9 be.  
10 Q Okay. And then that gave you another output; is that  
11 correct?  
12 A That's correct.  
13 Q So you had an output showing with levees and an output  
14 showing without levees; is that correct?  
15 A That's correct.  
16 Q And then -- that gave you a comparative analysis, did it

17 not?  
18 A Yes.  
19 Q You gave both those outputs to the defendant, did you  
20 not?  
21 A Yes.  
22 Q Now, did you then prepare some kind of a visual and  
23 tabular data that you could use to help the jury  
24 understand the difference between the condition with  
25 levees and the condition without levees, and as that ¶

1 might affect the plaintiffs?  
2 A Yes, I did.  
3 THE CLERK: Exhibit 210 marked.  
4 Q Is this the exhibit that you prepared to contrast the  
5 with and without conditions of the levees?  
6 A Yes, it is.  
7 Q And it's, in fact, a summary of your computer print-out;  
8 is that correct?  
9 A That's correct.  
10 Q The two runs you gave to the defendants and compare here?  
11 A Yes.  
12 Q And it has the plaintiffs' locations on here in  
13 numerical order, does it not?  
14 A Yes.  
15 Q Has other critical data relating to the flood plain in  
16 the area in which the plaintiffs reside?  
17 A It has landmarks, yes.  
18 Q And does this data -- is this -- by the way, is this  
19 essentially the same data that you provided in the form  
20 of other charts to the defendants?  
21 A It is essentially.  
22 Q Was there some change or -- by reason of any more recent  
23 data you received?  
24 A We revised some of the presentation because of survey  
25 information we received from Skagit County in the last ¶

1 four to six weeks.  
2 Q Did you change your model at all?  
3 A No.  
4 Q So this is the refined, then, version contrasting the  
5 two computer runs that you earlier gave the defendants;  
6 is that right?  
7 A Exactly right.  
8 MR. HAGENS: We'll offer Exhibit 210.  
9 MR. SMART: Voir dire the witness, Your Honor?  
10 THE COURT: All right.  
11 MR. SMART: Showing you Exhibit 210, Mr. Mutter,  
12 you never gave this to Skagit County, did you?  
13 THE WITNESS: No.  
14 MR. SMART: In fact, this wasn't even prepared  
15 until about a week ago, right?  
16 THE WITNESS: It was prepared prior to that.

17 MR. SMART: Two weeks ago maybe?  
18 THE WITNESS: More than that, but that hasn't  
19 been --  
20 MR. SMART: Approximately the start of the case?  
21 THE WITNESS: Pardon?  
22 MR. SMART: It was prepared approximately the  
23 start of the trial; is that correct?  
24 THE WITNESS: In the last few weeks. I can't  
25 recall exactly. ¶

1 MR. SMART: And, in fact, when you say you gave  
2 information to the county, what you're talking about is  
3 that when you were subpoenaed for a deposition, you  
4 brought certain information with you, correct?  
5 THE WITNESS: No. We provided information in  
6 digital form and you requested hard copy output plots,  
7 which we furnished to you directly.  
8 MR. SMART: Yeah, at your deposition.  
9 THE WITNESS: That's correct.  
10 MR. SMART: Which is the time you and I first  
11 met, correct?  
12 THE WITNESS: I believe that's right.  
13 MR. SMART: You didn't meet with somebody else  
14 from the county prior to time that time, did you?  
15 THE WITNESS: No.  
16 MR. SMART: So if I further understand, this  
17 document has been -- has changed information that was  
18 presented in your deposition by additional topographic  
19 information that you say you recently got within the  
20 last three or four weeks.  
21 MR. HAGENS: I object. This seems to be  
22 examining on the exhibit itself.  
23 MR. SMART: I'm asking what the document shows.  
24 MR. HAGENS: I'll offer Exhibit 210, as I have  
25 offered it. ¶

1 THE COURT: Counsel, that last question I think  
2 was beyond the scope of voir dire of the witness.  
3 MR. SMART: Well, specifically, Your Honor, the  
4 witness, in response to Mr. Hagens' question, said, when  
5 Mr. Hagens asked him if it was the same, he said no, it  
6 had been altered by some recently altered data, so the  
7 answer to whether or not it is a comparison of  
8 information which was previously disclosed in deposition  
9 would possibly be inaccurate. That's the purpose of my  
10 question as to what this document shows, and that's the  
11 purpose of voir dire is to find out what the document  
12 shows.  
13 THE COURT: That question didn't go to that  
14 issue, as far as I read it.  
15 MR. SMART: Let me ask -- see if I can phrase it  
16 correctly. This document shows recent information that

17 was not presented at your deposition because it has  
18 included certain topographical information that you have  
19 recently acquired within the last three or four weeks,  
20 correct?

21 THE WITNESS: No, that's not correct.

22 MR. SMART: What is the purpose -- what is --  
23 what does the document contain by way of that recent  
24 topographical information?

25 THE WITNESS: Nothing. ¶

1 MR. HAGENS: We'll offer the exhibit at this  
2 time, Your Honor.

3 MR. SMART: And I have an objection, Your Honor,  
4 since we have never seen it before the start of this  
5 trial, it wasn't produced in deposition, and it's a  
6 different document and different information than  
7 previously identified.

8 THE COURT: Counsel, did I understand your  
9 earlier questions, are you saying that it's -- you're  
10 offering it for substantive and illustrative?

11 MR. HAGENS: Absolutely, a summary of his -- of  
12 his computer model that the jury can understand.  
13 They're not going to understand numbers. This is the  
14 only thing it can understand. It took hours and hours  
15 to create, and he's testified it's a comparison of the  
16 two prior charts that they asked be produced, and were  
17 produced for them over a year ago, together with the  
18 computer data.

19 THE COURT: Mr. Anderson?

20 MR. ANDERSON: I have no objection, Your Honor.

21 THE COURT: 210 will be admitted then.

22 (Whereupon, Plaintiff's  
23 Exhibit No. 210 was admitted  
24 into evidence.)

25 Q (By Mr. Hagens) Okay. Dr. Mutter, do you want to come ¶

1 down here and -- we have a pointer here somewhere that  
2 lost its tip. Maybe if you can get over here.

3 THE COURT: Knowing Snohomish County as I do, it  
4 probably lost its tip about 1967, so we're talking about  
5 archival instruments. That's certainly among them.  
6 We'll break down and get you a new one before the trial  
7 is over.

8 Q I'm also putting this on the overhead.

9 MR. HAGENS: Your Honor, I have a copy of the  
10 exhibit for the Court's use.

11 THE COURT: Although you will recall, Mr. Hagens,  
12 that they finally hooked me up to the overhead, so I  
13 have that.

14 MR. HAGENS: If this helps a little bit --

15 THE COURT: I appreciate it. Thank you.

16 Q Okay, Dr. Mutter, maybe you can explain to the jury in a  
17 little more detail what this Exhibit 210 depicts.

18 A I'd be happy to.

19 We mentioned earlier that we had two separate  
20 computer runs that showed the water surface elevation  
21 throughout the study area, and the study area -- perhaps  
22 we could focus on that to begin with. This corridor we  
23 see here is the main channel of the Skagit River. We  
24 have some landmarks which include State Road 20, State  
25 Road 9, Burlington Northern Railway Bridge, Interstate ¶

1 5, Mount Vernon, Burlington, Sedro Wooley, so we have  
2 then two separate computer analyses, sets of solutions  
3 for water surface elevations in this region, one without  
4 the levees, one with the levees.

5 Q This is the existing levees now?

6 A That's correct. It's somewhat difficult to go point by  
7 point and determine the difference in the elevation as a  
8 result of taking out the levees and to visually make  
9 sense of that, so what we did was compute for you the  
10 difference in water surface elevation caused by the  
11 levees and then we've presented the differences here by  
12 zone.

13 So, for example, in this large blue zone in here,  
14 it's my opinion that water surface elevation throughout  
15 the zone is approximately two feet higher as a result of  
16 the levees. In the reddish zone here, for example, it's  
17 our opinion that the levees would cause flood levels in  
18 the November, '90, flood to be approximately five feet  
19 higher. They actually varied smoothly, they didn't go  
20 in steps, the depth of the increase as a result of the  
21 levees by five, four, three and so on. It would have  
22 been five feet here, 5.1 here, 4.9, but in order to show  
23 you in as simple a fashion as possible, we indicated  
24 whole zones of equal foot increments of effect of the  
25 levees in 1990. ¶

1 Q Okay. And you notice it starts at like a half a foot  
2 and ends down here at nine feet. Is that -- can you  
3 explain what that progression might mean to you, for  
4 instance, as a hydraulic engineer?

5 A Well, the primary bottle neck, if you will, is the levee  
6 system where it's at its narrowest, and that's where the  
7 greatest impact is. The levees cause the greatest rise  
8 in water surface elevation at that downstream location,  
9 9, 8, 7 feet, and that effect tapers off in the upstream  
10 direction, and it's at its least effect up near Sedro  
11 Wooley where it's perhaps a half foot in rise, so that  
12 the strongest effect of the levees is at the downstream  
13 end and the weakest effect is at the upstream end.

14 Q And no plaintiffs live down in this 9, 8, 7, 5 area. In  
15 fact, you don't get to see plaintiffs until we get to



16 the four foot level.  
17 A That's correct.  
18 Q Now, the individual numbers on here are -- go through 1  
19 to 60 something; is that correct?  
20 A One through 68, I believe.  
21 Q And they show at least the properties of the existing  
22 plaintiffs, I guess, and some that were former  
23 plaintiffs, those approximate locations?  
24 A Yes.  
25 Q And then you've also attempted to show in here -- can ¶

1 you tell the jury what this is, this wavy line that  
2 borders on the northwesterly side of your chart  
3 meandering through Highway 20? Can you tell the jury  
4 what that is?  
5 A That's Gages Slough. It's a remnant of the Skagit  
6 River, a former channel, which has filled in through  
7 sediment deposition during the years and it's now simply  
8 a large Marshy slough area.  
9 Q Okay. And do you know if this area, in fact, drained  
10 any significant water during the 1990 event, either the  
11 1990 events?  
12 A I think it probably did not. I'm not sure.  
13 Q Okay. But in years past had it, do you know? Can you  
14 tell by looking, your review of the documents and  
15 historical data, whether in years past that had?  
16 A I'm sure that it has historically. It has provided a  
17 flood nuisance to residents in the Burlington area  
18 because it has created flood water in the past.  
19 Q So a more serious situation in the past; is that correct?  
20 A That's probably accurate.  
21 Q Now, the white areas, you have a -- one area marked  
22 Clear Lake. What are the white areas in your graphic  
23 presentation of your computer result?  
24 A Those are high spots, essentially.  
25 Q Okay. Now, while we've got you in front of the map ¶

1 there, I wonder if you'd take a moment and perhaps  
2 explain where the river -- we also have this exhibit  
3 admitted in evidence as well if it helps you, Dr.  
4 Mutter, it's Exhibit 199.  
5 I wonder if you'd just take a moment to tell the  
6 jury or describe from these exhibits, 199 and 210, where  
7 the flood waters would go if there were no levees.  
8 A Well, as I mentioned in one of my basic conclusions, if  
9 there were no levees, the water would -- rather than  
10 being confined by the corridor as we see -- rather than  
11 being confined by these narrow corridors, the flow would  
12 fan out. In fact, this entire delta was created in  
13 earlier times by the channel moving pretty much wherever  
14 it felt like, and it would be free to do so again. Flow  
15 would fan out over the delta at very shallow depth.

