

280

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE DISTRICT OF ALASKA

3
4 STATE OF ALASKA,

5 Plaintiff,

6 vs.

7 UNITED STATES OF AMERICA; CHICKEN
8 VENTURES, LLC., an Alaska limited
9 liability company; GEORGE W.
SEUFFERT, SR.; GEORGE W. SEUFFERT, JR.,

10 Defendants.

11 _____
12 Case No. 3:12-CV-00114-SLG

13
14 DEPOSITION OF DR. ROBERT MUSSETTER

15 Taken April 23, 2015
16 Commencing at 9:00 a.m.

17 Volume I - Pages 1 - 228, inclusive

18 Taken by the Plaintiff
19 at
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22 Anchorage, Alaska 99501

23 Reported by: Susan J. Warnick, RPR
24
25

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18 Present: Kevin Sorensen, SOA, Dpt. of Natural Resources
19 Jonathan Fuller
20 Don Whitaker

21 Taken by: Susan J. Warnick, RPR

22 BE IT KNOWN that the aforementioned deposition was taken
23 at the time and place duly noted on the title page, before
24 Susan J. Warnick, Registered Professional Reporter and
25 Notary Public within and for the State of Alaska

PROCEEDINGS

1 DR. ROBERT MUSSETTER,
2 called as a witness herein, being first duly sworn to
3 state the truth, the whole truth and nothing but the truth
4 by the Notary, testified under oath as follows:

5 EXAMINATION

6 BY MR. SCHECHTER:

7 Q Good morning, sir. My name is Mike Schechter. I'm
8 an assistant attorney general with the Alaska Department
9 of Law. We're here today in the matter of State of Alaska
10 v. United States, pertaining to the navigability of the
11 Mosquito Fork.

12 Would you please state your full name and spell
13 your last name, please?

14 A All right. It's Robert Allen Mussetter,
15 M-u-s-s-e-t-t-e-r.

16 Q And would you please provide a business address?

17 A It's 3810 Automation Way, Suite 100, Fort Collins,
18 Colorado 80525.

19 MR. SCHECHTER: And counsel, would you please
20 make your appearance.

21 MS. ROBERTS: Rachel Roberts for the United
22 States. Last name is spelled R-o-b-e-r-t-s.

23 MR. SCHECHTER: And with the State of Alaska we
24 have Jessie Alloway, assistant attorney general with the
25 Department of Law; Kevin Sorensen from the Department of

1 Natural Resources; Jon Fuller; and Doug Whitaker, who are
2 our -- two of our experts in this case.

3 BY MR. SCHECHTER:

4 Q Dr. Mussetter, have you ever had your deposition
5 taken before?

6 A Yes, I have.

7 Q How many times?

8 A I don't know the exact number. A dozen or so.

9 Q Okay. So would it be fair to say that you're
10 familiar with the process?

11 A I believe I am.

12 Q And so you understand that today you've been sworn,
13 you're under oath, and your testimony today is -- has the
14 same effect as if it were given in a court of law?

15 A That's correct.

16 Q And we have a court reporter here today. And you
17 understand that she can only record audible answers.

18 Do you understand that?

19 A I do understand that.

20 Q Okay.

21 A I may forget sometimes; you'll remind me, I'm sure.

22 Q I will do my best to promptly remind you.

23 Okay. And do you understand that we are looking
24 for full and complete answers to the questions that I ask
25 today?

1 A I do understand.

2 Q So my responsibility today is ask questions that you
3 can understand. I would ask that you help me in my
4 responsibility: If you don't understand a question of
5 mine, that you say so and let me know, and I can either
6 rephrase the question or re-ask it in a way -- or maybe
7 provide additional information.

8 Would that be acceptable to you?

9 A Yes.

10 Q So I will try to take breaks on occasion so that
11 everybody is comfortable, for whatever needs folks might
12 have. And a half hour for lunch. Would that be okay?

13 A Sure.

14 Q I would ask that, if -- and you can ask for a break
15 whenever you feel you might need one. I would ask that,
16 if there's a question pending at the break, that you
17 answer the question before we go on the break.

18 Will that be acceptable?

19 A Sure.

20 Q And then, if during the course of the day -- and, you
21 know, this is true in life -- sometimes we remember
22 additional information or we want to clarify something
23 that we said earlier. If that happens and you feel that
24 additional information is important to an earlier answer
25 that you gave or that you have some reason to believe that

1 an answer you gave earlier was not completely accurate
2 or -- and you want to correct it or add additional
3 information, will you let me know?

4 A Sure.

5 Q Did you bring any documents or materials with you
6 today?

7 A I did not.

8 Q Are you taking any medication, drugs, or alcohol that
9 would make it difficult for you to understand or answer my
10 questions today?

11 A No.

12 Q Do you have any condition that would impair your
13 ability to listen to or respond to my questions?

14 A No.

15 Q Is there any reason that you would not be able to
16 answer my questions fully and accurately today?

17 A No.

18 Q What qualifications do you hold that are relevant to
19 your opinions in this case?

20 A Well, that's an open question.

21 Well, I have a bachelor's degree in civil
22 engineering, and in that -- in those studies I've
23 concentrated on hydrology and hydraulics. And then I have
24 a master of science and Ph.D. in hydraulic engineering.
25 So -- and I've spent 30 -- roughly 35 years studying

1 rivers. I think that would be the primary qualifications.
2 I'm also a boater, so I understand what it takes to travel
3 down rivers in a wide variety of boats.

4 Q Are there any other qualifications that you have that
5 you think are pertinent to your testimony and your opinion
6 in this case?

7 A Not that I can think of at this time.

8 Q Well, if there's others that you think of later, will
9 you let me know?

10 A I will.

11 Q Could you explain the difference to me between a
12 hydrologist and a hydraulic engineer?

13 A Yes. A hydrologist generally concerns themselves
14 with the quantities and timing of flow. The definition of
15 "hydrology" is basically the quantity and timing of flow
16 that occurs, as -- if we're talking specifically in the
17 context of a river.

18 "Hydraulic engineering" is more concerned with,
19 once we understand the quantity and timing of the flow,
20 the basic physics of how that flow moves through the river
21 and interacts with the boundary materials and so on.

22 Q Okay. What do you mean by "boundary materials"?

23 A The sediment, the alluvium that makes up the bed of
24 the river or the material that makes up the banks of the
25 river.

1 Q Okay. So would it be fair to say that your career is
2 more in the hydraulic engineering area than in the
3 hydrologist area?

4 A Well, I would say no. In my work, hydrology is a
5 critical part of essentially everything that I do. So I
6 would consider myself to be a hydrologist as well as a
7 hydraulic engineer.

8 Q Okay. Have you ever been terminated from any
9 position?

10 A No.

11 Q Have you or your firm ever been released from a
12 contract or had a working relationship that otherwise
13 ended because the client was not satisfied? And I
14 recognize that you work for a very large firm at the
15 moment, so yourself and your immediate group.

16 A The group that I'm familiar with, I'm aware of no
17 case where that occurred. We do work -- I do work for a
18 very large firm, and I can't speak for the rest of the
19 firm.

20 Q And how long have you worked for that firm?

21 A I sold my company to that firm in 2009.

22 Q Okay. And what firm is that?

23 A The previous firm was called Mussetter Engineering,
24 Incorporated.

25 Q And your current firm?

1 A Tetra Tech, Incorporated.

2 Q And so previous to the five or six years you've been
3 with Tetra Tech, I'd like to pose the same question for
4 your smaller firm. Has it -- and other entities that you
5 may have owned.

6 A We were never terminated from a contract for
7 nonperformance.

8 Q Have you ever been subject to professional
9 discipline?

10 A No.

11 Q In what navigability cases have you been hired as an
12 expert?

13 A I have been working on behalf of Salt River project,
14 on a series of rivers involved with the Arizona Navigable
15 Streams Commission, three specific rivers in the Gila,
16 Salt, and Verde. I was also retained and did some
17 preliminary work on the PPL Montana case. I believe that
18 was during the time between the Montana Supreme Court
19 ruling and the U.S. Supreme Court ruling. And then I also
20 played a role in the Yadkin River navigability case in
21 North Carolina.

22 Q And so the Gila, Salt, and Verde cases are ongoing?

23 A They are.

24 Q And when did that work start?

25 A I first -- I first started working on that in -- it's

1 2015. I believe 2013 -- 2012 or 2013, I don't remember
2 the exact date.

3 Q And when did you do the work on the PPL Montana case?

4 A It would have been around 2008 -- 2007 or 2008. I
5 don't recall the exact year. It was not too long before
6 we sold our company to Tetra Tech.

7 Q Okay. And the Yadkin case, what year
8 approximately -- when did you work on that?

9 A That's an ongoing case that we've been working on for
10 a couple of years.

11 Q When did you start working on it?

12 A Probably in 2012 or early 2013.

13 Q Are there navigability cases that you've worked on
14 besides the ones we've just talked about?

15 A I don't recall any others.

16 Q And in these navigability cases, have you always been
17 on the side that is a proponent of nonnavigability?

18 A Yes.

19 Q In any of those cases have you -- as you've gone
20 about your work, have you come upon information that would
21 lead you to believe that the river was navigable despite
22 working for the proponents of nonnavigability?

23 A Well, in some cases there are certainly segments of
24 the rivers that would be hard to argue that they're not
25 navigable.

1 Q Could you give some examples of those?

2 A Well, PPL Montana case, for example. The Missouri
3 River is a large river that is one of the issues in that
4 case. And there are certainly segments of the Missouri
5 River that are navigable.

6 Q And what about in the other two cases?

7 A The Arizona cases, in my opinion, none of those
8 rivers would meet the standard of navigability, the
9 portions of it that I was asked to develop an opinion on.

10 Q Have you used -- would it be fair to call the work
11 that you've done in the Mosquito Fork, or at least part of
12 that work, hydraulic modeling?

13 A Yes.

14 Q Have you used hydraulic modeling in any of these
15 other navigability cases?

16 A Yes.

17 Q Which case?

18 A We did some modeling for the Yadkin River case.
19 There was some modeling that my firm did previously for
20 another matter on the Verde River, that I -- the results
21 from that modeling I used to support my testimony in that
22 case.

23 Q And are you the primary expert working on the Yadkin
24 River case?

25 A I'm actually not.

1 Q And who is?

2 A Dr. Mike Harvey.

3 Q Does he work at Tetra Tech with you?

4 A He does.

5 Q Have you done the modeling work yourself in the
6 Yadkin River case?

7 A I did not; I supervised it.

8 Q So in either of those cases, is the work you did with
9 modeling similar to the work you did on modeling in this
10 case?

11 A Yes.

12 Q And I don't mean the modeling specifically. I mean
13 your role with relationship to the modeling, in terms of
14 whether you're a manager, whether you were putting in the
15 spreadsheets.

16 A In the Yadkin River modeling, I would say that I was
17 more in a supervisory role there. I didn't really do
18 much, if any, of the technical work in building the model
19 and executing the model. I helped strategize how to build
20 the model and then did quality reviews of the modeling to
21 help make sure that it made sense.

22 The modeling for the Gila -- I'm sorry -- for
23 the Verde River, sort of the same, except I had more of a
24 role in that. I actually did run models and make
25 adjustments and so on, although my staff did the bulk of

1 the work there as well.

2 Q And how does that compare to the work that you did on
3 modeling in this case?

4 A Again, I had staff assistants who did the bulk of the
5 work in building and executing the models, but I played a
6 much more significant role here in terms of going through
7 the details of the modeling and actually running models
8 myself and making my own adjustments to the models, to get
9 them in as good a shape as I could for what I wanted to
10 say.

11 Q So would it be fair to say that this is the first
12 case in which -- the first navigability case in which you
13 have had that much of a role in developing and creating
14 the model used in the case?

15 A No. I wouldn't say that's a fair statement.

16 Q Okay. Why not?

17 A Because, in all of those cases, I was responsible for
18 seeing that the model was -- modeling was done correctly
19 and that the results were interpreted correctly. And so
20 the amount of actual hands-on work that I did in inputting
21 the data and so on varied, depending on the circumstances.
22 But I was equally responsible there, and I think have had
23 equally in-depth understanding of what those models were
24 about as I do with the Mosquito Fork models.

25 Q Did you use the same models in those cases?

1 A The -- well, the answer is no.

2 Q What model did you use in the Yadkin case?

3 A In the Yadkin case, we actually did some
4 two-dimensional modeling, so it's a model called SRH-2D.

5 Q And what about in the Verde River case?

6 A The Verde River case, actually it was done more than
7 10 years ago, and I can't remember whether it was during
8 the time when we were transitioning from the old HEC-2
9 step-back water code to the more recent HEC-RAS code. I'm
10 not really sure. The modeling may have been done with
11 HEC-2 for that case. I don't clearly remember. But
12 essentially they're one-dimensional. The HEC-2 was a
13 precursor to HEC-RAS, so effectively they're the same type
14 of modeling.

15 Q And has -- has -- if Verde was done under HEC-RAS, do
16 people call it "HEC-RAS"?

17 A Some people call it that, yes.

18 Q What would you call it?

19 A When I'm being sloppy in my language, I call it
20 HEC-RAS, although the developers of the model, the
21 hydraulic engineering center, Corps of Engineers, prefers
22 that you call it HEC-RAS. So I try to do that. But habit
23 sometimes takes over.

24 Q Well, we'll try not to let the army be too pedantic
25 for us.

1 A HEC-RAS is fine.

2 Q Okay. You said the work on had Verde River was done
3 about 10 years ago; is that correct?

4 A More than 10 years. I believe it was 2002 or '3.

5 Q So has HEC-RAS changed significantly since then?

6 A There have been improvements to it, yes. I know I'm
7 not sure I'd qualify them as significant, but there have
8 been some upgrades.

9 Q Welcome back to all of that.

10 Sorry. Actually, let me ask a couple more
11 questions on that. Is the Verde River in its ordinary and
12 natural condition, in terms of being evaluated for
13 navigability?

14 A That's a tough question to answer. Parts of it are
15 -- the physical character of the river has probably not
16 been substantially altered by human activity since
17 European settlement. Parts of it have. The hydrology
18 certainly has been altered. And there are some changes
19 that have occurred in the river associated with the
20 changes in hydrology. So I think, for the most part,
21 you'd have to say it's probably -- mostly not in its
22 ordinary and natural condition -- or its natural
23 condition, I should say.

24 Q Would it be fair to say, in the Verde case, that it's
25 an issue of contention?

1 A Yes.

2 Q Okay. And what about the Yadkin River; is that in
3 its ordinary and natural condition?

4 A It is not.

5 Q And is that issue in dispute?

6 A I think it would be hard to dispute that some large
7 dams in the river don't change the natural character of
8 the river.

9 Q Okay. So would it be fair to say that both the
10 Yadkin and Verde are in significantly different states
11 than the Mosquito Fork?

12 A I would say the Mosquito Fork is closer to being in
13 its natural condition.

14 Q Is that something that would affect the modeling and
15 the questions being asked, that you would want to ask
16 about the river?

17 A Well, you certainly need to consider whether there
18 are -- whether changes have been made in areas that you're
19 trying to model that wouldn't represent a natural
20 condition. So it's a relevant question, yes.

21 Q Let's go back to talking about all of your litigation
22 work generally, so not just these navigability cases.

23 Has your testimony ever been refused by a court?

24 A No.

25 Q Has a court or other tribunal ever found you not

1 qualified as an expert in a case where you were offered as
2 an expert witness?

3 A No.

4 Q In your work in navigability or other issues where
5 you've been involved in litigation, have you interpreted
6 case law or other legal materials and applied it to your
7 work?

8 A I'm not an attorney.

9 Q Okay. I understand that.

10 A I have read case law to help understand technical
11 aspects of the work I'm doing and the context of the -- of
12 that technical work related to the case law. I probably
13 said that backwards, but hopefully you understand what I'm
14 saying.

15 I have read the case law. I'm not saying that I
16 interpret it. Certainly I don't interpret it in a legal
17 context, but I do periodically use information from
18 previous cases to help me understand the technical things
19 that need to be looked at.

20 Q So, I mean, is it fair to say that you read the cases
21 and think about the context of your hydrological problems
22 in that context?

23 A I think that's a fair statement.

24 Q Do you have a general understanding of the subject
25 matter of the case that we're here about today?

1 A I think so.

2 Q What is that understanding?

3 A Well, at the fundamental level, it's a question of
4 whether Mosquito Fork was navigable in its ordinary and
5 natural condition at the date of statehood. And the basic
6 question is, in simple terms, who owns the bed and banks
7 of the river.

8 Q What question or questions were you asked to answer
9 in this case?

10 A I was asked to render an opinion on whether or not
11 the Mosquito Fork would have been basically boatable in
12 its ordinary and natural condition, using the kinds of
13 watercraft that were in customary use in that part of
14 Alaska at roughly the time of statehood.

15 Q You just used the term "boatable, and a second before
16 you used the term "navigable." Could you differentiate
17 your understanding of those two terms for me?

18 A Yes. "Navigable," I think, is a legal term, and the
19 navigability of a river turns on -- or is determined by
20 factors -- well, I'm saying that inaccurately. Factors
21 other than hydraulic engineering can affect whether a
22 river is navigable. My specific role in this case is to
23 analyze the hydraulic conditions and the boatability. And
24 then we combine that with information from other experts
25 and from the, you know, legal interpretations of the

1 definition of "navigability," to come up with an overall
2 opinion as to navigability.

3 Q And when you say "navigability," do you mean
4 navigability in fact, as you understand that as a legal
5 term?

6 A Yes. I think that's what I mean.

7 Q As a term of art?

8 A I'm not sure I understand all the subtleties of what
9 you would mean when you say that, but yes, I mean, I
10 understand that a river is navigable if it's navigable in
11 fact. That's one of the tests.

12 Q You understand there's other kinds of federal
13 navigable standards, right?

14 A I do understand that.

15 Q Okay. So something that is a navigable water in the
16 U.S. may or may not be navigable in fact?

17 A That's correct.

18 Q Okay. So -- but today we're talking about whether
19 the Mosquito Fork is navigable in fact or not?

20 A Right.

21 Q And so are you prepared to render an opinion as to
22 whether the Mosquito Fork is navigable in fact?

23 A There may be aspects from the legal determination
24 that I'm not prepared to render an opinion on there. I am
25 prepared to render an opinion on whether it was navigable

1 using the boats that have been defined for me as in
2 customary use at the time of statehood.

3 Q So when you say "navigable" in that last sentence, do
4 you really mean boatable for those boats?

5 A Yes, I think that's probably a better term.

6 Q Are you prepared to render all of your opinions in
7 this case today?

8 A I believe so.

9 Q Have you done all the required work to reach the
10 opinion or opinions you have in this case?

11 A I believe so.

12 Q Is there any work that hasn't been done that is
13 necessary to render your opinion?

14 A Not to my knowledge.

15 Q Is there any work that you wanted to do but were
16 unable to do before rendering your opinion?

17 A Yes.

18 Q What was that?

19 A Well, as you saw from my report, I wanted to float
20 the river on a couple different occasions and was unable
21 to do that.

22 Q Is there any other work that you wanted to do, but
23 were unable to do?

24 A Not that I can think of.

25 Q How does the inability to complete the work of

1 floating the river affect your opinions?

2 A I don't think it directly affects my opinions. I
3 think I have enough information to render the opinions
4 that I'm giving in this case. But it certainly would give
5 me a higher level of comfort if I had seen the river at
6 different flow levels from what I did see.

7 Q What does "higher comfort level" mean?

8 A It means that, when you talk about something that you
9 haven't directly seen, there's always a little nagging
10 uncertainty because you haven't seen it. And when you
11 actually see something, it's much more -- it's much easier
12 to directly be completely confident of what you're saying.

