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1           IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON  
2                           IN AND FOR THE COUNTY OF SNOHOMISH  
3  
4 LEONARD and JEANNE HALVERSON,     )  
5 husband and wife, et al.,         )  
6                           Plaintiffs,     )  
7           vs.                             )     No. 93-2-05201-2  
8 SKAGIT COUNTY, a municipal         )  
9 corporation,                         )  
10                           Defendant.     )  
11   )  
12 SKAGIT COUNTY, a municipal         )  
13 corporation,                         )  
14                           Third-Party Plaintiff, )  
15           vs.                             )  
16 STATE OF WASHINGTON,                )  
17                           Third-Party Defendant. )

18  
19                           DEPOSITION UPON ORAL EXAMINATION OF  
20   D. GERALD MUTTER

21  
22   December 19, 1995    9:20 a.m.  
23   1201 Third Avenue, Seattle, Washington

24  
25                           MARK HOVILA, Court Reporter, CSR No. HO-VI-LM-\*493PD

00157

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D. GERALD MUTTER,

having been previously duly sworn, was examined and testified further as follows:

E X A M I N A T I O N

BY MR. SMART:

Q. Mr. Mutter, this is a continuation of your deposition which was begun in October. You're still under oath. Do you understand that?

A. I do.

Q. Okay. Have you performed any work since your last deposition on the question of flood levels along the Skagit River?

A. Yes, I have. We've completed our hydraulic analysis in the Nookachamps area to determine effective levees on water surface elevations in the Nookachamps.

Q. What work did you do since your last deposition?

A. Essentially we concentrated on completing model runs that would simulate conditions in 1990 without the presence of the levees.

21 Q. Is that without the presence of the levee system  
22 as you described it before?  
23 A. No, not entirely. It's without the presence of  
24 the levees that have been constructed by the diking  
25 districts, but left the other civil works in place.

00160

1 Q. Did you generate any documents in that regard?  
2 A. I did. I have some graphical displays and some  
3 tabulations of the results.  
4 Q. Can I see that, please?  
5 A. Yes. This drawing is --  
6 MR. HAGENS: Wait. Why don't you see if he  
7 wants to mark it or something. You have other copies of  
8 this, is that correct?  
9 THE WITNESS: Yes. It's reproducible.  
10 Q. How many of these do you have?  
11 A. That's --  
12 Q. How many documents have you generated?  
13 A. That's the principal one. We have another one  
14 for the condition where there are no highways, railroads,  
15 any improvements at all. But this is the primary visual  
16 that I have.  
17 Q. Can I see the other one?  
18 A. Yes. This is the portrayal of the results of  
19 the analysis with no civil works. Turn of the century  
20 conditions, essentially.  
21 Q. Let's mark this one.  
22 (Exhibit 11 marked)  
23 Q. You also mentioned that you have some tabulated  
24 information?  
25 A. I do. I can explain what each of these is.

00161

1 Once you've marked them, perhaps.  
2 (Exhibit 12 marked)  
3 A. These tabulations are the same information in  
4 three different forms. They've just been sorted three  
5 different ways for ease of reference.  
6 (Exhibits 13 through 15)  
7 A. And I have a copy of our final hydraulic model in  
8 digital form.  
9 MR. HAGENS: Is that the only one you have,  
10 Jerry?  
11 THE WITNESS: It is, yes.  
12 MR. HAGENS: Can you make a copy of it  
13 during lunch or something?  
14 MR. SMART: Okay.  
15 Q. Now that we've marked these exhibits, I'd like  
16 you to identify what Exhibit Number 11 is, if you would,

17 please.

18 A. In our hydraulic modeling, we analyzed water  
19 surface elevations through the Nookachamps reach of the  
20 Skagit River for the case of the 1990 event with existing  
21 conditions, and for the 1990 event without the levees  
22 present. This visual is a presentation of the differences  
23 in the water surface elevations throughout the area  
24 between those two simulations.

25 Q. How did you determine the water surface

00162

1 elevations for the 1990 flood?

2 A. Using our two dimensional numerical model, as we  
3 discussed last time.

4 Q. It was my understanding that you actually used  
5 surveyed reference points of known water surface levels in  
6 order to develop the model. Is that correct?

7 A. That's correct.

8 Q. All right. And where did you get those  
9 reference points?

10 A. Maybe I should ask for clarification as to which  
11 reference points we're talking about.

12 Q. The water surface elevation figures from  
13 observed levels of water during the 1990 flood.

14 A. We had I believe two principal sources of that  
15 information. Some of it came from the federal government,  
16 Corps of Engineers and perhaps the USGS. And we had some  
17 of our own observations which we surveyed ourselves.

18 Q. Do you have a document that identifies the water  
19 surface elevations other than Exhibits 4-G and 4-H to the  
20 Regan deposition?

21 A. Well, I'm sure we do. This is a notation on  
22 computer output of selected water surface high water  
23 marks. But this isn't the source of that information,  
24 this is just a comparison between the high water marks and  
25 our results.

00163

1 Q. And what are the documents where you have  
2 recorded the observed water surface elevations from which  
3 the model was derived?

4 A. Well, some of the high water mark information,  
5 as I mentioned, came from the Corps, so we undoubtedly  
6 have Corps reports or memos or something of that sort, and  
7 we collected some of the high water mark information  
8 ourselves. I believe you already have copies of our  
9 survey notes which indicate how we got that.

10 Q. Okay. Now, Exhibit Number 11, as I understand  
11 it, is a document that shows the difference in water  
12 surface elevations in the Nookachamps at particular points

13 between the 1990 flood as it existed and the 1990 flood as  
14 you say it would have been if the levees were not in  
15 place. Is that correct?

16 A. That's correct.

17 Q. Have you performed an analysis to determine  
18 whether there was any difference in the 1990 flood as it  
19 existed and the 1990 flood as it would have existed if the  
20 levees were in their 1975 condition?

21 MR. HAGENS: Objection as to form. Go  
22 ahead and answer. I object as to the relevancy of that  
23 inquiry.

24 A. I guess the answer is no.

25 Q. You earlier testified in your deposition on

00164

1 October 12th that the model that you had constructed  
2 assumed that the levees were in the same condition in 1990  
3 as in 1975. Is that correct?

4 MR. HAGENS: Object as to form. That is a  
5 mischaracterization of the testimony.

6 A. I believe I indicated that it was my  
7 understanding that the 1975 topography, including levees,  
8 was similar in terms of height to the 1990 condition, but  
9 we actually developed a model based on 1990 information.

10 Q. And your testimony before was that for the  
11 computer modeling that you did for the 1975 flood, it was  
12 based on the identical configuration and height of the  
13 levees as they existed in 1990 because you did not  
14 determine a material difference, is that correct?

15 MR. HAGENS: Objection as to form. Go  
16 ahead and answer the question.

17 A. I think that's nearly correct. We didn't think  
18 it was necessary to model potentially small differences in  
19 '75 and '90 topography.

20 Q. You would agree that any differences between  
21 1975 and 1990 were small?

22 MR. HAGENS: Objection as to form.

23 Q. Is that correct?

24 A. Differences with respect to the levee height or  
25 profile, yes.

00165

1 MR. SMART: Let's mark that.

2 (Exhibit 16 marked)

3 Q. Exhibit 16 is the computer tape of your final  
4 computer model for water surface elevations along the  
5 Skagit, is that correct?

6 A. It's actually a floppy disk, but yes, that's  
7 what it contains.

8 Q. Excuse me. And the final model, does that

9 contain any differences in dike alignment or configuration  
10 between 1990 and 1975?

11 A. As I mentioned earlier, it contains no direct  
12 information about 1975. It's strictly 1990.

13 Q. Have you performed any inquiry or study since  
14 your last deposition to determine whether or not there  
15 were any material changes say between 1955 and 1990 in the  
16 levee height or location as it would have affected water  
17 surface elevations during the 1990 flood?

18 MR. HAGENS: Objection as to form. Go  
19 ahead and answer.

20 A. I'm aware that there's been levee construction  
21 activity in the 1950s and even the early '60s, but whether  
22 or not it pertains to this location, I don't know.

23 MR. SMART: I move to strike as being  
24 non-responsive.

25 Q. My question is, have you performed any

00166

1 investigation since your last deposition to determine  
2 whether or not there are any material differences in the  
3 dikes between 1955 and 1990 that would have affected water  
4 levels in the Nookachamps in the 1990 --

5 MR. HAGENS: Objection as to form.

6 A. I have reviewed historical documents. I'm  
7 sorry, would you repeat the question?

8 Q. Yes. Have you performed any investigation since  
9 your last deposition in October of 1995 to determine  
10 whether or not there are any material changes in the  
11 height and profile of the levees that would have affected  
12 the water surface elevation in the portion of Skagit  
13 County depicted on Exhibit Number 11, assuming the same  
14 flow that you had in 1990?

15 MR. HAGENS: Objection as to form. Go  
16 ahead and answer.

17 A. Would have affected in what way?

18 Q. The water surface elevations.

19 A. We haven't performed any additional hydraulic  
20 analysis of the '75 condition.

21 MR. SMART: Move to strike as being  
22 non-responsive.

23 Q. My question was, did you perform any  
24 investigation to determine if there's been any change in  
25 the dike height or profile or alignment that would make a

00167

1 difference in the water surface elevations given the same  
2 flow of 1990?

3 MR. HAGENS: Objection as to form.

4 A. Well, I guess that would go to the condition of

5 the levees and whether they'd been raised or not. I did  
6 do review of documents to see if there was any evidence of  
7 construction activity that might affect levee heights. So  
8 to that extent, I guess I did further work.

9 Q. And did you determine that there was any change  
10 in the height or profile of the levee that would require a  
11 change in your computer program from what you had  
12 determined before was the correct boundary condition for  
13 the levees?

14 A. No, I did not.

15 MR. HAGENS: Objection as to form.

16 Q. I take it, then, that if you had discovered any  
17 change in the levee height or alignment, that the  
18 differences that you discovered between 1955 and 1990 were  
19 not material enough to change the program that you  
20 developed, is that correct?

21 MR. HAGENS: Objection as to form. Go  
22 ahead and answer.

23 A. You said 1955.

24 Q. Yes.

25 A. We had been discussing '75.

00168

1 Q. No, we'd been discussing '55. I asked you  
2 whether you performed any investigation back to '55 to  
3 determine whether there had been any change in the levee  
4 height or alignment between 1955 and 1990.

5 A. I'm sorry, I misunderstood. I thought you said  
6 1975.

7 Q. Okay.

8 A. I did encounter evidence that there was levee  
9 construction activity, certainly between 1955 and 1975  
10 that very likely raised levee heights. In fact, there was  
11 new levee construction during that period of time. But  
12 whether it would have resulted in higher water surface  
13 profiles, I don't know, I didn't analyze that.

14 Q. Would it be correct to say, then, that as far as  
15 you know, the water surface profiles as they exist for a  
16 given flow in 1990 are the same as they would have been in  
17 1956?

18 MR. HAGENS: Objection as to form.

19 Q. After the last major realignment of levees along  
20 the Skagit River?

21 MR. HAGENS: Objection as to form.

22 A. I think it would be a fair statement to say that  
23 I don't know how the 1955 water surface elevations would  
24 compare to 1975. But I would expect that they would have  
25 been lower.

00169

1 Q. Is that based on any analysis that you have  
2 performed with respect to your computer model?

3 A. No.

4 Q. Is it based on any investigation or study that  
5 you've made?

6 A. Yes, it's based on the history of construction  
7 activity in the area and my knowledge that from the turn  
8 of the century the levees essentially didn't exist, and I  
9 know what the configuration was in 1975. The process of  
10 levee construction and raising seemed to be almost  
11 continuous, so it's very likely that there was a raising  
12 that occurred between 1955 and 1975.

13 Q. Do you have an opinion as to what the difference  
14 in water surface elevations between 1956 and 1975 was for  
15 any geographical location?

16 A. No, I don't.

17 Q. Would it be correct to say that the dike profile  
18 and alignment for 1975, as far as you are concerned, is  
19 materially the same as for 1990?

20 MR. HAGENS: Objection as to form.

21 A. In my opinion, the 1975 levee height profile are  
22 for my purposes the same as the 1990.

23 Q. Would it be correct, then, that under the  
24 conditions imposed by you on the computer model, if you  
25 had the same flow of water in 1975 as you had in 1990, you

00170

1 would expect to have the same water surface elevations, is  
2 that correct?

3 MR. HAGENS: Objection as to form.

4 A. Would you repeat the question, please?

5 Q. Would it be correct to say that under the  
6 computer model that you have generated and the boundary  
7 conditions that you have determined to be material, that  
8 if you had the same flow of water as occurred during the  
9 1990 flood in 1975, you would get the same water surface  
10 elevations at each of the geographical points identified  
11 on Exhibit Number 11?

12 MR. HAGENS: Objection as to form. Go  
13 ahead.

14 A. I think they would have been very close under  
15 those circumstances, yes.

16 Q. Would you agree that they would not have been  
17 materially different?

18 MR. HAGENS: Objection as to form. Go  
19 ahead and answer the question.

20 A. I don't know what that phrase means.

21 Q. Well, to you. The way you understand it.

22 MR. HAGENS: Same objection.

23 A. I think they would have been, for engineering  
24 purposes, the same.

25 Q. Exhibit Number 12 is what, sir?

00171

1 A. This is a portrayal of the differences in water  
2 surface elevation between the 1990 flood conditions and  
3 let's say turn of the century conditions with the 1990  
4 event.

5 MR. SMART: Let's go off the record for a  
6 second.

7 (Discussion off the record)

8 BY MR. SMART:

9 Q. If I understand correctly, sir, Exhibit Number  
10 11 indicates that in your opinion there is a two foot  
11 water surface elevation gain in areas marked by the red  
12 two foot contour line as a result of the levees alone,  
13 leaving aside other civil works. Is that a correct  
14 summation of your testimony with respect to Exhibit Number  
15 11?

16 MR. HAGENS: Objection as to form.

17 A. That's correct.

18 Q. Okay. And going down closer to the Burlington  
19 Northern Bridge, do you contend that these three foot,  
20 four foot, five foot, and six foot lines indicate heights  
21 attributable solely to the levees of those magnitudes for  
22 the 1990 floods?

23 A. They do.

24 Q. Then it's my understanding that Exhibit Number  
25 12 is an indication of your belief as to the increase in

00172

1 water surface levels during the 1990 flood modeling the  
2 condition of the dikes as they existed in 1990 versus the  
3 condition of no dikes at all, is that correct?

4 A. No dikes or any other features such as highways,  
5 railroads, and so on.

6 Q. Would it be correct to say, then, that for areas  
7 downstream of Thillberg Road, both conditions seem to  
8 indicate approximately a four foot rise or greater as you  
9 approach the Burlington Northern Bridge?

10 A. Well, we've actually made a comparison point by  
11 point. If we look at --

12 Q. Let's take 44.

13 A. Point 44.

14 Q. Point 44, there would be a four foot rise in  
15 water without any dikes, is that correct?

16 MR. HAGENS: Any civil works.

17 A. Without any civil works, that's correct.

18 Q. And there is a four foot rise --

19 A. Approximately 3.3 feet with levees only.

20 Q. Does this indicate, then, that there is a lesser  
21 rise with levees only than there was with just civil

22 works?