16 Q Okay.  
17 A At higher flows there's always the possibility of  
18 diversions from even as far upstream as the Sterling  
19 area, the Samish Basin and Padilla Bay. That's happened  
20 historically also.  
21 Q When you say historically, can you give the jury some  
22 idea what you mean by that? You mean prior events of  
23 greater magnitude?  
24 A Its pre-developed case. It's happened recently enough  
25 that we know there's still physical signs that this has ¶

1 happened, but it hasn't happened in a major way since  
2 modern civil civilization, since the turn of the  
3 century.  
4 Q Back to your results here, when you did your modeling  
5 here and came up with this graphic computer presentation  
6 of the amount of water caused by the existing levee  
7 system, did you leave in, like, the Burlington Northern  
8 Railroad Bridge?  
9 A Yes.  
10 Q Did you leave in Highway 20?  
11 A Yes.  
12 Q And did you leave in -- well, all the civil works in  
13 this area?  
14 A We left everything in the model except for the Skagit  
15 County levee system, which we removed in its entirety.  
16 Q So if there was a structure like I-5 or Burlington  
17 Northern Bridge or Highway 20, was that left in the  
18 model?  
19 A Yes.  
20 Q Why don't you resume the stand then, Dr. Mutter.  
21 I did want to ask you what the accuracy is of  
22 this, plus or minus within how many inches or feet?  
23 A Well, the different results that we see portrayed on the  
24 chart are quite accurate. I would estimate them to be  
25 accurate within one or two-tenths of a foot. ¶

1 Q Okay. And did you also, as part of your work, prepare a  
2 table that shows on a per plaintiff basis the location  
3 and the difference in water elevations with and without  
4 levees?  
5 A Yes, we did.  
6 Q And that was, again, just a straight comparison of the  
7 two model results; is that correct?  
8 A That's correct.  
9 THE CLERK: Exhibit 211 marked.  
10 Q I'm going to hand you Exhibit No. 211 and ask if you can  
11 identify it.  
12 MR. SMART: Do you mind if I grab one of those  
13 for Mr. Anderson?  
14 MR. HAGENS: Didn't I give him one?  
15 MR. SMART: No.

16 MR. HAGENS: If I've got an extra.  
17 MR. HAGENS: Sorry, Glenn, did I leave you out?  
18 MR. ANDERSON: I'm not sure what happened.  
19 Q Can you identify that, Dr. Mutter?  
20 A Yes, this is the summary of results that we produced,  
21 showing the difference in water surface elevations would  
22 and without levees in 1990 at each of the plaintiff's  
23 locations.  
24 Q And this is using the same computer model that you've  
25 used on Exhibit 210; is that correct? ¶

1 A Yes.  
2 Q So this is just a computer printout of the varied  
3 differences between the two; is that correct?  
4 A At the specific locations of plaintiff's properties,  
5 that's correct.  
6 MR. HAGENS: We'll offer Exhibit 211, Your Honor.  
7 MR. SMART: Voir dire, Your Honor?  
8 THE COURT: All right.  
9 MR. SMART: Do I understand correctly that this  
10 document 211 simply shows which zone these properties  
11 are in?  
12 THE WITNESS: No.  
13 MR. SMART: Is there anything about this  
14 document that shows exactly where the plaintiff's  
15 residence is within the zone?  
16 THE WITNESS: Yes. Each plaintiff's property is  
17 numbered on the zone map, as you call it.  
18 MR. SMART: And would it be correct that the --  
19 that there are variances in topography with respect to  
20 each plaintiff's property?  
21 THE COURT: Counsel, you need to -- we need to  
22 limit the voir dire specifically to the admissibility of  
23 this document.  
24 MR. SMART: Yes. That's what I'm getting at,  
25 Your Honor. ¶

1 THE COURT: I think the last question wasn't  
2 getting us there, so I'd like you to move on.  
3 MR. SMART: Let me rephrase it. The number in  
4 the right-hand corner, is that right, is that supposed  
5 to be at a specific location on the property?  
6 THE WITNESS: Yes.  
7 MR. SMART: And which location is that supposed  
8 to be at?  
9 THE WITNESS: I'm sorry, I don't follow the  
10 question.  
11 MR. SMART: There's a elevation listed in the  
12 right-hand column, correct?  
13 THE WITNESS: Yes.  
14 MR. SMART: The question is, where on the  
15 plaintiff's property is that number supposed to

16 represent?  
17 THE WITNESS: I'm sorry, I don't have a copy of  
18 the table.  
19 The number in the right-hand column is not an  
20 elevation. Again, it's the difference in the two water  
21 surface elevations.  
22 MR. SMART: I understand. The question is,  
23 where on the plaintiff's property is that difference in  
24 water surface elevation supposed to be represented?  
25 THE WITNESS: Essentially anywhere. ¶

1 MR. SMART: But don't the properties vary in  
2 topography?  
3 MR. HAGENS: Your Honor, this seems to get  
4 into --  
5 THE COURT: Counsel, this doesn't go to  
6 admissibility.  
7 MR. HAGENS: We'll again re-offer the exhibit,  
8 Your Honor.  
9 MR. SMART: I'll object, Your Honor. The witness  
10 can't testify where it is.  
11 THE COURT: You're certainly free to inquire  
12 about that. That's very legitimate cross-examination,  
13 but as far as the admissibility -- 211 will be  
14 admitted.  
15 (Whereupon, Plaintiff's  
16 Exhibit No. 211 was admitted  
17 into evidence.)  
18 Q (By Mr. Hagens) I'll leave that in front of you and we'll  
19 put 211 up on the screen. That's as big as we can -- a  
20 big overview, and we'll zoom in to take a look at one or  
21 two of them.  
22 That's about as good as I can get this equipment  
23 to work.  
24 Let's go through this exhibit. Do you have it in  
25 your hand there, Dr. Mutter? ¶

1 A Yes, I do.  
2 Q Now, you've got all the plaintiffs listed on this  
3 Exhibit 211 in alphabetical order; is that correct?  
4 A Yes.  
5 Q Starting with Albe and going all the way to Erling  
6 Ytgard at the bottom, he's number six; is that right?  
7 A Yes, sir.  
8 Q In the next column you have the address. Is that the  
9 mailing address, as best as you were able to find it?  
10 A Yes.  
11 Q And then you've got the city indicated, and then you  
12 have -- at the far right-hand column, it says 1990 Flood  
13 Level Rise at Property Due to Levees, and what does that  
14 column designate?

15 A Those numbers indicate the difference in water surface  
16 elevations, flood levels, which we computed with and  
17 without the levee system.  
18 Q Okay. And you've done that alphabetically for each and  
19 every plaintiff on the chart; is that correct?  
20 A Yes.  
21 Q And there are several on, here like Number 8 after  
22 Bramlett, that were deleted. Are these former  
23 plaintiffs then?  
24 A Yes, that's correct.  
25 Q So the n/a's would reflect former plaintiffs; is that ¶

1 correct?  
2 A Yes.  
3 Q And the accuracy of these calculations in terms of plus  
4 or minus how many feet is, again, what?  
5 A Plus or minus one or two-tenths of a foot.  
6 Q So if a plaintiff were to testify that they -- for  
7 instance, Mr. Albe, was to testify that he had two feet  
8 of water on his property and if the table shows that the  
9 1990 flood level rise at property due to levees was 3.3,  
10 those 2.2 feet that Mr. Albe testified to, would those  
11 be caused by the levees or something else?  
12 MR. SMART: Object to the form of the question,  
13 Your Honor.  
14 MR. HAGENS: I'm just trying to help the jury  
15 understand how to use and interpret the exhibit.  
16 MR. SMART: I think he's confused. He misspoke  
17 himself concerning the numbers and how they might  
18 operate. I think it's a confusing question for the  
19 record.  
20 Why doesn't counsel rephrase it, because it's  
21 internally inconsistent.  
22 MR. HAGENS: I didn't intend it to be. Let me  
23 try again.  
24 Q Your exhibit, Plaintiff's Exhibit 211, shows 3.3 feet of  
25 1990 flood level rise at property due to levees. ¶

1 If Mr. Albe were to testify that he had two feet  
2 in his home of flood waters, what portion of that would  
3 be caused by the levees, if any?  
4 A All of it.  
5 Q And if he were to testify that he had three feet in his  
6 home, what portion of that would be caused by the levees?  
7 A All of it.  
8 Q And if he had four feet, if he testifies -- gets on the  
9 stand and says he has four feet or five feet, how much  
10 of that would be caused by the levees?  
11 A Only the top 3.3 feet.  
12 Q And that would be true for each and every plaintiff up  
13 and down this table; is that correct?  
14 A Yes.

15 Q By the way, you're conscious that Skagit County retained  
16 a hydraulic engineer; is that right?  
17 A Yes, I'm aware of that.  
18 Q You reviewed his deposition?  
19 A Yes.  
20 Q Did he disagree with any of these calculations, to your  
21 knowledge?  
22 A Not to my knowledge.  
23 Q Did he even do this type of a calculation?  
24 A Certainly not in terms of differences, no.  
25 Q Okay. Did he have the computer capacity to be able to ¶

1 do that, to your knowledge?  
2 A He used the same model, same software that I did, but  
3 didn't put it to this use.  
4 Q You mean he didn't undertake to isolate and identify the  
5 amount of flooding or flood elevations caused by the  
6 levees?  
7 A No, he didn't.  
8 Q Okay. Let's go to one other question before we leave  
9 this exhibit.  
10 Does the fact that plaintiffs' properties  
11 received this flooding that you've described in Exhibit  
12 210, does that provide any kind of of benefit or relief  
13 to other peoples protected by the levees in Skagit  
14 County? Does the fact that it operates as a storage  
15 area -- does that have any benefit to Skagit County?  
16 A Well, in principle, there's no difference between  
17 storing water in the Nookachamps area or storing at a  
18 flood control project upstream. There would be some  
19 reduction in the peak discharge downstream, so there  
20 would be relief in that sense.  
21 Q When you say some reduction in the peak discharge  
22 downstream, what do you mean, the flood level would be  
23 less because this is operating to some extent as a  
24 holding area or storage area?  
25 A Essentially, yes. ¶

1 Q And did you also see historical documents where the area  
2 was called a holding area or reservoir area from time to  
3 time?  
4 A I've seen descriptions like that, yes.  
5 Q And is there any other -- does this area act as --  
6 provide any pressure, for instance, to get the Skagit  
7 flows downriver?  
8 A Well, it does do that. If levels were lower in the  
9 Nookachamps area, there would be no way to pass as much  
10 flow down through the levees unless they were set back  
11 or opened up in some way, so they do provide additional  
12 energy -- higher flood levels in the Nookachamps area to  
13 provide energy to force water down.  
14 Q Is that like a water tower, in terms of stored energy

15 behind the levees?  
16 A I guess you could say that. It provides the potential  
17 energy which ultimately is converted into flow energy or  
18 kinetic energy.  
19 Q That does what?  
20 A That motivates the flow to go downstream through the  
21 levee system.  
22 Q Okay. Let's talk about your second opinion. In the  
23 past 50 years there's been, I don't know, let's say 15,  
24 20 events have occurred where the levee system caused  
25 water to be higher in the Nookachamps. And that, ¶

1 therefore, the flooding of the plaintiffs' experiences  
2 has been re-occurring and chronic. First of all, do you  
3 know at what point the Nookachamps begins to flood in  
4 terms of cfs measurements?

5 A Well, there have been various estimates made over the  
6 years, but they range from, I'd say, 60,000 to 80,000  
7 cfs, something in that order.

8 Q Okay. And when you talk about probability of  
9 reoccurrence, let's take like a 25 year flood, okay --  
10 let's just take a moment and go over that.

11 Twenty-five year flood has what probability of  
12 reoccurrence, Dr. Mutter?

13 A A 25 year flood has a four percent annual chance of  
14 occurring.

15 Q And that's computed simply by dividing 25 into 100; is  
16 that correct?

17 A Yes.

18 Q And a one -- a flood that occurs every ten years would  
19 have ten a pen percent chance of occurring because you  
20 divide it into 100 ten times; is that correct?

21 A That's correct.

22 Q Then is the magnitude of the event -- by the way, do you  
23 recall what the approximate magnitude of the November  
24 24-25, 1990, event was?