13 Q Have you asked for any information from counsel or
14 anyone else affiliated with the defendant that has not
15 been provided to you?

16 A Not to my knowledge.

17 Q Can you please state the opinions that you're
18 prepared to give in this case?

19 A My opinion is that the segments of the river that I
20 spelled out in my -- specifically spelled out in my expert
21 report, and I -- just from memory I don't remember the
22 exact river miles, but I'm sure you have that -- are not
23 boatable.

24 And based on the definitions of the craft that
25 would have been viable for commercial purposes or

1 customary use at the time, it's also my opinion that those
2 segments of the river would not be navigable.

3 Q Are there subsidiary opinions that you need to render
4 to support that opinion?

5 A Nothing that I can think of. I mean, there are
6 certainly a multitude of things that went into building
7 that opinion, that I'm sure we'll talk about. But I can't
8 think of any significant thing that would be worth
9 discussing at this time.

10 Q Okay. Why don't we get your report out.

11 (Exhibit 1 was marked.)

12 BY MR. SCHECHTER:

13 Q And, Dr. Mussetter, you've been handed what's been
14 marked as Exhibit 1 for the purposes of this deposition.

15 Can you identify Exhibit 1?

16 A Yes. This is Expert Report of Dr. Robert A.
17 Mussetter, Navigability of Mosquito fork River, Alaska
18 versus United States. And there's a civil action number
19 that we probably don't need to read.

20 Q Okay. And is this a report that you prepared?

21 A It is.

22 Q Okay. And do you believe this to be a full and
23 complete copy of the report that you prepared?

24 A I haven't looked thoroughly through the exhibit that
25 you just handed me, but on the surface it appears to be.

1 Q Okay. Will you let me know if anything jumps at you
2 as being incomplete?

3 A I will.

4 Q And something I forgot to -- I neglected to mention
5 earlier. If a document -- if you think of a document that
6 may help your answer or may refresh your recollection
7 about something, will you let me know what that is and
8 we'll see if we can get that for you?

9 A Sure.

10 Q So on pages 1 and 2 of Exhibit 1, is this a complete
11 list of the opinions that you will render in this case?

12 A I believe it is, yes.

13 Q And you state that the Mosquito Fork, from river mile
14 3.3 to river mile 36.3 is not navigable; is that correct?

15 A That's correct.

16 Q And you also state that river mile 55 through mile 60
17 is not navigable; is that correct?

18 A That's correct.

19 Q So with regard to the other reaches in the Mosquito
20 Fork, between mile zero, its confluence, and river mile
21 80.5 at Wolf Creek, are there other segments of the river
22 that you've reviewed and are prepared to issue an opinion
23 on?

24 A The reach below Chicken, I did not specifically study
25 that reach because it's my understanding that that's

1 already been determined to be navigable for whatever
2 reason. And so I didn't focus any energy on that part of
3 the reach.

4 The other parts beyond the two that we just read
5 have characteristics that would make them more boatable
6 than the ones that I believe are not navigable according
7 to this opinion. And whether I'm prepared to say that
8 they would be navigable, I would not -- I would say I'm
9 not prepared to say that, but they are certainly more
10 boatable.

11 Q But you would not testify that they're nonnavigable?

12 A I do not intend to testify to that fact.

13 Q And that would be from river mile zero to 3.3 you are
14 not prepared to testify that that's not navigable?

15 A I will not express that opinion, yes.

16 Q And the same question as to river mile 36.3 to river
17 mile 55?

18 A I am not planning to testify that those are not
19 navigable.

20 Q And from 60 to 80.5?

21 A Same answer.

22 Q Okay. That -- from river mile to 60 to 80.5, you
23 will not be prepared to testify that it is not navigable?

24 A That's correct.

25 Q Can you explain more about your -- the statement you

1 just said about those general areas, that they are more
2 boatable. What is your basis for saying that?

3 A Well, for example, the Mosquito Flats area, which is
4 upstream from river mile 60, is a relatively flat,
5 meandering reach. The flow depths, even at fairly low
6 flows, are reasonably substantial. There are some
7 challenges to navigation in those regions relating to
8 woody debris and so on, but nothing there that in my
9 opinion would preclude use of the criteria boats that I
10 talk about in this report.

11 Q And what about from 36.3 to 55?

12 A That portion of the reach grades more toward the
13 nonnavigability, but still it's a relatively flatter
14 gradient than the other reaches. It has less
15 obstructions, if I can use that term. And so it's more
16 boatable than the reaches that I have the opinion that
17 they're not navigable.

18 Q And what information did you collect or gather on
19 these more boatable reaches to determine that?

20 A That's primarily from field observation, coupled with
21 information that I can obtain from mapping and aerial
22 photography, direct observation of the river in those
23 areas.

24 Q Is it your analysis that the river in the more
25 boatable areas looks different than in the areas where you

1 have -- where your opinion is that it is not navigable?

2 A There are differences, yes.

3 Q What are those differences?

4 A Well, the flow depths tend to be greater. There are
5 less riffles and rapids in really shallow areas that would
6 make boating challenging.

7 Q How do you know what the flow depths are in those
8 areas?

9 A By observation.

10 Q Not by direct measurement?

11 A I did no direct measurements in those areas.

12 Q Did you do any other analysis to come to that
13 conclusion, other than the things that we just talked
14 about, field observation, mapping, et cetera?

15 A No.

16 Q Why didn't you do modeling for those areas?

17 A Well, as I said, those areas appeared to have
18 reasonably substantial depths. I saw less obstructions to
19 boatability in those reaches, and I didn't feel it was --
20 I had to prioritize my resources, and I wanted to focus my
21 energy on the areas where it appeared to be questionable
22 whether it would be boatable or not.

23 Let me just clarify one point.

24 Q Sure.

25 A We did have one study site that we built a model for

1 and evaluated, that's in the Mosquito Flats area, that is
2 in one of the areas that I would say is more boatable. So
3 in spite of what I said, we did do some direct
4 measurements in that particular area.

5 Q Is that the site that your materials refer to as Site
6 N?

7 A Yes.

8 Q N as in Nancy?

9 A Yes.

10 Q Let's also go -- have this marked.

11 (Exhibit 2 was marked.)

12 BY MR. SCHECHTER:

13 Q Dr. Mussetter, I've handed you what has been marked
14 as Exhibit 2 for purposes of this deposition.

15 Do you recognize this document?

16 A I do.

17 Q What is it?

18 A It's actually Figure 2 from my expert report. It's
19 an enlarged copy of it.

20 Q And what does it show?

21 A Well, it's an aerial photograph, satellite imagery of
22 the lower roughly 75 miles of the Mosquito Fork River.
23 And it shows river mile markers and then the locations of
24 the sites where we did our detailed studies.

25 Q I just wanted to get Exhibit 2 on the record so that

1 if you or I want to refer to it easily it's out there and
2 it's already entered and we can talk about it. But we can
3 set it aside for now.

4 A Okay.

5 Q So I think we established earlier that the opinions
6 on pages 1 and 2 of Exhibit 1 are the complete list of
7 your opinions to be rendered in this case; is that
8 correct?

9 A That's correct.

10 Q Okay. Have any of these opinions -- are any of these
11 opinions the result of changes that you made as a result
12 of errors found in a previous version of your report?

13 A The basic opinions are the same. The detailed
14 quantitative values that are listed in here to support
15 those opinions have changed as a result of that error.

16 Q And the error was in your expert report dated
17 December of 2014?

18 A That's correct.

19 Q And how did the opinions on pages 1 and 2 of Exhibit
20 1 change as a result of the errors you found?

21 A Well, I think I just explained that conceptually.
22 Some of the quantitative numbers, in terms of the numbers,
23 the discharges that would limit boatability, the number of
24 days when it would or would not be boatable changed as a
25 result of correcting that error.

1 Q And what was that error?

2 A Well, so I had a spreadsheet that I was using --
3 spreadsheet model that I was using to evaluate the
4 discharges that would result in the limiting depths for
5 boatability. And I inadvertently referenced the wrong
6 column in one of the calculations, and so it was pulling
7 the wrong discharges.

8 (Exhibit 3 was marked.)

9 BY MR. SCHECHTER:

10 Q This will be the unfortunate logistically
11 hard-to-manage-paper part of the day.

12 Dr. Mussetter, you've been handed what's been
13 marked as Exhibit 3 for purposes of this deposition.

14 Can you identify that document?

15 A Yes. This is the previous version of my expert
16 report dated December 18, 2014.

17 Q And would you turn to page 76 -- excuse me -- 73 in
18 Exhibit 3, which is the original report --

19 A Okay.

20 Q -- and page 76 in the revised report.

21 A Okay.

22 Q And are those both Table 7s?

23 A Yes, they are.

24 Q Okay. And what does Table 7 show?

25 A Well, it shows a variety of information.

1 Specifically, the number -- well, in the original exhibit
2 -- in the original report, Exhibit 3, it shows the number
3 of days when the -- each of those sites would have been --
4 would have had depths meeting or exceeding the criteria,
5 they would have been boatable; the percentage of days
6 within the open water season that that number of days
7 represents; and then the number of discrete periods when
8 you had flows above that level and then they drop back
9 below that during the open water period; and then the
10 average duration of those discrete periods for minimum
11 drafts of 8, 12, and 15 inches.

12 Q And what does the revised exhibit show?

13 A The revised exhibit is -- has been modified slightly.
14 The number of days in and the percentage of days in the
15 revised report represents the time periods when it would
16 not have been boatable, which is the opposite of what I
17 showed in the original table. And then the discrete
18 periods and the average duration are the periods when it
19 would have been boatable.

20 And it's -- the -- in the original report, the
21 table was based on the second highest rock in the control
22 volume that I analyzed for the boatability. In the
23 revised version of the table I present the results for
24 both the second highest and the highest rock.

25 Q It sounds like, in addition to correcting the error,

1 you made some substantive changes; is that fair?

2 A I just presented some additional information that I
3 didn't present in the original report.

4 Q Why did you do that?

5 A Because I felt, on retrospect, looking back through
6 the work, that the -- evaluating the boatability based on
7 the highest rock in that relatively small control volume
8 actually is worth considering.

9 Q So had we deposed you on the original day, would you
10 have been able to make that change had there not been an
11 error in your report?

12 A I don't understand what you mean.

13 Q So you produced a new report, and we canceled your
14 deposition as a result of the errors that were found in
15 your report; is that correct?

16 A That's correct.

17 Q And your original report was based on the second
18 highest rock?

19 A Correct.

20 Q And your original report presented the information as
21 the number of boatable days?

22 A Yes.

23 Q And in the new report, in addition to correcting the
24 error, you've decided to present additional information
25 that is more favorable to the U.S., as opposed to simply

1 correcting the information in your original report; is
2 that correct?

3 A Well, that's your characterization of it. I
4 presented new information that I didn't present. It was
5 information that I already had, I just didn't feel it
6 necessary to present it in the original report.

7 Q Why didn't you feel it was necessary in the original
8 report?

9 A Well, because, basing the opinion on the second
10 highest rock resulted, you know, with the erroneous
11 numbers, for sure, indicated a very substantial amount of
12 time that it wouldn't be boatable, and I didn't feel it
13 was necessary to even talk about the highest rock.

14 But that was an issue that I struggled with,
15 wrestled with, when I was developing the original report,
16 whether to use the highest or the second highest. And in
17 retrospect, I think I -- I wish I had presented that in
18 the original report. The relatively small control volume
19 that I used, if there's even one big rock sticking up into
20 knee that area, you would have a very difficult time
21 boating through the control volume without hitting that
22 rock.

23 Q And so your assumptions in the original report, then,
24 that a boater could miss the highest rock, were -- you
25 found those to be unreasonable upon further review?

1 A Yeah. I think it's -- I think it's definitely worth
2 considering the highest rock.

3 Q So using the original material, the original
4 numbers -- or the corrected numbers of the original --
5 your original analysis as presented in your original
6 assumptions, yielded, is it correct, approximately, in
7 some cases, three time as many boatable days?

8 A In some cases, that's true.

9 Q And in other cases, you know, a quarter to a third
10 more boatable days in the boatable season?

11 A Yeah, that's true.

12 Q So substantial significant changes?

13 A Well, those are your words. Larger, yes.

14 Q Well, you can disagree with my words; that's why
15 we're here. Okay.

16 So -- I mean, do you find three times as many
17 boatable days as insignificant?

18 A It's a significant number, yes.

19 Q In fact, the numbers are -- for the highest rock are
20 more favorable to the United States?

21 A Well, it would indicate less days of boatable
22 conditions, yes.

23 Q Let's turn to Table 6, which is on page 70 of the
24 revised and 69 of the original.

25 A I'm sorry. You said 70 and 69?

1 Q Yes.

2 A All right.

3 Q Okay. So Table 6, along with Table 7, are those the
4 tables where the error is most pronounced and evident?

5 A Yes.

6 Q Okay. Are there other tables or materials in the
7 report that would be influenced by the error?

8 A No. Only those two tables.

9 Q Because the error was solely in the flow
10 calculations?

11 A That's correct.

12 Q And comparing the two Table 6s, you added additional
13 information from the original to the revised.

14 What additional information did you add?

15 A Well, in the original table, the discharge numbers
16 correspond to the second highest rock. And the new table,
17 in the revised report, presents both the highest and the
18 second highest.

19 Q And that's based on your reasoning of you now feel
20 that the second highest rock is more reasonable -- excuse
21 me -- the highest rock is more reasonable?

22 A That's correct.

23 Q Okay. And what is -- what is the -- there also
24 appears to be additional information in the -- in terms of
25 columns regarding height above Thalweg.

1 What are those?

2 A Yes. I added a couple of columns just to provide
3 more information about the distribution of that -- of the
4 height of the highest or second highest rock among the
5 Monte -- thousand trials in the Monte Carlo simulation, to
6 give the reader a sense of, you know, how much does that
7 really vary from trial to trial.

8 And so I added the -- in the original table, the
9 height above Thalweg value is the median value from those
10 thousand trials. The median value is also presented in
11 the new table, and then I presented the 90 percent and 10
12 percent exceedence value. In other words, it was greater
13 than the -- for Site P1, was .9 feet above the Thalweg in
14 basically 900 of the thousand trials. And it was 1.4
15 feet above the Thalweg in a hundred of the thousand trials
16 or 10 percent.

17 Q So this is to provide the reader context and give
18 them some assurance that the median column is somewhat
19 reasonable?

20 A Yes. And also you get a sense of how widely variable
21 it is. It's -- you know, you'd have a 10 percent
22 probability that it would actually be less boatable by a
23 half a foot than what I've indicated by these discharges.
24 So it's just to give a little bit more information.

25 Q And that Monte Carlo analysis is of theoretical

1 rocks, not rocks that exist out there today?

2 A That's not true.

3 Q Okay. Why is that not true?

4 A Well, the distribution of rock sizes that went into
5 this analysis was measured in the field. The specific
6 location of those rocks in the cross-section is what is a
7 statistical -- we did a statistical evaluation of where
8 those might be located. But the actual rock sizes that
9 we're analyzing are field-measured values.

10 Q Okay. But you're taking that field-measured value
11 and adding it to an area where it may or may not exist in
12 reality?

13 A Well, again, these rocks exist at that location in
14 reality. Specifically where they are located on the
15 cross-section is the part that has uncertainty, and the
16 reason we need to do the Monte Carlo simulation.

17 Q Well, were the rock sampled from the middle of the
18 Thalweg?

19 A Some of them.

20 Q We'll come back to that in a little bit.

21 So the nature of your error in this area, in the
22 flow amount, runs from about 1.5 to more than twice as
23 much; is that correct? The flow increases were to rectify
24 the error -- the corrected amounts were somewhere between
25 1.5 and more than two times as much as the original flows.

1 A I haven't done that calculation, but that appears to
2 be reasonable.

3 Q And would you call that a significant error?

4 A Yes. It's a significant error, and the reason I felt
5 it necessary to correct it.

6 Q How did you discover the error?

7 A On the morning of my canceled deposition, I sat down
8 to review my calculations to make sure that I was
9 absolutely clear on all the details. And I noticed that
10 one of the formulas was referencing the wrong column. And
11 when I studied that in more detail, I realized that that
12 had carried through in all of the spreadsheets, and that
13 in fact these numbers are wrong.

14 Q And what -- you were looking at the spreadsheets that
15 underlie the report, not the report itself, to discover
16 the error?

17 A That's correct. That was studying the actual
18 calculations.

19 Q How did you miss these errors in the first place?

20 A I wish I knew that.

21 Q Who worked on the report -- who worked on the
22 spreadsheet? Excuse me.

23 A It's my spreadsheet. I did it.

24 Q So you entered in all that information?

25 A I did.

1 Q So what did all the assistants and the staff do on --
2 for the project?

3 A They built the model; they collected the field data.
4 I said that in the wrong order. They collected the field
5 data; they built the model; they reduced all of the
6 data -- grade size data, and so on and so forth.

7 And then I used the information from the model
8 and all the other data that we had to build the actual
9 spreadsheet.

10 Q And do you know, off the top of your head, what
11 spreadsheet it was or about what it was named?

12 A They're a series of eight spreadsheets -- I think
13 that's right -- yes, eight spreadsheets that start, I
14 believe, if I remember correctly, with the site number,
15 would be P-1 through P-9. And then I think it's -- the
16 title says something about size distribution, as I recall.
17 They're Excel spreadsheets.

18 Q In addition to the two tables we just discussed and
19 the changes in your opinions on pages 1 and 2, in revising
20 your report did you make any other changes besides
21 correcting the error?

22 A I did. And we provided an addendum with the revised
23 report that spells out those changes. And those all
24 basically were correction of typos; in one case a table
25 had been inadvertently left out of the report, and we

1 added that table in. Those clean-up type items.

2 Q Okay. And would it be fair to say -- so this
3 addendum identified Sections 2.62, 2.63, 2.64, that those
4 areas have changed significantly?

5 A Yes.

6 Q Okay. So we talked about the assumption of the first
7 rock versus second rock underlying your analysis.

8 A Yes.

9 Q What other assumptions did you change between the two
10 reports?

11 A I don't believe I changed any other assumptions. And
12 that's really not a change. It was just, you know,
13 providing additional information. The information behind
14 the highest rock was -- has always been in the
15 spreadsheet; I just chose not to present it the first
16 time.

17 Q So is your -- when I say "an assumption," I mean an
18 assumption underlying your opinion of boatability and
19 ultimately your opinion of navigability of the disputed
20 reaches of the Mosquito Fork.

21 So when we're discussing that, would it be fair
22 to say, in your original report, your assumption that the
23 river was not sufficiently boatable and, therefore, not
24 navigable based on the second highest rock?

25 A I'm sorry. I lost what you're trying to ask me.

1 Q In your original report --

2 A Yes.

3 Q -- you present no information about the highest rock.

4 A Yes.

5 Q And so in your first report, you have an opinion,
6 that for certain reaches of the river --

7 A Right.

8 Q -- the river is not sufficiently boatable and,
9 therefore, is not navigable. Is that a fair statement?

10 A Yes.

11 Q Okay. And in the original report, that opinion is
12 based on the assumption that a -- the boat would not be
13 able to avoid the second highest rock; is that correct?

14 A That's correct, yes.

15 Q In the original report?

16 A In the original report, that's the assumption.

17 Q And in the revised report, your current report, you
18 now have, again, an opinion that the river is not
19 sufficiently boatable, and supporting your opinion that
20 those reaches are not navigable?

21 A Yes.

22 Q And is that based on the assumption of the highest
23 rock or the second highest rock?

24 A Well, it's both. But as I said earlier, as I went
25 back -- I actually struggled with whether to present that

1 in the first case, in terms of the -- using the highest or
2 the second highest rock. And in retrospect, I wish I had
3 used the highest rock as well in the first round. And I
4 decided that it is of value and useful to present the
5 highest rock. And I actually believe that even the single
6 highest rock in that control volume would be difficult to
7 avoid if you were traveling through the reach with a boat
8 that had a draft that would project below the bottom -- er
9 -- I'm sorry -- below the top of that rock.