23 MR. HAGENS: At that point?

24 Q. Yes.

25 A. At that point, that's correct.

00173

1 Q. And you are using the same base elevation for  
2 the purpose of adding this four feet? In other words, if  
3 you subtracted the four feet from each of the exhibits,  
4 Exhibit Number 11 and Exhibit Number 12, you'd get to the  
5 same constant base elevation at a given point, is that  
6 right? A given point, geographical point?

7 A. Well, again these are not contours of  
8 topography, they're contours of differences. Let me ask  
9 you a question by saying that the same model was applied  
10 unchanged to the two conditions.

11 Q. Well, let's assume, then, at point 44 on Exhibit  
12 Number 11 -- Let me ask you this. What is a reasonable  
13 ground elevation to be applied in that geographical point?

14 A. I really can't say offhand.

15 Q. Well, it would be somewhere between 30 and 40  
16 feet, would it not, above sea level?

17 A. That's not unreasonable.

18 Q. Okay. Well, let's assume for the purposes of my  
19 question that the land at point 44 is at 35 feet.

20 A. Okay.

21 Q. Does Exhibit Number 11 tell me that the water  
22 surface elevation during the 1990 flood under the  
23 conditions assumed for Exhibit Number 11 would be 35 feet  
24 plus 3.3 feet?

25 A. No, it doesn't.

00174

1 Q. Does it tell me anything about what how high  
2 above sea level the water surface elevation is?

3 A. No, it doesn't.

4 Q. Okay. Can you figure out from Exhibit Number 11  
5 how high above the sea level the water surface elevation  
6 is at point 44 on Exhibit Number 11?

7 A. No. What's missing here is the absolute  
8 elevations water surface contours that you were inquiring  
9 about earlier. These contours are strictly differences in  
10 water surface elevations of two different conditions.  
11 There's no absolute information about elevations.

12 Q. What is the constants against which they are  
13 measured if it's not the height above sea level of the  
14 land itself?

15 A. The constant is the 1990 existing condition  
16 water surface elevation at each point. In other words, in  
17 Exhibit 11, water surface elevations are compared to 1990

18 existing conditions. And in Exhibit 12, for that  
19 hypothetical condition, water surface elevations are also  
20 compared to 1990 existing conditions.

21 Q. What existing conditions are you comparing in  
22 Exhibit Number 11 and Exhibit Number 12? What's the  
23 condition?

24 A. 1990 topography and 1990 flood event.

25 Q. Well, how high do you say the water was at point

00175

1 44 on Exhibit Number 11 during the 1990 flood event

2 against which --

3 MR. HAGENS: He doesn't --

4 A. That information's not portrayed on either of  
5 these drawings.

6 MR. HAGENS: For the third time.

7 A. It's inherent in our analysis, but it's not  
8 shown on the drawings.

9 Q. Well, can you tell me as you sit here today  
10 whether it is the height on Exhibit Number 11 is measured  
11 against a water level or against a land level?

12 A. I'm sorry, the height of what?

13 Q. Is it measured against the height of some flow  
14 of water or is it measured against the height of some land  
15 object?

16 A. Is what measured against --

17 Q. The three feet. The 3.3 feet at point 44 on  
18 Exhibit Number 11.

19 MR. HAGENS: This has been asked and  
20 answered.

21 A. Perhaps I could communicate it a little better.  
22 We performed an analysis for the 1990 topography and the  
23 1990 flood event and essentially produced a set of water  
24 surface elevations throughout the Skagit River and the  
25 Nookachamps area, a surface, a solution surface for the

00176

1 1990 event.

2 Q. Where is that?

3 A. That's not portrayed on this drawing.

4 Q. Okay. Where is it?

5 A. In fact, I'm not sure we have a hard copy.

6 MR. HAGENS: Is it on the computer thing?

7 A. It could be generated from the computer  
8 information, it might well be on there. I'm not sure what  
9 we brought. Then we computed another surface which  
10 corresponds to the same flood event, but no levees. And  
11 we compared the two surfaces. So the basis for comparison  
12 is the 1990 solution surface.

13 And Exhibit 12, we computed a third surface

14 that corresponds to the 1990 event with no civil works at  
15 all and compared that to the same baseline condition of  
16 the 1990 event. And what we've plotted in both cases is  
17 the difference between the solution surfaces as opposed to  
18 some absolute level associated with the ground or the  
19 water surface or anything else.

20 Q. Okay. Well, what is the level, for instance at  
21 point 44, for the 1990 flood? What's the water surface  
22 level?

23 A. I can't tell you that based on the information  
24 in these drawings. There are several thousand elements  
25 across the model and there's a solution, a water surface

00177

1 elevation computed at each one of those.

2 MR. SMART: Well, Carl, I'm going to need  
3 to see these in order to be able to --

4 MR. HAGENS: It's all in the computer  
5 model.

6 MR. SMART: But I can't get a map or a  
7 diagram that produces that. He says he's done it, but  
8 it's not on this drawing, and I need to have a drawing so  
9 I can compare these elevations.

10 MR. HAGENS: Drawing of what?

11 MR. SMART: Drawing like this that shows  
12 what he's comparing it to. The water surface profile.

13 MR. HAGENS: He's already told you what  
14 he's compared it to. He took the '90 water surface  
15 elevations and then merely took in, either took out levees  
16 or took out everything, and then he says what's the effect  
17 on the water elevation levels. Why do you have to make it  
18 more complicated than that?

19 MR. SMART: Carl, I'd like to see the  
20 absolute elevations.

21 MR. HAGENS: Well, it's all on the computer  
22 stuff.

23 MR. SMART: Okay. Well, let's go into  
24 that.

25 Q. Mr. Mutter, how do I get one of these maps out

00178

1 of your computer disk? Would you do it for me? Let's ask  
2 it that way.

3 A. Am I capable?

4 Q. Yes.

5 A. Certainly.

6 Q. How long would it take?

7 A. No more than a couple of days. Hourwise or  
8 time, absolute timewise?

9 Q. Well, absolute timewise.

10 A. No more than a couple of days. You have, I  
11 believe, last time we met, you had a smaller copy of our  
12 1990 water surface computations.

13 Q. Are you talking about Exhibits 4-G and 4-H to  
14 the Regan deposition?

15 A. I believe so. I wonder if I could see those,  
16 please.

17 Q. Okay.

18 A. This is essentially what you're asking for, I  
19 believe. It might be in a slightly preliminary form. But  
20 these are contours of water surface elevation.

21 MR. HAGENS: You're talking about 4-G and H  
22 to the Regan deposition?

23 THE WITNESS: That's correct. 4-G.

24 Q. Now, so if we take a point such as 44 on Exhibit  
25 Number 11, have you got that located?

00179

1 A. Well, very crudely.

2 Q. What does Exhibit 4-G to the Regan deposition  
3 indicate that the water surface level during 1990 in that  
4 area was?

5 A. This would indicate a water surface elevation in  
6 the range of 40 to 40.5 feet.

7 Q. Okay. So assuming that it's 40 feet, is the  
8 import of Exhibit Number 11 to say that the top 3.3 of  
9 those feet is attributable to simply the levees?

10 A. Yes.

11 Q. Is the import of Exhibit Number 12 to say that  
12 the top four feet of that 40 feet is attributable to the  
13 other civil works other than levees?

14 A. No, the top four feet would be attributable to  
15 all of the works, including the levees.

16 Q. Well, you indicated earlier that Exhibit Number  
17 12 indicated a depiction of all civil works other than the  
18 levees. Is that not correct?

19 A. If I did, that's not correct.

20 MR. HAGENS: He didn't say that.

21 A. Perhaps I could try and estimate an absolute  
22 elevation for these two cases. That might help us  
23 communicate. If the water surface elevation at point 44  
24 were on the order of 40 feet in 1990, levees present, all  
25 other civil works present, if we took out all

00180

1 improvements, the water surface elevation we predict for  
2 that same elevation would be on the order of 36 feet, 4  
3 feet below 40. If we took out levees only, the water  
4 surface elevation would be on the order of 36.5.

5 In other words, the first half foot of rise

6 from the no development condition could be attributed to  
7 roads, railroads, highways, and so on. And the next three  
8 and a half feet are attributable to the levees alone at  
9 that point.

10 Q. Have you performed a water surface profile  
11 taking out levees, but no other civil works?

12 A. Yes. And the results of that analysis are  
13 Exhibit 11.

14 MR. HAGENS: Right there on Exhibit 11, as  
15 he said earlier.

16 Q. And it's your statement then that Exhibit Number  
17 11 does include all other civil works other than the  
18 levees, is that right?

19 MR. HAGENS: That's what he just said about  
20 five times, Will.

21 A. Yes. That's correct.

22 MR. SMART: Carl, if you've got an  
23 objection, make it.

24 MR. HAGENS: It's repetitious.

25 MR. SMART: He's testified in several

00181

1 different fashions with respect to these diagrams. And  
2 it's --

3 MR. HAGENS: I know it's complicated, but I  
4 do think we have to move along.

5 MR. SMART: We'll be moving along, Carl,  
6 when I get ready to move along. If you want to get into a  
7 wrangle about this, that's fine, we can do go down and --

8 MR. HAGENS: I know this stuff can be a  
9 little bit confusing, and so I guess I'm coming along too  
10 strong, but I do think we should make an effort to  
11 understand what he's saying.

12 Q. Did you make any drawing that shows the water  
13 surface profiles with the dikes and the other civil works  
14 as they existed at any time prior to 1990?

15 A. Just of the turn of the century condition, when  
16 there were neither kind of improvement. No levees --

17 Q. Where is that drawing?

18 A. That's Exhibit 12.

19 Q. Did you make any drawing that showed the water  
20 surface elevations taking into account the existence of  
21 actual levees and actual civil works at any time between  
22 the turn of the century and 1990?

23 A. No, I did not.

24 Q. It would therefore be impossible to determine  
25 from either Exhibit 11 or Exhibit Number 12 what the

00182

1 incremental increase in water surface elevation would be,

2 if there were any, between any point after 1900 and 1990?  
3 Would that be correct? Do you want me to rephrase the  
4 question?

5 A. The results of Exhibits 11 and 12 don't provide  
6 any information about the effects of works as they might  
7 have existed between the turn of the century and 1990.

8 Q. Okay. Did you compute the water surface profile  
9 for any of the plaintiffs' locations shown on Exhibit  
10 Number 11 for 1951 --

11 A. No.

12 Q. -- and that flood? Why not?

13 A. I had no reason to.

14 Q. Did you make any determination other than by  
15 computation as to what the water surface profiles were for  
16 any of the plaintiffs' properties during the 1951 flood?

17 A. Would you repeat the question, please?

18 Q. Yes. Did you make a determination what the  
19 water surface elevation was on any plaintiff's property  
20 during the 1951 flood?

21 A. No, I did not.

22 Q. Did you use any information of any sort to make  
23 a determination as to what the water surface elevation was  
24 at any of the plaintiffs' properties during the 1951  
25 flood?

00183

1 A. I reviewed historical information about what  
2 water surface elevations were or depths of flooding were.  
3 I didn't perform any analysis on my own.

4 Q. What information did you review to determine  
5 what the depth of flooding was during any floods prior to  
6 1990?

7 A. I don't recall offhand what documents I saw.  
8 They were I believe identified in the list of evidence  
9 that was submitted earlier this month.

10 Q. Let's try point number 26. Can you find that?  
11 As I understand your Exhibits 13 through 15, that's the  
12 properties of Don and Barbara Austin, is that correct?

13 A. I believe so.

14 Q. Okay. Can you tell me from Exhibit Number 11  
15 and Exhibit Number 4-G and H to the Regan deposition what  
16 the approximate water surface elevation was at the Austin  
17 property during the 1990 flood?

18 MR. HAGENS: You mean the crest of the  
19 flood?

20 Q. That's what you're showing as the peak water  
21 elevation, is it not?

22 A. Yes, that's correct. I believe the peak water  
23 surface elevation was on the order of 41.2 feet at that  
24 site in 1990.

25 Q. Did you review any historical documents to

00184

1 determine what water surface elevation there was at that  
2 point during any previous flood?

3 A. I don't recall that specific site.

4 Q. Well, did you make a determination as to the  
5 water surface elevation for any particular site during a  
6 previous flood?

7 A. Well, in general I had no need to. My charge  
8 was to determine how much difference the levees made for  
9 the 1990 event and I went directly to that.

10 Q. But that's as compared to a no levee situation  
11 or just public works situation, correct?

12 MR. HAGENS: Public works situation?  
13 Object to the form of the question.

14 Q. I'll rephrase the question. You never compared  
15 the water surface elevations at any geographical point  
16 during 1990 versus the water surface elevations that would  
17 have existed during any previous year with the levees that  
18 existed in that year, did you?

19 A. Well, again, I had no reason to do that. The  
20 question I thought I was answering was what was the effect  
21 of the levees in 1990. So I had no reason to look at the  
22 early years. That provided no additional information for  
23 me.

24 Q. The answer to my question is you didn't do it,  
25 correct?

00185

1 A. That's correct.

2 Q. Now, did you ever seek any information  
3 concerning what the water levels had been on the Austin  
4 property during the previous year?

5 A. Not that property specifically, no.

6 Q. If you had done it for any property, what  
7 documents would you have consulted?

8 A. Generally the source of information like that is  
9 flood summaries published by the Corps of Engineers or by  
10 the County itself. Public agencies of one sort or another  
11 who would have recorded that during the course of flood  
12 fighting or follow-up damage assessments.

13 Q. Do you have an point as to how much variation  
14 there can be in flood surface elevations at a particular  
15 geographical point owing to the peculiar dynamics of an  
16 individual flood?

17 A. You'll have that to expand on that a little for  
18 me.

19 MR. HAGENS: Object to the form.

20 Q. Do you agree that each flood has its own  
21 dynamics?

22 MR. HAGENS: Object to the form. Go ahead  
23 and answer the question if you understand it.  
24 A. I'm afraid I don't.  
25 Q. Do you agree that some floods are the result of

00186

1 more rainfall as opposed to others?  
2 A. Sure.  
3 Q. Do you agree that flooding, for instance, in the  
4 upper Nookachamps basin might be more influenced by the  
5 rainfall that occurred on Cultus Mountain and the land  
6 to the southwest of the north Cascades?  
7 A. In the case of large floods like 1990, I think  
8 the localized effects are minimal.  
9 Q. Well, that's what I'm trying get at. What are  
10 the localized effects? How much?  
11 A. I think there would be no measurable effect in  
12 the 1990 event.  
13 Q. Have you sought to study what the localized  
14 effects would be for any two floods or series of floods,  
15 so that you could come up with a determination as to  
16 whether or not there is a difference, depending on which  
17 flood it is and what the dynamics of the particular floods  
18 are?  
19 MR. HAGENS: I'm going to object. The  
20 question is very compound and vague.  
21 Q. I'll rephrase it. Have you performed any  
22 analysis as to the differences in localized effects for  
23 any particular floods or series of floods?  
24 MR. HAGENS: Lack of foundation. Objection  
25 as to form. Go ahead and answer the question.