25 A Again, there is a range of estimates, but it's generally ¶

1 accepted as a 25 to 30 year event.

2 Q How many cfs was that event, just to try to refresh  
3 everybody's recollection here?

4 A The peak discharge on November 25th was 152,000 cfs.

5 Q Measured by whom?

6 A U.S. Geological Survey.

7 Q Okay. And was that an event that was characterized as a  
8 25 year event, or was it characterized as some other  
9 type of event?

10 MR. SMART: Objection. By whom?

11 MR. HAGENS: If you let me finish the question I  
12 might be able to --

13 THE COURT: Go ahead.

14 Q Was that event characterized as a 25 year event by any

15 governmental organization?  
16 A Yes, I believe the Corps of Engineers settled on a 25  
17 year characterization.  
18 Q They start out at some higher number and then ultimately  
19 arrive at that number. Do you know how, historically,  
20 that worked?  
21 A I recall their describing it as a 30 year event at one  
22 point. It was described by the National Weather Service  
23 and other agencies as other than 25 year, but I believe  
24 as time wore on the estimates sort of honed in on a 25  
25 year return period. ¶

1 Q Okay. And that was the November 24-25 event at 152,000  
2 cfs; is that correct?  
3 A 152,000, yes.  
4 Q Is that something that's going to happen only once every  
5 25 years? Can the residents, our clients, rest assured  
6 that this is only going to happen like once every 25  
7 years?  
8 A No, that's not correct.  
9 Q Explain to the jury why that's so.  
10 A Well, we've explained that in any given year there's a  
11 four percent chance that that flood could occur,  
12 the discharge could be 152,000 cfs or greater. And  
13 statistical theory tells us, we know that, then over a  
14 25 year period there is a 65 percent, roughly, chance  
15 that one of those events will occur. Sadly, some  
16 engineer back a few decades ago tried to make this  
17 abstract concept of probability, their four percent in  
18 this case, more understandable by discussing it in terms  
19 of a return period, but the 25 years has nothing to do  
20 with an once in 25 year concept. That's simply  
21 misleading.  
22 Q That's just a raw probability, isn't it?  
23 A Yes.  
24 Q In fact, it could happen any number of times in one year  
25 you could experience a 25 year happening? ¶

1 A That is correct.  
2 Q And, indeed, you have, at our request, prepared a chart  
3 that shows the number of events above 80,000 cfs as --  
4 measured at the Riverside gauge in Mount Vernon, have  
5 you not?

6 A Yes.

7 THE CLERK: 212 marked.

8 Q Can you identify that for the record, please.  
9 A This is a graph that I produced that shows the floods  
10 that have occurred since 1945 that had a magnitude  
11 greater than 80,000 cfs.

12 Q Okay. And how did you prepare the graph?

13 A Well, I have the discharge records from the U.S.  
14 Geological Survey and I examined those to determine



15 those occasions when the flow was greater than 80,000  
16 cfs, and simply graphed them.  
17 MR. HAGENS: We'd offer Exhibit 212, Your  
18 Honor.  
19 MR. SMART: Voir dire, please, Your Honor.  
20 THE COURT: All right.  
21 MR. SMART: Did all the information for this  
22 document come from the USGS?  
23 THE WITNESS: Yes, sir.  
24 MR. SMART: And how did you get that?  
25 THE WITNESS: We obtained the information from a ¶

1 vendor by CD ROM computerized version of it, but it's  
2 published by the U.S. Geological Survey.  
3 MR. SMART: Is it correct to say you got into  
4 the USGS data base through the CD ROM, and it's  
5 published for anybody who wants to use that data base?  
6 THE WITNESS: That's true, and we have hard  
7 copies also that we can use to verify these numbers.  
8 MR. SMART: And am I correct in interpreting the  
9 document that the '51 refers to 1951 flood that's above  
10 140,000 cfs?  
11 THE WITNESS: Yes, that's correct?  
12 MR. SMART: And these are the 1990 floods over  
13 here?  
14 THE WITNESS: Yes.  
15 MR. SMART: And the document indicates that the  
16 first flood above 140,000 --  
17 MR. HAGENS: Your Honor, this is not proper --  
18 MR. SMART: I'm trying to figure out what the  
19 document says.  
20 MR. HAGENS: Your Honor, he's asking questions  
21 about the exhibit.  
22 THE COURT: Sustained. That's fine.  
23 MR. SMART: The blue lines show the magnitude of  
24 the flood in thousands of cubic feet per second; is that  
25 correct? ¶

1 THE WITNESS: Yes, that's correct.  
2 MR. SMART: I don't have any objection, Your  
3 Honor.  
4 MR. ANDERSON: No objection, Your Honor.  
5 THE COURT: 212 will be admitted then.  
6 (Whereupon, Plaintiff's  
7 Exhibit No. 212 was admitted  
8 into evidence.)  
9 MR. HAGENS: I'll give it to the witness so he  
10 can explain what this is all about. Here again, this  
11 is always an experiment for me.  
12 Q (By Mr. Hagens) We have the exhibit in evidence now. Can  
13 you tell the jury what this exhibit depicts, Dr. Mutter?

14 A This -- perhaps I'm being redundant, but this indicates  
15 each of the episodes in the past -- since 1945 when the  
16 Skagit River had a flow equal to or greater than 80,000  
17 cfs, which is the discharge that my analysis shows the  
18 levees begin to affect flood levels in the Skagit River.  
19 At flows greater than 80,000 cfs, they -- the Skagit  
20 County levees cause flood levels to be higher upstream  
21 than they would be without the levee, so this indicates  
22 the episodes since 1945 when, in my opinion, the levees  
23 would have influenced flood levels.  
24 Q And you've got two events in 1990, and what events were  
25 those? ¶

1 A Those are the -- the most recent event is the November  
2 25th, 1990 event, and the one to its left happened  
3 approximately two weeks earlier. They were separate  
4 events, but both very large.  
5 Q The 1995 event, was that the November 30th, 1995, event?  
6 A That's correct.  
7 Q I see you have 1951 and '75 in here, that's correct?  
8 A Yes.  
9 Q Is it generally accurate to say the larger event, the  
10 more levee-induced flooding the plaintiffs would  
11 receive?  
12 A That's a fair statement.  
13 Q And, conversely, the smaller the flood, the less  
14 levee-induced flooding they would receive; is that  
15 correct?  
16 A Yes.  
17 Q While we're on that subject, did you, in all the  
18 documents you reviewed, did you come across any document  
19 from the Corps of Engineers, from Skagit County, from  
20 any source whatsoever, that undertook to quantify or  
21 measure the amount of flooding that was being caused by  
22 the existing levee system as opposed to some new  
23 proposed levee system?  
24 A No.  
25 Q Now, having reviewed this exhibit and prepared it, in ¶

1 point of fact, your opinion is what about -- insofar as  
2 demonstrating whether or not flooding is a re-occurring  
3 or chronic situation in the Nooachamps/Clear Lake area?  
4 A Well, this analysis tells me that -- I think I count 18  
5 occasions when the Skagit County levee system caused  
6 flood levels to be higher to some extent in the  
7 Nookachamps area in a period of approximately 50 years.  
8 That tells me that this is something that happens  
9 relatively frequently, and recurs and is an ongoing  
10 condition.  
11 Q Is it likely to happen in the future?  
12 A Absolutely.  
13 Q Let's go on then to your third opinion, that without the

14 levees, the 1990 flood would have spread over a broad  
15 flood plain with less flooding in the Nookachamps area.  
16 What's the basis for that opinion?  
17 A Well, two things. The historical descriptions of the  
18 site prior to the development of levees indicates that  
19 that's the way major floods used to occur. Flood would  
20 fan out at shallow depth all over the valley floor, and  
21 it makes sense geomorphically.  
22 Q Geomorphically, can you put that in some more layman's  
23 words.  
24 A Effluvial geomorphology is the study of rivers and how  
25 they form their own boundaries and patterns, they ¶

1 rearrange their beds and their banks and so on, but  
2 scouring, eroding, depositing sediment, and this setting  
3 is very typical of a delta area where flow has the  
4 ability to fan out in very shallow depth all over the  
5 delta, so there's the historical behavior and the  
6 historical descriptions that were available to me that  
7 are consistent with what I would expect. Also, we've  
8 computed what the flood levels would be in the absence  
9 of levees, and we know what the topography is out there  
10 and we could see that it would, in fact, spread out very  
11 broadly across the flood plain.

12 Q But in contrast to that it does what?

13 A In its present state?

14 Q Yes , the levees in place, the existing levees.

15 A In contrast to that, it's now confined to a narrow  
16 corridor between the levees.

17 Q Does that narrow corridor back the water up onto some of  
18 our client's property during these significant events?

19 A Well, it certainly would at all of the events that I've  
20 indicated on this Exhibit 212.

21 Q Okay. So it's a matter of degree, not kind, is that  
22 correct, when you're talking about the amount of  
23 flooding on the plaintiffs' property?

24 A That's correct.

25 Q Let's go on to opinion number 4, the local run-off from ¶

1 the Nookachamps Creek and other local drainage did not  
2 significantly affect flood levels on plaintiffs'  
3 property in 1990. What's the basis of that opinion, Dr.  
4 Mutter?

5 A The flow from Nookachamps Creek itself was not measured  
6 by USGS. There was a gauging station there up through  
7 1978 but which is no longer active, so we didn't have  
8 measurements, but we know from prior study that the  
9 flows to be expected from that drainage area, which is a  
10 few square miles, would be very small in relation to the  
11 3,000 square mile drainage area of the Skagit River. So  
12 I think it's that simple. The flows coming off the  
13 local drainages could be very small compared to Skagit

14 River flows and simply wouldn't influence the flood  
15 levels.  
16 Q Maybe you can come here and show the jury on this  
17 Exhibit 199, just to reacquaint them with where this  
18 Nookachamps Creek is, if you can plot it out on Exhibit  
19 199.  
20 A This shows -- I need to use the pointless end here.  
21 This is Nookachamps Creek main stem. The basin  
22 is an area something like this. It's -- what used to be  
23 gauged on the east fork, which is actually two separate  
24 locations, but in this approximate vicinity, the gauging  
25 area upstream at that point was about three square

1 miles, so we're looking probably at a ten square mile  
2 area, or something on that order.

3 Q In the Nookachamps Creek area?  
4 A In the Nookachamps Creek, and ultimately into the Skagit  
5 River.

6 Q Okay. And during significant flood events such as the  
7 two that happened in '90 and the one that happened in  
8 '95, what direction does the Nookachamps flow?

9 A Actually flows two directions, depending on the  
10 circumstances. Early on local run-off from the  
11 Nookachamps Creek would have the flow going downstream  
12 into Nookachamps Creek and into the Skagit River. When  
13 larger floods approach in the Skagit River, however, and  
14 flood levels go up in the Skagit, the flow can actually  
15 proceed in the opposite direction and go upstream on  
16 Nookachamps Creek.

17 Q That's what happened in the events of 1990 and again in  
18 '95; is that correct?

19 A That's correct.

20 Q Resume the stand, Dr. Mutter.

21 Your fifth opinion and final opinion was that  
22 improvements to the levee system have increased its  
23 strength and reduced the likelihood of levee failure.  
24 Had these improvements not been made, the levees would  
25 have failed in 1990. Such failure would have provided

1 flood relief for the Nookachamps area.

2 What's the basis of that opinion, Dr. Mutter?

3 A There are several. The basis was my knowledge of  
4 improvements that were made to the levee system by  
5 Skagit County that prevented seepage through the levee  
6 or erosion of the levee.