10 Q Let's say hypothetically the court says, Dr.
11 Mussetter, I believed you the first time. You're
12 absolutely right: Boater can miss the highest rock.

13 Does the second highest rock, your -- based on
14 your revised numbers, if you are forced to assume the
15 second highest rock and not the first highest rock, does
16 that support your opinion that the boat is -- the area is
17 not sufficiently boatable and, therefore, not navigable?

18 A There would still be challenges to navigation. And
19 the periods during which you would be able to traverse the
20 reach in the criterion boat that I analyzed would be
21 limited, and I still think it could not meet the standard
22 for navigability.

23 Q As you understand it?

24 A As I understand it.

25 Q And you would issue an opinion that, based on the

1 second highest rock and your revised numbers, that the
2 river is nonnavigable?

3 A Yes, I believe I would.

4 Q I just want to go through a couple of other errors on
5 the report, minor things maybe.

6 On page 5 of -- let's put away Exhibit 3, the
7 original report, for now. Clean up some of the paper.

8 So on page 5, you reference the date of
9 statehood as 1959. In the original you had used 1912.

10 A Yes.

11 Q What was 1912?

12 A It was a typo.

13 Q Okay. I believe it's Arizona's date of statehood; is
14 it not?

15 A It is.

16 Q Were you using material from a previous report on
17 Arizona to start your work?

18 A I wouldn't describe it that way. I think the wording
19 of that particular statement I basically edited from a
20 statement that I had made in one of my Arizona reports.
21 And I didn't -- inadvertently didn't get the date changed.

22 Q It's not because you believe that Mosquito Fork is
23 like one of the Arizona rivers; is it?

24 A I do not believe the Mosquito Fork is in Arizona.

25 Q Not that it's in Arizona, but that it's similar to

1 one of the Arizona rivers.

2 A I don't believe that either.

3 Q Okay. Your -- let's turn to page 78.

4 A Okay.

5 Q This lists your total compensation through October
6 2014. I note that your original report was submitted in
7 December 2014, and the revised report was submitted in
8 March. It's now almost the end of April.

9 Do you have a sense of your updated numbers for
10 how much this report cost to complete?

11 A I don't know at this time. It's -- I don't know.

12 Q Do you bill monthly?

13 A We do.

14 Q Okay.

15 A I just don't remember the number.

16 Q Can we have that updated information?

17 MS. ROBERTS: Yes.

18 (Exhibit 4 was marked.)

19 BY MR. SCHECHTER:

20 Q Dr. Mussetter, you have been handed what's been
21 marked as Exhibit 4 for purposes of this deposition.

22 Do you recognize this document?

23 A Well, I certainly recognize the format, but I'm not
24 sure I recognize all the numbers that are in it at this
25 time. And I seem to have gotten my report slightly mixed

1 up here. Sorry.

2 I recognize the format of this, but I'm not
3 exactly sure what the numbers are. I'd have to dig
4 through -- back all through my preliminary calculations to
5 see exactly what this represents. It's not something I
6 relied on.

7 Q Okay. Do you recognize the file name at the bottom
8 of Exhibit 4?

9 A I do.

10 Q Okay. What is that? What file does this come from?

11 A This is a file that I used to compare the navigable
12 discharges with the flow records for the various sites, to
13 determine the periods when it would or would not have been
14 boatable.

15 Q And do you recognize the name of the tab at the top
16 of the sheet?

17 A Yes.

18 Q Okay. So what is that?

19 A It says, "Scratch sheet."

20 Q How is that used in the context of this Excel file?

21 A I'd have to go back to the details of it. But the
22 processing is done through a piece of visual basic code
23 that's embedded in the spreadsheet, and this is, as the
24 name implies, it's a scratch sheet; it's a sheet that's
25 used to write and copy values back and forth. I don't

1 remember the precise purpose of it.

2 Q Okay. Do you -- so you recognize that this differs
3 -- the material that's represented here in Table 6 -- and
4 I will represent to you that this was printed out from
5 your file as it stood, and I made no changes.

6 A Sure.

7 Q And obviously you can check that when you go back to
8 your computer.

9 A Sure.

10 Q This -- would you agree that this does not match the
11 second highest particle numbers in Table 6 as it is in
12 either your original report or your revised report?

13 A Yeah, I agree with that.

14 Q Okay. Do you have some concern that there's a third
15 set of numbers for the second highest particle?

16 A No, I don't have that concern.

17 Q Why don't you have that concern?

18 A Because these numbers are just basically -- it's
19 bogus numbers that are put in there for purposes of
20 debugging the program. They have -- they have no meaning,
21 really, with respect to the opinions that I'm using.
22 They're -- as the sheet says, it's a scratch sheet, and
23 they're not numbers that I relied on.

24 Q Where do the numbers come from?

25 A They were numbers that were put in there as a -- sort

1 of a seed to get the program started and to make sure that
2 the code is working right. I don't know the specific
3 basis for the calculation that arrived at those numbers,
4 but they were written in there just in the process of
5 debugging the program. As I said, they have absolutely no
6 meaning with respect to the discussion we're having today.

7 Q How do you know that for sure?

8 A Because the ones that I'm relying on are the numbers
9 that you see in the report.

10 Q Well, but we've already had an issue of an error with
11 those numbers.

12 A Sure.

13 Q Okay. So how do I know -- I know that you know or
14 you believe, but how do I know that this is not some other
15 set of numbers?

16 A I'm afraid I can't help you with that. I explained
17 to you what this table is and it's -- you know, it's not
18 something that I relied on.

19 Q And why wouldn't you use the numbers that you already
20 have for other things in debugging the program?

21 A Well, at the time we were doing this, we didn't have
22 those numbers. The whole purpose of the program is to
23 develop the numbers that were -- that you see in the
24 report.

25 Q Well, but -- so the columns at the right of this, 8,

1 12, and 15 --

2 A Right.

3 Q -- aren't those mathematical functions from other
4 places in your report? Aren't they spitting out data
5 based on other information in your spreadsheets?

6 A The 8, 12 and 15 inch is designation of the draft
7 that we're analyzing.

8 Q I think we both know I'm discussing the information
9 in the columns below that.

10 A Well, I don't know that --

11 Q Sorry.

12 A -- or I didn't know that; I do now.

13 Q Okay.

14 A So like I said, I would have to go back and retrace
15 every step of the debugging process that we went through
16 in developing that visual basic code. One of my staff
17 actually developed that code; I wasn't even directly
18 involved in that part of it. Why he had those numbers in
19 there in the debugging process, I have no idea.

20 Q Okay.

21 A He may have been applying a different criteria. I
22 simply don't know.

23 Q All right. I'm sorry. He did the visual basic but
24 you compiled the spreadsheet. I guess I'm confused.

25 A We're talking about two different spreadsheets.

1 Q Okay. So you compiled the final spreadsheet.

2 And what did he work on?

3 A He wrote the spreadsheet -- wrote the visual basic
4 code that is used to compare the discharge for the -- you
5 know, the limiting discharge basically with the hydrology
6 records to determine boatable versus non-boatable days. I
7 wrote the spreadsheet that analyzed the heights of the
8 rocks in the Monte Carlo simulation and basically the
9 spreadsheet that had the error in it. This is a different
10 sheet.

11 Q So which spreadsheet did the Table 6 as it appears in
12 the reports come from?

13 A The calculations that are the basis for those numbers
14 came from the sheet that had the errors in it.

15 Q Your spreadsheet?

16 A My spreadsheet.

17 Q Okay.

18 A These are simply being used to compare with the --
19 the purpose of the run nav depth spreadsheet is to compare
20 those numbers with the hydrology record to determine the
21 number of boatable days.

22 Q And then -- so how does -- how does the automatic
23 hydrograph figure spreadsheet fit into that picture?

24 A That's what I just described. It takes the numbers
25 from the original spreadsheet for each site and then

1 compares that with the hydrology record.

2 Q Okay. And then -- so the original spreadsheet for
3 each site is the one that you programmed?

4 A Yes.

5 Q Okay. And that is the one that created the error?

6 A Yes.

7 Q Okay. So this is not -- the automatic hydrograph
8 figures is not the spreadsheet you worked on?

9 A That's correct.

10 Q Okay.

11 A Well, let me clarify that. I mean, I worked on this
12 spreadsheet. I certainly used it. I studied the results
13 and so on. I did not write the basic -- the code that it
14 -- the processor basically that's in that sheet that does
15 the analysis.

16 Q Okay. So who would we talk to; who else would we
17 need to talk to to figure out where this information came
18 from?

19 A Well, the staff member that did the programming for
20 me is -- his name is Mike Brown. But I think you'd
21 probably get the same answer from him that you're getting
22 from me: This is a scratch sheet that's just -- it's a
23 dummy table, basically, that's just used to help debug and
24 to transfer data back and forth. These numbers, again,
25 have no meaning with respect to the opinion that I'm

1 expressing in this case.

2 Q Okay.

3 MR. SCHECHTER: Would you like a short break?

4 THE WITNESS: Sure.

5 (Recess taken.)

6 BY MR. SCHECHTER:

7 Q Dr. Mussetter, do you have any changes or other
8 issues you'd like to bring up about any of the things you
9 testified to earlier this morning?

10 A No.

11 Q Let's talk about trips you've made to the Mosquito
12 Fork River. Have you visited the Mosquito Fork River?

13 A Yes, I have.

14 Q Okay. When?

15 A The first time was in July 2013. I describe this in
16 my report. Maybe I should look at the precise dates.

17 Q You're looking at Exhibit 1?

18 A I am looking at Exhibit 1, yes. Let's see. Yes,
19 July 16, 2013.

20 Q What other trips have you made to the Mosquito Fork
21 River?

22 A I was also there during the period from August 13
23 through August 17, 2013.

24 Q Any other times?

25 A Those are the only times.

1 Q Did you travel to the area in June of 2014?

2 A No. Sorry, I was thinking the wrong year. I did
3 not.

4 Q Did you plan to take a trip in June 2014?

5 A I did.

6 Q Okay. And when was that trip planned for?

7 A June of 2014. I don't recall the exact dates.

8 Q And did you travel to Alaska?

9 A No.

10 Q And you stayed -- where did you stay instead?

11 A I stayed home.

12 Q Okay. How far in advance of that trip was it
13 canceled?

14 A We were due to travel from Colorado to Alaska -- I
15 believe it was a Sunday -- and the trip was canceled on
16 Friday.

17 Q Does June 2 ring any bells?

18 A That sounds like -- yes, I see that in my report,
19 Exhibit 1.

20 Q Sorry, I apologize. That was a little colloquial.

21 A It's perfect.

22 Q And what was the purpose of the trip that had been
23 planned for June 2, 2014?

24 A Well, it was to float the reach to make additional
25 observations and hopefully collect some additional

1 calibration data for the model.

2 Q And I apologize. You were supposed to leave on
3 Sunday, and you canceled the trip on Friday?

4 A That's correct.

5 Q And why did you cancel the trip?

6 A Because we were told by the BLM representative that
7 we were coordinating through that the river was too low to
8 float it.

9 Q And who was the BLM representative who told you that?

10 A Ben Kennedy.

11 Q Did he tell you what the flow was?

12 A I'm sure we discussed the flow levels. I don't
13 remember clearly, but we were aware -- well, I'm not sure
14 the Mosquito Fork gauge was actually operational then.
15 Let me just say I don't remember.

16 Q And would -- so would 368 cubic feet per second --
17 sorry. Is that the correct CFS?

18 A Yes.

19 Q Okay. Cubic feet per second. I don't know why I had
20 a little schism about that.

21 Does 368 cubic feet per second sound familiar?

22 A It was a low flow. Whether -- that number doesn't
23 exactly ring a bell with me; I'd have to go back to the
24 flow records to see.

25 Q Okay. And if I represented to you that that week the

1 flow was 368 to 257, based on your flow records, would
2 that seem reasonable?

3 A I'd want to confirm that, but it sounds like the
4 right ballpark.

5 Q Okay. Did Mr. Kennedy, the BLM rep, make the
6 decision for the trip not to occur?

7 A Well, I made the final decision. But he -- it was
8 based on his recommendation.

9 Q And do you recall his recommendation, specifically?

10 A Well, that the river was too low and we were going to
11 have problems.

12 Q And what did he mean by "problems"?

13 A Too low to be boatable. We'd be running aground and
14 dragging boats and having issues, and it wasn't very
15 feasible.

16 Q Are you aware of trips that have occurred at higher
17 -- excuse me -- lower flows than the 368 to 257 range that
18 we just talked about?

19 A It's my understanding that the State's experts, or
20 representative of the State, did a trip down in the low
21 200s range.

22 Q And by June of 2014, had you generated your flow
23 charts -- your math calculations for the river?

24 A I had not.

25 Q Let's turn to page 70 of Exhibit 1. Do you know what

1 kind of boat you planned to take for the trip in June
2 2014?

3 A We were going to borrow a boat from the BLM. And I
4 believe it was a 14-foot self-bailing raft.

5 Q Like a rubber raft?

6 A Inflatable raft, yes.

7 Q Sort of typical recreational raft?

8 A I believe so. I never actually saw the boat, but
9 that was my understanding.

10 Q Okay. And do you know what kind of load you were
11 planning to carry in it?

12 A Well, it would have been either two, potentially
13 three, most likely two people, and the necessary camping
14 gear for a few days on the river and some survey gear.

15 Q Do you know about how much all of that would have
16 weighed?

17 A Just a guess in the -- including the people, 6- to
18 800 pounds.

19 Q And do you know what the draft of the boat, loaded or
20 unloaded, would have been, approximately?

21 A Unloaded, it'd be a few inches at most. Loaded, I've
22 never measured it. I suppose it's in the order of a half
23 a foot or so or less, four to six inches maybe. Just a
24 total guess.

25 Q Okay. You wouldn't expect it to be much more than

1 that?

2 A No.

3 Q And at -- so having since done your calculations, how
4 long was your trip planned to be?

5 A I think we planned to be on the river for three days.
6 Three to four days, depending on how long it took to do
7 things.

8 Q And who was the other person you planned to take with
9 you?

10 A Mike Brown.

11 Q So now, looking at your Table 6 on page 70, and
12 comparing that to the 247 and 368 CFS that would have
13 occurred -- or that did occur in June of 2014, would much
14 of the river have been boatable had you taken that trip?

15 A I expect we could have floated through some sections
16 of the river without difficulty.

17 Q Well, so, in fact, there would only be two reaches at
18 eight inches that would be over the CFS that week; is that
19 correct?

20 A Say that again, please?

21 Q There would have only been two reaches -- or two
22 cross-sections actually -- that would have required,
23 according to your chart, a flow greater than 257 to 368
24 that week?

25 A Of the sites that I analyzed, that's correct.

1 Q And you expect that there would have been other sites
2 that had much more difficulty than the ones you analyzed?

3 A I think there are other sites that are similar to
4 these. I don't specifically know, because I didn't take
5 measurements at those sites.

6 Q How many other sites do you think would have been
7 similar to Site P, which is -- what you characterized as
8 the most difficult of the reaches you measured?

9 A Yeah. I think in the initial work to select these
10 sites, we identified something on the order of 25 total
11 sites in these two reaches that looked like they could be
12 problematic.

13 Q And how many did you -- would you say of those 25 --
14 sorry. Does that 25 include P-1 through -9?

15 A It does.

16 Q Okay. So of the remaining 16 sites -- excuse me --
17 17, because there's no P-5.

18 A Right.

19 Q Of the remaining 17 sites, how many of them would
20 have been similar to P-8?

21 A Well, just from a qualitative comparison, the other
22 17 sites were similar to these sites. So if we base it on
23 a percentage basis, I suppose a quarter of them.

24 Q Okay. You know, in your experience boating, would
25 that have been a trip that you think would have been

1 reasonable for you to take now, examining the numbers and
2 knowing the flow for that week?

3 A I expect we could have done the trip. I'm also aware
4 that the State's trip at the flow that -- not
5 substantially less than that, they had to drag their boat
6 a whole lot of times.

7 Q Are you against dragging the boat?

8 A I have no objection to dragging the boat. I prefer
9 not to, but...

10 Q Well, it doesn't ruin the trip; does it?

11 A Depends.

12 Q What does it depend on?

13 A How much hassle you have dragging the boat.

14 Q What's too much hassle?

15 A I can't quantify that.

16 Q All right. Well, isn't that kind of why we're here?

17 A No.

18 Q Isn't there a point at which too much hassle makes
19 the river not navigable, unboatable?

20 A The standard relates to commercial navigation.

21 Q Okay.

22 A We're talking about different kinds of boats and
23 about activities that relate more to, you know,
24 recreational use of the rivers. So it's a completely
25 different standard.

1 Q You don't think that if -- even if we accept your
2 premise that it's a completely different standard, you
3 don't think that, you know, you as a human being and
4 someone thinking about navigability issues might have some
5 thought about, well, how much is this impinging upon my
6 trip and my ability to move up and down the river?

7 A Well, sure. I think about that.

8 Q All right. So how much is too much?

9 A Like I said, I've not thought it through to the point
10 where I can quantify it for me personally. If I'm on a
11 small craft that is not the same craft that we're talking
12 about in customary use for commercial purposes -- I don't
13 know. It depends on my purpose for being out there, as
14 well. If I'm just there for pleasure, having to drag it
15 several times might be a pain in the neck and I might
16 choose not to do it. I don't know how else to answer the
17 question.

18 Q But if you're out there to make money, you might put
19 up with a little bit more because you have a job to do?

20 A That's possible.

21 Q Let's go back to your earlier trips that you actually
22 took. In July of 2013, can you tell me about your trip to
23 the Mosquito Fork?

24 A Yes. We took a helicopter from Tok and flew more or
25 less directly to the mouth of Wolf Creek and then flew

1 down the river to Chicken. I think we re-fueled at that
2 point. And then we made a pass down to the mouth, a
3 little ways down the Dennison Fork, and then came back up
4 roughly to the mouth of Kechumstuk Creek, low altitude
5 flight, and did some circling around to look closer at
6 things. And then we also stopped -- I believe we set down
7 in four different locations, if I remember correctly, and
8 spent some time on the river, wading back and forth
9 across, looking at the conditions and so on.

10 Q How long were you out there?

11 A The trip was the better part of a day, to do the
12 things I just described.

13 Q Eight hours, 10 hours?

14 A I'd guess probably closer to eight hours.

15 Q And do you recall what the four locations were where
16 you landed?

17 A I don't recall off the top of my head. I'd have to
18 go back to my notes.

19 Q Did you identify the locations that you wanted to
20 land for any specific reasons, if you recall?

21 A Yeah. They were areas that looked like -- had
22 shallow flow, rocks in the river, things that would be
23 challenges to boating. And I do have the four locations
24 identified in Exhibit 1, if you want to discuss them.

25 Q Sure. Where are they?

1 A Page 5, the first paragraph under Section 2.2. River
2 mile 18.2, 24.2, 29.3, and 37.2.

3 Q And would those roughly correspond to any of the
4 sites that you ended up selecting for greater study?

5 A I don't recall clearly. I think two of them were
6 either at or near sites that we ultimately studied, and
7 two of them were not.

8 Q Which two sites were those?

9 A The two that I think were close were at river mile
10 18.2 and Site P-7, and then -- let's see -- I'm not sure.
11 The other one may not actually be -- P-3 and P-4 are in
12 the vicinity of 29.3, but I don't think -- I don't think
13 it's exactly the same site.

14 Q How high did you fly?

15 A Wow. I -- well, it varied. I wasn't paying
16 attention to the altimeter, but I suppose we were 200
17 feet, a hundred feet. You know, we -- the pilot adjusted
18 the height so that I could get a good view of the river,
19 basically.