00187

1 A. We looked at the local runoff, I believe in the  
2 1990 event in Nookachamps Creek to determine whether it  
3 would play a significant role in water surface elevations  
4 and therefore whether it needed to be included in the  
5 model. We concluded that it wasn't necessary because the  
6 runoff, the peak happened considerably earlier than the  
7 peak in the Skagit. Essentially the effects were gone by  
8 the time the Skagit peak came along. In addition to that,  
9 the magnitude of Nookachamps Creek inflows was too small  
10 to have any significant influence. We included --  
11 Q. How much --  
12 MR. HAGENS: Let him finish.  
13 A. We included Nookachamps Creek in the model in  
14 any case because we thought it would, the question would  
15 arise as to why we didn't if we didn't include it.  
16 Q. So how much did that contribute to water levels  
17 in the upper Nookachamps basin during the 1990 flood?

18 A. As I say, I think there's no measurable effect  
19 of local inflows.

20 Q. You would agree, would you not, that the  
21 Nookachamps Creek continues to fill out the upper  
22 Nookachamps basin and that that water cannot escape as  
23 long as the Skagit River water is also coming in under the  
24 bridge at Highway 9?

25 A. As I mentioned, the bulk of runoff from --

00188

1 Q. Answer the question that I asked you first,  
2 please. Would you agree that that is so?

3 A. I would agree that some flow from the  
4 Nookachamps, the tail end of the flood hydrograph from the  
5 Nookachamps, would continue to come into the Nookachamps  
6 area, but that volume of contribution compared to the  
7 volume in the Nookachamps area that comes from the Skagit  
8 is miniscule.

9 Q. How much is it?

10 A. I don't have a number as we sit here today.

11 Q. Well, what's the increase in water surface  
12 elevation in the upper Nookachamps as a result of that  
13 Nookachamps water?

14 A. It's immeasurable. I would say less than a  
15 hundredth of a foot.

16 Q. And that's based on what analysis?

17 A. Based on the analysis I mentioned earlier about  
18 the timing and volume of Nookachamps Creek inflows  
19 compared to the volume of the Nookachamps basin.

20 Q. So in your opinion, then, people living in the  
21 Nookachamps basin experience water surface elevations that  
22 are attributable solely to the Skagit runoff as opposed to  
23 the Nookachamps Creek runoff, is that correct?

24 A. I didn't say that. The people in the  
25 Nookachamps basin undoubtedly see water on their

00189

1 properties from time to time to comes from the Nookachamps  
2 Creek or other local runoff, but if there's a major event  
3 in the Skagit system, generally later in the sequence of  
4 things, the Skagit levels are much higher and it's  
5 essentially irrelevant that there was water locally from  
6 the Nookachamps prior to the Skagit peak.

7 Q. So would it be correct to say then that people  
8 in the Nookachamps, if they experience a flood of say  
9 magnitudes between 130,000 and 150,000 cfs, and that gives  
10 them a certain water surface elevation during one flood,  
11 they would expect to see approximately that same water  
12 surface elevation during the next flood of the same  
13 magnitude, is that correct?

14 A. I believe so.  
15 Q. Have you made any calculation of the amount of  
16 water that emergency sandbagging of Highway 20 had with  
17 respect to the 1990 flood?  
18 A. Are you asking how high the water got with  
19 respect to the --  
20 Q. I'm asking if you made any calculation with  
21 respect to the effect of that emergency sandbagging on  
22 water surface elevations at any point.  
23 MR. HAGENS: You mean since his last  
24 deposition?  
25 MR. SMART: He hadn't done any calculations

00190

1 up to the point of the last deposition, so I assume, Carl,  
2 that it would have to have been done since the last  
3 deposition, if you'd done it at all.  
4 Q. Am I correct in that assumption, sir?  
5 A. I'm not sure I followed that conversation, I'm  
6 sorry.  
7 MR. HAGENS: Well, he's just being unhappy  
8 this morning. Want to take a little break? You're a  
9 little restless this morning.  
10 MR. SMART: Maybe that's a good idea, Carl.  
11 MR. HAGENS: Do you want to --  
12 MR. SMART: I want to ask him this question  
13 first.  
14 Q. It was my understanding from your previous  
15 testimony, Mr. Mutter, that you had not performed any  
16 analysis to determine what increase in water surface  
17 elevations there would have been by the emergency  
18 sandbagging of Highway 20. Am I correct in recollecting  
19 your testimony in that regard?  
20 A. I don't think that is correct. What we did do  
21 was assume for our purposes that there was no overflow at  
22 the sandbagging and flood fighting location and computed  
23 water surface elevations in the study reach. Those water  
24 surface elevations in the vicinity of SR 20 would indicate  
25 there would be an overflow. And presumably that's what

00191

1 was prevented by the placement of sandbags.  
2 Q. Are the water surface elevations in Exhibit  
3 Number 11 made with the assumption that there is overflow  
4 of Highway 20 or not?  
5 A. Let me clarify that these aren't water surface  
6 elevations on this drawing, but difference contours. But  
7 that analysis was made with the assumption that there was  
8 not a significant overflow at SR 20.  
9 Q. Well, was there any overflow in the assumptions

10 that went into production of Exhibit Number 11?

11 A. At SR 20?

12 Q. Yes.

13 A. It was assumed to be zero.

14 Q. So it would be correct to say, then, that the  
15 water surface elevations shown in Exhibit Number 11 were  
16 affected to some degree or another by the temporary  
17 sandbagging of Highway 20 because you're assuming that  
18 that effort is effective and prevents the water from  
19 flowing to the northwest of Highway 20, is that correct?

20 A. That's correct.

21 Q. Okay. What increase in water surface elevation  
22 is attributable to there being no overflow of Highway 20?

23 MR. HAGENS: Increase? Objection as to  
24 form.

25 Q. I'll restate it. How much of the increase in

00192

1 water surface elevation shown on Exhibit Number 11 is  
2 attributable to is there being no overflow of Highway 20?

3 MR. HAGENS: Objection as to form. Go  
4 ahead and answer the question.

5 A. I think the amount of increase would be small.

6 Q. Have you calculated it?

7 A. Well, I believe we have, manually.

8 Q. When did you do that?

9 A. During the course of developing the model to  
10 decide whether or not we needed to impose a boundary  
11 condition on that location. The depths of overflow would  
12 be very small, it's a paved highway, so essentially what  
13 that does is provide a broad crested weir, which would  
14 limit the outflows at a very shallow depth to quite small  
15 discharges compared to the 150,000 or so going down the  
16 Skagit. So I think it wouldn't have a material effect on  
17 the water surface elevations as we computed them in our  
18 model.

19 Q. Wouldn't it depend on the height of the  
20 sandbags?

21 A. No, in the absence of the sandbags, the amount  
22 of flow that could leave the system at that point  
23 certainly would be enough to be bothersome to the local  
24 residents, but it wouldn't have a significant effect on  
25 the flow that remains in the Skagit River as left behind

00193

1 there, and the water surface elevations, in my  
2 point, wouldn't be very different, even if outflow over  
3 the highway were allowed.

4 Q. How did you calculate the amount of overflow  
5 that could go over Highway 20 if it were not temporarily

6 sandbagged?

7 A. I believe we made a relatively standard  
8 engineering calculation based on the height of water, the  
9 geometry of the highway, and as I mentioned, it would act  
10 as a broad crested weir. The hydraulic properties of that  
11 kind of structure are well known. We were able to  
12 estimate the discharge.

13 Q. And what was the discharge that would have gone  
14 over Highway 20 if it hadn't been temporarily sandbagged  
15 during the 1990 flood?

16 A. I don't recall.

17 Q. Okay. Do you have an estimate? What order of  
18 magnitude? How many cfs?

19 A. I really don't.

20 Q. Do you know at what level of discharge water  
21 starts flowing over Highway 20?

22 MR. HAGENS: Measured where?

23 Q. At Highway 20.

24 A. Maybe I could answer your question this way. I  
25 would expect that the loss of flow across SR 20 from the

00194

1 Skagit River system would very likely be less than a  
2 percent of the total discharge. So perhaps less than 1500  
3 cfs.

4 Q. And that's based on what assumptions? Or what  
5 analysis?

6 A. It's based on my engineering judgment as we sit  
7 here today. But I'm sure we did make a calculation that's  
8 considerably more refined than that.

9 Q. Okay. So your opinion is that the amount of  
10 water that could escape across Highway 20 during a  
11 154,000 cfs flood such as occurred in 1990 would be less  
12 than 1500 cfs, is that your testimony?

13 A. I think that's a reasonable number. It  
14 certainly wouldn't be more than a percent or two of the  
15 total Skagit River discharge.

16 Q. All right. Now, the answer to the question I  
17 started out with, have you made a calculation showing what  
18 the effect of the temporary sandbagging of Highway 20 is  
19 on the water surface elevations during the 1990 flood?

20 MR. HAGENS: I thought he answered that.

21 A. We have essentially determined that there is no  
22 effect, no measurable effect.

23 Q. And have you made a specific calculation showing  
24 that?

25 A. I believe we did.

00195

1 Q. Okay. Can you show it to me?

2 A. No.  
3 Q. Why not?  
4 A. I didn't bring the records. I thought you had  
5 copied everything you were interested in and brought it  
6 with you, so --  
7 MR. HAGENS: Are they part of the records  
8 we turned over earlier? We turned over your entire work  
9 product earlier.  
10 MR. SMART: And his earlier testimony was  
11 he hadn't made such a calculation. Now he says he has.  
12 So I'm going to demand that that be produced to me.  
13 Okay, let's take the break.  
14 (Recess)  
15 BY MR. SMART:  
16 Q. Mr. Mutter, you indicated that the water surface  
17 elevation of the Austin property during the 1990 flood was  
18 approximately 41.2 feet. And what I'd like you to do now  
19 is give me a couple of other points like for Johnson and  
20 Halverson, if you would, please. Johnson is point  
21 number --  
22 A. 37.  
23 Q. -- 37 on Exhibit Number 11?  
24 A. Yes.  
25 Q. The water surface elevation there that you

00196

1 computed as a result of your computer model was what?  
2 A. Again, it's somewhat difficult to locate the  
3 property precisely, but I would estimate the water surface  
4 elevation there to be at 40.8 feet.  
5 Q. During the 1990 flood?  
6 A. Yes.  
7 Q. And how about for Mr. Halverson's property?  
8 A. Halverson's property is indicated as point 81.  
9 In 1990 the water surface elevation might have been on the  
10 order of 41.3 feet.  
11 Q. That's based on your best estimate and the  
12 document Exhibit Number 4-H to Mr. Regan's deposition?  
13 A. Yes.  
14 Q. Would it be correct to say that you have not  
15 determined what the water surface elevations for the water  
16 at those properties were for any earlier flood?  
17 A. We did analyze the turn of the century condition  
18 for the 1990 event, but we didn't simulate earlier events,  
19 that's correct.  
20 Q. Well, there was a flood, for instance, in 1896,  
21 which is about the turn of the century. Can you telling  
22 me what the water surface elevation at Mr. Johnson's  
23 property was in 1896?  
24 A. No.  
25 Q. Can you do that for Mr. Halverson or Mr. Austin?

00197

1 A. No.

2 Q. Is that because you haven't sought to determine  
3 what those water surface elevations were?

4 A. That's correct.

5 Q. Okay. You just told me that Mr. Johnson's water  
6 surface elevation in 1990 was 40.8 feet, correct?

7 A. I believe so.

8 Q. All right. Now, if you would the same flow of  
9 the Skagit River as you had in 1990, during the 1975  
10 event, would you have expected the water surface elevation  
11 at Mr. Johnson's house to be 40.8 feet in 1975?

12 MR. HAGENS: Objection as to form.

13 A. I would expect the water surface elevation to be  
14 on that same order. There could be slight differences  
15 owing to differences in the river geometry or levees or  
16 anything else.

17 Q. According to your computer model, you would get  
18 the same water surface elevation in 1990 and 1975 for Mr.  
19 Johnson's property, wouldn't you?

20 A. That's correct.

21 Q. Okay. And if you had the same flow in 1975 as  
22 you had in 1990, would you also expect the water surface  
23 elevation level at the Halverson property to be 41.3 feet  
24 in 1975?

25 A. Yes.

00198

1 Q. And if you had the same flow in 1975 as you had  
2 in 1990, would you also expect the water surface elevation  
3 at the Austin property to be 41.2 feet?

4 A. Yes, I would.

5 Q. What information did you rely on to determine  
6 what the flood flows were for the 1990 flood?

7 A. There are a variety of sources, including the  
8 U.S. Army Corps of Engineers and the U.S. Geological  
9 Survey. Those are the primary sources.

10 Q. Is the U.S. Geological Survey often referred to  
11 as USGS?

12 A. Yes, it is.

13 Q. Do they get their information from the riverside  
14 gauge just downstream from the Burlington Northern Bridge?

15 A. Yes, they do.

16 Q. And did you use that information in determining  
17 what the flood flow was for 1990?

18 A. Yes.

19 Q. Do you believe that to be accurate and reliable?

20 A. Yes.

21 Q. Do you know of any flood engineer that does not

22 utilize the USGS information generated from the riverside  
23 gauge to study flood flows in the Skagit River in this  
24 area?

25 A. I guess I have no knowledge one way or the

00199

1 other.

2 Q. Did you use the USGS information from the  
3 riverside gauge for the purpose of determining flood flows  
4 for the 1975 flood?

5 A. Yes.

6 Q. And for any previous flood that you studied on  
7 the Skagit, would that also be correct?

8 MR. HAGENS: Objection as to form. Go  
9 ahead and answer the question.

10 A. I don't recall. Probably we used values that  
11 were published by the Corps of Engineers or USGS  
12 themselves, and I presume they came from that same site.

13 Q. The values that are published by the Army Corps  
14 of Engineers for flood flows during any particular year  
15 come from the USGS gauge, do they not?

16 A. It depends on which location you're talking  
17 about.

18 Q. Well, I'm talking about the location of the  
19 riverside, just downstream from the Burlington Northern  
20 Bridge.

21 A. That location of the river?

22 Q. Yes.

23 A. For discharges at that location, yes, they would  
24 come from that source.

25 Q. And when one refers to 154,000 cfs flood which

00200

1 has been widely attributed to this particular flood, we're  
2 talking about that particular gauge, are we not, the  
3 riverside gauge just downstream from the Burlington  
4 Northern Bridge?

5 A. Yes.

6 Q. Now, you earlier indicated that your model would  
7 calculate the water surface elevation for previous floods  
8 on the Skagit River if you just plugged in the amount of  
9 flow, is that right? In other words, you could take the  
10 1975 flood, which was on the order of 130,000 cfs, and  
11 plug it into your model and get water surface elevations,  
12 correct?