7 Q What is your knowledge of improvements by Skagit County?  
8 What did you review in that regard?

9 A Reviewed documentation of the projects that was  
10 produced by Skagit County, and they were mostly in the  
11 form of grant applications to Department of Ecology of  
12 projects that were to be built, and also deposition  
13 testimony of Skagit County staff and diking district

14 staff.  
15 Q And can you give us some of the names of the depositions  
16 that you reviewed?  
17 A Oh, Mr. Nelson and Mr. Brookings at the county, Mr.  
18 Anderson with Diking District 20, Mr. Mapes with Diking  
19 District 12.  
20 Q Did you also review some of the actual project records,  
21 a sampling of those, actual projects that were done?  
22 A A sampling, yes.  
23 Q And can you tell the jury how you many reviewed there?  
24 A Perhaps a dozen.  
25 Q Okay. And can you give the jury an idea of what these ¶

1 projects were.  
2 A Well, they varied. Some of them involved the  
3 construction of a keyway, which was essentially a  
4 cut-off wall on the riverside of the levee so if the  
5 levee were aligned in this fashion there would be a  
6 cut-off wall excavated down beneath the levee to prevent  
7 seepage underneath the levee. To obtain a similar  
8 result, some of the projects put ballast on the back  
9 side of the levee, making the seepage path longer by  
10 adding material to the back side of the levee. Some of  
11 the levees were broadened to achieve the same purpose.  
12 Some of the construction projects involved placement of  
13 riprap on the riverside of the levee to protect them  
14 against erosion.

15 Q Okay. And these projects were during what period of  
16 time?

17 A The ones I looked at that I sampled were in the early  
18 eighties through early nineties, that time frame.

19 THE COURT: Okay. Actually, counsel, we'll take  
20 our afternoon recess at this point.

21 MR. HAGENS: Thank you, Your Honor.

22 THE COURT: All right. We'll take our afternoon  
23 break.

24 (Recess was taken.)

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AFTERNOON SESSION

1 (Whereupon, the following  
2 occurred in the  
3 presence of the jury:)  
4 THE COURT: Counsel, just a moment, before we  
5 start, we're going to get the juror's note pads.  
6 All right, sir, if you'd step forward, please.  
MR. HAGENS: Dr. Mutter.

---

7 DOUGLAS G. MUTTER called in behalf of the  
8 plaintiff, being first duly  
9 sworn, testified as follows:

DIRECT EXAMINATION

10 BY MR. HAGENS:  
11 Q Would you state your name, and spell it, please, and  
12 also --  
13 THE COURT: Actually just one moment. We're just  
14 handing out the last of the pens.  
15 Q Would you please state your name, spell it for the Court  
16 Reporter, and your business address.  
17 A My name is Douglas Gerald Mutter, M-u-t-t-e-r. And my  
18 business address is 16300 Christenson Road, Suite 350,  
19 Tukwila, Washington.  
20 Q And by whom are you currently employed?  
21 A I'm employed by Northwest Hydraulic Consultants.  
22 Q Before we get into your role in the firm, can you tell  
23 the jury a little bit about your firm. For instance,  
24 how many offices does it have? ¶  
25

1 A We have two offices in the western United States,  
2 Seattle and Sacramento, California, two in western  
3 Canada and two overseas.  
4 Q And how long has your company been in business?  
5 A Since 1972.  
6 Q How many employees does it have?  
7 A Approximately 75.  
8 Q And does it have any specialties?  
9 A Our firm is focused on hydraulic engineering,  
10 hydrology, hydraulics, river engineering and

11 sedimentation. That's all we do.  
12 Q And can you tell us a little bit about the 70 employees,  
13 what do they do?  
14 A Well, there are approximately 15 principals in the firm  
15 who are specialists in various areas that I just  
16 mentioned, river engineering or sedimentation, for  
17 example. And they're supported by staff engineering  
18 professionals, and also technicians and clerical staff,  
19 so we do work at a variety of levels in the firm.  
20 Q Okay. And can you give the jury some idea of your  
21 clients, the clients you've served over the years, Dr.  
22 Mutter?  
23 A Certainly. We do a considerable amount of work for  
24 government of one sort or another, in particular the  
25 U.S. Army Corps of Engineers, Federal Emergency ¶

1 Management Agency. We do some legal work, State of  
2 Washington, for example, and the Justice Department,  
3 U.S. Justice Department, as well as counties and local  
4 governments.

5 Q And what is your role at the firm?  
6 A Well, I wear two hats. I'm a specialist in one of our  
7 areas of interest, river engineering, and I'm also  
8 involved in management with the firm.

9 Q And what's your role in management position?

10 A I manage the U.S. operations of our company, which  
11 amounts to the northwest and California offices that I  
12 mentioned.

13 Q Has your company received any awards or commendation  
14 from any of the governmental clients?

15 A We have. We've been fortunate enough to be commended  
16 for our work by both the Army Corps and FEMA.

17 Q And have you qualified as an expert in hydraulic  
18 engineering in the past?

19 A Yes.

20 Q And you were retained in this litigation by plaintiffs;  
21 is that correct?

22 A That's correct.

23 Q Can you give the jury some idea of your educational  
24 background. How does one become a hydraulic engineer,  
25 for instance? ¶

1 A Well, I can describe the path I took. Received a  
2 Bachelors and Masters Degree at the University of  
3 Alberta, undergraduate degree in civil engineering and a  
4 Master's Degree in -- also in civil engineering, with a  
5 specialty in hydraulics, river engineering. PhD at  
6 Colorado State University, also in civil engineering,  
7 with a specialty in river engineering and sediment  
8 transport, and all of my experience has been in the same  
9 field, water resources in one way or another.

10 Worked first as a government employee with the

11 Water Resources Agency, Provincial Government, and for  
12 the past 20 some years I've worked with Northwest  
13 Hydraulics on river engineering-type work, flood plain  
14 studies and so on.  
15 Q Are you a licensed civil engineer?  
16 A Yes, I am.  
17 Q Have you ever taught hydraulics at any college or  
18 university?  
19 A As a graduate student, yes.  
20 Q At where?  
21 A Colorado State and University of Alberta, both.  
22 Q When did you join the company, Northwest Hydraulics?  
23 A 1973.  
24 Q And your capacity when you joined the company?  
25 A I was a junior engineer. ¶

1 Q And your current capacity?  
2 A I'm President of the U.S. corporation subsidiary that  
3 operates in the U.S..  
4 Q Do you recall approximately when you were contacted by  
5 plaintiffs, or attorneys for the plaintiffs in this  
6 case, do you recall?  
7 A Almost five years ago. I believe it was April of 1992.  
8 Q Okay. And were you subsequently retained?  
9 A I was, yes.  
10 Q By the way, did the Skagit County try to retain you as  
11 well in this litigation?  
12 A Yes, they did.  
13 Q And were you subsequently retained by plaintiffs in this  
14 case? You were hired in this case to look at the  
15 various problems they asked you to look at?  
16 A Yes, I was.  
17 Q What was the financial arrangement? Would you basically  
18 tell the jury what the financial arrangement was?  
19 A We were hired on a time and materials basis and an  
20 hourly fee.  
21 Q What were you asked to do?  
22 A We were asked to investigate the flood event of  
23 November, 1990, in the Skagit River, and to offer a  
24 technical opinion as to whether or not the levee system  
25 along the Skagit River affected flood levels in the ¶

1 Nookachamps area.  
2 Q Okay. And were there any restrictions or limitations on  
3 your assignment?  
4 A No. We were asked for an independent opinion,  
5 essentially.  
6 Q Were you given a free hand in how you went about  
7 assessing the impact of the existing levee system in  
8 Skagit County?  
9 A I would say so.  
10 Q Will you tell the jury a little bit what you did in



11 furtherance of that assignment. What are some of the  
12 first things that you did in furtherance of that  
13 assignment?

14 A Well, initially reviewed the complaint to make sure we  
15 understood the issue, what was being asked of us. We  
16 assembled all the available information, historical  
17 information, government reports, all of the documents  
18 that had been produced in the legal case from both  
19 plaintiffs and defendants that we could review to get  
20 the background on the case. We made a preliminary  
21 assessment, a manual calculation or estimate as to what  
22 the effect of the levees on flood levels in the  
23 Nookachamps might be.

24 Q Why don't you just stop there for a moment. Explain to  
25 the jury what you did in that regard. ¶

1 A Well, using approximate methods, let's call them,  
2 Empirical methods and manual calculations, we estimated  
3 the depth of flow in the Skagit River for the 1990 peak  
4 discharge rate both with and without the levee system,  
5 and admittedly this was an estimate, but it allowed us  
6 to determine within reasonable limits whether to expect  
7 that there was an effect from the levees or not and  
8 whether it be justified to proceed and work with more  
9 sophisticated approaches to fine-tune our estimate.

10 Q What did your preliminary calculations reveal?

11 A My own estimate was that the effect could be as great as  
12 four feet.

13 Q This was a mathematical calculation, was it?

14 A That's correct.

15 Q You indicated you reviewed documents that had been  
16 produced in the case by both parties. Did you review  
17 any depositions that had been produced?

18 A Yes.

19 Q Have you continued to review documents and depositions  
20 as they've become available?

21 A Yes.

22 Q Did you review the General Design Memorandum that was  
23 put together by the Army Corps of Engineers in 1979?

24 A Yes.

25 Q Now, you said you assembled some historical data. Over ¶

1 what period of time was this historical data assembled,  
2 that is it covered what period of time?

3 A Well, it began from the turn of the century. I believe  
4 the earliest reports that I reviewed were created in the  
5 early 1920's, but they covered a period of time back to  
6 the turn of the century and, of course, we reviewed data  
7 right up to the present day.

8 Q What was the purpose of reviewing this historical data?

9 A Primarily to get a feel for the background, how the  
10 system works, how the Skagit River behaves during a

11 flood, and what changes have taken place over time.  
12 Q All right. Have you reviewed the flood level reports as  
13 well?  
14 A Yes.  
15 Q And what data do you turn to for that, to determine, you  
16 know, what the history of flooding has been in the  
17 region?  
18 A Primarily we got that information from published records  
19 from the U.S. Geological Survey.  
20 Q People in your field typically rely upon that data?  
21 A Yes, that's correct.  
22 Q Okay. Did you conduct any kind of field investigation  
23 or surveys as part of your assignment?  
24 A We did both. We made a site reconnaissance to make sure  
25 we were familiar with the area and to visit with various ¶

1 of the plaintiffs to hear their descriptions of what  
2 occurred in November, 1990, and subsequent to that we  
3 also made our own field surveys of high water marks and  
4 some other interesting --  
5 Q When you say an field survey, is this getting transoms  
6 out and taking survey measurements, or is it just visual  
7 observations?  
8 A No. We used leveling equipment and actually determined  
9 elevations of a limited number of high water marks.  
10 Q Okay. And then did you construct a -- what is called an  
11 a numerical model?  
12 A Yes.  
13 Q And can you tell the jury a little bit -- kind of give  
14 them an overview of what was involved there.  
15 A Well, quite simply, a numerical model in this case was a  
16 computer program which embodies the rules of  
17 engineering, hydraulics and mathematics, and allows us  
18 to predict flood levels and patterns using the computer  
19 model.  
20 Q Go ahead.  
21 A It has some basic data that we use to construct it, and  
22 we impose some flow conditions, for example, and it's  
23 capable of computing and telling us what the elevations  
24 of the water surface would be at various points in the  
25 study area. ¶

1 Q Okay. And will it also tell you what the differences  
2 are at various points with and without certain  
3 topographical adjustments?  
4 A Yes, that's correct.  
5 Q Is this a commonly accepted methodology by hydraulic  
6 engineers?  
7 A Yes, it is.  
8 Q Have you used it in other assignments?  
9 A Yes.  
10 Q Is this state of the art approach or the best hydraulic

11 engineers can do these days, or is it something less  
12 than that?  
13 A It's -- the particular approach that we took is quite  
14 sophisticated.  
15 Q Okay. So you've given them an overview. Then did you  
16 also undertake to present the results of that work on a  
17 graphic basis?  
18 A Yes, we summarized the results. As I mentioned, we  
19 computed results at a large number of points in the  
20 study area, so we summarized those both graphically and  
21 in a tabular fashion.  
22 Q How long did it take to put this model together, can you  
23 tell the jury that?  
24 A We worked for, I would estimate, between 500 and a  
25 thousand hours over a period of perhaps six months to ¶