20 Q And did you -- so when you -- you had no sort of
21 aerial-based instruments to take measurements, I'm
22 assuming; is that correct?

23 A Well, I had a hand-held GPS unit with me that I could
24 track location and I could mark way points, places of
25 interest.

1 Q But nothing to take, you know, measurements of the
2 river or anything like that?

3 A We did have an ADCP unit with us, and we did take a
4 flow measurement at, I believe, all four sites.

5 Q So we'll come back to the ground in a second. I
6 meant anything from the air.

7 A Oh, from the air. No.

8 Q Okay. And so let's talk about the measurements you
9 took on the ground at the four sites. What is an ADCP?

10 A Acoustic dopler current profiler.

11 Q And it measures stream flow?

12 A It measures the velocity and the depth and converts
13 that to stream flow.

14 Q And you took that measurement at all four sites?

15 A I believe so, yes.

16 Q And what else did you do?

17 A The measurement was actually taken by Mr. Kennedy.
18 And during the time he was doing the measurement, I
19 basically looked the site over, took photographs and notes
20 of what I was seeing at the sites.

21 Q Were any other measurements taken?

22 A I think I may have taken some spot measurements of a
23 few rocks and things, just to get an idea of the general
24 sizes, but no formal systematic measurements.

25 Q And was anyone out there with you besides Mr.

1 Kennedy?

2 A No. And the pilot.

3 Q And the pilot. I'm assuming the pilot was not a BLM
4 employee?

5 A He was not.

6 Q Okay. And so on that flight you identified 25
7 potential sites?

8 A The 25 sites were identified partly on the basis of
9 the information I collected on that flight and then other
10 information that I had from mapping an aerial photography
11 back in the office. I wouldn't have been able to list the
12 25 sites from strictly -- on strictly on the basis of that
13 flight -- or the visit.

14 Q Had you reviewed the mapping and such beforehand to
15 give you an idea of the places you wanted to concentrate
16 on in the air?

17 A I wouldn't describe it that way. I certainly
18 reviewed the mapping to get a general idea of the
19 character of the river, the geography of the area. But
20 the mapping by itself didn't give me enough information to
21 know where challenges to boating would occur.

22 Q Are there -- in addition to the four places you
23 landed, did your flight concentrate on any particular
24 areas of the river?

25 A Not specifically. We covered the Mosquito flat area

1 only once, down -- well, Mosquito flat down to Kechumstuk
2 Creek. We went over that only one time.

3 The river below Kechumstuk we did two passes
4 over that part, so I guess -- you know, that would be a
5 more -- give me another opportunity to look at it from a
6 different direction.

7 And then there were specific places where I saw
8 something that looked interesting, and we had the pilot
9 circle around so that I could get a better look at it.

10 Q What kind of -- do you know many -- roughly how many
11 places that was?

12 A Gosh, I don't remember. Half dozen maybe, 10.

13 Q And were those all downstream from Kechumstuk?

14 A I'm not prepared to say that. There may have been
15 other places upstream. I really don't remember.

16 Q Why did you only take one pass of the area from
17 Kechumstuk to Mosquito flats?

18 A Well, from the first pass, it was clear that the area
19 downstream from Kechumstuk was the area that would have
20 the most navigation hazards; that's part of the reason.
21 The second part of the reason, it was just a time factor.
22 We didn't -- by the time we'd done all the things that we
23 already had done, it was time to turn back. And so we got
24 up to Kechumstuk and came back to Tok.

25 Q Okay. What -- when did you identify the 25 sites

1 that you thought might warrant more consideration as --
2 I'm going to call them "challenges to boatability"; is
3 that a fair --

4 A That's fair.

5 Q All right.

6 A Well, certainly sometime between July 16 and August
7 13; I don't recall the exact date. I worked on it for a
8 period of time during that roughly one-month period and
9 identified a suite of sites and then we prioritized those.
10 We still had a little bit of uncertainty, I think, when we
11 went out to actually do the work on the 13th, as to which
12 specific sites we were going to take the measurements on.
13 But we were armed with all 25 and had a priority list of
14 the ones that we thought would be the best to study.

15 Q How did you prioritize the list?

16 A We wanted to have a suite of sites that, from the
17 information we had, was representative of the overall
18 population of -- "challenge sites," we'll call them. And
19 we wanted to have a good geographic distribution. We
20 didn't want to cluster them all in one part of the river;
21 we wanted to distribute them through the areas where the
22 challenges to navigation would be most likely to occur.

23 Q So is it fair to say that between July 16 and August
24 13 you had made a determination that the areas between
25 36.3 and river mile 55 and then again from river mile 60

1 to river mile 80.5 were likely navigable?

2 A I wouldn't say that's a fair characterization.

3 Q Likely boatable?

4 A I certainly felt that the area upstream from river
5 mile 60 looked to be reasonably boatable. I don't know
6 that I consciously had made a decision at that time that
7 the area between 36 and 55 was boatable, but as we went
8 through my photographs from the field and the notes from
9 the field and the other information we had, it just
10 happened that the challenging sites fell into those two
11 segments of the river and, you know, that's -- when we
12 went back and looked at things on the next trip and so on,
13 it turned out that that was about right.

14 Q The -- so you -- sorry. And how did you narrow down
15 the 25 sites to be the ones that you studied?

16 A Well, I already answered that question. We basically
17 wanted to pick a suite of sites that represented the range
18 of conditions that we saw, and we wanted them to be
19 distributed through the reaches that had challenges to
20 boating. And so we picked the sites that we picked.

21 Q And do you feel that -- that the sites that you
22 picked were a fair representation of the two reaches that
23 you believe are not navigable?

24 A I think it's a fair representation of the areas that
25 would be challenges to boating in those segments of the

1 river, yes.

2 Q What were the flows when you did your helicopter
3 flight in July of 2013?

4 A They were relatively low, and I honestly don't
5 remember the flow numbers; I'd have to go back to my -- to
6 the discharge tables. I don't remember. Fairly low.

7 Q Would something around 130 CFS sound correct?

8 A That sounds like the right ballpark.

9 Q Would -- and did you judge that to be too low to go
10 boating?

11 A We did intend to float the river during that period
12 and again chose not to because the flows were too low.

13 Q Did you try to put a boat in anywhere, even places
14 where, you know, you might be able to easily retrieve it
15 or float only a small segment of the river to test for
16 boatability?

17 A No.

18 Q Even something like the Taylor Highway bridge area?

19 A No.

20 Q Did you, in addition to the over-flight, did you do
21 do any reconnaissance or investigation in the Chicken
22 area, during your July 2013 trip?

23 A Nothing other than the over-flight.

24 Q Okay. What about the August 2013 trip?

25 A No. I did go down to the river on the ground, in the

1 vicinity of the mouth of Chicken Creek, and looked at the
2 river on the ground there during that period. But other
3 than that -- and I didn't take any systematic measurements
4 at that time.

5 Q And that was on the August trip?

6 A Yes.

7 Q When you were done with the trip, basically?

8 A I think it was at the beginning, actually.

9 Q When you observed the river in July of 2013, could
10 you describe what the water -- what the river looks like,
11 just give us a general overlay -- overview?

12 A Well, it's -- it looked to me like a sort of typical
13 gravel, cobble-bed river. As we said, the flows were
14 quite low. There were a lot of rocks sticking out of the
15 river in the areas -- in the riffle areas that I saw.
16 It's -- it has a -- I guess I would call it a riffle pool
17 character along much of the reach, so there are segments
18 of deeper flow that are separated by riffles and shallower
19 areas. It has a well-defined bank line with, you know,
20 the typical vegetation that you see in that part of Alaska
21 on both of the banks. Cobble gravel bars in the middle of
22 the river in places.

23 Q Is the water clear, muddy, silty?

24 A As I recall, the water was quite clear the day we
25 were there.

1 Q And was the bottom visible during that trip?

2 A Yes, I believe you could see through, in most places,
3 the water to the bed.

4 Q All right. Let's talk about the August 2013 trip.

5 When did you go?

6 A Started on August 13.

7 Q And how long did you go for?

8 A I was there for, I believe, three days. And then the
9 field crew -- three or four days. And the field crew was
10 there for a bit over a week, as I recall.

11 Q And what was the purpose of that trip?

12 A Well, to allow me just to do more in-depth look at --
13 at the river and specifically the sites we wanted to
14 study, and then to collect the detailed data that would
15 form the basis for our modeling and the quantitative
16 analyses that we did.

17 Q How did you travel?

18 A By helicopter.

19 Q Did you travel by boat at all?

20 A No.

21 Q What was the flow of the river that week?

22 A Very low. It varied along the reach, but it was very
23 low.

24 Q Could you characterize it with a number?

25 A I could if you will allow me to search through my

1 report and find the numbers.

2 Q Of course.

3 A Yes. If we look at Table 1, we measured the flow in
4 conjunction with each of the surveys. And so you'll see
5 there that it ranged from 9 -- a little over 9 CFS at Site
6 P-1 on August 17 up to -- looks like the highest discharge
7 was 79 CFS, actually at Site P-2 the day before.

8 Q You would characterize that as very low flow?

9 A Yes.

10 Q And what was the water like during that trip?

11 A It was same, fairly clear.

12 Q And you could see the bottom?

13 A Yes.

14 Q And that flow was actually lower than the previous
15 trip?

16 A Yes.

17 Q And you didn't go boating on that trip either?

18 A Did not.

19 Q Okay. Did anybody from your crew, after you left, go
20 boating down the river?

21 A No.

22 Q How many people were in the crew?

23 A Three in addition to myself.

24 Q And what were their -- what was everybody's role out
25 there, working together as a crew?

1 A The -- the crew was there to do two primary things.
2 One was to survey the topography of the river, and the
3 other was to collect sediment samples to characterize the
4 range of sizes of the sediment that makes up the boundary
5 of the river. And also to do flow measurements.

6 Q And were they able to do all those things?

7 A Yes.

8 Q Did you -- did you pick the sites -- so did you do
9 another helicopter over-flight in addition to landing in
10 particular places to do surveys?

11 A Yes.

12 Q Okay. And you did that on your first day?

13 A Well, I did that on basically all the days I was
14 there. I looked at different parts of the reach from the
15 helicopter.

16 Q Did the crew camp out or did everybody return
17 somewhere --

18 A Everybody returned to Tok.

19 Q Returned to Tok every day?

20 A Yes.

21 Q Okay. And how many hours were folks working out in
22 the field each day?

23 A I suppose a minimum of 12 to 14. Long days.

24 Q And did surveying start on the first day?

25 A I believe we started surveying on the first day we

1 were actually at the sites, yes.

2 Q Did you -- so on August 13?

3 A I believe so -- yes, it was August 13.

4 Q So you selected -- so obviously on the first day you
5 were -- looking at Table 1 -- you had selected P-9 as a
6 site of interest, as a site that was going to --

7 A Yes.

8 Q Okay. And what -- how did you determine the rest of
9 the sites over the week? I'm not asking the same question
10 as I did earlier. I'm asking, you know, how did it
11 materialize over the week, in terms of when you selected
12 sites and what -- what were you -- how did your additional
13 information from additional over-flights and what you'd
14 already selected influence how you picked from your list
15 of 25 at that point?

16 A Yeah. Well, first of all, we had narrowed it down to
17 roughly half, maybe less than that, said, I'll take 10 to
18 12 sites that were candidates that we wanted to focus on.
19 We knew that Site P-9 at the Taylor Highway bridge was one
20 site that we definitely wanted to study, for a variety of
21 reasons.

22 So we went there the first day because we were
23 able to drive there, and we were -- and waiting for the
24 helicopter to mobilize and so on. So it allowed us to
25 drive without the helicopter support.

1 Then the following day, as I recall, we went
2 directly to Site 8, Site P-8. Spent a bit of time on the
3 ground making sure that it did seem like a reasonable
4 site. And it did. And so the crew set about collecting
5 the data. I worked with them a bit there, but then I went
6 with the helicopter, and we went on upstream and set down
7 at the other sites and looked them over to make sure that
8 we had -- that they were appropriate sites to study.

9 Q And did you make the final decision on all of the
10 sites that were chosen?

11 A I did.

12 Q And so you let the crew know what was going on, which
13 sites you wanted surveyed, and then left and they finished
14 the work the rest of the week?

15 A That's correct.

16 Q Was there a Site P-5?

17 A There was a Site P-5 that was in the original list of
18 candidate sites, and we chose not to survey that.

19 Q Why -- I guess my question is sort of -- did it make
20 it further in the process than the other 12 or 25 sites,
21 such that it was labeled and then taken out of
22 circulation?

23 A It was certainly on the list of sites that we
24 considered when we arrived to do the work. And then it
25 was eliminated while we were there, I think mainly for

1 time and logistical reasons; I don't remember any specific
2 technical reason. I don't remember looking at the site
3 and saying, oh, this is not a good site; we shouldn't
4 study it. It just -- we had enough, and it just seemed
5 like that was one that we could drop off the list.

6 Q What is the -- would you be able to identify where
7 the other 17 sites are on the map?

8 A Not with the information I have sitting in front of
9 me.

10 Q Okay. Are they reasonably -- are they distributed
11 over -- evenly from over the entire map or --

12 A Again, they're mostly concentrated in the two areas.
13 There may be some that are in the areas that I'm saying
14 would be more boatable; I don't specifically recall. But
15 most of them would be in those same areas and more or less
16 evenly distributed.

17 Q How long is the open water season at Mosquito Fork?

18 A I think it generally runs from late April, early May
19 up to early October -- early to mid-October.

20 Q So when you're doing your work, how many -- when you
21 say "percentage of days," what number are you using as --
22 what would be a hundred percent?

23 A A hundred and 53 days for the period that I looked
24 at.

25 Q And if it were boatable a hundred and 53 days, would

1 it be -- would you have the opinion that you have?

2 A If it were boatable with the criteria boats and the
3 loads that I used in my calculations, I would -- I would
4 have the opinion that it's boatable.

5 Q Okay. And if it were one day, you would -- you would
6 say that it's not navigable?

7 A Only one day?

8 Q Only one day -- one random day, different day every
9 year.

10 A Sure.

11 Q And so can we agree that the line for both number of
12 days and how those days are distributed is somewhere
13 between a hundred and 53, all of the days, and one random
14 day that occurs anywhere in between those -- anywhere of
15 those hundred and 53 days, completely randomly every year?

16 A I think that's fair.

17 Q Okay. All right. How many days of the open water
18 season does a reach have to be boatable by a criterion
19 craft for you to determine that the river is navigable in
20 fact?

21 A I don't have a specific number in mind.

22 Q Is it -- is there a percentage?

23 A Not necessarily, no.

24 Q Is there a distribution of the days?

25 A The distribution of the days is certainly a factor.

1 Q So what does a navigable distribution look like to
2 you?

3 A I'd say, on a regular basis, most of the time. On a
4 predictable basis.

5 Q What is "most"?

6 A I don't have a quantitative number in mind there.

7 Q And what is "predictable"?

8 A Well, it means that if I have to do -- have to plan
9 for a trip, I'm able to do that in enough -- well enough
10 in advance to be able to get the things organized to do
11 the trip and then arrive at the river and have enough flow
12 in the river to actually do the trip.

13 Q What kind of trip?

14 A Well, in the context of this case, it would have to
15 be some manner of commercial navigation.

16 Q So how far in advance would that have to be known?

17 A It depends on what the purpose of your navigation is.

18 Q So it varies from every commercial operator to every
19 commercial operator?

20 A I expect it probably does, yes.

21 Q So how does anyone determine if a river is boatable
22 frequently enough to be navigable?

23 A How do they determine whether it's boatable
24 frequently enough? I suppose by observation.

25 Q And what are you observing?

1 A The amount of flow and the flow depths and experience
2 in terms of -- I'm sure people try to navigate areas, and
3 they say, this isn't worth it; I can't do to; it's not
4 commercially viable, and so they abandon it.

5 And other places they try it and it works and
6 they say, yeah, this works, and they continue doing it.

7 Q And they look at it on a daily basis; is that fair to
8 say?

9 A Well, I don't think they necessarily every morning,
10 you know, or every day say, I'm going to make a choice
11 today, can I navigate it, can I carry my load on this
12 river. And so then it's navigable on that day. And then
13 the next day they look at it and say, oh, I can't do it
14 today; I'm not going to do it today. I mean, commercial
15 reliability, it seems to me, wouldn't work that way; you'd
16 need to -- you would need to do it on a regular basis.

17 Q So -- and I guess what I'm asking is: You -- in
18 Table 6 and 7, you couch this in number of days and the
19 number of -- mostly in Table 7 -- how many days is the
20 river boatable, how many days is the river not boatable.

21 A Right.

22 Q And so that forms the basis of your determination
23 that these two reaches are navigable; does it not, the
24 number of boatable days?

25 A Well, I didn't determine that the river was

1 navigable. I don't understand your question.

2 Q Okay. So your -- how did you determine that the two
3 other reaches are likely to be navigable?

4 A Well, it's primarily a qualitative comparison.
5 It's -- you know, these reaches, I have the numbers that
6 represent the duration and frequency at which there'd be
7 enough flow in the river to be able to boat with the types
8 of boats we considered.

9 Those other reaches, from an observational
10 perspective and also from just the technical data on the
11 gradients of the river and so on, they have greater
12 depths, and so they would be more frequently than the
13 reaches that I studied.

14 And so I'm not -- I think in this case I'm not
15 prepared to absolutely say those reaches are navigable.
16 They're more navigable or more boatable than the reaches
17 that I studied. And I chose to focus my energy on the
18 segments that I did because those are the ones that would
19 be the most limiting.

20 Q How much more boatable are they than the reaches
21 where you determined that the boatability is not
22 sufficient?

23 A Well, as I said, I don't have quantitative data to be
24 able to give you numbers for that more.

25 Q So -- you're a scientist; is that fair?

1 A That's fair.

2 Q And your work -- at some degree, I know you're an
3 engineer, and engineers and scientists sometimes have
4 disputes about these things. But would it be fair to say
5 that we have a scientific question here?

6 A Well, there are lots of scientific questions here.
7 What specific question?

8 Q Well, we have a question of: Is this river
9 navigable?

10 A Yes.

11 Q And would you agree that that's a scientific
12 question?

13 A Sure.

14 Q And part of the --

15 A Sorry. Let me clarify that. Boatable is the
16 scientific part of it. The navigable involves a lot of
17 other things. Excuse me for interrupting.

18 Q Give me a second here.

19 So one of the other changes in your report is,
20 in several places, you have changed the word "navigation"
21 to the word "boatable" or "boatability"; is that fair?

22 A No, I don't believe that is fair.

23 Q Would you look at -- I'll withdraw that last
24 question.

25 At Section 2.6 of your report is, "Navigability

1 of the Disputed Reach."

2 A Right.

3 Q And so you're addressing navigability in addition to
4 boatability; are you not?

5 A To some degree. Really, the -- it probably would be
6 better to title that "Boatability".

7 Q Well, to some degree. So to what degree are you --
8 are you characterizing these reaches as navigable and
9 nonnavigable?

10 A Well, I've used the fact that those specific reaches
11 of the segments that we talked about are not boatable for
12 sufficient quantity and time, with enough reliability, to
13 meet a standard that would allow them to be navigable from
14 a commercial reality perspective.

15 Q Okay. So how much time -- so we agree that there are
16 days when it is boatable in -- under your commercial
17 reality standard?

18 A Yes.

19 Q Okay. So -- but not enough days to fulfill this
20 navigability standard?

21 A Right.

22 Q How many more days?

23 A I've told you before, I don't have a specific number
24 in mind.

25 Q Okay. So let's come back to our science question,

1 all right? We have a hypothesis, all right -- or we have
2 two competing hypotheses in this case, the Mosquito Fork
3 and these reaches is navigable and the Mosquito Fork and
4 these reaches is not navigable. Would you agree that's a
5 fair statement of the question?