13 A. Yes.

14 Q. All right. And could you do that with any  
15 previous flood?

16 A. Yes, we could.

17 Q. Have you done it for any other floods?

18 A. No.  
19 Q. That occurred on the Skagit River?  
20 A. No.  
21 Q. What would be necessary in order to compute  
22 water surface elevations for floods prior to 1975? How  
23 would you do it?  
24 A. We would need to know the geometry of all of the  
25 hydraulic controls, which would include levee profiles,

00201

1 roads, railroads, any other civil works.  
2 Q. You haven't sought to compute that geometry,  
3 have you?  
4 A. Not prior to 1975, that's correct.  
5 Q. What changes did you make in your computer  
6 program, which is on the floppy disk Exhibit Number 16,  
7 between your last deposition in October and the present  
8 time?  
9 A. Essentially none.  
10 Q. You earlier indicated that you had made some  
11 changes, I thought.  
12 MR. HAGENS: I object to the  
13 characterization.  
14 Q. Well, it was my understanding from your previous  
15 testimony that there had been some changes. Was that my  
16 error, or were there some refinements that were made?  
17 MR. HAGENS: Objection to the form of the  
18 question. Go ahead and answer.  
19 A. Let me answer by saying that the basic model,  
20 the topography, the boundary conditions, everything that  
21 creates the basic structure of the model, is identical  
22 with that which you already have. In order to get a  
23 solution for those boundary conditions, or any given set  
24 of boundary conditions, because of the complexity of the  
25 hydraulics, one has to actually perform a stepwise series

00202

1 of analyses to get to the final condition. That's the  
2 process that we went through since October for the results  
3 that you see here today. So we actually performed the  
4 complete hydraulic analysis during the interim since we  
5 last met. But the model is unchanged.  
6 Q. Exhibit Number 11, as I understand it, is the  
7 diagram that shows the effect of the dikes only, is that  
8 correct?  
9 A. Yes, that's correct.  
10 Q. Does that include the diking district 20 dike?  
11 MR. HAGENS: Objection as to form. Are you  
12 representing there is a dike in diking district 20 of any  
13 consequence?

14 Q. Go ahead and answer the question.  
15 MR. HAGENS: Are you making that  
16 representation?  
17 Q. Go ahead and answer the question.  
18 MR. HAGENS: Are you making that  
19 representation?  
20 MR. SMART: Have you got an objection,  
21 Carl?  
22 MR. HAGENS: Yes, I do.  
23 MR. SMART: Is it to the form of the  
24 question?  
25 MR. HAGENS: I think you have an ethical

00203

1 responsibility to assert to the witness --  
2 MR. SMART: I'm quite sure you're going to  
3 be very well qualified to instruct other lawyers on  
4 ethical questions, but right now I'd like to know if you  
5 have an objection to the form of the question. If not,  
6 quiet down, please.  
7 MR. HAGENS: I do. And I won't take  
8 instructions from you like that or we're going to leave.  
9 MR. SMART: Good.  
10 MR. HAGENS: Did you say good?  
11 Q. Now would you answer the question, please?  
12 A. Would you repeat the question, please.  
13 Q. Yes. Do your boundary conditions take into  
14 account the diking district 20 dike?  
15 MR. HAGENS: Same objection.  
16 A. The model takes into account all of the levees  
17 within the model boundaries that were in existence in  
18 1990.  
19 Q. And does that include the diking district 20  
20 dike?  
21 A. I can't say.  
22 Q. Who would know that?  
23 A. We would have to go back to source documents and  
24 identify where the boundaries are. The diking district  
25 boundaries were not of particular interest to us.

00204

1 Q. How did you get your geographic boundaries for  
2 the dikes?  
3 A. We obtained planned alignment of the dikes from  
4 mapping that was provided by the Corps of Engineers, and  
5 the levee profiles we also obtained from the Corps. I  
6 don't believe they distinguished from diking district to  
7 diking district on their surveys. And we certainly  
8 weren't interested in the political boundaries. It was  
9 not relevant to our analysis.

10 Q. On Exhibit Number 11, are there any dikes  
11 actually shown or can you not tell that from Exhibit  
12 Number 11 as to what constitutes a dike?

13 A. The topography is not shown on this drawing,  
14 just as water surface contours are not shown. These are  
15 again contours of differences in water surface elevation.  
16 Where there's a discontinuity in those contours is where  
17 the dikes would be located. So there are lines where the  
18 contours go from positive numbers to negative numbers, and  
19 that would be the line that the dikes --

20 Q. So your Exhibit Number 11, for instance, shows no  
21 dike on the south side of the Skagit River, correct?

22 MR. HAGENS: Objection as to form.

23 A. Again, the dikes are not explicitly shown, but  
24 this would indicate that there are dikes, for example, on  
25 the south bank between the Burlington Northern Bridge and

00205

1 I-5 and downstream.

2 Q. Does Exhibit Number 11 show the existence of any  
3 dikes on the south side of the Skagit River upstream from  
4 the Burlington Northern Bridge?

5 MR. HAGENS: Objection as to form.

6 A. It's possible. The boundaries are a function of  
7 topography. If the topographic limit in any particular  
8 direction happened to coincide with a levee, then that  
9 would indicate the levee alignment.

10 Q. Can you tell me from your review of Exhibit  
11 Number 11 whether or not it shows any dikes on the south  
12 side of the Skagit River upstream from the Burlington  
13 Northern Bridge?

14 MR. HAGENS: Objection as to form. The  
15 exhibit doesn't show any topographical features. You  
16 continue to mischaracterize the exhibit. Go ahead and  
17 answer.

18 A. I can't identify from this exhibit where the  
19 dikes are.

20 Q. Okay. And you don't remember whether or not  
21 there are any dikes included on the south side of the  
22 Skagit River upstream from the Burlington Northern Bridge  
23 in your boundary conditions, is that correct?

24 MR. HAGENS: Objection as to form. What  
25 kind of dikes are you talking about, counsel?

00206

1 MR. SMART: Any dikes.

2 MR. HAGENS: A half a foot dike, a half  
3 foot tall? Foot tall? What kind of a dike are you  
4 talking about?

5 Q. Go ahead and answer the question, sir.

6 A. I know that if there were any significant dikes  
7 present in the upstream portion of the model that we  
8 represented them in the model topography.

9 Q. What constitutes, in your opinion, significant?  
10 How high?

11 A. That would depend on the surrounding topography.  
12 I don't have an answer to that question.

13 Q. Who was responsible for identifying which dikes  
14 to include in the boundary conditions and which ones not  
15 to?

16 A. Well, there were three of us who worked, had  
17 hands-on involvement in the development of the model.  
18 Other than myself there was Robert Elliott and Evan  
19 Twombly. Could have been any of the three of us.

20 Q. Is what you're telling me you just don't  
21 remember as you sit here today who was responsible for  
22 determining what dikes to include in the boundary  
23 conditions?

24 A. It wasn't a matter of which dikes to include, it  
25 was a matter of defining the model boundary according to

00207

1 the local topography. And if the dike happened to be the  
2 logical point to end the model, then a judgment was made.  
3 That doesn't say who made those decisions inch by inch as  
4 we go around the model boundary, however.

5 Q. Did you use any documents to determine what the  
6 water level was at any given property for a previous  
7 flooding event? And when I say previous, I mean previous  
8 to 1990.

9 A. We made no use of such information directly in  
10 our modeling, no.

11 Q. Did you review any documents that gave the flood  
12 surface elevations for previous floods that you found to  
13 be reliable?

14 A. We saw a considerable amount of information  
15 about water surface elevations in prior floods, some of  
16 which was reliable, I'm sure.

17 Q. And which information do you say is reliable  
18 concerning the water surface elevations for floods prior  
19 to 1990?

20 A. As to specific events, and so on?

21 Q. Yes.

22 A. I can't cite specific examples today.

23 Q. Do you have any dispute, for instance, with the  
24 Army Corps of Engineers information with respect to water  
25 surface profiles for previous flood events?

00208

1 A. Nothing significant, I'm sure.

2 Q. If the Army Corps of Engineers published  
3 information showing water surface elevations at particular  
4 properties during previous floods, would you accept that  
5 as being accurate?

6 A. Probably.

7 Q. You yourself did not attempt to survey any water  
8 surface elevations from previous floods prior to 1990, did  
9 you?

10 A. No, we did not.

11 Q. Did you make a determination as to when the  
12 flood crest occurred in the 1990 flood?

13 A. It's a matter of record. I don't recall what  
14 the timing was.

15 Q. Do you know who kept that record?

16 A. Again, that would be USGS.

17 Q. And you would have no dispute with their  
18 determination as to when the flood crest occurred?

19 A. Probably not.

20 Q. You haven't discovered anything about their  
21 information concerning when the crest of the flood  
22 occurred that caused you to question it during your  
23 investigation of this matter, have you?

24 A. No, I haven't.

25 Q. Can you tell me when the break of the Fir Island

00209

1 dike occurred?

2 A. I don't recall today.

3 Q. Do you know how far in advance of the crest of  
4 the flood the Fir Island dike break occurred?

5 A. No.

6 Q. Did you ever analyze that?

7 A. I don't recall that I did. I had no reason to.

8 Q. Did you ever make a calculation as to what  
9 effect, if any, the break of the Fir Island dike had on  
10 the water surface elevations in the area shown on Exhibit  
11 Number 11?

12 A. No, I did not.

13 Q. Would it be correct to say, then, that you do  
14 not have an opinion one way or another as to whether or  
15 not the Fir Island break had any such neck?

16 MR. HAGENS: Objection as to form. Go  
17 ahead and answer.

18 A. In principle, I would expect a decrease in water  
19 surface elevations in response to a lowering of downstream  
20 water levels. That's basic physics, I think. But we  
21 haven't analyzed what that amount might have been at the  
22 time.

23 Q. Similarly, you haven't analyzed how far upstream  
24 any effect might take place, have you?

25 A. That's correct.

00210

1 Q. Have you analyzed the effect of any other dike  
2 failures during the 1990 flood, other than the Fir Island  
3 dike break?

4 A. No, I have not.

5 Q. Did you do that with respect to any failures in  
6 any previous flood?

7 A. No.

8 Q. You earlier indicated in your previous portion  
9 of your deposition that you had calculated that a 100 year  
10 event would take place on the Skagit River when it  
11 achieved a flow of 169,000 cubic feet per second. Do you  
12 recall that testimony?

13 A. I recall a discussion about some rough frequency  
14 analysis that we had performed in house. I would accept  
15 that number.

16 Q. Was that 169,000 cubic feet per second the flow  
17 at the riverside gauge?

18 A. I believe we were discussing the frequency of  
19 discharge at that location, yes.

20 Q. The 100 year flood is a flood that has a 1  
21 percent chance of occurring in any given year, is that  
22 correct?

23 A. That is correct.

24 Q. All right. How did you calculate that the 1  
25 percent frequency was a flood of 169,000 cubic feet per

00211

1 second?

2 A. We performed a statistical analysis of annual  
3 maximum peak discharge values at that location and fit a  
4 mathematical relationship to the values and inferred what  
5 the 1 percent discharge would be based on that  
6 mathematical relationship.

7 Q. Okay. Tell me how did you it, if you would,  
8 please.

9 A. Certainly. The annual maximum values were  
10 extracted from USGS records?

11 Q. Going back how far?

12 A. For the entire period of record.

13 Q. That would be going back to 1815?

14 A. No, it would be that period of time in which  
15 USGS was actually observing on a continuous basis the  
16 stage at that location.

17 Q. Do you know approximately how far back that was?

18 A. I don't know offhand, no.

19 Q. Was it before 1940?

20 A. Probably. I don't recall. We then ranked the  
21 values in order of magnitude and computed a probability

22 for each one. The first, the highest value occurred once  
23 out of all of the observations during the period of  
24 record, which equates to a probability of occurrence.  
25 Each of those points was plotted then, given its observed

00212

1 probability, and the mathematical relationship used to fit  
2 a line essentially through the observed data. That line,  
3 that relationship was used to infer the 1 percent  
4 discharge.

5 Q. And is that the standard method by which 100  
6 year floods or 1 percent probabilities of a flood is  
7 determined by flood engineers?

8 A. It is, but the choice of which mathematical  
9 relationship to use is quite subjective. Often one  
10 doesn't rely on just one relationship, but tries several  
11 to see if there's a best fit. We're simply applying  
12 frequency analysis as a quality control check to satisfy  
13 ourselves that the GS data were reliable. We didn't  
14 require any analysis of frequency in order to perform our  
15 analysis of levee impacts. Our results constitute one  
16 possible relationship as to the frequency of flows at that  
17 site. But not the only one.

18 Q. Well, if 169,000 cubic feet per second is a 100  
19 year flood, what is a 50 year flood according to your  
20 calculation?

21 A. I don't recall offhand.

22 Q. Can you figure that out for me?

23 A. I don't have my frequency plots here.

24 Q. Are these your frequency plots?

25 A. Yes, they are.

00213

1 Q. Showing you Exhibits 9 and 10 to your October  
2 12th deposition, I take it those are the frequency plots?

3 A. The exhibits you've shown me are in fact stage  
4 discharge plots, not discharge frequency curves.

5 MR. HAGENS: Well, give it back to him,  
6 then.

7 Q. Where are the frequency plots?

8 MR. HAGENS: Were they turned over to the  
9 other side?

10 THE WITNESS: They were in the materials  
11 that you looked at last time we met.

12 MR. SMART: Well, I'm sure I wouldn't have  
13 recognized them as frequency plots. Is there some reason  
14 why they're not here today?

15 MR. HAGENS: Yes. We turned over  
16 everything to you, and then when you had an opportunity to  
17 look at it, we asked for it back. And so it is now back

18 in Dr. Mutter's good hands.  
19 MR. SMART: Well, as you know, Carl, we had  
20 asked that he bring his documents --  
21 MR. HAGENS: No, I didn't know that.  
22 MR. SMART: -- to the other deposition.  
23 Carl, it's right in the notice.  
24 MR. HAGENS: I'm sure you've got plenty  
25 of -- you had plenty of opportunities -- we're not going

00214

1 to bring five boxes of material down here.  
2 MR. SMART: It's your position, Carl, that  
3 the witness isn't supposed to bring his documents with him  
4 to the deposition?  
5 MR. HAGENS: He brought his documents with  
6 him once.  
7 Q. Can you tell me within certain parameters what  
8 the flow of a 50 year flood would be?  
9 A. Well, I wouldn't hazard a guess. I can't  
10 estimate it. I don't recall what the frequency  
11 distribution was.  
12 Q. Okay. Are you familiar with other agencies'  
13 calculations of the flow for a 100 year flood?  
14 A. I know that there are a number of opinions,  
15 including the Corps of Engineers and others, and we looked  
16 at those for the sake of interest, but again they didn't  
17 bear directly on the analysis that we were doing, so I  
18 didn't pay that much attention to them.  
19 Q. Who was the agency, or which is the agency  
20 responsible for making the determination as to what  
21 constitutes the 100 year flood or the 1 percent flood?  
22 A. I don't believe that there is an agency which  
23 has that official responsibility. It depends on how the  
24 information is being used. If it's for the design of a  
25 flood protection project that the Corps of Engineers is

00215

1 involved in, then they would perform that analysis. If it  
2 were for the delineation of flood risk in the floodplain,  
3 then the Federal Emergency Management Agency would, and so  
4 on. So there can be several opinions as to what the flood  
5 probability or flood risk is at any given location.  
6 Q. Do you know what the Federal Emergency  
7 Management people have determined as being the 100 year  
8 flood flow?  
9 A. Not offhand, no.  
10 Q. You may have answered this, but I'm unclear as  
11 to exactly its import. Am I to understand that in your  
12 computer model, and as that model is reflected in Exhibit  
13 11, that you assumed that there would be no overland flow

14 to the north and west of Highway 20?