1 assemble the model.  
2 Q And the data that went into the computer was acquired  
3 from where?  
4 A A variety of sources. For example, we used topographic  
5 mapping produced by U.S. Geological Survey and the U.S.  
6 Army Corps of Engineers. They also furnished levee  
7 profile surveys.  
8 Q Who's they?  
9 A I'm sorry, the U.S. Army Corps of Engineers.  
10 Q What about the surface roughness, that sort of data, if  
11 any, was that included in the computer model?  
12 A That was included in the computer model, and that was  
13 something we estimated using engineering judgment.  
14 Q Maybe you ought to give the jury a quick -- we'll come  
15 back to this in quick detail in a moment, but maybe you  
16 ought to give the jury a quick overview of what surface  
17 roughness is all about.  
18 A Certainly. Surface roughness is actually quite simple.  
19 It's about what it sounds like. When water is  
20 attempting to flow in the river channel or over the  
21 flood plain, it encounters resistance, something that  
22 tries to prevent it from flowing downstream, and you can  
23 imagine if the surface texture is very rough or if  
24 there's a lot of vegetation in place, then the water  
25 would have a difficult time moving downstream. If it's ¶

1 very smooth, then it would find it easier to move  
2 downstream.  
3 There is a parameter or series of parameters that  
4 engineers estimate and use to describe this roughness  
5 which translates to the resistance of flow, so it's one  
6 of the basic parameters of the model.  
7 Q And how did you put the downstream conditions into the  
8 model that you folks prepared? Where did you get the  
9 information for that?  
10 A The downstream condition which we imposed as a boundary

11 condition, so-called, was provided by the U.S.  
12 Geological Survey records at the gauging station at the  
13 Riverside Bridge vicinity.  
14 Q That's in Mount Vernon?  
15 A It is.  
16 Q Did you put any -- well, let's call it rating curve  
17 information? Maybe you ought to stop and tell the jury  
18 what a rating curve is, but was that information used at  
19 all in your computer modeling?  
20 A That essentially furnished the downstream boundary  
21 conditions, and it's, very simply, a relationship  
22 between the rate of flow going downstream, how many  
23 cubic feet per second we're going downstream and how  
24 high the water level got, and that's a relationship  
25 study by USGS by field measurements. They go out and ¶

1 use meters to make measurements and establish this  
2 curve.  
3 Q Okay. So you did a review of the historical data. You  
4 did some preliminary work to determine if the model was  
5 justified. You reviewed all those preliminary  
6 historical documents, did you not?  
7 A Yes.  
8 Q And did you then arrive at a number of opinions relative  
9 to how the hydraulics affect or the levees affect the  
10 Nookachamps/Clear Lake area?  
11 A Yes, I did.  
12 Q Would you give the jury an overview of your opinions in  
13 that regard.  
14 A Very well. In my work on this case I came to five basic  
15 opinions I'd like to share with you. The first is that,  
16 in my opinion, the existence, the presence of the Skagit  
17 County levee system caused flood levels in the  
18 Nookachamps area to be higher than they would have been  
19 if the levee system weren't there.  
20 In the November 25th, 1990, flood event, my  
21 analysis indicates that flood levels were higher as a  
22 result of the presence of the levees by amounts ranging  
23 from a foot and a half to four feet, depending on the  
24 location in the study area.  
25 Q Depending upon the plaintiff's location, you're talking ¶

1 about?  
2 A Yes, that's correct. My second opinion is that this  
3 occurrence, this effect that the levee has had on flood  
4 levels in the Nookachamps, is not something that happens  
5 just once, it's not a rare occurrence. In fact, by my  
6 analysis, it's occurred 15 to 20 times in the last 50  
7 years, and it's clearly something that recurs and is  
8 chronic. It can be expected to occur again in the  
9 future. It's my opinion if the levees didn't exist,  
10 during significant flood event the flow, rather than

11 being confined in a narrow corridor between levees,  
12 would be allowed to spread out on the valley floor of  
13 the Skagit River and would flow at shallow depth  
14 resulting in lower flood levels than occur in the  
15 present day.

16 It's my opinion that the local run-off, such as  
17 from Nookachamps Creek, for example, and other local  
18 drainages was very small in relation to the amount of  
19 water that was going down the Skagit River itself and  
20 the local drainage had essentially no effect on flood  
21 levels in the Nookachamps area.

22 And, finally, it's my opinion that the Skagit  
23 County levee system has, over time, undergone a great  
24 many changes and improvements that have strengthened it  
25 with respect to it's ability to withstand erosion and ¶

1 seepage such that it's much less prone today to collapse  
2 or to be eroded than it was in years past.

3 In my opinion, had these improvements not been  
4 made to the levee system and had flood fight activities  
5 not been carried out in November, 1990, the 25th of  
6 November, in my opinion it's more likely than not that  
7 the levee system would have failed either through  
8 erosion or collapse and there would have been a  
9 subsequent lowering of flood levels up and down the  
10 Skagit River that would have reduced the flood impact to  
11 residents up and down the river, including plaintiffs in  
12 the Nookachamps area.

13 Q Okay. Let's go to your very first opinion, that the  
14 levee system caused the 1990 flood levels in the  
15 Nookachamps to be higher by amounts ranging from one and  
16 a half to four feet. And the basis of that opinion is  
17 what, Dr. Mutter?

18 A The basis of that opinion is essentially our modeling  
19 analysis.

20 Q Okay. And to -- I wonder if we can just maybe, in a  
21 perhaps a little bit more detail -- how do you put the  
22 topographical information into the computer that  
23 generates this result, for instance?

24 A We furnished between four and five thousand points in  
25 the study area elevation information so you can picture ¶

1 -- actually 48 hundred points on the ground throughout  
2 the study area, which we furnished the computer program  
3 information about the elevation of the topography.

4 Q Okay. And what about the levee profile as such, what  
5 was the source for that data?

6 A That came from two sources. I think I mentioned earlier  
7 one was topographic mapping provided by the Army Corps  
8 of Engineers, as well as specific top of levee profile  
9 survey.

10 Q Okay. And the resistance data, I think you mentioned

11 that there was some data on that. Can you be a little  
12 bit more specific as to the source of that information  
13 as it went into the computer model.  
14 A That information came from engineering judgment. We  
15 observed the appearance of the river channel and flood  
16 plains and, based on experience, estimated the roughness  
17 values.  
18 Q Okay. And was that up and down the river, or just  
19 certain locations? Where did you estimate those values?  
20 A It was estimated at essentially every point in the study  
21 area in the model.  
22 Q And what was the study area of the model?  
23 A It extended, as we mentioned, from the downstream limit,  
24 was somewhat downstream, slightly downstream of the  
25 Riverside Bridge. It actually extended down to the Big ¶

1 Bend area and extended upstream beyond Sedro Wooley,  
2 beyond the Highway 9 Bridge.  
3 Q And those were the points that you put in the  
4 topographical area?  
5 A In the entire reach between those two appointments,  
6 that's correct.  
7 Q The rating curve data, the source for this, the  
8 hydraulic data that showed you the relationship between  
9 flow and elevations, again, where did you get that data?  
10 A We obtained that directly from U.S. Geological Survey.  
11 Q Did you also have to map out the plaintiffs' locations  
12 as best you understood them?  
13 A Yes.  
14 Q Where did you get that data?  
15 A That came from plat maps and street maps, essentially.  
16 Q Okay. What did you do with the model once you had it  
17 constructed? Did you undertake to calibrate it at all?  
18 A Yes, we did.  
19 Q Would you explain to the jury what your calibration  
20 procedure was to assure yourselves that this model was  
21 going to produce accurate results?  
22 A Well, again, the purpose of the model is to predict  
23 water surface elevations and flow directions, flow  
24 patterns, and what we did was simulate something that  
25 was known, something that had been observed, mainly the ¶

1 1990 flood event, so we imposed -- having constructed  
2 the model, we imposed the known 1990 flood discharge and  
3 compared the computer model's predictions of water  
4 surface elevations with high water marks that had been  
5 observed during and after the flood event to make sure  
6 that we were within reasonable agreement of what had  
7 actually been observed in the field.  
8 Q Did you also run '75, 1975 event through as a form of  
9 calibration?  
10 A Yes, we did. Well, the first step simulating the 1990

11 event was the calibration, and I should explain that  
12 there was tuning involved in adjusting the roughness  
13 values we spoke of earlier until there was adequate  
14 agreement between the model's predictions and what was  
15 observed in the field, but, having done that, it's a  
16 standard procedure to test the reliability of the model  
17 by applying another flood, which we used the 1975 flood  
18 discharge, and hands-off retuning the model, seeing how  
19 -- what kind of job it did at predicting water surface  
20 elevations from 1975, and we found it did an adequate  
21 job of that also.

22 Q The idea of doing that is what kind of a check on the  
23 accuracy of your model?

24 A That's correct, to build confidence that the model was  
25 reliable. ¶

1 Q Okay. And so you compare the results of the model with  
2 the known statistical information that you get from the  
3 USGS and for the 1975 flood; is that correct? In part  
4 anyway?

5 A Actually we compared the results of the 1975  
6 verification run, the check run, with high water marks  
7 that had been observed by the Army Corps of Engineers in  
8 1975.

9 Q Okay. And did you find that they matched or didn't  
10 match?

11 A We found that they matched adequately.

12 Q Okay. And then -- okay. Having done the preliminary  
13 calculation to estimate the flow, having done this model  
14 that took you six months and 500 to a thousand hours to  
15 put together, and having calibrated the model as you've  
16 told the jury, what did you do with the model after  
17 that?

18 A Well, we had let's call it a base line condition, a  
19 simulation of the 1990 flood event for existing  
20 conditions as they were observed on the 25th of  
21 November. We modified the model to remove the levee  
22 system only to see what the effect of removing the  
23 levees would be on flood levels in the Skagit River, so  
24 we had a second lower water surface solution that we  
25 could compare directly with the 1990 existing condition ¶

1 and determine what the impact of the levees was on flood  
2 levels in 1990.

3 Q Okay. Let me see if I understand. You removed the  
4 levee system from the Skagit -- from the levee system,  
5 Exhibit 199, from the flood plain, so to speak; is that  
6 correct or incorrect?

7 A Removed all of the levee system, wherever it happened to  
8 be.

9 Q Okay. And then that gave you another output; is that  
10 correct?

11 A That's correct.  
12 Q So you had an output showing with levees and an output  
13 showing without levees; is that correct?  
14 A That's correct.  
15 Q And then -- that gave you a comparative analysis, did it  
16 not?  
17 A Yes.  
18 Q You gave both those outputs to the defendant, did you  
19 not?  
20 A Yes.  
21 Q Now, did you then prepare some kind of a visual and  
22 tabular data that you could use to help the jury  
23 understand the difference between the condition with  
24 levees and the condition without levees, and as that  
25 might affect the plaintiffs? ¶

1 A Yes, I did.  
2 THE CLERK: Exhibit 210 marked.  
3 Q Is this the exhibit that you prepared to contrast the  
4 with and without conditions of the levees?  
5 A Yes, it is.  
6 Q And it's, in fact, a summary of your computer print-out;  
7 is that correct?  
8 A That's correct.  
9 Q The two runs you gave to the defendants and compare here?  
10 A Yes.  
11 Q And it has the plaintiffs' locations on here in  
12 numerical order, does it not?  
13 A Yes.  
14 Q Has other critical data relating to the flood plain in  
15 the area in which the plaintiffs reside?  
16 A It has landmarks, yes.  
17 Q And does this data -- is this -- by the way, is this  
18 essentially the same data that you provided in the form  
19 of other charts to the defendants?  
20 A It is essentially.  
21 Q Was there some change or -- by reason of any more recent  
22 data you received?  
23 A We revised some of the presentation because of survey  
24 information we received from Skagit County in the last  
25 four to six weeks. ¶

1 Q Did you change your model at all?  
2 A No.  
3 Q So this is the refined, then, version contrasting the  
4 two computer runs that you earlier gave the defendants;  
5 is that right?  
6 A Exactly right.  
7 MR. HAGENS: We'll offer Exhibit 210.  
8 MR. SMART: Voir dire the witness, Your Honor?  
9 THE COURT: All right.  
10 MR. SMART: Showing you Exhibit 210, Mr. Mutter,



11 you never gave this to Skagit County, did you?  
12 THE WITNESS: No.  
13 MR. SMART: In fact, this wasn't even prepared  
14 until about a week ago, right?  
15 THE WITNESS: It was prepared prior to that.  
16 MR. SMART: Two weeks ago maybe?  
17 THE WITNESS: More than that, but that hasn't  
18 been --  
19 MR. SMART: Approximately the start of the case?  
20 THE WITNESS: Pardon?  
21 MR. SMART: It was prepared approximately the  
22 start of the trial; is that correct?  
23 THE WITNESS: In the last few weeks. I can't  
24 recall exactly.  
25 MR. SMART: And, in fact, when you say you gave ¶

1 information to the county, what you're talking about is  
2 that when you were subpoenaed for a deposition, you  
3 brought certain information with you, correct?