6 A I would agree, except that we need to understand in
7 that hypothesis that there are elements of that that are
8 not necessarily scientific questions.

9 Q I can -- I can understand that. And what are
10 those -- what are those elements?

11 A Well, it has to do with definitions of "navigability"
12 that don't -- that aren't directly controlled by whether
13 you can physically boat down the reach or not.

14 Q Okay. So applying whatever definition of
15 "navigability" you're applying, what -- how am I to repeat
16 your experiment and determine under -- using the same
17 parameters and the same investigation, that the Mosquito
18 Fork is not navigable?

19 A Well, you can repeat the analytical work that I did,
20 and you certainly should be able to come up -- if you make
21 the same assumptions I made, you'll come up with the same
22 numbers in terms of the limiting discharges, periods of
23 time that you could or not boat with a particular boat.

24 The rest of that question has to be answered by,
25 first of all, making sure that you're talking about the

1 correct criteria boat; and secondly, understanding what,
2 you know, from a commercial navigation -- commercial
3 reality perspective, how often would -- and with what kind
4 of a regularity would you have to do it to make it a
5 viable operation. And I don't have that number. I didn't
6 analyze that piece of the question.

7 Q So it seems like you're going back and forth a little
8 bit here on whether or not you're rendering an opinion on
9 navigability. Are you rendering an opinion on
10 navigability?

11 A I'm rendering an opinion on the part of the question
12 that relates to the boatability and the reliability of
13 that boatability.

14 Q So your -- your analysis, you -- you've been given a
15 criterion craft?

16 A Yes.

17 Q You've been given a load for that criterion craft?

18 A Yes.

19 Q You've analyzed that?

20 A That's correct.

21 Q You've come out with a number of -- you've been given
22 a river. Yes?

23 A Yes.

24 Q Okay. And you went out and looked at that river in a
25 way you thought appropriate?

1 A Yes.

2 Q And you determined the flows in that river?

3 A Yes.

4 Q And what the flows in that river, over certain
5 particular reaches, could carry with regard to that
6 criteria craft?

7 A Would you say that last part again, please?

8 Q You determined that -- what those flows in certain
9 reaches of the river, certain areas of the river, could
10 carry with regards to the criterion craft, whether they
11 could carry it or not? Whether the criterion craft would
12 float in those -- would clear the highest rock in those
13 areas?

14 A I did determine that, yes.

15 Q Okay. And then based on that, you determined the
16 area is boatable a certain number of days and non-boatable
17 a certain number of days?

18 A Right.

19 Q Is there -- now, the next step is: Is that amount of
20 boatability -- would you agree that the next step in our
21 question is: Is that amount of boatability sufficient,
22 using that criterion craft and a commercial reliability
23 standard, sufficient to determine the river navigable?

24 A I agree that that is the question, yes.

25 Q Have you answered that question?

1 A I've answered it from a qualitative perspective.
2 I've looked at the numbers, the charts that show when it
3 is and is not navigable. And in my opinion, because they
4 tend to be relatively short periods and they -- and the
5 specific time when those occurred varies widely from year
6 to year, it seems to me that, if I were thinking about
7 doing a commercial operation on that river, I would say,
8 this doesn't look like it's going to be viable.

9 Q So you are in fact determining that the river is not
10 navigable?

11 A I'm expressing the opinion that, based on my
12 quantitative evaluation of the times when the river would
13 and would not be boatable with the criteria craft, the
14 irregularity of those times, I'm expressing the
15 qualitative opinion that it probably does not meet the
16 standard for navigability. But there are other questions
17 that must be answered, that I'm not specifically
18 answering, before the final determination on whether it's
19 navigable or not can be made.

20 Q What are the other questions?

21 A Well, the questions about the criteria boat, what
22 type of commercial navigation we're doing, what the
23 purposes are, and that sort of thing.

24 Q Well -- and now I'm giving you everything in the
25 world. The world -- the world is your oyster, Doctor.

1 The criterion craft is exactly as it's been specified to
2 you. The load in it is commercially viable.

3 A Okay.

4 Q And now I'm -- now all those other questions have
5 been answered. And so now you've taken those two things
6 and have put them in the river, the boat and the load, and
7 now I need to know -- well, how often -- how often could I
8 -- do I need to move up and down this river for it to be
9 commercially viable?

10 A I can't give you a specific answer to that. You want
11 me to tell you a numbers of days or a frequency, and I
12 can't give you that number.

13 Q Why not?

14 A It's more than what we have here.

15 Q How much more?

16 A I can't --

17 MS. ROBERTS: Objection; asked and answered.

18 BY MR. SCHECHTER:

19 Q Why can't you give that to me?

20 A I don't have a specific number in mind. And it would
21 also vary -- you haven't given me enough information to
22 know even what the purpose of the navigation -- what is
23 the cargo load, what am I -- why am I trying to carry it,
24 who am I delivering it to. You know - where am I trying
25 to take it, am I taking it up river, down river. There

1 are all kinds of things.

2 I have said repeatedly: I don't have a specific
3 number in mind. It's irregular, it's short duration
4 periods, and that to me is enough to question the --
5 certainly it -- I can quantify the periods that it is not
6 not boatable. And, in my opinion, based on that -- what I
7 understand about those other issues, I don't believe it
8 meets the standard for navigability.

9 Q What does a boatable river look like? Excuse me.
10 What does a navigable river look like? How often can I
11 use a navigable river? Not Mosquito Fork, whatever you
12 want, whatever theoretical river. How often do I need to
13 be able to use it?

14 A Well, I have to give you a qualitative answer. You
15 would need to be able to use it most of the time during
16 the time that you care about carrying some kind of --
17 carrying on some commercial activity on the river.

18 Q So what -- how did you come to this standard? You're
19 applying a standard. You're saying: I'm applying a
20 qualitative standard; is that fair?

21 A That's fair.

22 Q And I'm determining that the river, based on the
23 number of boatable days and the distribution of boatable
24 days, using this criterion craft, is not navigable. So
25 where -- where -- where does your qualitative standard

1 come from?

2 A It comes from my common sense. My primary role, as
3 I've said several times already, in this project, in this
4 case, is to do the technical analysis of when would you be
5 able to pass through the reach with the criteria boat,
6 when would you not be able to. I have done that.

7 I've also thought, from a qualitative
8 standpoint, about what it would take to do commercial
9 navigation, to carry on commercial activities with a boat
10 on this river. And it's my opinion that it probably does
11 not meet the standard.

12 But my opinion -- the ultimate decision on that
13 matter relies on a lot of other things that -- many of
14 which are founded on what I've done here, but this is not
15 -- this does not answer all of the questions.

16 Q I guess I'm not understanding. So you've listed the
17 criterion craft as one of the questions.

18 A Yes.

19 Q You've listed the commercial enterprise as one of the
20 questions? What the person is doing?

21 A Yes, that's a relevant question.

22 Q What are the other questions?

23 A Well, I suppose those two questions encompass most of
24 the things. There are many subquestions associated with
25 each of those, but...

1 Q Those are the two big questions?

2 A Two overriding questions, sure.

3 Q Okay. And is the criterion craft question not
4 somehow answered in your analysis?

5 A It is.

6 Q Okay. So what are we left with?

7 A Why they're doing it, what their load is, who they're
8 taking it to, where they're taking it, when they need to
9 get it there.

10 Q So you need more information other than how often can
11 this 2000-pound load be carried in this size boat?

12 A Yes.

13 Q What other -- so what did you assume in that -- in
14 determining that the number of days that you presented
15 here is not navigable?

16 A As I've said before, I didn't make a specification
17 assumption at that. I looked at the charts -- the red in
18 these charts, I considered the number of days, and I said,
19 to me, for carrying those kinds of loads, the number of
20 boatable days is broken up to the point where, if I were a
21 person who thought about doing a commercial, you know,
22 load-carrying operation on that river, I would say, I'm
23 going to find a different river to work on.

24 Q So do you -- so to you, does "predictable" mean --
25 sorry -- does "unpredictable" mean random?

1 A Not necessarily random. I mean, certainly there
2 would be a random component to it. I'm not sure if I can
3 answer that question, actually.

4 Q Well, are there mathematical ways we can measure the
5 distribution of boatable days?

6 A Sure.

7 Q Have you done any of that?

8 A Yeah.

9 Q You have? What mathematical formula have you used to
10 measure the distribution of boatable days?

11 A Well, I've presented the quantitative information
12 about when they occur.

13 Q Well, you've presented binary information. It's
14 occurring; it's not occurring.

15 A Okay.

16 Q Okay. The number of boatable days is -- occurs
17 within a finite period within a year. Can we agree on
18 that?

19 A Sure.

20 Q A hundred and 53 days, your number.

21 A Well, the period of the year that we're considering
22 the open water season lasts for roughly a hundred and 53
23 three days.

24 Q That's your maximum?

25 A Yes.

1 Q And within that hundred and 53, can we measure the
2 distribution or observe the distribution of boatable days
3 to determine, are they really occurring in an
4 unpredictable way?

5 A That could be done. We can observe that by looking
6 at the charts.

7 Q So why do you think they're unpredictable?

8 A Because they don't happen at the same time every
9 year. They happen in response to storms. Can we predict
10 exactly when storms will happen that will raise the level
11 of the river throughout every year? No.

12 Q What do you mean by "same time"?

13 A I mean, can I count on June 1st I can go out there
14 and be very assured that I have enough water in the river
15 to carry my load. On July 15th, same question. And you
16 can't. You look down the chart and you see some years you
17 could, some years you couldn't.

18 Q So navigability requires a daily time table,
19 prediction at a daily level?

20 A I wouldn't say it requires that. That certainly
21 would be helpful.

22 MS. ROBERTS: Let's take a break. Can we take a
23 break, Counsel?

24 MR. SCHECHTER: Sure.

25 (Recess taken.)

1 BY MR. SCHECHTER:

2 Q Dr. Mussetter, is there anything that you would like
3 to change from earlier this morning?

4 A No.

5 Q So you've said that you based your analysis that puts
6 your number of boatable versus non-boatable days in a
7 navigability framework based on your common sense and your
8 understanding of the commercial reality standard; is that
9 fair?

10 A That's fair.

11 Q And do you have any experience running a commercial
12 operation on a small river?

13 A Not beyond the typical studies that I've done
14 throughout my career. But that wouldn't, I guess, be in
15 the category of commercial navigation in the context
16 you're using it. So the answer is no.

17 Q You don't have experience or background in mining,
18 particularly placer mining?

19 A No.

20 Q Okay. And you haven't been a trapper?

21 A I've done some trapping, but I wouldn't consider
22 myself to be a trapper.

23 Q Have you done trapping on a commercial level?

24 A No.

25 Q When you say that you have done trapping on a

1 commercial level, how much trapping have you done?

2 A Well, I didn't say I've done it on a commercial
3 level.

4 Q Sorry. You haven't -- that you haven't done it.
5 How much have you done?

6 A Very little. When I was a child my father and my
7 brother-in-law did some trapping, and I worked with them a
8 little bit, just on a casual basis.

9 Q A couple animals here and there?

10 A Yes.

11 Q And you don't have experience operating a commercial
12 recreation operation?

13 A No.

14 Q Looking at page 2, 8-a and 8-b.

15 So looking at 8-a, and by my calculations, you
16 have identified that the small poling boat carrying a
17 2,000-pound cargo load, boatable conditions would have
18 occurred a hundred and 70 days of the year, which is
19 greater than the open water season.

20 A Well, you've done the calculation incorrectly, if
21 that's what you calculate.

22 Q "Boatable conditions would have occurred during an
23 average of five discrete, unpredictable periods each year
24 for durations averaging about 34 days each."

25 Why -- would I not multiply five by 34?

1 A No, you can't do that.

2 Q Why not?

3 A Because the way the distribution works out, it skews
4 the average to rough applied number because there are
5 periods when it significantly exceeds 34 days. So when
6 you average them all together, it comes up with a larger
7 number than you would get if you just considered the
8 discrete periods.

9 Q Is "average" not taking the sum of individual periods
10 and then dividing them by the number of individual
11 periods?

12 A It's averaging together the length of the individual
13 periods.

14 Q So maybe this is an inartfully worded sentence?
15 "Five discrete, unpredictable periods for durations of 34
16 days each."

17 A Maybe it is an inartfully worded sentence.

18 Q Okay. So how do I get to something that makes sense?

19 A We need to parse it into two pieces. During the
20 average year -- on average you have done -- what was I
21 saying, unboatable or boatable? Yeah. Boatable
22 conditions would occur five different times. It would be
23 separated by periods that with not be boatable.

24 Q Okay. I understand that.

25 A When those occur, the average length of those periods

1 is about 34 days.

2 Q Okay. So -- and there's no predictability as to when
3 they may roughly start or roughly end?

4 A There is very little predictability.

5 Q What is the little predictability?

6 A Well, they tend to be -- the flows tend to be higher
7 earlier in the open water season. And so the odds of
8 having boatable conditions are higher early in the season
9 than they are later in the season.

10 Q Is there some period later in the year when people
11 can roughly expect that boatable flows will start to occur
12 again?

13 A No.

14 Q Let's turn to page 75.

15 A Okay.

16 Q "From the above analysis, it is clear that
17 boatability of the two segments of the disputed reach
18 containing the study sites would have been limited and
19 unpredictable for the wooden boats that were in customary
20 use for commerce in smaller rivers and the Yukon and
21 Tanana River drainages at the time of Alaska statehood."

22 In that sentence, what flow are you specifically
23 referring to that is limited and unpredictable?

24 A Well, it's the specific flows that are spelled out in
25 Table 6 and evaluated in Table 7.

1 Q So the flow for the river as a whole?

2 A Well, the flow at the individual sites. And then
3 collectively.

4 Q Why did you change that section -- that sentence from
5 "extremely limited and unpredictable" in your original
6 report to "limited and unpredictable" in this report?

7 A Well, because, with the corrected numbers, the
8 periods are longer and they tend -- the boatable periods
9 do tend to occur more often than I had originally believed
10 based on the incorrect numbers. So I basically softened
11 the sentence.

12 Q Do you have a standard or quantifiable idea of what
13 "limited and unpredictable" means?

14 A No. And we've talked about that at length.

15 Q Let's talk about modeling.

16 A Let's do.

17 Q Okay. What is the of purpose of modeling, generally?

18 A It's to quantify the hydraulic conditions in the
19 reach of the river that you're interested in.

20 Q So do you -- is modeling -- what do you typically use
21 modeling for, what kind of applications?

22 A A wide variety of applications. I don't think I can
23 give you a typical answer.

24 Q Are they -- is a model frequently or often used to
25 give a rough -- a rougher estimation of what's going on

1 with a water body for the purposes of then engineering
2 some purpose around it? At least as you use it.

3 A I'm sorry. I don't understand what your question is.

4 Q Well, are -- so in the navigability cases, it seems
5 like you're using modeling to identify the water
6 specifically and -- water for water's sake, right? Is the
7 water there, is it above a certain flow, what flow is it
8 at, right?

9 And I have a sense -- and maybe I'm wrong --
10 that modeling is more often used for, let's get a general
11 idea of the river, and then we're going to build a bridge,
12 or, we're going to build a dam, or, we're going to, you
13 know, determine what happens if we divert this amount of
14 water somehow. I could be wrong.

15 A I certainly wouldn't characterize it that way, no.

16 Q Okay. How would you characterize it?

17 A Well, again, modeling is used for a wide variety of
18 purposes. Some to get rough ideas and some to get very
19 specific, highly accurate ideas about what's happening in
20 the river.

21 Q So what -- for modeling in this specific case, what
22 question or questions were you using modeling to answer?

23 A The specific question was: What are the depths of
24 flow for the range of discharges that occur in the river?

25 Q How does modeling help you answer that question?

1 A Well, the HEC-RAS model that we talked about
2 calculates the water surface elevation and, by extension,
3 from that, you know what the depth is because you know
4 what the water surface elevation is and you know what the
5 bed of the river elevation is.

6 Q And in this case you used one-dimensional modeling;
7 is that correct?

8 A That's correct.

9 Q Okay. What is the difference between one-dimensional
10 and two-dimensional modeling?

11 A One-dimensional modeling basically assumes that the
12 flow lines are all basically in the down river direction.
13 A one-dimensional model doesn't allow you to quantify
14 circulation or long flow patterns.

15 The two-dimensional models that we typically use
16 basically quantify the flow directions in the horizontal
17 plane. So it does have the ability to look at
18 circulation.

19 Q How -- so what would a two-dimensional modeling tell
20 us here that we don't already know about the river?

21 A There are a couple of things you could learn from a
22 two-dimensional model that you can't get from a 1-D model.
23 One, as I said before, is the circulation patterns. The
24 flows, as we know, don't always go straight downstream
25 across a cross-section. The other is the -- depending on

1 the resolution that you build the model, and the
2 resolution of your topography, you can get more spatially
3 distributed information.

4 The one-dimensional model is cross-sectionally
5 based; the two-dimensional model is -- considers the
6 topography of the entire area, not just lines across the
7 river.

8 Q Would that give us a better idea of where water is
9 moving in the channel for purposes of whether it's
10 sufficient to float a boat or not?

11 A You could get information out of the two-dimensional
12 model that would -- would be very informative for the
13 question we're trying to answer here, that you can't get
14 from a 1-D model.

15 Q Okay. Why didn't you choose a one-dimensional model
16 in that case, then?

17 A Because of the level of effort that's required to --
18 the availability of data, I guess I would say, and the
19 level of effort that's required to build a good
20 two-dimensional model, primarily.

21 Q What other data would you need?

22 A We'd need a whole lot more topography at the sites
23 than the cross sections and other limited topographic
24 points that we collected. We'd have to have topography
25 for the entire area.

1 Q And how would you collect that?

2 A You could do it basically using the same techniques
3 that we used. You could also do it using aerial mapping
4 or Lidar-based approaches.

5 Q Would those be more cost efficient than surveying?

6 A Not necessarily.

7 Q Oh. Why not?

8 A Well, you have to consider the mobilization costs,
9 the cost of the equipment, the cost of the processing
10 time. You end up with a whole lot more data. And so, you
11 know, I didn't do a direct comparison, but I think -- I'm
12 not sure if we could have collected the same data for
13 cheaper, using Lidar or some other purpose. But there are
14 other values of being on the river and collecting data
15 using conventional survey techniques that you can't get if
16 you just go out and -- send somebody out there to do a
17 Lidar flight.

18 Q Was -- is there other data that -- other than
19 topography -- that you would need to do the 2-D work?

20 A Yes.

21 Q What else would you need?

22 A Well, you need to know the quantities of the flow
23 that you're modeling. You need to know the character of
24 the -- of the boundary materials, the sediment on the bed
25 of the river, the bank material, the vegetation, those

1 sorts of things.

2 Q I'm sorry. I meant in addition to the things that
3 you wouldn't need for -- beyond what you would need for a
4 one-dimensional model. It sounds like those are things
5 you would also need for a one-dimensional model?

6 A Yes.

7 Q Okay. So in addition to topography, what other
8 things would you need for a two-dimensional model that you
9 wouldn't already be acquiring for a one-dimensional model?
10 And I guess it could be something that you need more
11 detail of than you would need for a one-dimensional model
12 also.

13 A That's -- the primary thing is the detail of the
14 topography. That's the primary difference.

15 Q And did you investigate the cost of that, for doing
16 two-dimensional work in this case?

17 A I did not.

18 Q Okay. Did -- were you specifically requested to do
19 one-dimensional modeling?

20 A No.

21 Q Were you requested to model?

22 A Not explicitly, no.

23 Q Implicitly?

24 A Well, I was asked to develop an opinion on the matter
25 that we're talking about today. And I was asked to give a

1 work plan to do that and to do -- tell them what I felt I
2 needed to do to answer the question.