15 A. A better way to state that is that we assume  
16 there was no significant loss from the main Skagit River  
17 flow.

18 Q. So basically, according to your computer model,  
19 then, all of the water is contained within the boundary  
20 conditions, is that the way to say it?

21 A. That's a fair assessment.

22 Q. And those boundary conditions are Highway 20 and  
23 the dikes and the topography on the south side of the  
24 river?

25 A. Yes.

00216

1 Q. In terms of its flow, what flood have you  
2 studied that is most comparable to the flood of 1990?

3 A. I really can't answer that. We didn't make such  
4 a comparison.

5 Q. I thought that you just said that you had plots  
6 of flood flow frequency for different floods, and that  
7 those were contained in Exhibit Number 10 to your earlier  
8 deposition.

9 A. We certainly could pick another event that has a  
10 peak discharge that's close, or the next closest to the  
11 1990 event.

12 Q. And which one would that be?

13 A. It would be the 1951 event.

14 Q. And in your answer to that question you were  
15 referring to Exhibit Number 10 to your previous  
16 deposition, is that correct?

17 A. Yes, I believe so.

18 Q. On Exhibit Number 10, the top page is entitled  
19 Semilog Fit to Rating Curve, do you see that?

20 A. Yes.

21 Q. What does that mean?

22 A. It's just a particular type of mathematical  
23 relationship. I think we should clarify that we're  
24 looking at a stage discharge curve there and not the  
25 flood frequency curve.

00217

1 Q. Yes, I understand that. And I phrased my  
2 earlier question in terms of flow. So that would be the  
3 correct document, would it not, to answer my question?

4 A. Sure.

5 Q. Showing you page 2 of Exhibit Number 10 which  
6 says Stage/Discharge of Annual Max Events, again, you have  
7 the flood of 1951 as being the most comparable to the  
8 flood of 1990, is that correct?

9 A. This is the same plot as the one we just looked

10 at, less the line.  
11 Q. And is the Semilog Fit to Rating Curve the same  
12 plot, but just in a different graphical form?  
13 A. Yes, that's correct.  
14 Q. Now, the rating curve shows what relationship  
15 between flood flow and water surface elevation?  
16 A. I'm sorry, I don't follow your question.  
17 Q. What is the relationship between the rating  
18 curve and water surface elevation?  
19 A. Well, in general terms, the higher the water  
20 surface elevation, the greater the discharge.  
21 Q. Okay. So would it also be correct to say that  
22 the higher the discharge, the higher the water surface  
23 elevation?  
24 A. That would be true also.  
25 Q. And at the riverside gauge, is there a standard

00218

1 relationship, then, between the water surface discharge  
2 and the elevation of the height of the water?  
3 A. I'm not quite sure what you mean by standard,  
4 but that relationship, in its graphical form, is present  
5 on those exhibits.  
6 Q. Well, you earlier indicated that because there  
7 was not a lot of scatter in the rating curve, as shown on  
8 Exhibit Number 10, that it indicated to you that there had  
9 not been really any change in the ability of the river to  
10 pass water down at the point of the riverside gauge, is  
11 that right?  
12 A. Yes.  
13 Q. Okay. And would you then expect then for these  
14 various floods to be able to pick water surface elevation  
15 as a result of the amount of flow observed at the  
16 riverside gauge?  
17 A. Certainly at that location, yes.  
18 Q. Is Exhibit Number 10 a plot of the annual peak  
19 discharges for the floods on which you had historical  
20 information?  
21 A. I believe that's the case, yes.  
22 Q. Do you have a document that shows what year  
23 these floods come from other than for 1951, 1975, and  
24 1990?  
25 A. The source documentation there I'm sure was USGS

00219

1 records.  
2 Q. Why are there three points for the 1990 flood on  
3 Exhibit Number 10?  
4 A. The highest two points I believe come from USGS  
5 records, and the lowest of the three was an estimate by

6 the National Weather Service.

7 Q. As to what the flow was?

8 A. Yes, I believe so. There was some variation in  
9 the estimates at the time.

10 Q. So you believe that the lowest estimate which is  
11 identified NWS is an estimate performed by the National  
12 Weather Service?

13 A. I think that's correct.

14 Q. But it's still talking about the same 1990  
15 flood?

16 A. As far as I recall.

17 Q. And of the various agencies, I take it from your  
18 testimony that you would credit the USGS with the more  
19 credible information concerning the peak flow, because  
20 they operated the gauge, is that right?

21 A. I have to be careful here, these people are all  
22 my clients.

23 Q. Well, even granted the fact that they're your  
24 clients, would you still agree that the USGS people are  
25 probably more accurate in terms of depicting, or

00220

1 determining peak flow because they operate the gauge?

2 MR. HAGENS: Object to form. Go ahead and  
3 answer. It's argumentative.

4 A. The USGS is responsible for actually collecting  
5 the water surface elevation data and developing a rating  
6 curve. And they do a great job at that. Beyond that,  
7 there's considerable interpretation involved in the  
8 statistical analysis. And I don't know that their opinion  
9 would be more valid than others. However, I seem to  
10 recall at the time that the National Weather Service  
11 estimate was considered to be somewhat low.

12 Q. And you yourself would consider it to be  
13 somewhat low, wouldn't you?

14 A. Probably.

15 Q. Have you performed any calculation to determine  
16 the flood frequency for the 1990 flood?

17 A. Not beyond the information you already have, no.

18 Q. Well, you and Mr. Hagens are contending that I  
19 have all kinds of information that we might get into a  
20 dispute over as to whether or not I actually have it. So  
21 I guess perhaps you could answer the question that I'm  
22 asking, and that is, have you performed any calculation to  
23 determine what percent flood this was? If it wasn't  
24 100 year floods, was it a 50 year flood, a 20 year flood,  
25 or a five-year flood?

00221

1 A. I don't know that we again did any serious

2 frequency analysis to convince ourselves it was one value  
3 or another, but we generally accepted that it was on the  
4 order of a 25 year event.

5 Q. And that was without doing any frequency  
6 analysis, is that correct?

7 A. We did some, which I believe you have. And I  
8 think the results didn't lead us to believe that the  
9 numbers were any different than those published by the  
10 Corps, for example, or USGS.

11 Q. Did you perform any analysis to determine what  
12 the water level would be at any particular points for a  
13 169,000 cubic feet per second flood?

14 A. No.

15 Q. Could you do that in your model?

16 A. Yes, that's possible.

17 Q. Would it be correct to say, then, that based on  
18 your analysis concerning the frequency of floods, that the  
19 difference between a 25 year flood and a 100 year flood is  
20 15,000 cubic feet per second? In other words, the  
21 difference between 169,000 and 154,000?

22 A. I think I testified I don't recall what the 50  
23 year number was from my own analysis at this point.

24 Q. I didn't ask you that.

25 A. So I can't tell what you the difference was.

00222

1 Q. My question was, is it your testimony that the  
2 difference between a 100 year flood and a 25 year flood is  
3 15,000 cubic feet per second?

4 MR. HAGENS: Objection to form.

5 Q. Measured by the difference between 169,000 and  
6 154,000?

7 A. I think I really don't have an opinion on what  
8 the difference is. As I said before, the analysis of  
9 frequency of flooding wasn't a factor in what we had to  
10 do.

11 Q. Well, you calculated a 100 year flood as being  
12 169,000 cubic feet per second, correct?

13 A. That was one analysis that we made for the sake  
14 of interest, basically.

15 Q. Did you make another analysis that came up with  
16 a different number?

17 MR. HAGENS: For what?

18 Q. For flood frequency.

19 MR. HAGENS: At what level?

20 Q. Go ahead and answer the question.

21 MR. HAGENS: What event level?

22 Q. 100 year, 25 year?

23 MR. SMART: Yes. 100 year.

24 A. I don't recall making more than one statistical  
25 fit to the data. We were aware that there were several

00223

1 others that had been published, so we -- the data we were  
2 looking at seemed reliable in light of results that had  
3 already been published and we could feel comfortable in  
4 using it for the rest of our hydraulic analysis.

5 Q. The answer to my question would be no, you  
6 didn't calculate any other number being the 100 year  
7 floods other than the 169,000 cubic feet per second, did  
8 you?

9 A. Not that I recall.

10 Q. And you agree that the 1990 floods was 154,000  
11 cubic feet per second, correct?

12 MR. HAGENS: 154? Objection to the form.  
13 Go ahead, answer the question.

14 A. I don't recall what we selected as a 50 year  
15 discharge.

16 Q. I'm not asking what you selected as a 50 year  
17 discharge, I'm asking you whether you agree that the 1990  
18 flood was 154,000 cubic feet per second.

19 MR. HAGENS: Objection as to form. Go  
20 ahead and answer.

21 A. I'm sorry. I would agree that it's in the range  
22 of 152 to 154,000 cfs.

23 Q. So would you agree, then, that the difference  
24 between a 100 year flood and a 25 year flood is 15 to  
25 17,000 cubic feet per second?

00224

1 MR. HAGENS: Objections as to form. Go  
2 ahead.

3 A. I would agree that the difference between those  
4 two events as we analyzed it, not necessarily as other  
5 frequency analysis supported, would be that amount. Yes.

6 Q. Okay. That's your opinion?

7 A. That's an opinion. I don't believe that we  
8 developed a frequency analysis that we cared to publish.  
9 It was something we did strictly for our own interest.

10 Q. Well, are you telling me now, then, that the  
11 frequency analysis that you performed does not constitute  
12 your opinion concerning what the frequency of the 100 year  
13 flood is?

14 A. It's a factor in developing our opinion.

15 Q. Well, is it or is it not your opinion that a 100  
16 year flood has a flow on the Skagit at the riverside gauge  
17 of 169,000 cubic feet per second?

18 MR. HAGENS: Objection as to form. Go  
19 ahead and answer.

20 A. I think as we sit here today I don't have an  
21 opinion on what the exact value is.

22 Q. But that's certainly the only figure that you  
23 generated for that 100 year frequency?  
24 A. Sure.  
25 Q. And you don't have an opinion that it's

00225

1 different than that, do you?  
2 MR. HAGENS: Objection as to form. Go  
3 ahead and answer the question.  
4 A. I'm aware that there are a number of estimates  
5 which differ from ours, and I'm not prepared to say which  
6 is correct.  
7 Q. Where did the data come from that went into  
8 identifying the plot points on Exhibit Number 10?  
9 A. That information all came from USGS.  
10 Q. And do you find that information to be reliable?  
11 A. Yes.  
12 Q. Can you determine anything about the water level  
13 that would be experienced by any of the plaintiffs in the  
14 1951 flood from the fact that the 1951 flood shows up on  
15 Exhibit Number 10 as being very similar to the 1990 flood  
16 and on the same rating curve?  
17 MR. HAGENS: Objection as to form. Go  
18 ahead and answer the question.  
19 A. I think this would tell us that flood levels  
20 were unusually high in the Nookachamps, but without the  
21 knowledge of what the topography was in 1951, including  
22 all of the levee systems, and so on, it's not possible to  
23 say with any precision how this event would compare with  
24 the 1990 event at each of the properties. That was the  
25 whole point of developing a numerical model.

00226

1 Q. So it's your testimony that all you can  
2 determine from Exhibit Number 10 with respect to the flood  
3 levels on the plaintiffs' properties is that the flood  
4 levels would be unusually high, is that right?  
5 A. I think so.  
6 Q. When you say unusually high, how do you use the  
7 term unusual?  
8 MR. HAGENS: Objection as to form. Go  
9 ahead and answer.  
10 A. Not something you'd see every year.  
11 Q. Did you perform any analysis to determine what  
12 water level might be predicted at any of the plaintiffs'  
13 properties as a result of the information in Exhibit  
14 Number 10?  
15 MR. HAGENS: Excuse me? Objection as to  
16 form.  
17 A. I'm not sure I understand your question.

18 Q. I'll parse it out then, into pieces. Have you  
19 ever performed any analysis to determine what water level  
20 was experienced on any of the plaintiffs' properties  
21 during the 1951 flood?

22 A. No.

23 MR. HAGENS: Haven't you asked that  
24 question about a zillion times now today?

25 Q. Taking Exhibit Number 10, could you tell me what

00227

1 water level you would have expected to see at, for instance,  
2 Mr. Johnson's property during the 1951 flood?

3 A. No. As I indicated in response to an earlier  
4 question, what Exhibit 10 tells us is the difference in  
5 water surface elevations at the gauge, the riverside  
6 gauge, but without the knowledge of what else is different  
7 between the gauge and any particular property, it's not  
8 possible to predict with the model what the difference in  
9 water surface elevations between those two events would  
10 have been at that property.

11 Q. You don't know that anything was different in  
12 1951 than 1990, do you, that would have affected the water  
13 surface levels?

14 MR. HAGENS: Let him finish.

15 Q. Let me finish the question if I could, please.

16 A. Sorry.

17 Q. Go ahead.

18 A. I'm not aware that there's a change or no  
19 change, but I do know that the Skagit River is fairly  
20 dynamic, so --

21 Q. Well, if the water surface elevations were the  
22 same in 1951 and 1990, you would agree, then, that there  
23 hadn't been any material change in the boundary conditions  
24 that would affect the water surface levels, would you?

25 A. No, I wouldn't agree to that statement. I think

00228

1 the boundaries in the water surface elevation relationship  
2 with discharge is very constant at the gauge site. GS did  
3 an excellent job of selecting a gauge site. However, I  
4 don't think we have that same confidence in locations  
5 upstream. I think there could well be changes in water  
6 surface elevation at a given location, with any particular  
7 discharge.

8 MR. SMART: I move to strike as being not  
9 responsive.

10 Q. My question is this. If the water surface  
11 elevations were the same or essentially the same between  
12 the 1951 and 1990 floods, that would tell you that there  
13 hadn't been any boundary conditions that had changed to

14 substantially affect water surface elevation as a function  
15 of flow, wouldn't it?

16 MR. HAGENS: Objection as to form. If you  
17 understand the question, go ahead and answer the question.

18 A. Actually, I think I was being responsive.

19 MR. HAGENS: You were.

20 A. That would indicate that there was no change at  
21 the location or the vicinity, near the vicinity of the  
22 gauging station. But it doesn't have that same  
23 implication for virtually anywhere else upstream of the  
24 model.

25 Q. Let me ask the question this way. Leaving aside

00229

1 Exhibit 10, if the water surface elevations experienced at  
2 the particular properties of any plaintiff were the same  
3 in 1951 as in 1990, that would tell you that there hadn't  
4 been any change in boundary conditions which would have  
5 changed the amount of water that they'd expect to receive  
6 for a given flow, wouldn't it?