4 THE WITNESS: No. We provided information in  
5 digital form and you requested hard copy output plots,  
6 which we furnished to you directly.

7 MR. SMART: Yeah, at your deposition.

8 THE WITNESS: That's correct.

9 MR. SMART: Which is the time you and I first  
10 met, correct?

11 THE WITNESS: I believe that's right.

12 MR. SMART: You didn't meet with somebody else  
13 from the county prior to time that time, did you?

14 THE WITNESS: No.

15 MR. SMART: So if I further understand, this  
16 document has been -- has changed information that was  
17 presented in your deposition by additional topographic  
18 information that you say you recently got within the  
19 last three or four weeks.

20 MR. HAGENS: I object. This seems to be  
21 examining on the exhibit itself.

22 MR. SMART: I'm asking what the document shows.

23 MR. HAGENS: I'll offer Exhibit 210, as I have  
24 offered it.

25 THE COURT: Counsel, that last question I think ¶

1 was beyond the scope of voir dire of the witness.

2 MR. SMART: Well, specifically, Your Honor, the  
3 witness, in response to Mr. Hagens' question, said, when  
4 Mr. Hagens asked him if it was the same, he said no, it  
5 had been altered by some recently altered data, so the  
6 answer to whether or not it is a comparison of  
7 information which was previously disclosed in deposition  
8 would possibly be inaccurate. That's the purpose of my  
9 question as to what this document shows, and that's the  
10 purpose of voir dire is to find out what the document

11 shows.  
12 THE COURT: That question didn't go to that  
13 issue, as far as I read it.  
14 MR. SMART: Let me ask -- see if I can phrase it  
15 correctly. This document shows recent information that  
16 was not presented at your deposition because it has  
17 included certain topographical information that you have  
18 recently acquired within the last three or four weeks,  
19 correct?  
20 THE WITNESS: No, that's not correct.  
21 MR. SMART: What is the purpose -- what is --  
22 what does the document contain by way of that recent  
23 topographical information?  
24 THE WITNESS: Nothing.  
25 MR. HAGENS: We'll offer the exhibit at this ¶

1 time, Your Honor.  
2 MR. SMART: And I have an objection, Your Honor,  
3 since we have never seen it before the start of this  
4 trial, it wasn't produced in deposition, and it's a  
5 different document and different information than  
6 previously identified.

7 THE COURT: Counsel, did I understand your  
8 earlier questions, are you saying that it's -- you're  
9 offering it for substantive and illustrative?

10 MR. HAGENS: Absolutely, a summary of his -- of  
11 his computer model that the jury can understand.  
12 They're not going to understand numbers. This is the  
13 only thing it can understand. It took hours and hours  
14 to create, and he's testified it's a comparison of the  
15 two prior charts that they asked be produced, and were  
16 produced for them over a year ago, together with the  
17 computer data.

18 THE COURT: Mr. Anderson?

19 MR. ANDERSON: I have no objection, Your Honor.

20 THE COURT: 210 will be admitted then.

21 (Whereupon, Plaintiff's  
22 Exhibit No. 210 was admitted  
23 into evidence.)

24 Q (By Mr. Hagens) Okay. Dr. Mutter, do you want to come  
25 down here and -- we have a pointer here somewhere that ¶

1 lost its tip. Maybe if you can get over here.

2 THE COURT: Knowing Snohomish County as I do, it  
3 probably lost its tip about 1967, so we're talking about  
4 archival instruments. That's certainly among them.  
5 We'll break down and get you a new one before the trial  
6 is over.

7 Q I'm also putting this on the overhead.

8 MR. HAGENS: Your Honor, I have a copy of the  
9 exhibit for the Court's use.

10 THE COURT: Although you will recall, Mr. Hagens,  
11 that they finally hooked me up to the overhead, so I  
12 have that.

13 MR. HAGENS: If this helps a little bit --

14 THE COURT: I appreciate it. Thank you.

15 Q Okay, Dr. Mutter, maybe you can explain to the jury in a  
16 little more detail what this Exhibit 210 depicts.

17 A I'd be happy to.

18 We mentioned earlier that we had two separate  
19 computer runs that showed the water surface elevation  
20 throughout the study area, and the study area -- perhaps  
21 we could focus on that to begin with. This corridor we  
22 see here is the main channel of the Skagit River. We  
23 have some landmarks which include State Road 20, State  
24 Road 9, Burlington Northern Railway Bridge, Interstate  
25 5, Mount Vernon, Burlington, Sedro Wooley, so we have ¶

1 then two separate computer analyses, sets of solutions  
2 for water surface elevations in this region, one without  
3 the levees, one with the levees.

4 Q This is the existing levees now?

5 A That's correct. It's somewhat difficult to go point by  
6 point and determine the difference in the elevation as a  
7 result of taking out the levees and to visually make  
8 sense of that, so what we did was compute for you the  
9 difference in water surface elevation caused by the  
10 levees and then we've presented the differences here by  
11 zone.

12 So, for example, in this large blue zone in here,  
13 it's my opinion that water surface elevation throughout  
14 the zone is approximately two feet higher as a result of  
15 the levees. In the reddish zone here, for example, it's  
16 our opinion that the levees would cause flood levels in  
17 the November, '90, flood to be approximately five feet  
18 higher. They actually varied smoothly, they didn't go  
19 in steps, the depth of the increase as a result of the  
20 levees by five, four, three and so on. It would have  
21 been five feet here, 5.1 here, 4.9, but in order to show  
22 you in as simple a fashion as possible, we indicated  
23 whole zones of equal foot increments of effect of the  
24 levees in 1990.

25 Q Okay. And you notice it starts at like a half a foot ¶

1 and ends down here at nine feet. Is that -- can you  
2 explain what that progression might mean to you, for  
3 instance, as a hydraulic engineer?

4 A Well, the primary bottle neck, if you will, is the levee  
5 system where it's at its narrowest, and that's where the  
6 greatest impact is. The levees cause the greatest rise  
7 in water surface elevation at that downstream location,  
8 9, 8, 7 feet, and that effect tapers off in the upstream  
9 direction, and it's at its least effect up near Sedro

10 Wooley where it's perhaps a half foot in rise, so that  
11 the strongest effect of the levees is at the downstream  
12 end and the weakest effect is at the upstream end.  
13 Q And no plaintiffs live down in this 9, 8, 7, 5 area. In  
14 fact, you don't get to see plaintiffs until we get to  
15 the four foot level.  
16 A That's correct.  
17 Q Now, the individual numbers on here are -- go through 1  
18 to 60 something; is that correct?  
19 A One through 68, I believe.  
20 Q And they show at least the properties of the existing  
21 plaintiffs, I guess, and some that were former  
22 plaintiffs, those approximate locations?  
23 A Yes.  
24 Q And then you've also attempted to show in here -- can  
25 you tell the jury what this is, this wavy line that ¶

1 borders on the northwesterly side of your chart  
2 meandering through Highway 20? Can you tell the jury  
3 what that is?  
4 A That's Gages Slough. It's a remnant of the Skagit  
5 River, a former channel, which has filled in through  
6 sediment deposition during the years and it's now simply  
7 a large marshy slough area.  
8 Q Okay. And do you know if this area, in fact, drained  
9 any significant water during the 1990 event, either the  
10 1990 events?  
11 A I think it probably did not. I'm not sure.  
12 Q Okay. But in years past had it, do you know? Can you  
13 tell by looking, your review of the documents and  
14 historical data, whether in years past that had?  
15 A I'm sure that it has historically. It has provided a  
16 flood nuisance to residents in the Burlington area  
17 because it has created flood water in the past.  
18 Q So a more serious situation in the past; is that correct?  
19 A That's probably accurate.  
20 Q Now, the white areas, you have a -- one area marked  
21 Clear Lake. What are the white areas in your graphic  
22 presentation of your computer result?  
23 A Those are high spots, essentially.  
24 Q Okay. Now, while we've got you in front of the map  
25 there, I wonder if you'd take a moment and perhaps ¶

1 explain where the river -- we also have this exhibit  
2 admitted in evidence as well if it helps you, Dr.  
3 Mutter, it's Exhibit 199.  
4 I wonder if you'd just take a moment to tell the  
5 jury or describe from these exhibits, 199 and 210, where  
6 the flood waters would go if there were no levees.  
7 A Well, as I mentioned in one of my basic conclusions, if  
8 there were no levees, the water would -- rather than  
9 being confined by the corridor as we see -- rather than

10 being confined by these narrow corridors, the flow would  
11 fan out. In fact, this entire delta was created in  
12 earlier times by the channel moving pretty much wherever  
13 it felt like, and it would be free to do so again. Flow  
14 would fan out over the delta at very shallow depth.

15 Q Okay.

16 A At higher flows there's always the possibility of  
17 diversions from even as far upstream as the Sterling  
18 area, the Samish Basin and Padilla Bay. That's happened  
19 historically also.

20 Q When you say historically, can you give the jury some  
21 idea what you mean by that? You mean prior events of  
22 greater magnitude?

23 A Its pre-developed case. It's happened recently enough  
24 that we know there's still physical signs that this has  
25 happened, but it hasn't happened in a major way since ¶

1 modern civil civilization, since the turn of the  
2 century.

3 Q Back to your results here, when you did your modeling  
4 here and came up with this graphic computer presentation  
5 of the amount of water caused by the existing levee  
6 system, did you leave in, like, the Burlington Northern  
7 Railroad Bridge?

8 A Yes.

9 Q Did you leave in Highway 20?

10 A Yes.

11 Q And did you leave in -- well, all the civil works in  
12 this area?

13 A We left everything in the model except for the Skagit  
14 County levee system, which we removed in its entirety.

15 Q So if there was a structure like I-5 or Burlington  
16 Northern Bridge or Highway 20, was that left in the  
17 model?

18 A Yes.

19 Q Why don't you resume the stand then, Dr. Mutter.

20 I did want to ask you what the accuracy is of  
21 this, plus or minus within how many inches or feet?

22 A Well, the different results that we see portrayed on the  
23 chart are quite accurate. I would estimate them to be  
24 accurate within one or two-tenths of a foot.

25 Q Okay. And did you also, as part of your work, prepare a ¶

1 table that shows on a per plaintiff basis the location  
2 and the difference in water elevations with and without  
3 levees?