3 Q Okay. So other than -- so a two-dimensional model
4 might have been another direction to go.

5 What other things might you have considered
6 doing, other than a one-dimensional model, for supporting
7 your opinion?

8 A I'm sorry. Would you ask that again?

9 Q What other possibilities could you have considered to
10 answer the question, in this case?

11 A Well, I think, to me, modeling of some form is
12 necessary to fully answer the question. There are other
13 background things that could have been done that provides
14 additional information. But you can't be on the river at
15 all places at all flows to see the conditions. And that's
16 one of the primary reasons to model, is you have the
17 ability to quantify conditions at places and times that
18 you can't physically go out there and measure.

19 Q Well, why can't you go -- physically go out and
20 measure?

21 A Perhaps "can't" isn't the right word. But you don't
22 have the resources and the time to do it.

23 Q Well, a quarter million dollars, you could have gone
24 on a couple more trips to the wilderness?

25 A Apparently not.

1 Q Well, you spent it on the modeling.

2 So what are the limitations of the 1-D model? I
3 think we talked about already that it doesn't show
4 horizontal flows as something -- maybe we didn't talk
5 about those specifically as limitations of 1-D modeling,
6 but you mentioned it as something that 2-D modeling does
7 and 1-D modeling does not.

8 A It doesn't show horizontal circulation --

9 Q Okay.

10 A -- variation from just the downstream direction.

11 Q All right. So everything flowing downstream is
12 assumed to be going same speed, same direction?

13 A No.

14 Q No. Okay. Could you explain that a little bit more
15 then?

16 A The one-dimensional model assumes that the flow is
17 going across the cross-section, as it's defined,
18 perpendicular to the line.

19 Q Okay.

20 A And it explicitly gives you the average velocity
21 across the cross-section for the wetted part of the
22 cross-section. And then there are techniques that you can
23 use to approximate how that velocity varies across the
24 cross-section.

25 Q And what are other limitations of the one-dimensional

1 model?

2 A Well, I suppose one limitation is that it -- that the
3 results strictly only to -- apply to the specific
4 cross-sections that are incorporated into the model and
5 they're spaced at some distance apart, so there -- the
6 topography is different. If you surveyed a different
7 cross-section you'd get different topography, and it would
8 give you somewhat different results.

9 Q And are there any other limitations of the
10 one-dimensional model that come to mind?

11 A I think, with respect to this question at least,
12 that's the primary issue.

13 Q And is there -- are there different or additional
14 issues with the HEC-RAS modeling specifically? You know,
15 on what -- would there be general issues with
16 one-dimensional modeling?

17 Maybe I'll ask it a different way: Did you
18 consider other one-dimensional models?

19 A I did not consider other one-dimensional models.

20 Q Why not?

21 A Because HEC-RAS is a commonly-accepted model in the
22 industry. It's a well-formulated modeled. Most
23 one-dimensional models use essentially the same solution
24 to the equations of motion that are used in the HEC-RAS
25 model. So fundamentally, you would -- almost any

1 one-dimensional model that you would pick would give you
2 essentially the same results. So there's no reason to use
3 a different model.

4 Q Can you walk me through -- and we can break this down
5 more if you'd like. But what I'd like to do is go through
6 the steps that start with: Here's my problem; here's my
7 HEC-RAS model at the other end of it. And so how do we
8 get from A to B? I have this question about Mosquito Fork
9 on the one end, and what work steps and what things
10 happened to create these models?

11 A So it sounds like you're asking me to describe for
12 you everything we did from the time I was first contacted
13 by DOJ until I published my report. Is that what I'm
14 hearing?

15 Q No. I think -- starting with DOJ might be okay. And
16 You can sort of summarize the trips. I think we've talked
17 about those at length.

18 A Right.

19 Q But maybe going into more detail on the surveys and
20 how that ends up in the model. And then we can -- let me
21 ask if this understanding is correct. So we have -- you
22 have the question, you have the over-flight, you have site
23 selection, you have the surveys, you have some calculation
24 of some other values and numbers. And then you have that
25 input into HEC-RAS; that creates -- and that creates that

1 model. And from HEC-RAS you may have -- there may have
2 been other things with the Monte Carlo analyses and things
3 like that that happened afterwards.

4 Is that the sort of correct understanding of the
5 general time line?

6 A Conceptually, that's about right.

7 Q Okay. So I'd like to -- so that's my level of
8 understanding of that time line. I'd like to hang some
9 meat on its skeleton.

10 A Okay. So what is your first question?

11 Q Let's start with DOJ.

12 How did DOJ come to contact you?

13 A We have done work for DOJ before, and so I think --
14 well, I can't really say how they knew about us. We've
15 done work for them before; I suppose that's it.

16 Q You're not allowed to say or you don't know?

17 A I don't know --

18 Q Okay.

19 A -- specifically why they came to us. But I received
20 a call from DOJ saying, here's a problem we've got; is
21 this something that you'd be interested in helping us
22 with. And I said yes.

23 And so then we discussed generally the issues
24 associated with the case. I think they provided me with a
25 copy of -- I don't know if the terminology is right -- the

1 complaint or the court filing; I read through that. And
2 then we discussed it some more. And I -- then I was asked
3 to put together a work plan on a budget to carry out the
4 work I felt was necessary to answer the question.

5 Q And what was the total budget?

6 A It was the range of \$250,000.

7 Q And when did DOJ first contact you?

8 A Again, I don't remember the exact date. Late 2012,
9 early 2013, rough time frame.

10 Q So what happened after you developed the work plan?

11 A Well, then we went through the process of executing a
12 contract to do the work. And then we set about
13 implementing the work plan.

14 Q Is the work plan summarized on pages 3 and 5 of your
15 Exhibit 1? I'm looking at numbers one through five.

16 A That's a very general characterization of the work
17 plan, yes.

18 Q Okay. Did you add additional detail to that?

19 A Well, those are the major tasks that were done.
20 There are a lot of subtasks that fall into each of those
21 categories.

22 Q Okay. What -- so what was the first item on the work
23 plan, and what happened after you executed the contract?

24 A I think the first thing that happened was we got the
25 mapping and the available aerial photography and whatever

1 documents we could find about that area, to try to
2 understand what we were dealing with, what type of river
3 was it.

4 We discussed the physical conditions there with
5 the BLM representative, Mr. Kennedy, that I mentioned
6 earlier, primarily. And then we scheduled the
7 reconnaissance trip, to have a look at the river. And, as
8 I said earlier, we originally intended to float the river
9 during that period and were unable to.

10 Q And you were personally involved in all those steps
11 that we've talked about so far?

12 A Yes.

13 Q Was anyone else involved?

14 A Well, I had staff members assisting me, pull
15 information together, plot profiles, pull flow data, those
16 sorts of things.

17 Q I'd like to -- I know we talked a little bit about
18 site selection earlier. I'd like to ask a couple more
19 questions about it.

20 So are -- were all of sites selected -- the 25
21 initial list, was that -- was there any other list besides
22 the 25 that we talked about before?

23 Was there some greater list?

24 A No.

25 Q So is it fair to say that the criteria for being on

1 the list of 25 were that they were areas that were all
2 challenges to boatability?

3 A They were areas that I judged -- that appeared to
4 present challenges to boatability, based on the
5 information that I had at that time, yes.

6 Q Did you consider mapping or studying in greater
7 detail areas that weren't challenges to navigation?

8 A Other than the -- the site at Mosquito Flats that we
9 talked about, I didn't, no.

10 Q Why not?

11 A I didn't feel that it informed me. I fully expect
12 that I could take most any boat and float down through a
13 pool. That's not the question.

14 Q Would it be helpful, in terms of comparison or any
15 other base line for this particular river?

16 A I don't see how.

17 Q Why not?

18 A It doesn't inform me about the challenges to boating
19 the river.

20 Q So would you want to confirm what you observed from
21 the air and from the mapping with regards to those areas?

22 A Well, yes. I mean, that's one of the reasons that we
23 wanted to float the river, because we wanted to see what
24 it was like along the entire length.

25 Q And that would be a more useful way to confirm than

1 surveying a site that appears to not have any particularly
2 interesting riffles or bars or anything?

3 A I don't know that I would say it's a more useful way.
4 It's useful information.

5 Q So it would have been useful information to
6 potentially survey one of those sites?

7 A I don't think it would have contributed significantly
8 to answering the question that I answered here.

9 Q Were you -- in your work plan and in your directions,
10 were you directed to study the whole river from zero to
11 80.5?

12 A I don't think I was explicitly directed to. I was
13 asked -- I was basically asked to consider the question of
14 navigability/boatable for that entire reach, initially, up
15 to the mouth of Wolf Creek, the area that's -- that's
16 described in the court filing.

17 Q You say "initially." Did that change at some point?

18 A Well, so sometime after I started working on the
19 project, I realized that, before we even did the field
20 reconnaissance, I came to know -- and I don't even
21 remember why, maybe Mr. Kennedy told me, I'm not sure,
22 maybe one of the attorneys -- that the lower part of the
23 reach, below Chicken, had already been declared to be
24 navigable. And so I took that off the list, not something
25 I needed to study.

1 Q Was there anything else that changed on your list as
2 a result of anything besides your own reconnaissance and
3 decisions?

4 A No.

5 Q At any point during the project?

6 A Not that I recall, other than, you know, having input
7 from Mr. Kennedy that it's probably not a good idea to try
8 to float the river on the two occasions when I planned to
9 do it.

10 Q Fair enough. Okay. So I think we were at you --
11 there was a work plan, and then now you and your staff
12 have started pulling the mapping and the flow rates. That
13 informed your helicopter over-flight?

14 A Yes.

15 Q You took the over-flight. You landed at four sites.

16 A Right.

17 Q Okay. And then, based on the information obtained at
18 the -- at the -- during the over-flight, some work in
19 between the over-flight and the August trip, and during
20 the course of the August trip you limited your 25 sites
21 first down to about half, and then eventually to the sites
22 that were surveyed.

23 A That's correct.

24 Q Okay. How did you limit or pick -- identify the
25 boundaries of the areas that were to be surveyed for each

1 of those particular sites?

2 A Generally, we tried to encompass enough of the river
3 to make sure we had enough cross-sections, topography, to
4 model conditions through the riffle or impediment to
5 navigation at that location, without influence from the
6 boundary conditions, uncertainty in what's happening right
7 at the edges of the model. So we tried to get them far a
8 enough away to avoid that.

9 Q Do -- in -- so it looks like most of the sites are --
10 all of the sites are several miles apart; is that fair, if
11 not more?

12 A Yes.

13 Q And so the other 17 or so sites that you identified
14 would be interspersed between these?

15 A Correct.

16 Q Okay. So this -- I mean, does your analysis take
17 into account -- or the site selection take into account
18 sort of how one riffle or one bar in the selected sites
19 might lead into other ones?

20 A Well, I'm not sure of the context of your question,
21 but I don't -- I would say no. They're individual sites
22 that represent hydraulic controls in the river from a
23 hydraulic performance perspective. And so, I mean, there
24 -- it's -- within some sites, there is more than one
25 shallow area that could be an impediment. So to that

1 extent they do, but I don't know that there's necessarily
2 any direct connection between the analytical work we did
3 at one site and the analytical work that we did at the
4 next downstream or upstream site.

5 Q Okay. I think what I'm getting at is, from my
6 boating experience, there's -- you know, you hit one
7 riffle, and then, you know, there might be another one,
8 and they're tracking. And it sounds like for some of
9 those sites -- and I think, looking at some of the sites
10 there are more than one feature potentially, more than one
11 challenge, within a particular site.

12 Would it be fair, then, to say that, between
13 both the sites that were actually surveyed and if we
14 included the other sites, that the areas between all of
15 these are relatively free of challenges to navigation?

16 A I'm not sure I'd say it quite that strongly. I think
17 it's more likely that the intervening reaches would be
18 boatable than the reaches that we studied or the candidate
19 sites. Whether that list of 25 encompasses every single
20 place on the river that would be a challenge to
21 navigation, I wouldn't be prepared to go that far. But
22 they're the ones that I was able to identify. There may
23 be others, but generally those -- the intervening areas
24 would be more boatable.

25 Q And would the -- of the 17 that weren't surveyed, are

1 there any that you would have liked to have surveyed
2 because they are of greater magnitude or for some other
3 reason -- some other special reason that you would really
4 like to have surveyed them?

5 A I'm not aware of any -- I mean, obviously more is
6 better. Limited resources, you have to do what you can
7 do. But I don't know of any other sites that I look back
8 now and say, jeez, I wish we would have studied that site.

9 Q There -- I mean I guess what I'm getting at: Is
10 there some monster out there that wasn't surveyed?

11 A If there is, I'm not aware of it.

12 Q So within each survey area, we talked about how you
13 limited the boundaries. How were the cross-sections
14 selected?

15 A They were selected to represent the range of
16 conditions through the site, to capture the hydraulic
17 controls within the site, and to give us enough resolution
18 that we could make defensible judgments about the flow
19 depths through the site at the various flows.

20 Q And did you survey cross-sections for all of the
21 modeling reaches?

22 A Yes.

23 Q How did you align the cross-sections?

24 A They were aligned perpendicular to the flow.

25 Q Based on the model?

1 A Well, we didn't have a model at that time. Based on
2 observation.

3 Q And for the -- and the elevation error for all of the
4 work done was 1.9 centimeters; is that correct?

5 A Thereabouts, yeah.

6 Q Okay. And that's roughly three-quarters of an inch?

7 A Sounds about right.

8 Q How might that impact things?

9 A Probably has no perceptible impact on things.

10 Q Okay. Are -- well, so is the error individual or --
11 so -- I guess what I'm asking: Is everything -- when you
12 survey a site, if the error is roughly 1.9 centimeters,
13 roughly three-quarters of an inch, is everything on the
14 site off from some vertical mark by the same? So in
15 relationship to each other, everything in the survey is
16 correct, or is it possible for different places in the
17 survey to be up to three-quarters of an inch off from each
18 other?

19 A The quoted error numbers in the report are the -- a
20 description, generally, of the standard deviation of the
21 distribution of those errors about the expected value. So
22 what it means is -- it means that, if the error is 1.9
23 centimeters, it means that roughly two-thirds of the
24 points would be within plus or minus 1.9 centimeters of
25 their absolute true value. It's not all in the same

1 direction. Some are negative; some are positive.

2 Q Okay. So the error is in relation to some standard
3 point and not in relation to each other?

4 A Well, if you went out and measured the point a
5 thousand times, completely independently, the same exact
6 point, you would get that kind of variability in the
7 measurement.

8 Q Right. So I guess what I'm asking is: Can I ignore
9 the error because the error is not between -- the error --
10 so if I have point A and point B, and then I have some
11 central reference point, are they -- are both A and B 1.9
12 centimeters off of the reference point, or they're -- I
13 think you've answered this. They're variable; they could
14 be different amounts off of the reference point, which
15 means that they're not necessarily the same amount of
16 error for every point?

17 A That's correct. It does not mean that all points in
18 the survey are off by 1.9 centimeters.

19 Q Okay. That I understand. But there's a potential
20 for error, and so the error tells me that there may be --
21 in relationship between two points at the site, there may
22 be some error between them?

23 A Yes.

24 Q Okay. Now, I apologize if we're getting into the
25 same questions again, but I don't know that we are.

1 So how were the -- so the -- we now have the
2 surveys done.

3 A Okay.

4 Q We have the cross-sections. Your team went out into
5 the field to do that work. That's all correct?

6 A That's correct.

7 Q Okay. And they bring the work home. And what
8 happens next?

9 A Well, the survey data are -- we call it reduced --
10 into a format that can be applied in the model. So they
11 -- when you take the survey point with the GPS instrument,
12 it records the coordinates of each point, which is a
13 horizontal X and Y coordinate, and then an elevation. For
14 use in the one-dimensional model, those have to be
15 converted to elevations and distances along a line. So
16 that's one aspect of the conversion.

17 Q So let me roll back a second, back to the field.

18 So on the cross-sections, how far apart -- the
19 cross-sections are measuring the depth across the river at
20 a particular -- on the line perpendicular to the river's
21 flow?

22 A They're measuring the elevation of the ground surface
23 along that line.

24 Q Okay. Are they also measuring the water surface
25 elevation?

1 A When we encounter water, we do measure the --
2 typically, we measure the edge of the water, which is one
3 point that represents the water surface and the ground at
4 that specific point.

5 Q Okay. And so that creates a contour of the bottom of
6 the channel?

7 A Yes.

8 Q Okay. And so, when you're out in the field, are you
9 also measuring the water surface elevation separate from
10 the channel elevation? If I have a channel and there's
11 water above it, there's a delta between the two; isn't
12 there?

13 A Yes.

14 Q Okay. So for a single location that's in the middle
15 of the river channel, say, are we taking two elevation
16 measurements?

17 A No.

18 Q No. Which elevation measurement are we taking?

19 A The ground, the bed --

20 Q The bed of the river?

21 A Yes.

22 Q So -- and why aren't we taking the water surface
23 elevation?

24 A Because we define that water surface elevation by the
25 point at the edge of the water. We don't take --

1 Q At the bank?

2 A At the bank. We don't record the individual water
3 surface elevations across the channel, typically.

4 Q Could there -- could there be variations in water
5 surface elevation?

6 A There can be some, yes.

7 Q Okay. And what would those reveal?

8 A That there's variation.

9 Q Okay. I mean, what does that tell us about the
10 nature of the river or what's underneath it?

11 A Well, if we laid the cross-sections out in an
12 appropriate manner, the variation across the river is
13 typically relatively small. That's one of the purposes of
14 it. So the assumption in the 1-D model is that the water
15 surface is flat across the river.

16 Q Okay. Is that another issue with the one-dimensional
17 model, is that assumption?

18 A Yes. It basically is a point where you need to take
19 special care in the way you lay the cross-sections out to
20 limit that effect.

21 Q So if you have -- if the cross-section spans multiple
22 -- I don't want to use the word "channel," but I'm
23 struggling to come up with another word -- multiple areas
24 of water that are separated by a bar or a riffle,
25 something that's not covered with water, would it be

1 possible that those are going to have two different water
2 surface elevations?

3 A Yes.

4 Q But in this model we're only measuring the banks,
5 even if there's a -- some inundated portion of the channel
6 in the middle of the water?

7 A Are we talking about the field measurement or the
8 model result now?

9 Q The field measurements.

10 A Well, we measure the edge of water wherever we
11 encounter it. So if there are multiple channels, we would
12 have a shot on every edge of water that we encounter.

13 Q Okay. That's helpful.

14 MR. SCHECHTER: Go off record for a second.

15 (Off record.)

16 BY MR. SCHECHTER:

17 Q Okay. So now you've taken that information back.
18 The survey is one part of the information, then the flow
19 in the water is the other main part of information; is
20 that correct?

21 A That is another very important piece of information,
22 yes.

23 Q Okay. What -- so what other things besides the
24 survey need to go into the HEC-RAS model?

25 A You need to define two primary things. One is the

1 hydraulic roughness; there are parameters that you input
2 into the model that describe the amount of energy,
3 basically.

4 And then the other is the downstream boundary
5 condition. The user has to give the model information to
6 know what the water surface elevation is at the most
7 downstream cross-section.

8 Q And is that in addition to information about flow and
9 how much water is coming into the system?

10 A Yes, except that both of those pieces of information
11 are a function of the amount of flow. They vary with
12 flow.