7 MR. HAGENS: Objection as to form. Go  
8 ahead and answer.

9 A. Not necessarily. It could mean that changes had  
10 occurred, but on balance, the same results was manifested.

11 Q. Okay. Is there anything else that it could  
12 mean, other than one of those two things?

13 A. I don't believe so.

14 Q. As I understand your testimony, the fact that  
15 water surface elevations are the same or very close  
16 between two floods events tells you either, A, that  
17 there's been no change in boundary conditions that would  
18 affect water surface level, or B, if they were, there were  
19 changes, the changes netted out so that there was no  
20 material difference, is that right?

21 MR. HAGENS: Objection as to form. Go  
22 ahead and answer.

23 A. At those two points in time, yes.

24 Q. Have you determined what the frequency of the  
25 1975 event was?

00230

1 A. Again, we have a frequency analysis that we  
2 performed, and I could infer that value, but I don't  
3 recall that we did or what the number might have been.

4 Q. Have you performed any analysis of levee  
5 failures along the Skagit River in terms of how and when  
6 they have occurred?

7 A. I reviewed historical documents that indicate to  
8 me that they have occurred and what the mechanism of  
9 failure was, but I haven't analyzed them in the

10 engineering sense.

11 Q. Do you agree that the propensity of any levee to  
12 fail is a function of the height of the water and how long  
13 the levee is exposed to high water?

14 MR. HAGENS: Objection as to form. I think  
15 that's an incomplete hypothetical question. What's the  
16 levee made of? Concrete, like the ones you folks  
17 constructed, or something else?

18 MR. SMART: I'll move to strike colloquy of  
19 counsel.

20 Q. If you understand the question, you can go ahead  
21 and answer.

22 A. You described two of the factors that would be  
23 involved in determining how a levee would fail. The  
24 nature of the materials in the levee and beneath it would  
25 also be a consideration.

00231

1 Q. Do you know of any levee failures in the last 50  
2 years on the Skagit River that did not occur when the  
3 levee was overtopped or close to being overtopped?

4 A. Well, continuing depends on what you described  
5 as failure. I think the record is full of observations of  
6 piping failures, or boils. That is imminent failure, in  
7 my opinion. One does not design levees such that piping  
8 occurs, so to that extent I think there's all kinds of  
9 evidence as to what I would consider to be a failure.

10 Q. Well, a piping failure such as the generation of  
11 a boil doesn't result in a decrease in the water surface  
12 profile on the stream side of the dike, does it?

13 A. It does not.

14 Q. And -- well, let me ask the question again. Are  
15 you aware of any levee failures during flood events during  
16 the last 50 years that did not occur when the levee was  
17 either overtopped or close to being overtopped?

18 A. Again, I'll repeat my answer that the occurrence  
19 of boils to me is imminent failure, so --

20 Q. All right. Let me ask it this way. Are you  
21 aware of any levee failures that occurred in the last 50  
22 years along the Skagit River that resulted in a lower  
23 water surface profile on the river side of the dike that  
24 did not occur when the dike was overtopped or closed to  
25 being overtopped?

00232

1 A. I'm not sure that I can cite specific examples  
2 that would meet those criteria, no.

3 Q. How many levee failures are you aware of that  
4 resulted in a lowering of the water surface profile on the  
5 river side of the dike in the last 50 years?

6 A. I can't cite any today.  
7 Q. Is that because you don't know of any?  
8 A. That's correct.  
9 Q. Does your computer model take into account the  
10 effect of the Burlington Northern Bridge and its log jams  
11 on water surface levels upstream of the bridge?  
12 A. Not directly.  
13 Q. Does do it indirectly, and if so, how?  
14 A. The model represents the existence of the  
15 bridge, but we made no effort to simulate the effects of  
16 debris accumulation.  
17 Q. Why not?  
18 A. With this model, which is one of the most  
19 sophisticated tools available, one essentially imposes on  
20 the model this effect that you're asking me about. It  
21 doesn't compute the effect of debris accumulation. In my  
22 opinion, it's not clear one way or the other what the  
23 upstream impact on water surface elevations would be from  
24 a debris accumulation.  
25 Q. Well, you haven't studied it, have you?

00233

1 A. I haven't performed any engineering analysis,  
2 but I'm aware of the engineering progressions that are  
3 associated with debris accumulation.  
4 Q. It's familiar to any beaver, right?  
5 A. Yes.  
6 Q. But you have not performed an analysis on the  
7 1990 flood to determine whether debris accumulations  
8 contributed to water surface elevations upstream from the  
9 Burlington Northern Bridge, is that correct?  
10 A. In my opinion there's no analysis that can be  
11 performed to determine that. So we have not performed  
12 one.  
13 Q. How big was the debris accumulation on the  
14 Burlington Northern Bridge during the 1990 flood, do you  
15 know?  
16 A. It was large.  
17 Q. Did you measure it?  
18 A. No.  
19 Q. Did you make any attempt to determine what  
20 volume of water it impeded from going down the river?  
21 MR. HAGENS: Objection as to form. Assumes  
22 facts not in evidence. Namely, that it impeded any water  
23 going down the river.  
24 MR. SMART: Well, he testified earlier, Carl,  
25 if you'll recall, that it did impede the water going down

00234

1 the river.

2 MR. HAGENS: The debris?  
3 MR. SMART: Yeah.  
4 MR. HAGENS: I thought there was a  
5 countervailing scouring effect that he testified to in his  
6 first -- so that the net effect was not as you have  
7 described.  
8 Q. Is that your testimony, sir, that despite no  
9 study of the debris accumulations and no determination as  
10 to how big it was, that you are of the opinion that  
11 the net effect was zero?  
12 A. I think that there can be no answer with that  
13 kind of precision. I think we simply don't know whether  
14 there's a significant impact upstream or not.  
15 Q. It would help to make a determination whether  
16 there was if you actually studied that, wouldn't it?  
17 A. Well, I'm afraid there's no study that can be  
18 made after the fact. No one was there to observe the  
19 conditions during the flood to see if in fact the water  
20 surface elevations went up, no one was there to observe  
21 whether the bed scoured and allowed water surface  
22 elevations to stay the same. We simply don't know.  
23 Q. Is it your testimony that there's no one, no  
24 person that exists that can testify that the debris  
25 accumulations occurred and the water surface elevation

00235

1 went up?  
2 A. I'd agree with that statement.  
3 Q. Is that because you have never talked to any  
4 person in that regard, or is that because Mr. Hagens told  
5 you that that was so?  
6 A. No, that conclusion is because people might well  
7 have made observations of water surface elevations  
8 upstream. They did not make simultaneous observations of  
9 what the water surface elevations would have been like  
10 without the debris. So they can't draw conclusions about  
11 what the effect of the debris was. All they know is what  
12 they observed that day.  
13 Q. Is it because of your belief that there could be  
14 no credible observations in that regard that you did not  
15 study the effect of the debris accumulations on water  
16 surface elevations upstream of the bridge?  
17 A. I'm sorry, would you repeat the question?  
18 Q. Is it because of your belief that there could be  
19 no credible observer to give you the information that you  
20 required that you performed no study of the effect of log  
21 jams on the water surface elevations upstream of the  
22 bridge?  
23 A. I think I said that there might well have been  
24 credible observers who made a record of what the water  
25 surface elevations were. I'm virtually certain that no

00236

1 one made a record of what happened to the river bed during  
2 the course of the event.

3 Q. Well, you don't know what happened to the river  
4 bed either, right?

5 MR. HAGENS: Objection as to form. Go  
6 ahead and answer, Mr. Mutter.

7 A. Based on experience, I have a pretty good idea  
8 of what likely happened during the course of the flood.

9 Q. You didn't see the river bed, did you?

10 A. Certainly didn't.

11 Q. Didn't take any soundings, did you?

12 A. Certainly didn't.

13 Q. Didn't receive any information from anybody who  
14 did, did you?

15 A. Certainly didn't.

16 MR. HAGENS: It's 12 noon. What's your  
17 druthers there, Will?

18 MR. SMART: I think I just have a few more  
19 questions. Glen, are you going to ask any questions?

20 MR. ANDERSON: No.

21 Q. What has been your relationship over time with  
22 the Washington flood control engineer?

23 A. I have no relationship with that person.

24 Q. You never met with them?

25 A. No.

00237

1 Q. Never provided them any information?

2 A. No.

3 Q. Do you have any relationship with the state  
4 supervisor of flood control?

5 A. No.

6 Q. How about the Department of Water Resources?

7 A. No.

8 Q. How about the Department of Ecology?

9 A. Anyone specifically at the department?

10 Q. Yes.

11 A. I'm sorry, you need to ask me the question --

12 Q. Do you have any relationship with anybody  
13 specifically in the Department of Ecology?

14 A. Not directly, no.

15 Q. Do you have any knowledge of any permanent  
16 change in any particular piece of property that was caused  
17 by the 1990 flood?

18 MR. HAGENS: Objection as to form.

19 A. Would you repeat that too, please?

20 Q. Do you have any knowledge of any permanent

21 change in any particular piece of property caused by the

22 1990 flood?  
23 MR. HAGENS: Objection as to form. What do  
24 you mean by change? You mean damage, structural damage?  
25 What are you talking about?

00238

1 Q. Go ahead and answer the question.  
2 MR. HAGENS: I object to the form. It's  
3 vague.  
4 A. I guess I'm aware of specific flood damages that  
5 occurred and changes in the river. Other than that, I'm  
6 not sure how to answer your question.  
7 Q. What changes in the river do you say occurred  
8 during the 1990 flood?  
9 A. Oh, just shifting of the channel alignment, and  
10 so on.  
11 Q. That happens in every flood, doesn't it?  
12 MR. HAGENS: Objection as to form.  
13 A. Essentially.  
14 MR. SMART: I have no further questions.  
15 MR. ANDERSON: No questions.  
16 MR. SMART: But I am going to reserve the  
17 right to ask questions about the documents that I asked be  
18 produced. And I do want a copy of this thing, the flood  
19 elevations, Carl. Is that going to be a problem?  
20 MR. HAGENS: What's that?  
21 MR. SMART: I want a copy of --  
22 MR. HAGENS: Is this on the record? Let's  
23 leave it off the record.  
24 (Discussion off the record)  
25 MR. SMART: I'm asking that, requesting

00239

1 to be produced maps with the absolute water surface  
2 elevations on it as opposed to just the increase. And the  
3 reason that I want that is for purposes of comparison. I  
4 think it would be much clearer and Mr. Mudder's testimony  
5 would be much clearer if we had something to compare  
6 Exhibits 11 and 12 to, and that is a document that has the  
7 water surface profiles as he says occurred during the 1990  
8 flood, and he says it's essentially Exhibit Number 4-G and  
9 H to the Regan deposition, which is the smaller maps,  
10 okay, but you'd like to have one that's comparable in size  
11 to Exhibit Number 11.  
12 MR. HAGENS: I understand what you'd like,  
13 but my understanding of the testimony, and correct me if  
14 I'm wrong, Dr. Mutter, it would take you several days to  
15 generate such a document, is that correct?  
16 THE WITNESS: I'm afraid it might. It  
17 might be the end of the week.

18 MR. SMART: It's not several days of his  
19 time, it's just that that's the overall time that it would  
20 take to get it.  
21 MR. HAGENS: Right.  
22 MR. SMART: But you're not going to spend  
23 24 hours a day generating this thing?  
24 THE WITNESS: No, it would be a matter of  
25 several hours, but it could be done.

00240

1 MR. HAGENS: Well, I think I want to take  
2 that under advisement. I don't recall your experts  
3 offering to do anything for us in connection with this  
4 case, whether you thought something was explainable or  
5 not. In other words, I think this is unusual to ask the  
6 plaintiff's experts to prepare some kind of an exhibit for  
7 the defense. And so I will discuss it with him and let  
8 you know by letter whether we're willing to do it. I also  
9 think the information can be created off the disk itself.  
10 MR. SMART: Well, the other thing is, I'm  
11 going to want to have Melone copy the disk, like we did  
12 the last ones.  
13 MR. HAGENS: How did you do that? This is  
14 the only copy we have.  
15 MR. SMART: The same thing was true with  
16 the last ones. We gave to Melone, he copied them, got it  
17 back.  
18 MR. HAGENS: But you said Melone is  
19 hospitalized, and so I'm not --  
20 MR. SMART: There's another engineer that  
21 I'm sure can copy this in his office.  
22 THE WITNESS: Fine.  
23 MR. HAGENS: Why don't we make the copy  
24 for them and give it to them? That way, we'll guard the  
25 integrity. Is that possible?

00241

1 THE WITNESS: We could do it right here if  
2 you have a PC available.  
3 MR. HAGENS: Do you have a PC available?  
4 MR. SMART: I'm sure we do.  
5 MR. HAGENS: Let's try to do that before he  
6 goes this afternoon, because we're going to stay and look  
7 at the production, Melone production. Where are you  
8 going?  
9 MR. SMART: Find somebody with a computer  
10 so he can copy the thing. The other documents that I  
11 want, that I mentioned during the course of the  
12 deposition, are, calculation of the amount of water that  
13 the emergency sandbagging of Highway 20 had with respect

14 to the water surface elevations --  
15 MR. ANDERSON: I would like a copy of that,  
16 also.  
17 MR. HAGENS: What was it?  
18 MR. SMART: Calculation that he made with  
19 respect --  
20 MR. HAGENS: The Highway 20?  
21 MR. SMART: -- to the emergency sandbagging  
22 and its effect on water surface elevations. The flood  
23 frequency plot, or plots. I think that's it. Okay?  
24 Now, you want the computer so that you can  
25 do it, is that the deal?

00242

1 (Lunch recess taken at 12:10 a.m.)  
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00243

1 AFTERNOON SESSION  
2 1:00 P.M.  
3  
4 E X A M I N A T I O N  
5 BY MR. HAGENS:  
6 Q. In your first deposition, Dr. Mutter, you said  
7 that you would expect the same flood level elevations if  
8 the event were 130,000 cfs as occurred in 1975, as you  
9 found in the 1990 event of 152,000 cfs. Do you recall

10 that testimony?

11 MR. SMART: I object to the form of the  
12 question.

13 A. I believe I do.

14 Q. Is it right that with those differing cfs  
15 numbers you would expect the same flooding?

16 MR. SMART: Same objection.

17 A. No, I would expect lower water surface levels in  
18 1975.

19 Q. Then earlier in your deposition you used the  
20 phrase that the dikes were built by the dike districts.  
21 Do you know who in fact built the dikes in Skagit County?

22 A. I have no direct knowledge.

23 Q. Okay. Then I want to talk to you a little bit  
24 about levee failure and its role. First of all, you said  
25 that you had reviewed some historical documents, and that

00244

1 there was indications in those documents that the levees  
2 had in earlier times failed during flood events. Do you  
3 recall that testimony?

4 A. Yes.

5 Q. Can you tell us generally what documents you're  
6 referring to?

7 MR. SMART: I'm going to object to the form  
8 of the question. I asked him to specifically tell me what  
9 documents he was referring to and he wouldn't identify  
10 them.