4 A Yes, we did.

5 Q And that was, again, just a straight comparison of the  
6 two model results; is that correct?

7 A That's correct.

8 THE CLERK: Exhibit 211 marked.

9 Q I'm going to hand you Exhibit No. 211 and ask if you can

10 identify it.  
11 MR. SMART: Do you mind if I grab one of those  
12 for Mr. Anderson?  
13 MR. HAGENS: Didn't I give him one?  
14 MR. SMART: No.  
15 MR. HAGENS: If I've got an extra.  
16 MR. HAGENS: Sorry, Glenn, did I leave you out?  
17 MR. ANDERSON: I'm not sure what happened.  
18 Q Can you identify that, Dr. Mutter?  
19 A Yes, this is the summary of results that we produced,  
20 showing the difference in water surface elevations would  
21 and without levees in 1990 at each of the plaintiff's  
22 locations.  
23 Q And this is using the same computer model that you've  
24 used on Exhibit 210; is that correct?  
25 A Yes. ¶

1 Q So this is just a computer printout of the varied  
2 differences between the two; is that correct?  
3 A At the specific locations of plaintiff's properties,  
4 that's correct.  
5 MR. HAGENS: We'll offer Exhibit 211, Your Honor.  
6 MR. SMART: Voir dire, Your Honor?  
7 THE COURT: All right.  
8 MR. SMART: Do I understand correctly that this  
9 document 211 simply shows which zone these properties  
10 are in?  
11 THE WITNESS: No.  
12 MR. SMART: Is there anything about this  
13 document that shows exactly where the plaintiff's  
14 residence is within the zone?  
15 THE WITNESS: Yes. Each plaintiff's property is  
16 numbered on the zone map, as you call it.  
17 MR. SMART: And would it be correct that the --  
18 that there are variances in topography with respect to  
19 each plaintiff's property?  
20 THE COURT: Counsel, you need to -- we need to  
21 limit the voir dire specifically to the admissibility of  
22 this document.  
23 MR. SMART: Yes. That's what I'm getting at,  
24 Your Honor.  
25 THE COURT: I think the last question wasn't ¶

1 getting us there, so I'd like you to move on.  
2 MR. SMART: Let me rephrase it. The number in  
3 the right-hand corner, is that right, is that supposed  
4 to be at a specific location on the property?  
5 THE WITNESS: Yes.  
6 MR. SMART: And which location is that supposed  
7 to be at?  
8 THE WITNESS: I'm sorry, I don't follow the  
9 question.

10 MR. SMART: There's a elevation listed in the  
11 right-hand column, correct?  
12 THE WITNESS: Yes.  
13 MR. SMART: The question is, where on the  
14 plaintiff's property is that number supposed to  
15 represent?  
16 THE WITNESS: I'm sorry, I don't have a copy of  
17 the table.  
18 The number in the right-hand column is not an  
19 elevation. Again, it's the difference in the two water  
20 surface elevations.  
21 MR. SMART: I understand. The question is,  
22 where on the plaintiff's property is that difference in  
23 water surface elevation supposed to be represented?  
24 THE WITNESS: Essentially anywhere.  
25 MR. SMART: But don't the properties vary in ¶

1 topography?  
2 MR. HAGENS: Your Honor, this seems to get  
3 into --  
4 THE COURT: Counsel, this doesn't go to  
5 admissibility.  
6 MR. HAGENS: We'll again re-offer the exhibit,  
7 Your Honor.  
8 MR. SMART: I'll object, Your Honor. The witness  
9 can't testify where it is.  
10 THE COURT: You're certainly free to inquire  
11 about that. That's very legitimate cross-examination,  
12 but as far as the admissibility -- 211 will be  
13 admitted.

14 (Whereupon, Plaintiff's  
15 Exhibit No. 211 was admitted  
16 into evidence.)

17 Q (By Mr. Hagens) I'll leave that in front of you and we'll  
18 put 211 up on the screen. That's as big as we can -- a  
19 big overview, and we'll zoom in to take a look at one or  
20 two of them.

21 That's about as good as I can get this equipment  
22 to work.

23 Let's go through this exhibit. Do you have it in  
24 your hand there, Dr. Mutter?

25 A Yes, I do. ¶

1 Q Now, you've got all the plaintiffs listed on this  
2 Exhibit 211 in alphabetical order; is that correct?

3 A Yes.

4 Q Starting with Albe and going all the way to Erling  
5 Ytgard at the bottom, he's number six; is that right?

6 A Yes, sir.

7 Q In the next column you have the address. Is that the  
8 mailing address, as best as you were able to find it?

9 A Yes.  
10 Q And then you've got the city indicated, and then you  
11 have -- at the far right-hand column, it says 1990 Flood  
12 Level Rise at Property Due to Levees, and what does that  
13 column designate?  
14 A Those numbers indicate the difference in water surface  
15 elevations, flood levels, which we computed with and  
16 without the levee system.  
17 Q Okay. And you've done that alphabetically for each and  
18 every plaintiff on the chart; is that correct?  
19 A Yes.  
20 Q And there are several on, here like Number 8 after  
21 Bramlett, that were deleted. Are these former  
22 plaintiffs then?  
23 A Yes, that's correct.  
24 Q So the n/a's would reflect former plaintiffs; is that  
25 correct? ¶

1 A Yes.  
2 Q And the accuracy of these calculations in terms of plus  
3 or minus how many feet is, again, what?  
4 A Plus or minus one or two-tenths of a foot.  
5 Q So if a plaintiff were to testify that they -- for  
6 instance, Mr. Albe, was to testify that he had two feet  
7 of water on his property and if the table shows that the  
8 1990 flood level rise at property due to levees was 3.3,  
9 those 2.2 feet that Mr. Albe testified to, would those  
10 be caused by the levees or something else?

11 MR. SMART: Object to the form of the question,  
12 Your Honor.

13 MR. HAGENS: I'm just trying to help the jury  
14 understand how to use and interpret the exhibit.

15 MR. SMART: I think he's confused. He misspoke  
16 himself concerning the numbers and how they might  
17 operate. I think it's a confusing question for the  
18 record.

19 Why doesn't counsel rephrase it, because it's  
20 internally inconsistent.

21 MR. HAGENS: I didn't intend it to be. Let me  
22 try again.

23 Q Your exhibit, Plaintiff's Exhibit 211, shows 3.3 feet of  
24 1990 flood level rise at property due to levees.

25 If Mr. Albe were to testify that he had two feet ¶

1 in his home of flood waters, what portion of that would  
2 be caused by the levees, if any?

3 A All of it.

4 Q And if he were to testify that he had three feet in his  
5 home, what portion of that would be caused by the levees?

6 A All of it.

7 Q And if he had four feet, if he testifies -- gets on the  
8 stand and says he has four feet or five feet, how much



9 of that would be caused by the levees?  
10 A Only the top 3.3 feet.  
11 Q And that would be true for each and every plaintiff up  
12 and down this table; is that correct?  
13 A Yes.  
14 Q By the way, you're conscious that Skagit County retained  
15 a hydraulic engineer; is that right?  
16 A Yes, I'm aware of that.  
17 Q You reviewed his deposition?  
18 A Yes.  
19 Q Did he disagree with any of these calculations, to your  
20 knowledge?  
21 A Not to my knowledge.  
22 Q Did he even do this type of a calculation?  
23 A Certainly not in terms of differences, no.  
24 Q Okay. Did he have the computer capacity to be able to  
25 do that, to your knowledge? ¶

1 A He used the same model, same software that I did, but  
2 didn't put it to this use.  
3 Q You mean he didn't undertake to isolate and identify the  
4 amount of flooding or flood elevations caused by the  
5 levees?  
6 A No, he didn't.  
7 Q Okay. Let's go to one other question before we leave  
8 this exhibit.

9 Does the fact that plaintiffs' properties  
10 received this flooding that you've described in Exhibit  
11 210, does that provide any kind of benefit or relief to  
12 other peoples protected by the levees in Skagit County?  
13 Does the fact that it operates as a storage area -- does  
14 that have any benefit to Skagit County?

15 A Well, in principle, there's no difference between  
16 storing water in the Nookachamps area or storing at a  
17 flood control project upstream. There would be some  
18 reduction in the peak discharge downstream, so there  
19 would be relief in that sense.

20 Q When you say some reduction in the peak discharge  
21 downstream, what do you mean, the flood level would be  
22 less because this is operating to some extent as a  
23 holding area or storage area?

24 A Essentially, yes.

25 Q And did you also see historical documents where the area ¶

1 was called a holding area or reservoir area from time to  
2 time?

3 A I've seen descriptions like that, yes.

4 Q And is there any other -- does this area act as --  
5 provide any pressure, for instance, to get the Skagit  
6 flows downriver?

7 A Well, it does do that. If levels were lower in the  
8 Nookachamps area, there would be no way to pass as much

9 flow down through the levees unless they were set back  
10 or opened up in some way, so they do provide additional  
11 energy -- higher flood levels in the Nookachamps area to  
12 provide energy to force water down.  
13 Q Is that like a water tower, in terms of stored energy  
14 behind the levees?  
15 A I guess you could say that. It provides the potential  
16 energy which ultimately is converted into flow energy or  
17 kinetic energy.  
18 Q That does what?  
19 A That motivates the flow to go downstream through the  
20 levee system.  
21 Q Okay. Let's talk about your second opinion. In the  
22 past 50 years there's been, I don't know, let's say 15,  
23 20 events have occurred where the levee system caused  
24 water to be higher in the Nookachamps. And that,  
25 therefore, the flooding of the plaintiffs' experiences ¶

1 has been re-occurring and chronic. First of all, do you  
2 know at what point the Nookachamps begins to flood in  
3 terms of cfs measurements?  
4 A Well, there have been various estimates made over the  
5 years, but they range from, I'd say, 60,000 to 80,000  
6 cfs, something in that order.  
7 Q Okay. And when you talk about probability of  
8 reoccurrence, let's take like a 25 year flood, okay --  
9 let's just take a moment and go over that.  
10 Twenty-five year flood has what probability of  
11 reoccurrence, Dr. Mutter?  
12 A A 25 year flood has a four percent annual chance of  
13 occurring.  
14 Q And that's computed simply by dividing 25 into 100; is  
15 that correct?  
16 A Yes.  
17 Q And a one -- a flood that occurs every ten years would  
18 have ten a pen percent chance of occurring because you  
19 divide it into 100 ten times; is that correct?  
20 A That's correct.  
21 Q Then is the magnitude of the event -- by the way, do you  
22 recall what the approximate magnitude of the November  
23 24-25, 1990, event was?  
24 A Again, there is a range of estimates, but it's generally  
25 accepted as a 25 to 30 year event. ¶

1 Q How many cfs was that event, just to try to refresh  
2 everybody's recollection here?  
3 A The peak discharge on November 25th was 152,000 cfs.  
4 Q Measured by whom?  
5 A U.S. Geological Survey.  
6 Q Okay. And was that an event that was characterized as a  
7 25 year event, or was it characterized as some other  
8 type of event?