13 Q And -- all right. So you tell me what happens next.

14 A Well, you input the topographic information into the
15 model.

16 Q Into HEC-RAS?

17 A Into HEC-RAS, yes. Another key piece of information
18 is the distance between the cross-sections, and that comes
19 from the survey data as well. Then you define the
20 roughness relationship, and you input that into the model.
21 And then you -- you tell the model how much flow, so
22 before you make a model run, you have to say, I want to
23 understand what happens at 200 cubic feet per second. So
24 okay, I put that into the model. I have to tell the
25 model, at 200 cubic feet per second -- there are different

1 techniques, but basically what is the downstream water
2 surface.

3 There are other minor coefficients, expansion
4 and contraction coefficients, that in this case don't have
5 a whole -- have a huge impact on the results, but they're
6 important.

7 And then you run the model and you compare the
8 results. You run it for flows that you have measured data
9 for and compare the results to make sure they match
10 reality. And then you're off and running.

11 Q So -- and where do you get the flow information from?

12 A Well, so in this case, the so-called calibration
13 discharges for all of the sites came from the measured
14 water surface elevations.

15 And you asked about the flow, the measured
16 discharge at the time of the survey. So we measure the
17 water surface, we measure the discharge, so we know the
18 correlation between the two. At the Taylor Highway site,
19 we also have the reading curve at the gauge, and so we're
20 able to us that. So we can look at a whole different
21 range of flows, all the flows that have occurred there.

22 Q Is that the entire list of input parameters? Like,
23 we have the topography from the survey, roughness, the
24 downstream elevations --

25 A Downstream boundary condition.

1 Q -- and -- I can't remember one you --

2 A Expansion and contraction losses.

3 Q Okay.

4 A Coefficients. And then the quantity of flow. For
5 the simple models, that's all.

6 Q Okay. So which of those were parameters from which
7 you had to make choices about, as opposed to some measured
8 value of the world?

9 A Well, the topography within the channel came directly
10 from the survey data, so there's no choice to be made
11 there. The estimates of the hydraulic roughness
12 coefficient is a combination of a choice, as you describe
13 it, and then efforts to make sure that the model predicts
14 observed conditions. The expansion and contraction loss
15 coefficients are also a choice, although there are
16 standard values that, unless you're dealing with an
17 unusual condition, that are typically used. And then the
18 downstream boundary condition, as I said, there are
19 different methods of quantifying that downstream boundary
20 condition; and so you make a choice based on the data that
21 you have, which is the most appropriate method to use.

22 Q Were there any special conditions, as you just said,
23 for these reaches?

24 A I'm sorry. Special conditions? I'm not sure what
25 you're referring to.

1 Q I think for the expansion and contraction
2 coefficients, you said there's normal values and then
3 there's some other values if there's --

4 A There was nothing that would cause us not to use the
5 standard values in this reach.

6 Q That was my question.

7 A Yes.

8 Q And so it sounds like the modeling process is
9 iterative, a little bit. There's -- you put the initial
10 information in, and then there's other calibration
11 information you use to check to see if the model is
12 working correctly?

13 A Yes.

14 Q Okay. So how does that happen?

15 A Well, it's a complex process that involves a lot of,
16 you know, paying attention to a lot of things. But
17 generally, you start out by -- you know, we were out
18 there, we talked about the range of flows that were
19 present in the river when we did the surveys. So we -- at
20 each site we modeled that specific discharge. We made
21 initial estimates of the roughness coefficient at that
22 discharge, and they're variable through the site,
23 actually. We compared the computed water surface
24 elevations with the measured elevations.

25 And then, when we saw -- if we saw that we

1 weren't matching, then we made adjustments to those --
2 primarily the coefficients -- roughness coefficients to
3 better match conditions in the field. In some cases the
4 transitions between cross-sections weren't quite
5 appropriate, and so we interpolated some additional
6 cross-sections just to help the model avoid
7 discontinuities, if you will, and that helped improve the
8 calibration as well.

9 But we do the best we can to get the measured
10 water surface elevation -- the modeled water surface
11 elevation to match the measured elevation.

12 Q Okay. And how far -- so how far off was the first
13 run?

14 A Oh, gosh, I don't -- I didn't even make the first
15 run. I don't know. I really don't know.

16 Q Is it common for the first run to be very far off?

17 A No, we're usually fairly close, because we
18 understand -- I mean, we've been doing this kind of --
19 I've been doing this this kind of model for 35 years, and
20 I can -- my Ph.D. dissertation had to do with roughness in
21 these kinds of channels. So I have a reasonably good idea
22 of how they behave. So we can get close.

23 Q Are there -- is there a standard deviation of or a
24 confidence interval, in terms of what -- what amount of
25 error the model has inherent to it?

1 A No. No.

2 Q There's no plus or minus range?

3 A Well, I mean, there could be. And you could do a
4 specific study to quantify that, I suppose, but it's not
5 something that you would typically do. We compare the
6 water surface elevations. We've provided the plots; you
7 can see for yourself how close we came to the measured
8 points. I don't know what I can say beyond that.

9 Q Well -- so as calibrated at, say, P-9; is that right?

10 A Well, we calibrated it using the measured data at all
11 the sites.

12 Q At the variable flows, as you call them?

13 A Yes. Yes.

14 Q So is -- is it optimal to calibrate at a range of
15 flows?

16 A That would be better, yes.

17 Q Okay. So -- and so what's the highest flow you were
18 able to calibrate the model at?

19 A Well, at Site P-9, it went up to the high range of
20 flows in the rating curve -- I don't remember. We may not
21 have gone -- run the model for flows higher than a couple
22 of thousand CFS.

23 We did actually look at higher, because I wanted
24 to get an idea of what the bank flow is. But we weren't
25 specifically focused on that. We spent most of our energy

1 trying to make sure that everything worked down in the
2 range that could be questioned in this case, which is
3 generally the lower to mid-range flows.

4 Q And so no error -- there's no plus or minus for any
5 of the, you know, 300, 500, 800 CFS? There's no -- you
6 know, the model spits out the gospel, and that's where
7 we can expect the water -- the surface elevation to be?

8 A I didn't say that.

9 Q Sorry. Okay. Tell me what you would say.

10 A I would say that we do the best we can to get the
11 model result to match the measured data as closely as
12 we can. And sometimes close enough is sort of in the eye
13 of the beholder, and in our case, for the data that we
14 have, we're generally within, you know, a tenth or so.
15 There are some case where we might be a little bit farther
16 off than that, but --

17 Q A tenth of what?

18 A -- well calibrated.

19 Q A tenth of what?

20 A Tenth of a foot. Sorry.

21 Q That's over an inch.

22 A About an inch, a little bit over an inch.

23 Q 1.2 inches, to be precise.

24 A Okay.

25 Q Doesn't 1.2 inches seem like a big deal when we're

1 talking about -- I mean, that's five to 10 percent of a
2 boat draft.

3 A It is what it is. That's as good as you can do.

4 Q All right. If you had been able to boat on the river
5 more, would you have been able to obtain more data that
6 would have been able to further calibrate the model?

7 A It was our intent to float it at a higher flow to get
8 some data at a higher level at the other sites, yes.

9 Q Does your model -- does your model jive with the
10 State trips or BLM trips that were taken at various flows?

11 A I'm not sure what you're asking me.

12 Q Well -- so I think the tables will tell us that the
13 State's trip at 220 was unboatable. But they boated it.

14 A And they drug their boat -- a lot.

15 Q What's "a lot"?

16 A I don't know how many times they boated [sic] -- they
17 drug their boat.

18 Q Does that -- is that still something that influences
19 how the model is calibrated or not or how you were
20 thinking about how well the model is calibrated?

21 A Not really. We're talking about a different kind of
22 boat, so it's not -- it's not relevant.

23 Q Even if the boat has a similar draft?

24 A Well, I don't know that it does.

25 Q If the boat did have a similar draft, would it be

1 relevant?

2 A It could be helpful.

3 Q Because, I mean, it's -- really, it's a box, right?

4 We're talking about a box down the river. And if
5 something fits in the box, it should be okay, right?

6 A I suppose boaters would probably object to you
7 calling their boat a box, but...

8 Q It's better than calling it a hole in the water that
9 you shovel money into, but -- I mean, but that's -- is it
10 fair to call the question here, you know, we have -- we're
11 trying to see if one box fits in another box? We're
12 trying to see if the boat box fits in the river box?

13 A We're trying to see whether it's feasible to float
14 the criteria boat, on a reliable basis -- to boat through
15 the reach with that criteria boat is the question.

16 Q Right. And -- but isn't another way to frame that
17 question: The criterion boat occupies a box of X, Y, and
18 Z dimensions; and the river is, you know, A, B, and C
19 dimension at this flow.

20 Does this box float down the river?

21 A You could characterize it that way, sure.

22 Q Okay. You would characterize it that way -- you
23 could characterize it that way?

24 A You could, yes.

25 Q And you wouldn't object to that?

1 A I think that's a fair characterization.

2 Q So, really, the box -- the criterion boat tells us
3 what size the box should be. But if another boat is
4 similar and would fit in that box, you would find that to
5 be potentially useful evidence of what could go down the
6 river?

7 A If the other boat had the same draft, the same
8 horizontal footprint, same operating characteristics, then
9 that would be useful information.

10 MR. SCHECHTER: Okay. Let's break for lunch
11 there.

12 (Lunch recess.)

13 EXAMINATION (Resumed.)

14 BY MR. SCHECHTER:

15 Q Good afternoon, Dr. Mussetter.

16 A Good afternoon.

17 Q Is there anything that you would like to change or
18 add to from your answers this morning?

19 A No.

20 Q We were talking about confidence intervals and
21 calibration of the HEC-RAS model; is that your
22 recollection as well?

23 A I recall that.

24 Q Okay. And so if you would turn to page 52 of Exhibit
25 1.

1 A Okay.

2 Q Is Figure 51-A the -- something that shows how the
3 model is being calibrated?

4 A It provides some information about the model
5 calibration, yes.

6 Q Okay. What information does it provide?

7 A Well, it shows a comparison of the rating curve, the
8 stage discharge rating curve at the Mosquito Fork gauge
9 with the computed values from the model for equivalent
10 flows.

11 Q And what is the stage rating curve?

12 A Well, it shows the relationship between the --
13 actually, in this case, it's water surface elevation --
14 relationship between the water surface elevation and the
15 discharge, or vice versa.

16 Q And that -- and where does that curve come from?

17 A The blue curve was developed from measurements that
18 were made at the site.

19 Q At the Taylor Highway bridge?

20 A At the Taylor Highway bridge.

21 Q And there -- there's a gauge there?

22 A There is.

23 Q Okay. And the gauge measure the changes in the water
24 surface elevation?

25 A Yes.

1 Q Okay. And then someone at some agency takes that
2 information and has developed it into this curve that
3 shows how that relates to what the flow of the river is?

4 A Sort of.

5 Q Okay. Straighten it out for me.

6 A They go out periodically, and they make flow
7 measurements at the gauge. And at the same time they take
8 a measurement of the -- actually the gauge height, which
9 is a little different from the water surface elevation.
10 But they -- and then they develop a correlation, and
11 that's where this blue line comes from.

12 Q Okay. So they -- and I'm assuming not every point on
13 there has been measured; they've extrapolated that data
14 into this curve?

15 A "Extrapolation" is not the correct word.

16 Q Okay. What would the correct word be?

17 A They fit a curve to the data. And then they can
18 calculate discharges for a known water surface by
19 interpolation or by applying the curve directly.

20 Q Okay. And so that curve is -- so the curve that
21 we're seeing here is not necessarily -- any given point on
22 that curve is not necessarily actual data that's out
23 there, but is a mathematical model that's been developed
24 from the data that's out there?

25 A It's a mathematical equation developed from the data,

1 yes.

2 Q And -- so how does that curve relate to the triangles
3 that we see on there?

4 A Well, the curve is -- you can view it as a best fit
5 to the measured data. There's some scatter in the
6 measured data as well. And the triangles are computed
7 values from the model.

8 Q From the HEC-RAS model?

9 A From the HEC-RAS model.

10 Q Okay. So how -- how far off are -- so each triangle
11 here on Figure 51-A on page 52 is what the expected water
12 surface elevation would be at a given discharge; is that
13 correct?

14 A The triangles represent the predicted value from the
15 model.

16 Q Okay. Of water surface elevation --

17 A Yes.

18 Q -- based on a given discharge?

19 A Correct.

20 Q Okay. And it's hard to see in -- at the scale of
21 this diagram. You know, some of the triangles are right
22 on, right down the middle of the line. I would assume
23 those are a very good fit; is that correct?

24 A Yes.

25 Q And the ones that are a little further off the line

1 are not a perfect fit?

2 A That's fair.

3 Q Okay. And so what -- what is the -- the difference,
4 you know, between some of these triangle values and the
5 water -- the curve? I mean, how -- they're both giving us
6 an elevation in feet; is that correct?

7 A Correct.

8 Q So I assume a spatial relationship in this chart
9 is -- if the triangle isn't on a curve, there is some --
10 there's a difference in the number -- in the elevation
11 number of the triangle, the model -- HEC-RAS model is
12 giving us versus what we would expect from the stage
13 rating curve?

14 A The model doesn't predict precisely the same water
15 surface elevation in every case that you'll get from the
16 equation of the curve.

17 Q Okay. So how far off are we?

18 A The worst ones appear to be on the order of a tenth
19 of a foot or less.

20 Q Okay. And so, again, we're talking about -- about an
21 inch -- somewhere in the neighborhood of zero to 1.2
22 inches?

23 A The worst fit points there, yes.

24 Q Okay. And this -- if we're looking at the model as a
25 whole, this -- so do you take this information -- when you

1 fit this -- what did you do to the model as a result of
2 looking at how this fits?

3 A Would you ask that again, please?

4 Q So the model spits out these elevations. You've --
5 for Site P-9 --

6 A Right.

7 Q -- the HEC-RAS model spits out these elevations. You
8 have this stage rating curve that is established for Site
9 P-9?

10 A Yes.

11 Q And this chart matches them to see how closely they
12 fit?

13 A For the cross-section at the upstream side of the
14 Taylor Highway bridge.

15 Q Okay. So did you do anything to the model as a
16 result of seeing where this lies, where the model lies, as
17 opposed to the stage rating curve? Did you make any
18 additional adjustments to the model as a result of seeing
19 this comparison?

20 A Yes. As I recall, the first few model runs didn't
21 fit as well as this -- as you see in this. And we made
22 some adjustments to primarily the roughness coefficients
23 to make it fit better.

24 Q So this is -- this is the model as it exists now.
25 This shows what the model would spit out in its current

1 state?

2 A This is a model that I'm relying on, yes.

3 Q So the end result of the HEC-RAS modeling for each
4 cross-section is an estimate of water surface elevation?

5 A Yes.

6 Q And not water depth?

7 A Well, if you know the water surface elevation, then
8 you also know the depth at the points that define the
9 cross-section.

10 Q At the cross-section?

11 A Yes.

12 Q Okay. So now you have the HEC-RAS models, and you've
13 calibrated them to the extent that you can. What else did
14 you -- besides the stage rating curve at P-9, what else
15 did you use to calibrate the HEC-RAS models?

16 A The measured water surface elevations at the time we
17 did the surveys.

18 Q And was there anything else?

19 A No.

20 Q And optimally, there would have been a float trip or
21 other opportunities to measure water surface elevations
22 and calibrate the model?

23 A It would have been nice to have some measured water
24 surface elevations at different flows, yes.

25 Q Do you -- are there any other sources for those?

1 A Not to my knowledge.

2 Q Would there be any other information or data that you
3 could collect or do other than water surface elevations to
4 better calibrate the model?

5 A We used all of the relevant information that was
6 available to us.

7 Q I understand that. But is -- are there other -- this
8 is not a question about what you did, but this is a
9 question of: What are way to calibrate the model in
10 addition to water surface -- going out and collecting
11 water surface elevations or observing them during a float
12 trip? Are there -- is there other means of collecting
13 data that would be better used -- but not -- excuse me --
14 not better, but other ways to calibrate the model?

15 A Not that I can think of, no.

16 Q So now that you have the HEC-RAS models, what -- what
17 is the next step in developing your analysis for -- for
18 this report?

19 A Well, once we'd calibrated the models to our
20 satisfaction, then we ran it for a range of flows, from
21 very low flows up to close to what would be the bank-full
22 flow, in some cases maybe slightly above that, so that we
23 have a -- the ability to define the flow depth at the
24 cross-sections over the range of flows that you'd expect
25 to see in the river.

1 Q And why is the flow depth important?

2 A Well, it's a parameter that controls whether you can
3 float a boat.

4 Q Okay. And so how do you -- how do you determine the
5 flow depth from those flow runs?

6 A Well, as we've discussed, the model -- the primary
7 output from the model is the water surface elevation. We
8 have a -- the topographic information from the surveys
9 that gives us the ground profile. And if you superimpose
10 that water surface on the ground profile, then at any
11 point across there you can tell what the depth is.

12 Q And then -- then what do you do to -- so now you have
13 cross-sections and flow depths that -- you've generated
14 two sets of information you have, both from the model and
15 your topography; is that correct?

16 A Well, sort of. I mean, the topography is encompassed
17 in the model, but yes.

18 Q Okay. But you're -- you're then back comparing --
19 you're overlaying the model against -- the model output
20 against the model input; you're showing the surface
21 elevation with the bed?

22 A Yes.

23 Q And so then what do you do?

24 A Well, you evaluate the flow depths in relation to the
25 question that you're trying to answer.

1 Q Well -- and so we're continuing our sort of --

2 A Yeah.

3 Q -- march through your methodology.

4 A Right.

5 Q So what are you doing to compare the flow depths to
6 the question that you have to answer?

7 A Well, so then another piece of information is: What
8 is the draft of the boats. And I described in some detail
9 the two boats that I considered and, from that, concluded
10 that a reasonable range of drafts to be analyzed -- or
11 flow depths to be analyzed would be primarily to the 12-
12 to 18-inch range. I included the 8-inch range just as
13 additional information on the low end, even though that
14 probably doesn't apply to the criteria boat, but it's
15 information to show the range of conditions.

16 Q And are there other dimensions of the boat and what
17 you're comparing to see how the boat fits with the flow
18 depth, the flow -- the flow depths?

19 A Yes.

20 Q What are those?

21 A Well, the width of the boat has an effect on that.

22 Q Okay. And what widths did you use for the boats?

23 A I used the actual width shown on the drawings for the
24 boats that I considered.

25 Q And what were the boats that you considered?

1 A Well, I -- there was a, roughly, 20-foot poling boat
2 that, as I noted in my report, it's our historian's
3 opinion that that's really too small to be considered a
4 commercially-viable boat, but it was one that has been
5 used in the area and it provided some information. So I
6 analyzed that.

7 I also analyzed a, roughly, 30-foot -- little
8 less than 30-foot, wooden river boat that is typically
9 operated with a motor.

10 Q And how wide are these boats?

11 A The -- at the gunnels, they're roughly five feet
12 wide. I'll have to look to get the exact numbers; they're
13 in my report. And then they taper down to roughly
14 two-and-a-half feet at the -- at the bottom of the boat.

15 Q And which number is used to determine how the boat
16 compares to flow depth?

17 A Well, you actually need to consider the range of
18 numbers, because it's -- you know, the narrowest width if
19 the boat was just sitting on the water would be roughly
20 two-and-a-half feet. But as it sits down into the water,
21 under load, then the width that it occupies increases.

22 Q And is there -- is there another dimension that you
23 consider in determining how the boat fits in the flow
24 depth? Is there a particular portion of the channel that
25 you're using?

1 A Well, to be conservative, I used the deepest part of
2 the channel, under the assumption that an operator could
3 get the boat into the deepest part of the channel.

4 Q And did you assign a particular width to that?

5 A I did. I assumed eight feet.

6 Q Why did you assume eight feet?

7 A Well, to give enough room to allow the boat that's
8 going to occupy somewhere in the range of three to --
9 could be pushing as much as five feet, probably, and
10 closer to the range of four feet -- to go through the
11 reach and be able to have at least some maneuverability to
12 miss obstacles.