11 Q. Well, generally or specifically, whatever you  
12 can do in terms of describing them.

13 MR. SMART: Same objection, unless the  
14 documents are identified.

15 Q. Go ahead.

16 A. Again, I can't identify any specific document as  
17 we speak, but there was a list of evidence that was  
18 identified to be submitted for the trial, and I reviewed  
19 most of those historical documents. They ranged from 1922  
20 to date, and there was considerable evidence in there  
21 relating to levee failures.

22 Q. What is the relationship between the likelihood  
23 of plaintiffs suffering flooding, or the degree to which  
24 any plaintiff would suffer flooding and the potential  
25 failure of a levee? Is there some relationship there?

00245

1 MR. SMART: Object to the form of the  
2 question. It's an incomplete hypothetical, calls for  
3 speculation.

4 Q. Would you go ahead?

5 MR. SMART: Without foundation.

6 A. Any levee failure, no matter what the mechanism,  
7 would result in lowered water surface elevations at the  
8 location of the failure and upstream for some distance.  
9 If the water surface lowering were to reach a particular  
10 plaintiff's property, then he would be impacted less than  
11 if the levee failure were not to occur.

12 Q. Okay. Now, you also, in response to some of  
13 counsel's questions, identified some projects that had  
14 been done on the levees since 1955. Do you recall that  
15 testimony? Some work that had been done on the levees  
16 since 1955?

17 A. Yes.

18 Q. Generally, what kind of work, if you know, was  
19 done on the levees between, say, '55 and '90, or '75 and  
20 '90, for that matter?

21 MR. SMART: Object to the form of the  
22 question. It's without foundation.

23 Q. Go ahead.

24 A. The nature of the work was primarily to broaden  
25 the levees, make the top width greater, increasing it

00246

1 from widths as narrow as three feet to on the order of 10  
2 or 12 or 14 feet, to put material in a tow so as to  
3 prevent seepage through the levee. One of the techniques  
4 that was used was to create a deep trench, ten feet in  
5 depth, on the stream side, river side of the levee, and  
6 replace the excavated material, alluvial material with  
7 clay or other impervious material to prevent seepage  
8 underneath the levee. The improvements seemed to be  
9 directed at preventing a levee failure through collapse  
10 due to saturation and piping failure.

11 Q. And what's the effect of putting a keyway in or  
12 widening and increasing the size of the levee in terms of  
13 its ability to withstand floodwaters?

14 A. Its effect is to ensure that the levee will stay  
15 in place and hold water in the river, in the main channel,  
16 not allow it to flow into protected areas behind the  
17 levee.

18 Q. Did you notice any relationship between where  
19 these keyways were put in and where the levees were  
20 widened and increased in size and earlier boils found in  
21 those locations?

22 A. Well, certainly the clues used by County  
23 personnel and diking district personnel to locate the  
24 areas most prone to failure were the observance of boils  
25 or piping failures on the landward side of levees. That's

00247

1 how they decided where to increase the strength of levees.

2 Q. In what ways, the ways you've described?

3 A. Yes, during flood fight operations, they  
4 sandbagged, quite often sandbagged those areas on the back  
5 side of the levee. But then once the emergency had passed  
6 during the next maintenance season, they would return to  
7 those areas and install the keyways or widen the levee.

8 Q. Did you see any of those projects done in the  
9 period '75 to 1993?

10 A. I believe the records indicate that those  
11 projects were constructed, yes.

12 Q. You earlier indicated that there had been at  
13 least some documents you say in the '20s, levee failures,  
14 and that those levee failures provided relief to some of  
15 the people, some of the plaintiffs who may have been  
16 living in the Nookachamps --

17 MR. SMART: Object to the form of the  
18 question.

19 MR. HAGENS: I'm not through with the  
20 question.

21 MR. SMART: You've already got a  
22 misstatement in there, but go ahead.

23 Q. Can you determine from your review of the  
24 historical data whether the levee, whether the flood  
25 protection, floods event protection level has increased

00248

1 over time like from say less than ten years to maybe  
2 currently 25 year event level?

3 MR. SMART: Object to the form of the  
4 question.

5 Q. Do you understand the question?

6 A. Yes. I think there's no question that the  
7 protection level has increased over time. I think even  
8 the County's characterized the protection level at amounts  
9 far less than 25 years in the past, and it's been their  
10 objective to raise the level of protection. But looking  
11 at the historical reports of the condition, levees, as far  
12 as the turn of the century and for probably decades  
13 thereafter, it's clear that the levees were not designed,  
14 probably poorly constructed, and not integrated into an  
15 overall system very well, so that I think the level of  
16 protection in that time frame was very low.

17 MR. SMART: That's the turn of the century?

18 THE WITNESS: Yes.

19 Q. And has it increased from that point in time  
20 forward?

21 A. Yes.

22 Q. How has its level of protection of the system  
23 been increased from the turn of the century?

24 A. Levees have been raised, new levees have been  
25 constructed, levees have been tied together to form an

00249

1 overall system, and they've been broadened and reinforced  
2 so they're less likely to collapse, even if they're not  
3 overtopped.

4 Q. So then, Dr. Mutter, have the levees been static  
5 or, in terms of their strength, been in the same situation  
6 as they were in 1975? The levees in 1990 were in the same  
7 degree of strength in 1975, do you know?

8 MR. SMART: Object to the form of the  
9 question. He was talking about the turn of the century.

10 Q. Go ahead. I'm looking at a different  
11 period, Dr. Mutter.

12 MR. SMART: You said so, and that's the  
13 reason for my objection.

14 Q. Between 1975 and 1990, have the levees been  
15 strengthened, in your view, to increase the event level of  
16 protection?

17 MR. SMART: Objection, no foundation.

18 A. Yes.

19 Q. And in the way you've earlier described, is that  
20 correct?

21 A. Yes.

22 Q. So is it accurate to say that since the turn of  
23 the century, then, the levees have been continually  
24 increased in terms of their strength, is that correct, or  
25 incorrect?

00250

1 MR. SMART: Object to the form of the  
2 question.

3 A. I think that's correct.

4 Q. And counsel asked you if you know of any levee  
5 failures. Or excuse me, collapses was the word he used.  
6 And you said you didn't know of any levee collapses as he  
7 had described them. I'm going to ask you, do you know if  
8 any levees failed in 1990 at Fir Island?

9 MR. SMART: Object to the form of the  
10 question.

11 Q. Go ahead.

12 A. Yes, there were levee failures at Fir Island in  
13 1990.

14 Q. Were there other instances you found in the  
15 records where levees had indeed failed for one reason or  
16 another?

17 A. Yes, there were quite a few references to levee  
18 failures.

19 Q. And have those diminished as time has gone on,  
20 or increased since the turn of the century?

21 MR. SMART: I'll object to the form of the

22 question. You're asking about 1990 now.  
23 MR. HAGENS: Strike that. Have the number  
24 of levee failures increased or decreased since the turn of  
25 the century?

00251

1 MR. SMART: I'll object to the form of the  
2 question. It's without foundation.

3 Q. Go ahead.

4 A. Well, that's a difficult question to answer.  
5 The record gets fuzzier going back farther in time. My  
6 expectation is that the number of failures has decreased  
7 over time.

8 Q. Okay.

9 MR. SMART: Move to strike.  
10 Non-responsive, not based on personal knowledge.

11 Q. And the reason your expectation would be that  
12 they've decreased is what?

13 A. My expectation is based on the fact that  
14 weaknesses have been detected during flood periods, and  
15 systematically eliminated by so-called maintenance  
16 activity.

17 Q. Let's talk a little bit about so-called  
18 maintenance activity. What did you as a hydrological  
19 engineer view as maintenance of a levee or dike?

20 MR. SMART: Object to the form of the  
21 question.

22 A. In my experience, maintenance means preserving  
23 something constructed at an earlier time. Perhaps erosion  
24 protection on the river side of the dike, mowing, keeping  
25 trees off, rodents from burrowing, that sort of thing.

00252

1 Q. Would you contrast that with your view as a  
2 hydrological engineer to an improvement to a dike or  
3 levee?

4 A. Well, improvement is something that would  
5 materially change the function of the structure. So  
6 widening it significantly or using keyways, something that  
7 would prevent seepage through the levee, changes its  
8 character from the way it was originally constructed. And  
9 that to me is not maintenance, that's an improvement.

10 Q. One last area, Dr. Mutter, and that had to do  
11 with probabilities. Are you familiar with the flooding  
12 that occurred on or about November 30th, 1995, of this  
13 year?

14 A. Yes.

15 Q. Do you have an understanding of what the cubic  
16 feet per second as measured at the riverside gauge was of  
17 that event on approximately or approximately the cfs of

18 that event?

19 A. Well, it's still considered provisional by USGS,  
20 but my understanding is it's approximately 140,000 cfs.

21 Q. Okay. And based upon your analysis and  
22 investigation to date would you expect those people that  
23 received flooding on November 24th of 1990 to have also  
24 received some flooding on November 30th, 1995?

25 MR. SMART: Object to the form of the

00253

1 question.

2 A. I would expect that water levels were on the  
3 order of what they were in 1990, perhaps not quite so  
4 high.

5 MR. HAGENS: That's all I have. Thank you.

6

7 FURTHER EXAMINATION

8 BY MR. SMART:

9 Q. How much lower would they have been in 1995 than  
10 in 1990?

11 A. I don't know at this point. I haven't had a  
12 chance to make an analysis of that.

13 Q. What you're saying, though, is that plaintiffs  
14 that received flooding in 1990, all of them received  
15 flooding in 1995, is that your testimony?

16 A. No. I was not testifying to that.

17 Q. Do you know who received flooding in 1995?

18 A. No, I don't.

19 Q. You've never studied that, have you?

20 A. No.

21 Q. So you can't tell us which properties  
22 experienced floodwaters in 1995?

23 A. That's correct.

24 Q. Would you expect if somebody received flooding  
25 in 1975 they would have received flooding in 1990?

00254

1 A. I think there's a good chance. I think the  
2 water surface elevations would be comparable. There might  
3 be localized changes, but I think they'd be comparable.

4 Q. In your capacity as a hydrologic engineer -- is  
5 that the way right way to describe your profession?

6 A. That's close enough.

7 Q. Have you advised various governmental entities  
8 over the last 20 years with respect to the construction  
9 and building of dikes?

10 A. Yes.

11 Q. Have you designed dikes yourself?

12 A. Yes.

13 Q. When you design them, do you design them so that

14 they will disappear if there is a flood?

15 A. No.

16 Q. Would you agree that if you're going to have a  
17 dike, you should have one that works?

18 MR. HAGENS: On whom? Object to the form  
19 of the question. Works for who, counsel?

20 Q. I'll rephrase the question. Would you agree  
21 that if you're going to have a dike it makes sense to have  
22 one that has a lesser rather than greater chance of  
23 washing away during a flood?

24 A. Well, in fact, that's done in levee systems, so  
25 that failure points are predictable. I think a

00255

1 responsible engineer would do enough work to know how the  
2 structure would perform that he's designing. Both with  
3 respect to its likelihood of failure and with respect to  
4 any potential impacts or changes on others that would  
5 result from construction of the works.

6 Q. Have you designed improvements to levees in  
7 western Washington over the last 20 years?

8 A. Yes.

9 Q. For whom?

10 A. The Corps of Engineers.

11 Q. Anyone else?

12 A. A private party in Sequim.

13 Q. Anyone else?

14 A. Not that I recall offhand.

15 Q. How many levees have you designed for the Corps  
16 of Engineers?

17 A. Several miles at Grays Harbor, the Aberdeen,  
18 South Aberdeen, Cosmopolis and Hoquiam. Several miles  
19 along the Yakima river in Yakima. Several thousand feet  
20 along the lower Elwha. I'm sure there are more, but I  
21 don't recall offhand.

22 Q. And did you notify any individuals as to what  
23 effect these levees were going to have on them, in your  
24 opinion?

25 MR. HAGENS: Objection as to form, lack of

00256

1 foundation. Go ahead and answer.

2 A. I wasn't the engineer responsible for the  
3 overall design of these projects, and it wasn't my  
4 responsibility to do more than analyze them from a  
5 hydraulic engineering standpoint.

6 Q. My question is, did you notify any residents in  
7 the areas where you were designing the levee of what  
8 effect you thought they would have on them?

9 MR. HAGENS: Objection as to form, lack of

10 foundation. It wasn't established it would be his  
11 responsibility to do so.

12 Q. Go ahead and answer the question.

13 A. What I did do was analyze them as to their  
14 effect on water surface profiles and inform my clients,  
15 who did have that responsibility.

16 Q. I take it that you did not do anything in that  
17 regard, is that correct?

18 A. Communicating directly with --

19 Q. Yes.

20 A. That's correct.

21 Q. And your clients in each case was the Corps of  
22 Engineers, the owner of the dike, is that right?

23 A. That's correct.

24 Q. And it's your testimony that the owner of the  
25 dike would have that responsibility?

00257

1 A. Yes.

2 Q. Have you talked with any of the plaintiffs in  
3 this case with respect to water surface elevations that  
4 they had experienced in any flood?

5 A. Yes.

6 Q. Who did you talk with?

7 A. Well, we visited several during the course of  
8 one day. I have a hard time keeping their name straight.  
9 But I do recall meeting Ken Johnson. There were several  
10 people along Francis Road whose names I don't recall. We  
11 met with a couple in the Clear Lake area whose name  
12 escapes me.

13 Q. The Austins?

14 A. I don't recall. It's been probably three years.  
15 And we met with a couple of homeowners in the Lafayette  
16 Road area.

17 Q. Okay. Which floods did you ask them about  
18 concerning what water levels they experienced?

19 A. Well, you listened to whatever they had to  
20 offer, but as I recall, we especially probed to get  
21 information about 1975 and 1990.

22 Q. And did you keep notes of what they told you  
23 with respect to what water levels they experienced in  
24 those two floods?

25 A. Yes, I think we did.

00258

1 Q. And where are those notes?

2 A. I think you probably have those. I think  
3 they're part of the survey notes that we provided to you  
4 earlier.

5 Q. Was the information from those notes included on

6 the elevations identified in Exhibits 4-G and 4-H to the  
7 Regan deposition?

8 A. I can't answer that question. I can't  
9 discriminate between the high water marks from the Corps  
10 and the high water marks from our own surveys on that  
11 exhibits. I could --

12 Q. Let me ask it this way. Did you receive any  
13 identifications of high water marks from these plaintiffs  
14 that you met with that you did not include in Exhibits 4-G  
15 or 4-H to the Regan deposition?

16 MR. HAGENS: Objection as to form. Go  
17 ahead and answer the question.

18 A. Not to my knowledge.

19 Q. Would it be correct to say then that the water  
20 surface elevations that are identified in Exhibits 4-G and  
21 4-H of the Regan deposition include the water surface  
22 elevations that you were told about when you met with the  
23 plaintiffs at their residences? Is that correct?

24 A. I think that's probably correct, yes.

25 Q. That was your intention, is to include those in

00259

1 these documents?

2 A. Yes, although there can be inconsistencies  
3 between different observations, and if there were a  
4 conflict between say a Corps of Engineers high water mark  
5 and one of the local residents, we might give more  
6 significance to the Corps's value. So I'm not sure  
7 they're all there.