9 MR. SMART: Objection. By whom?  
10 MR. HAGENS: If you let me finish the question I  
11 might be able to --  
12 THE COURT: Go ahead.  
13 Q Was that event characterized as a 25 year event by any  
14 governmental organization?  
15 A Yes, I believe the Corps of Engineers settled on a 25  
16 year characterization.  
17 Q They start out at some higher number and then ultimately  
18 arrive at that number. Do you know how, historically,  
19 that worked?  
20 A I recall their describing it as a 30 year event at one  
21 point. It was described by the National Weather Service  
22 and other agencies as other than 25 year, but I believe  
23 as time wore on the estimates sort of honed in on a 25  
24 year return period.  
25 Q Okay. And that was the November 24-25 event at 152,000 ¶

1 cfs; is that correct?  
2 A 152,000, yes.  
3 Q Is that something that's going to happen only once every  
4 25 years? Can the residents, our clients, rest assured  
5 that this is only going to happen like once every 25  
6 years?  
7 A No, that's not correct.  
8 Q Explain to the jury why that's so.  
9 A Well, we've explained that in any given year there's a  
10 four percent chance that that flood could occur,  
11 the discharge could be 152,000 cfs or greater. And  
12 statistical theory tells us, we know that, then over a  
13 25 year period there is a 65 percent, roughly, chance  
14 that one of those events will occur. Sadly, some  
15 engineer back a few decades ago tried to make this  
16 abstract concept of probability, their four percent in  
17 this case, more understandable by discussing it in terms  
18 of a return period, but the 25 years has nothing to do  
19 with an once in 25 year concept. That's simply  
20 misleading.  
21 Q That's just a raw probability, isn't it?  
22 A Yes.  
23 Q In fact, it could happen any number of times in one year  
24 you could experience a 25 year happening?  
25 A That is correct. ¶

1 Q And, indeed, you have, at our request, prepared a chart  
2 that shows the number of events above 80,000 cfs as --  
3 measured at the Riverside gauge in Mount Vernon, have  
4 you not?  
5 A Yes.  
6 THE CLERK: 212 marked.  
7 Q Can you identify that for the record, please.  
8 A This is a graph that I produced that shows the floods

9 that have occurred since 1945 that had a magnitude  
10 greater than 80,000 cfs.  
11 Q Okay. And how did you prepare the graph?  
12 A Well, I have the discharge records from the U.S.  
13 Geological Survey and I examined those to determine  
14 those occasions when the flow was greater than 80,000  
15 cfs, and simply graphed them.  
16 MR. HAGENS: We'd offer Exhibit 212, Your  
17 Honor.  
18 MR. SMART: Voir dire, please, Your Honor.  
19 THE COURT: All right.  
20 MR. SMART: Did all the information for this  
21 document come from the USGS?  
22 THE WITNESS: Yes, sir.  
23 MR. SMART: And how did you get that?  
24 THE WITNESS: We obtained the information from a  
25 vendor by CD ROM computerized version of it, but it's ¶

1 published by the U.S. Geological Survey.  
2 MR. SMART: Is it correct to say you got into  
3 the USGS data base through the CD ROM, and it's  
4 published for anybody who wants to use that data base?  
5 THE WITNESS: That's true, and we have hard  
6 copies also that we can use to verify these numbers.  
7 MR. SMART: And am I correct in interpreting the  
8 document that the '51 refers to 1951 flood that's above  
9 140,000 cfs?  
10 THE WITNESS: Yes, that's correct?  
11 MR. SMART: And these are the 1990 floods over  
12 here?  
13 THE WITNESS: Yes.  
14 MR. SMART: And the document indicates that the  
15 first flood above 140,000 --  
16 MR. HAGENS: Your Honor, this is not proper --  
17 MR. SMART: I'm trying to figure out what the  
18 document says.  
19 MR. HAGENS: Your Honor, he's asking questions  
20 about the exhibit.  
21 THE COURT: Sustained. That's fine.  
22 MR. SMART: The blue lines show the magnitude of  
23 the flood in thousands of cubic feet per second; is that  
24 correct?  
25 THE WITNESS: Yes, that's correct. ¶

1 MR. SMART: I don't have any objection, Your  
2 Honor.  
3 MR. ANDERSON: No objection, Your Honor.  
4 THE COURT: 212 will be admitted then.  
5 (Whereupon, Plaintiff's  
6 Exhibit No. 212 was admitted  
7 into evidence.)

8 MR. HAGENS: I'll give it to the witness so he  
9 can explain what this is all about. Here again, this  
10 is always an experiment for me.

11 Q (By Mr. Hagens) We have the exhibit in evidence now. Can  
12 you tell the jury what this exhibit depicts, Dr. Mutter?

13 A This -- perhaps I'm being redundant, but this indicates  
14 each of the episodes in the past -- since 1945 when the  
15 Skagit River had a flow equal to or greater than 80,000  
16 cfs, which is the discharge that my analysis shows the  
17 levees begin to affect flood levels in the Skagit River.  
18 At flows greater than 80,000 cfs, they -- the Skagit  
19 County levees cause flood levels to be higher upstream  
20 than they would be without the levee, so this indicates  
21 the episodes since 1945 when, in my opinion, the levees  
22 would have influenced flood levels.

23 Q And you've got two events in 1990, and what events were  
24 those?

25 A Those are the -- the most recent event is the November ¶

1 25th, 1990 event, and the one to its left happened  
2 approximately two weeks earlier. They were separate  
3 events, but both very large.

4 Q The 1995 event, was that the November 30th, 1995, event?

5 A That's correct.

6 Q I see you have 1951 and '75 in here, that's correct?

7 A Yes.

8 Q Is it generally accurate to say the larger event, the  
9 more levee-induced flooding the plaintiffs would  
10 receive?

11 A That's a fair statement.

12 Q And, conversely, the smaller the flood, the less  
13 levee-induced flooding they would receive; is that  
14 correct?

15 A Yes.

16 Q While we're on that subject, did you, in all the  
17 documents you reviewed, did you come across any document  
18 from the Corps of Engineers, from Skagit County, from  
19 any source whatsoever, that undertook to quantify or  
20 measure the amount of flooding that was being caused by  
21 the existing levee system as opposed to some new  
22 proposed levee system?

23 A No.

24 Q Now, having reviewed this exhibit and prepared it, in  
25 point of fact, your opinion is what about -- insofar as ¶

1 demonstrating whether or not flooding is a re-occurring  
2 or chronic situation in the Nookachamps/Clear Lake area?

3 A Well, this analysis tells me that -- I think I count 18  
4 occasions when the Skagit County levee system caused  
5 flood levels to be higher to some extent in the  
6 Nookachamps area in a period of approximately 50 years.  
7 That tells me that this is something that happens

8 relatively frequently, and recurs and is an ongoing  
9 condition.  
10 Q Is it likely to happen in the future?  
11 A Absolutely.  
12 Q Let's go on then to your third opinion, that without the  
13 levees, the 1990 flood would have spread over a broad  
14 flood plain with less flooding in the Nookachamps area.  
15 What's the basis for that opinion?  
16 A Well, two things. The historical descriptions of the  
17 site prior to the development of levees indicates that  
18 that's the way major floods used to occur. Flood would  
19 fan out at shallow depth all over the valley floor, and  
20 it makes sense geomorphically.  
21 Q Geomorphically, can you put that in some more layman's  
22 words.  
23 A Effluvial geomorphology is the study of rivers and how  
24 they form their own boundaries and patterns, they  
25 rearrange their beds and their banks and so on, but ¶

1 scouring, eroding, depositing sediment, and this setting  
2 is very typical of a delta area where flow has the  
3 ability to fan out in very shallow depth all over the  
4 delta, so there's the historical behavior and the  
5 historical descriptions that were available to me that  
6 are consistent with what I would expect. Also, we've  
7 computed what the flood levels would be in the absence  
8 of levees, and we know what the topography is out there  
9 and we could see that it would, in fact, spread out very  
10 broadly across the flood plain.

11 Q But in contrast to that it does what?  
12 A In its present state?  
13 Q Yes, the levees in place, the existing levees.  
14 A In contrast to that, it's now confined to a narrow  
15 corridor between the levees.  
16 Q Does that narrow corridor back the water up onto some of  
17 our client's property during these significant events?  
18 A Well, it certainly would at all of the events that I've  
19 indicated on this Exhibit 212.  
20 Q Okay. So it's a matter of degree, not kind, is that  
21 correct, when you're talking about the amount of  
22 flooding on the plaintiffs' property?  
23 A That's correct.  
24 Q Let's go on to opinion number 4, the local run-off from  
25 the Nookachamps Creek and other local drainage did not ¶

1 significantly affect flood levels on plaintiffs'  
2 property in 1990. What's the basis of that opinion, Dr.  
3 Mutter?

4 A The flow from Nookachamps Creek itself was not measured  
5 by USGS. There was a gauging station there up through  
6 1978 but which is no longer active, so we didn't have  
7 measurements, but we know from prior study that the

8 flows to be expected from that drainage area, which is a  
9 few square miles, would be very small in relation to the  
10 3,000 square mile drainage area of the Skagit River. So  
11 I think it's that simple. The flows coming off the  
12 local drainages could be very small compared to Skagit  
13 River flows and simply wouldn't influence the flood  
14 levels.

15 Q Maybe you can come here and show the jury on this  
16 Exhibit 199, just to reacquaint them with where this  
17 Nookachamps Creek is, if you can plot it out on Exhibit  
18 199.

19 A This shows -- I need to use the pointless end here.  
20 This is Nookachamps Creek main stem. The basin  
21 is an area something like this. It's -- what used to be  
22 gauged on the east fork, which is actually two separate  
23 locations, but in this approximate vicinity, the gauging  
24 area upstream at that point was about three square  
25 miles, so we're looking probably at a ten square mile ¶

1 area, or something on that order.

2 Q In the Nookachamps Creek area?

3 A In the Nookachamps Creek, and ultimately into the Skagit  
4 River.

5 Q Okay. And during significant flood events such as the  
6 two that happened in '90 and the one that happened in  
7 '95, what direction does the Nookachamps flow?

8 A Actually flows two directions, depending on the  
9 circumstances. Early on local run-off from the  
10 Nookachamps Creek would have the flow going downstream  
11 into Nookachamps Creek and into the Skagit River. When  
12 larger floods approach in the Skagit River, however, and  
13 flood levels go up in the Skagit, the flow can actually  
14 proceed in the opposite direction and go upstream on  
15 Nookachamps Creek.

16 Q That's what happened in the events of 1990 and again in  
17 '95; is that correct?

18 A That's correct.

19 Q Resume the stand, Dr. Mutter.

20 Your fifth opinion and final opinion was that  
21 improvements to the levee system have increased its  
22 strength and reduced the likelihood of levee failure.  
23 Had these improvements not been made, the levees would  
24 have failed in 1990. Such failure would have provided  
25 flood relief for the Nookachamps area. ¶

1 What's the basis of that opinion, Dr. Mutter?

2 A There are several. The basis was my knowledge of  
3 improvements that were made to the levee system by  
4 Skagit County that prevented seepage through the levee  
5 or erosion of the levee.

6 Q What is your knowledge of improvements by Skagit County?  
7 What did you review in that regard?

8 A Reviewed documentation of the projects that was  
9 produced by Skagit County, and they were mostly in the  
10 form of grant applications to Department of Ecology of  
11 projects that were to be built, and also deposition  
12 testimony of Skagit County staff and diking district  
13 staff.  
14 Q And can you give us some of the names of the depositions  
15 that you reviewed?  
16 A Oh, Mr. Nelson and Mr. Brookings at the county, Mr.  
17 Anderson with Diking District 20, Mr. Mapes with Diking  
18 District 12.  
19 Q Did you also review some of the actual project records,  
20 a sampling of those, actual projects that were done?  
21 A A sampling, yes.  
22 Q And can you tell the jury how you many reviewed there?  
23 A Perhaps a dozen.  
24 Q Okay. And can you give the jury an idea of what these  
25 projects were. ¶

1 A Well, they varied. Some of them involved the  
2 construction of a keyway, which was essentially a  
3 cut-off wall on the riverside of the levee so if the  
4 levee were aligned in this fashion there would be a  
5 cut-off wall excavated down beneath the levee to prevent  
6 seepage underneath the levee. To obtain a similar  
7 result, some of the projects put ballast on the back  
8 side of the levee, making the seepage path longer by  
9 adding material to the back side of the levee. Some of  
10 the levees were broadened to achieve the same purpose.  
11 Some of the construction projects involved placement of  
12 riprap on the riverside of the levee to protect them  
13 against erosion.

14 Q Okay. And these projects were during what period of  
15 time?

16 A The ones I looked at that I sampled were in the early  
17 eighties through early nineties, that time frame.

18 THE COURT: Okay. Actually, counsel, we'll take  
19 our afternoon recess at this point.

20 MR. HAGENS: Thank you, Your Honor.

21 THE COURT: All right. We'll take our afternoon  
22 break.

23 (Recess was taken.)  
24  
25