8 Q. Well, where are the ones that were not included?

9 A. I think all the basic information would be with  
10 the survey notes.

11 Q. Well, I understand about survey notes. What I'm  
12 talking about is, where are the recorded notes concerning  
13 your conversations with the plaintiffs with regard to  
14 water surface elevations that they experienced in previous  
15 floods?

16 A. I believe that information resides in one place.

17 Q. Where is that?

18 A. Our observations in the field led to subsequent  
19 surveys, and I believe the survey notes, notes of our  
20 field reconnaissance, are together.

21 Q. Again, I'm not talking about your observations  
22 and I'm not talking about your survey notes. I am talking  
23 about notes of your conversations with plaintiffs where  
24 they told you what water surface elevations they had  
25 experienced in previous floods.

00260

1

MR. HAGENS: He's already told you the

2 answer to that like two times.  
3 A. I think that information's in the same place. I  
4 believe it's --  
5 Q. And where is that place?  
6 A. With the survey notes, I believe.  
7 Q. Well, then I'm also going to demand that those  
8 be produced again.  
9 MR. HAGENS: They've been turned over.  
10 MR. SMART: We don't have them.  
11 MR. HAGENS: I don't know whether you made  
12 copies or not.  
13 MR. SMART: You didn't bring any documents  
14 to this deposition --  
15 MR. HAGENS: We brought a ton of documents  
16 to the last deposition. You had weeks to go over this  
17 then and pick what you wanted. So don't accuse of us of  
18 not turning over everything these fellows have produced.  
19 I mean, if you didn't take them, that's fine, we'll get  
20 them available to you, but we're not going back hunting  
21 for stuff.  
22 MR. SMART: That's what I'd like to do, is  
23 just have those survey notes with these other documents.  
24 And then I can take a look at them.  
25 MR. HAGENS: We didn't say we wouldn't make

00261

1 it available to you.  
2 MR. SMART: Good. Great. We don't have an  
3 argument, although I know you want to have one.  
4 MR. HAGENS: You want to accuse us of  
5 hiding stuff when we did nothing here.  
6 MR. SMART: Let's go off the record.  
7 (Discussion off the record)  
8

9 E X A M I N A T I O N

10 BY MR. ANDERSON:  
11 Q. Dr. Mutter, in your analysis in your study that  
12 led to Exhibit 11 or 12, did you do any analysis of the  
13 effect of any civil works upstream of the Nookachamps  
14 Valley or the effect that those civil works would have on  
15 flood levels?  
16 A. The model extended through the Highway 9 bridge  
17 and at least past Highway 9 itself. To that extent, I  
18 guess that would be considered upstream of the Nookachamps  
19 area. Those civil works are all in the model.  
20 Q. Anything beyond that?  
21 A. Beyond meaning upstream?  
22 Q. Yes.  
23 MR. SMART: And the Highway 9 bridge.  
24 A. We might have gone as far as the railway bridge,  
25 the abandoned railway bridge, but I don't recall.

00262

1 Q. But beyond the abandoned railway bridge you  
2 didn't analyze the effect of any civil works on flood  
3 levels in the Nookachamps?

4 A. That's correct.

5 Q. If I understand your testimony as to the  
6 maintenance and the activities performed on the dikes  
7 between 1975 and 1990, your understanding is that those  
8 didn't affect the profile, location or height of the  
9 levees, but were rather attempts to strengthen the levees,  
10 is that correct?

11 A. I think that's a fair assessment, yes.

12 Q. And other than reducing the potential for levee  
13 failure, assuming that's what these attempts to strengthen  
14 the levees did, are you aware of any changes to the levees  
15 between 1975 and 1990 that would have had any effect on  
16 flood levels in the Nookachamps Valley?

17 A. I'm not aware of anything significant, no.

18 Q. Do you have an opinion as to whether any of the  
19 levees would have failed in 1975 had the flood cfs been  
20 154,000 feet?

21 A. No, I don't.

22 Q. In your analysis which resulted in Exhibits 11  
23 and 12, when you removed the levees, did you consider a  
24 portion of the railroad grade north of the Burlington  
25 Northern Bridge to be a portion of the levee or a portion

00263

1 of another civil work?

2 A. I think I understand your question. The  
3 Burlington Northern railway and embankments, SR 20 and  
4 other major civil works, remained in the topography. So  
5 we removed pieces of levee that attached to those works,  
6 but not the works themselves.

7 Q. So is there a piece of the levee north of the  
8 Burlington Northern Bridge that you removed in order to  
9 reach your conclusions in Exhibit 11?

10 A. North of the Burlington Northern Bridge is a  
11 large embankment for the railway itself, and that remained  
12 in place. Not sure if that answers your question.

13 Q. Did you remove that in reaching your conclusions  
14 for Exhibit 12?

15 A. Yes.

16 MR. ANDERSON: Those are all the questions  
17 I have.

18

19 FURTHER EXAMINATION

20 BY MR. HAGENS:

21 Q. I think one of the questions counsel was getting

22 at, in arriving at the scope of your model, did you take  
23 into account civil works upstream as far as Ross Dam?

24 A. No, we didn't.

25 Q. And why not?

00264

1 A. In our opinion, the hydraulics of the  
2 Nookachamps area is not influenced by anything farther  
3 upstream than the upstream extent of our model. The flow  
4 is controlled through the bridge opening at Highway 9, and  
5 then has the opportunity to spread throughout the area  
6 downstream and/or escape through levees, and so on. But  
7 changes that might take place farther upstream wouldn't  
8 have any effect on that process. The flow all has to come  
9 together at the Highway 9 bridge. So there's really no  
10 need to do any simulation farther upstream.

11 Q. And then counsel asked you about your experience  
12 in actually designing levees or dikes. And you indicated  
13 several that you had done work on. And as part of that  
14 testimony, you stated that your client had the  
15 responsibility for notifying people of the impacts of  
16 these levees or dikes that you were designing for the  
17 Corps of Engineers. Do you recall that testimony?

18 A. I do.

19 Q. Do you know if they gave any such notification?

20 A. In the indication of the projects I mentioned, I  
21 don't have any direct knowledge, but it's usually their  
22 policy to do so.

23 MR. SMART: Move to strike the last part of  
24 that as being non-responsive.

25 Q. What do you mean by it's their policy to do?

00265

1 What did you know about their policy with respect to  
2 notification?

3 MR. SMART: Objection. Without foundation.

4 Q. Go ahead.

5 A. Well, as a public agency the Corps of Engineers  
6 seems to go out of its way to inform people before, during  
7 and after construction of flood control projects as to  
8 their intentions and the costs and impacts, and so on.  
9 It's a very public process.

10 Q. And indeed there was such a process in 1979 in  
11 connection with the lower levee project, isn't that right,  
12 up in Skagit County?

13 A. Yes.

14 Q. And in the course of that project the Corps of  
15 Engineers put out several public notices about the  
16 proposed project, did it not?

17 A. Yes. And they held public meetings.

18 Q. And on this question of notification and civil  
19 works upstream, are you familiar with the extent to which  
20 the Corps of Engineers goes in acquiring flowage easements  
21 when it builds a dam or other obstruction in the waterway  
22 that's going to have the effect of flooding people? Do  
23 you have any understanding of how far the Corps of  
24 Engineers goes in that regard?  
25 MR. SMART: Object to the form of the

00266

1 question.  
2 A. I'll have to say no, I don't know what the  
3 limits are.  
4 Q. Do you know if it acquires flowage easements as  
5 part of its activities if they're going to install a dam  
6 or other structure that's going to obstruct the natural  
7 flow of water?  
8 A. It's my understanding that they do acquire them  
9 for that purpose, yes.  
10 Q. Okay. You don't know how far they acquired them  
11 in terms of likelihood of impact, but you know that they  
12 do, is that what it gets down to?  
13 MR. SMART: Object to the form of the  
14 question.  
15 A. Yes.  
16 Q. Okay. Did you ever see any evidence in any of  
17 the files you're seeing here, or reviewed, that Skagit  
18 County ever tried to get a flowage easement from any of  
19 the plaintiffs in this case?  
20 A. I haven't seen anything. I'm not aware that  
21 they did.  
22 MR. HAGENS: That's all I've got.  
23  
24  
25

00267

1 FURTHER EXAMINATION  
2 BY MR. ANDERSON:  
3 Q. Dr. Mutter, am I to understand your testimony  
4 that the Highway 9 bridge provides some limit as to the  
5 volume of water that can flow into the lower Skagit?  
6 A. No. I didn't say that.  
7 Q. Can you explain what you meant by your testimony  
8 in response to counsel's questions regarding the Highway 9  
9 bridge?  
10 A. What I intended to say was that the way our  
11 model has been constructed, there's no way that water can  
12 enter the modeled area but through the Highway 9 bridge.  
13 And to that extent there's no need to model anything

14 upstream from that vicinity in order to know we've  
15 accounted for all the flow into and through the model.  
16 Q. And in terms of your model, does your model  
17 incorporate some type of limit as to what can flow into  
18 the model through the Highway 9 bridge?  
19 A. No. I'm not quite sure where you're going with  
20 that, but no, we impose no limit there.  
21 Q. Well, I guess where I'm going is to try and  
22 understand whether -- if the upstream flow of the water  
23 had increased during this flood event, would that water  
24 have come through the Highway 9 bridge and into the  
25 Nookachamps area? Or are you saying that based on your

00268

1 model, that no more water could have come into that area  
2 through the Highway 9 bridge?  
3 A. Maybe we should clarify that our simulations  
4 were performed for steady flow conditions that  
5 corresponded to the maximum flow rate that was observed in  
6 1990. I think what you're asking about is temporal  
7 effects, where the flow increased over time and decreased  
8 over time. And in fact we took the worst condition, if  
9 you will, the peak discharge, and performed our  
10 simulations assuming a steady flow at that rate throughout  
11 the study reach.  
12 Q. Okay. And I guess what I'm trying to understand  
13 is what your model assumed is that at some point there was  
14 some maximum flow rate through the Highway 9 bridge?  
15 A. And through the entire modeled reach, yes.  
16 Q. And my question is, is there any limitation  
17 other than that's what the water that went through there  
18 at that point in time -- in other words, could more water  
19 have come through, could the maximum flow rate have been  
20 higher?  
21 A. Sure. Yes.  
22 MR. HAGENS: You mean under his model,  
23 or --  
24 MR. ANDERSON: Well, under his model or in  
25 real life.

00269

1 A. Absolutely.  
2 MR. ANDERSON: Those are all the questions  
3 I have.  
4  
5 FURTHER EXAMINATION  
6 BY MR. SMART:  
7 Q. In fact, the flow does go up and then down,  
8 correct?  
9 A. In terms of its time, variation?

10 Q. Yes.  
11 A. Yes.  
12 Q. But your model assumes that it always remains  
13 constant, is that correct?  
14 A. Our final simulations make that assumption, yes.  
15 Q. And you assume that it remains constant at the  
16 highest rate that it achieves during a particular flood  
17 event, correct?  
18 A. During the 1990 simulation itself, we did, yes.  
19 Q. Well, did you do any simulations for other  
20 floods in which you assumed that it was at a different  
21 than peak discharge?  
22 A. Yes, we did. We ran a two dimensional unsteady  
23 stimulation to determine whether that was necessary, it  
24 was a sensitivity analysis of a base case where --  
25 Q. What's a base case?

00270

1 A. That's what I'm about to describe. A case  
2 wherein there was a time variation in the inflow and we  
3 allowed that to occur over the same duration of time as  
4 the 1990 event and then observed what came out the  
5 downstream end of the model. And in fact, there was very  
6 little attenuation. In our judgment it wasn't worth  
7 treating as an unsteady process. It was accurate  
8 enough to treat it as a steady state flow, which made it  
9 much simpler to analyze. Much less time-consuming to  
10 analyze.  
11 Q. Did you perform any analysis on the effect of  
12 upriver storage facilities on the 1990 flood?  
13 A. No.  
14 Q. You would agree, would you not, that upriver  
15 storage facilities did have an effect on the amount and  
16 timing of the water coming downstream, wouldn't you?  
17 A. Yes.  
18 Q. And you would also agree that the less water  
19 that came downstream during the peak of the flood, the  
20 better off everybody who was exposed to flooding would be?  
21 A. Yes.  
22 Q. Did you ever analyze what the flood levels would  
23 be in the 1990 flood at any point along the river if the  
24 upstream storage facilities such as Ross Dam were not  
25 there?

00271

1 A. No.  
2 Q. So when you say in Exhibit Number 12 that you  
3 removed all of the public works, you didn't remove the  
4 dams, did you?  
5 A. That's correct.

6 Q. What are the public works that you did remove  
7 for Exhibit Number 12?

8 MR. HAGENS: He already went through all  
9 this.

10 MR. SMART: No, he didn't Carl. He didn't  
11 identify exactly what they were. He just said he removed  
12 them all.

13 A. They would include Highway 9, Interstate 5,  
14 Highway 99, SR 20, and the Burlington Northern railway  
15 embankments, as well as all the levees.

16 Q. Take away the bridge?

17 A. Yes.

18 Q. Let's see if I got the list right. Highway 9,  
19 Burlington Northern railway embankment, the Burlington  
20 Northern Bridge, Highway 99, I-5, Highway 20, and the  
21 levees themselves are the works that you removed for  
22 Exhibit Number 12, is that correct?

23 A. I think that's correct.

24 Q. And those are the only things that you removed,  
25 correct?

00272

1 A. As far as I recall, yes.

2 MR. SMART: Okay, thank you.

3 (Deposition concluded at 2:00 p.m.)

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STATE OF WASHINGTON )  
COUNTY OF KING )

I have read my within deposition, and the same is true and accurate, save and except for changes and/or corrections, if any, as indicated by me on the correction sheet hereof.

\_\_\_\_\_  
D. GERALD MUTTER  
Taken December 19, 1995

SUBSCRIBED TO before me this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_.

\_\_\_\_\_  
Notary Public in and for the State of \_\_\_\_\_, residing at \_\_\_\_\_

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C E R T I F I C A T E

STATE OF WASHINGTON )  
COUNTY OF KING )

I, the undersigned Notary Public in and for the State of Washington, do hereby certify;  
That the annexed and foregoing deposition of each witness named herein was taken stenographically before me and transcribed under my direction;  
I further certify that the deposition was submitted to each said witness for examination, transcribed, unless indicated in the record that the parties and each witness waive the signing;  
I further certify that all objections made at the time of said examination to my qualifications or the manner of taking the deposition, or to the conduct of any party, have been noted by me upon said deposition;  
I further certify that I am not a relative or employee of any such attorney or counsel, and that I am not financially interested in the said action or the outcome thereof;  
I further certify that each witness before examination was by me duly sworn to testify to the truth, the whole truth and nothing but the truth;

00275

1 I further certify that the deposition as  
2 transcribed is a full and correct transcript of the  
3 testimony, including questions and answers and all  
4 objections, motions, and exceptions of counsel made and  
5 taken at the time of the foregoing examination;

6 IN WITNESS WHEREOF, I have hereunto set my hand  
7 and affixed my official seal this 19th day of December  
8 1995.

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Mark Hovila  
Notary Public in and for the  
State of Washington, residing  
at Seattle