13 Q Okay. And do you use the average depth of this
14 eight-foot-wide area or the maximum depth?

15 A Well, actually, I used the minimum depth in the
16 eight-foot-wide area.

17 Q And why do you use that?

18 A Because that's the -- that's the shallowest part;
19 it's the part where the boat would hit the bottom if it
20 hit bottom.

21 Q And is that the only area -- so do you do that
22 analysis for every cross-section?

23 A Yes.

24 Q Okay. And is -- every cross-section is reflected in
25 the report?

1 A Either the report or the additional information
2 models that we provided to you, and the output files.

3 Q So do you rely on how the boat will pass through
4 every cross-section to make your -- to support your
5 opinions, or just the shallowest cross-section?

6 A It's primarily the shallowest cross-section. Or I
7 call it the limiting cross-section.

8 Q And at the limiting cross-section -- so you're
9 looking at an eight-foot-wide channel; is that correct?

10 A Yes.

11 Q How wide is the river at these limiting
12 cross-sections?

13 A It varies from a hundred to roughly a hundred and 50
14 feet, if memory serves me right.

15 Q Are there --

16 A Much wider than eight feet.

17 Q Are there other potential areas where the boat could
18 pass through besides this eight-foot channel?

19 A All shallower than the eight-foot channel.

20 Q So when we're talking about the limiting depths and
21 what flow is necessary to inundate that, we're talking
22 about the shallowest part of the shallowest cross-section
23 of the study areas; is that correct?

24 A No.

25 Q No. Okay. How is that incorrect?

1 A We're talking about the deepest part of the
2 shallowest passage.

3 Q Okay. And you -- so over the eight feet, are you
4 using the actual depth or an average depth?

5 A I'm using the minimum depth within that
6 eight-foot-wide corridor.

7 Q And that's that the deepest eight-foot-wide corridor
8 across the river?

9 A Correct.

10 Q Is it -- in these -- in the limiting cross-sections,
11 are there portions of the -- are there other portions of a
12 cross-section that would allow travel of the boat, besides
13 the deepest cross-section?

14 A Not at the limiting flow.

15 Q Did you make an adjustment to -- to the channel --
16 that you considered to the eight-foot channel?

17 A I'm not sure I understand the question.

18 Q So as I understand it, the HEC-RAS model creates a
19 surface elevation for a particular cross-section. Using
20 the information that was created, you're now looking at a
21 cross-section of a channel. And within that
22 cross-section, you identify the deepest eight-foot
23 channel.

24 A That's correct.

25 Q Okay. Now, did you then run the analysis of the boat

1 at various flows with the channel in that condition?

2 A No. There's one additional step.

3 Q Okay. What is the additional step?

4 A The additional step is to account for the cobbles and
5 boulders that would project up into that area, that are
6 not picked up in the survey data.

7 Q And why would they not be picked up in the survey
8 data?

9 A Because the survey data doesn't include points at
10 every single location across the cross-section. The
11 purpose of the cross-section is to define the shape of the
12 cross-section.

13 Q And how far apart are measurements taken for the
14 cross-section?

15 A Typically in the range of five to six feet.

16 Q And the water, as you said yourself, was clear --

17 A Right.

18 Q -- while the surveying work was being done?

19 A It was more or less clear, yes.

20 Q So wouldn't it have been possible to identify any
21 large cobbles and boulders that might have been protruding
22 up and measure them if they were of particular concern?

23 A It would have been possible, yeah.

24 Q And so why wasn't that done?

25 A Well, again, we were trying to collect the data as

1 efficiently as we could, to develop a valid hydraulic
2 model of the site. The resolution of the cross-sections
3 that we surveyed was fairly high resolution for this type
4 of a survey. We didn't -- and it's not standard practice
5 to go out and measure every single rock across the
6 cross-section.

7 Q Did you notice the potential limiting size of the
8 criterion craft when you did the survey?

9 A I did not.

10 Q Would that information have better helped you define
11 how you were doing your field work?

12 A Not necessarily.

13 Q Well, for example, if you knew that you were going to
14 have a roughly eight-foot channel to fit the criterion
15 craft through, would maybe three to four feet been more
16 helpful so that you would have a direct idea of the
17 channel as opposed to having to try to account for things
18 after the fact, as opposed to directly surveying what
19 might be there at a level that would match the level of
20 detail that you're looking at?

21 A Well, to some extent, the proposition you just posed
22 is hindsight. But in addition to that, in many of these
23 reaches the material that you find, the rocks that you
24 find on the bed of the river, moves around. So if I go
25 out there and take a very detailed measurement of it

1 today, and then I go back next summer after the high flow
2 period, they aren't necessarily in the same place.

3 So what we're trying to do is get a
4 characterization of the typical condition of the river in
5 those areas.

6 Q So if you're -- so how do you -- so how does this
7 actually functionally work, that you put -- are you --
8 you're adding rocks into the model; is that fair?

9 A No.

10 Q No. What are you doing?

11 A I'm taking the model water surface elevation and I'm
12 taking the measured cross-section, and then I'm
13 distributing rocks after the model is run -- or parallel
14 to the model being run. I'm looking at the possible
15 distribution of those rocks across the eight-foot corridor
16 that I've defined as the deepest part of the channel, and
17 statistically looking at how those could fall and what the
18 odds are that one of those would be sticking up above the
19 bed of the river.

20 Q So -- so the rocks -- the rocks that you're
21 accounting for may theoretically exist but don't -- you
22 don't know them to actually exist in that eight-foot
23 channel?

24 A The rocks that I'm accounting for are all present in
25 the site at the cross-section. What I don't know is, at

1 any given time, precisely where each one of those is
2 located.

3 Q So when you say the rocks are at the site at that
4 cross-section, what do you mean?

5 A I mean they're present in the bed of the river there.

6 Q Based on what? Is there a sample or something?

7 A Yes.

8 Q Okay. So -- and the sample is taken from that
9 cross-section?

10 A They're not necessarily always taken at specifically
11 this -- the limiting cross-section. We took samples in
12 the riffle that are representative of the areas that those
13 cross-sections represent.

14 Q And -- okay. So there are -- they are -- so I
15 understand you correctly, they are rocks that are of the
16 area, and you have not necessarily surveyed them in the
17 eight-foot channel, but the analysis that you're doing
18 accounts for the possibility that they migrated there?

19 A I suppose that's a fair characterization, yes.

20 Q And if -- what -- what would move things -- what
21 would move rocks in this eight-foot area?

22 A Water.

23 Q Just regular water flow?

24 A Well, they typically would mobilize at high flows.

25 Q Wouldn't that same flow also move rocks from other

1 areas of the same cross-section?

2 A Yes, if it mobilized that part of the cross-section.

3 Q Well, so -- I mean, how big are some of these rocks
4 we're talking about moving into the cross -- into the
5 eight-foot channel?

6 A Well, if you look at the gradation curves from our
7 samples, they range up to a foot or two.

8 Q That's a big rock.

9 A It's a big rock.

10 Q It takes a pretty big water event to move a rock that
11 big?

12 A Yes.

13 Q Wouldn't that same kind of water event also likely
14 scour things of smaller or near or similar sizes to the
15 left and right of that eight-foot channel?

16 A You have scour and fill at high flows, yes.

17 Q So why -- so now -- now then, your analysis runs the
18 boat through that eight-foot channel after you've
19 accounted for this potential of rocks to be placed in it?

20 A Well, it looks at the -- at the possibility that
21 those rocks would end up in a place in the channel that
22 would limit the flow depth to less than you would get if
23 you just said, okay, let's compare the water surface with
24 one specific measured survey point.

25 Q So it basically requires more water -- more water

1 flow for the boat to pass through the eight-foot channel?

2 You would need a greater flow.

3 A If the rock sticks up into that eight-foot channel,
4 you need more flow to clear the rock.

5 Q Well, are there -- in this rock analysis, are there
6 occasions where you've said, there's no rock that will
7 project?

8 A Sure.

9 Q And that's what you've measured and used as the
10 limiting flow depth?

11 A The rock value that I used is the one that -- that
12 would be the limiting rock, the highest rock in that
13 eight-foot zone 50 percent of the time in the thousand
14 simulations. So you got a 50/50 chance that that rock is
15 going to be there. Some of the trials would have no rocks
16 sticking substantially above the bed; some of trials would
17 have rocks sticking well up into the flow.

18 Q So I guess what I'm asking is: You're analyzing this
19 eight foot-channel for the movement of rocks into it. But
20 then you're -- and then you're -- that's the -- there's
21 never going to be another eight-foot channel in your
22 analysis; that is the eight-foot channel, whether rocks
23 have moved into it based on your rock analysis or not; is
24 that right?

25 A Well, I've defined the deepest eight-foot zone along

1 the section, and then I'm looking at basically the suite
2 of possibilities given the distribution of all the rocks
3 from the little guys up to the really big ones in the
4 section, which is a suite of possibilities for where those
5 rocks could be located within that eight-foot zone.

6 Q Okay. And we talked about this eight-foot zone as
7 existing somewhere between a hundred and a hundred and 80,
8 200-foot-wide river?

9 A Right.

10 Q Now, this event -- this theoretical event, is it a
11 theoretical event?

12 A Well, they've happened.

13 Q They've happened. But you're counting -- you don't
14 know that those rocks exist in the eight-foot channel for
15 sure?

16 A Yes.

17 Q You're accounting for the possibility that they may
18 be deposited there?

19 A I'm accounting for the probability that different
20 rocks of different sizes would be at different locations
21 within that eight-foot zone.

22 Q Okay. Now, how does that account for the entire
23 remainder of the cross-section?

24 A It doesn't.

25 Q Why not?

1 A I don't need to. I'm saying -- I'm using the deepest
2 part of the cross-section. My assumption is that, if you
3 can pass through the deepest part of the cross-section,
4 then you may be able to pass through other parts. And
5 alternatively, if you can't get through that eight-foot
6 section, then you certainly can't get through any of the
7 other parts of the cross-section.

8 Q But now -- so that's the eight-foot to -- say you
9 have an eight-foot channel in the before condition, right?
10 You've measured the deepest part of the channel before
11 you've added additional rocks into it?

12 A I have a few survey points that define the general
13 shape of the cross-section.

14 Q Right.

15 A One or two, in general.

16 Q And based on those points, you've identified what you
17 believe to be the deepest eight-foot channel?

18 A Well, at the time of the survey it would be the
19 deepest part of the channel.

20 Q Even if you missed a point in between that might be
21 higher?

22 A Well, it is possible that a rock could stick up above
23 the straight line between the two points, yes; in fact,
24 they often do.

25 Q Okay. And in addition to that, you're now -- the --

1 this next step, this is accounting for change, not for the
2 cross-section as it existed on the day of survey; is that
3 fair?

4 A No, that's not fair.

5 Q What is it -- what is this change regarding the rocks
6 attempting to encapsulate?

7 A We're saying, this is the typical shape of the
8 cross-section that we've measured out here; we have found
9 the deepest part of it. And we didn't measure every
10 single rock, partly because of the time it takes to do
11 that and partly because they won't necessarily be in the
12 same place the next time.

13 Sure, that eight-foot zone, there could be some
14 adjustment of that as the rocks move -- there would be
15 adjustment to it. But it's a typical zone, and we're
16 saying, okay, now we have this suite of particle sizes in
17 the bed; they're distributed basically randomly throughout
18 the reach. Yes, the flow characteristics do have some
19 effect on where specific rock -- the sizes of rocks in
20 various zones of the cross-section. But generally,
21 it's -- in those areas it's -- they're randomly
22 distributed based on the distribution.

23 So we're just saying: What are the suite of
24 possibilities of where these rocks could be and how would
25 they affect the depth within that zone?

1 Q Wouldn't the movement of those rocks affect other
2 areas of the cross-section?

3 A If you move a big rock out of another part of the
4 cross-section, then the area that that big rock moved from
5 could become deeper.

6 Q Wouldn't that be true of small rocks, too?

7 A Sure.

8 Q So if you take the deepest eight-foot section and
9 then you move rocks into it, how do you account in your
10 analysis for other areas of the cross-section that might
11 now be more boatable than the original eight-foot section
12 was?

13 A Well, I think the assumption in your statement is
14 that any rock that got into the eight-foot channel had to
15 have come from somewhere else in that cross-section. And
16 that's almost certainly not the case; it came from
17 somewhere upstream.

18 Q So nothing else would happen to anything else along
19 the rest of the eight-foot cross-section, now the entire
20 reach -- excuse me -- the entire cross-section is
21 shallower. Wouldn't the same processes that potentially
22 fill the deepest eight-foot section also lift material out
23 of other areas along the cross-section?

24 A It could do that, yes. You have scour and you have
25 fill.

1 Q How do you account for that?

2 A I don't.

3 Q Why not?

4 A Because I don't need to.

5 Q Why not?

6 A Because the sections that we've measured describe a
7 typical condition of the river. We're saying that, you
8 know, if I went out there again and did -- repeated the
9 exact same surveys that we did the last time, there would
10 be some variability there that would relate to movement of
11 the particles. But I'm virtually certain that the bulk
12 properties of those areas, the locations of most of the
13 deep parts of channel, the bars, those sorts of features,
14 would be essentially in the same place that they were when
15 we measured them. The details would be somewhat
16 different.

17 Q All right. So essentially you're adding obstacles
18 that would diminish the size of the box of a boatable
19 channel?

20 A Well, by observation, those obstacles are there; I'm
21 accounting for them.

22 Q You're accounting for rocks that could occur?

23 A Yes.

24 Q Okay. And -- but you agree that it diminishes the
25 size of your eight-foot boatable channel?

1 A Well, it diminishes the depths within that eight-foot
2 channel. Or in some cases, it could actually increase it.
3 In many of the simulations, the trial simulations in the
4 Monte Carlo method, it's actually deeper.

5 Q So let's look at page 70 for a second. So looking at
6 these lists of the highest rock and the second highest
7 rock, this -- these lists -- the columns that are
8 described under "Height above Thalweg" feet, median, 90
9 percent, 10 percent, these are the columns we're talking
10 about when we're talking about the size of the limiting
11 rock, this -- for this Monte Carlo analysis that you've
12 done, this is the results of that; is that correct?

13 A Yeah. It's not the -- it not specifically the size
14 of the rock, but rather how far that rock sticks up above
15 the -- well, in this case, above the Thalweg elevation.

16 Q The deepest part of the channel?

17 A The deepest part of the channel.

18 Q So it -- the 90 percent column represents that 90
19 percent of the simulations create a height greater than
20 that number; is that correct?

21 A Yes.

22 Q Okay. So -- and you said a good number of these --
23 these simulations, created -- lowered the depth.

24 A There are places within that eight-foot zone that are
25 -- that would be deeper than you would get if you just

1 drew a straight line between the two survey points.

2 Q Do those matter if we're talking about what the
3 limiting issue is? I mean, if, in the deepest part of the
4 channel you've now created a rock that's, you know, 90
5 percent of the time going to be somewhere between two
6 inches and a foot higher, more than a foot higher, how
7 does the -- whatever scouring you're talking about around
8 it do anything to improve boatability?

9 A I didn't say it improved boatability.

10 Q Okay. So you're just saying, yeah, there's probably
11 some rocks coming out of the sides also?

12 A Yeah. Some places it's lower; some places it's
13 higher.

14 Q Is there something in the Monte Carlo analysis that
15 shows there are places within the eight-foot area that are
16 dropping?

17 A Yes.

18 Q So there is more than one value for the Monte Carlo
19 analysis for every cross-section?

20 A The Monte Carlo analysis distributes the rocks all
21 the way across that eight-foot zone, measures it -- it
22 calculates the height of the top of all the rocks across
23 that eight-foot zone. And then this -- the numbers that
24 are summarized in this table are the characterization of
25 either the highest or the second highest rock that

1 occurred.

2 Q So I guess I'm not understanding how -- what input is
3 going into the analysis that is dropping depths? It seems
4 to me -- and please correct me if I'm wrong -- that the
5 Monte Carlo analysis is a deposition of the rocks?

6 A It's not really deposition of the rocks. It's just
7 different placement of the rocks.

8 Q Why don't you walk me through how the Monte Carlo
9 analysis works. We have eight-foot channel.

10 A Right.

11 Q You're looking at it. And why do you decide to do
12 the Monte Carlo analysis?

13 A Well, because I can't predict a priority exactly
14 where the rocks will be. It's a statistical analysis. So
15 I know the distribution of the rock sizes out there, and I
16 know the general shape of the cross-section. I also know
17 that there are rocks that stick up into the flow. So I'm
18 trying to figure out, what are the -- how far up will they
19 stick and what are the odds that they'll stick up that far
20 throughout the so-called boatable zone that I'm analyzing.

21 Q Even though -- wouldn't these rocks, by and large,
22 have been above water at those flows?

23 A No.

24 Q It's a limiting rock, right? This is the limiting
25 rock. If it's not inundated, the boat hits it.

1 A Well, if it's not inundated more than the draft of
2 the boat.

3 Q So -- and the survey was done at 60 to 70 CFS?

4 A Generally.

5 Q And you did mention that, every time there was dry
6 land, that was a survey point.

7 A I didn't say that.

8 Q What did you say?

9 A The survey points were generally distributed at about
10 five- to six-foot intervals across the channel. When
11 there was a well-defined channel with a clear edge of
12 water, we always included that edge of water as one of the
13 survey points.

14 Q So if there was a two-foot rock sticking up from the
15 bottom --

16 A Correct.

17 Q -- and that wasn't covered by water --

18 A Right.

19 Q -- would that have been a survey point?

20 A Not necessarily.

21 Q Why not?

22 A It's just a rock that's sticking up out in the middle
23 of the channel. We wouldn't typically survey that. That
24 doesn't define the general shape of the cross-section.

25 Q It's a pretty big rock. I mean, isn't the whole

1 question here, how do we -- can we get over pretty big
2 rocks?

3 A We didn't set out to measure the location and height
4 of every big rock in the sites that we studied.

5 Q Why not?

6 A Time, more than anything.

7 Q Okay. So you're adding in randomly placed rocks into
8 the channel, into the eight-foot channel. That's what the
9 Monte Carlo analysis is for.

10 A I wouldn't say I'm adding them in. I'm basically
11 looking at the possibilities of where those rocks could
12 be located at any given time.

13 Q So let's look at page 66. And -- okay. So I got
14 side-tracked a little bit. We talked about you have the
15 eight-foot channel, you've decided you want to account for
16 the possibility of rocks that were not captured in the
17 survey; is that --

18 A Correct.

19 Q That's fair?

20 A Fair.

21 Q So what do you decide to do?

22 A Well, that's where the Monte Carlo simulation comes
23 into play. We take the measured size distribution of the
24 rocks in the riffle or the shallow area that we measured.
25 And then we use that to distribute the rocks across the

1 eight-foot zone based on that size distribution, both
2 their height and their horizontal location within the
3 zone.

4 Q So how does that account for the possibility of -- so
5 there's a -- is there a certain volume of rocks going into
6 the eight-foot zone?

7 A I wouldn't characterize it as a certain volume. But
8 we basically -- the simulation builds it across from one
9 side to the other. And we start with the left edge of the
10 eight-foot zone; we randomly sample and say, what size is
11 that rock and where does it fall relative to the reference
12 plane; we place it there. And then we place -- and then
13 we do the same thing with the next rock. It's maybe a
14 different size, but it butts up the against the one that
15 -- first one we placed. And then we work our way across
16 the channel.

17 So there's a sampling involved in the
18 distribution of rocks sizes across the channel, and you'll
19 have different numbers of rocks, depending on what you
20 happen to pick from the random sampling, and also the
21 vertical location of those rocks with respect to the
22 reference plane.

23 Q So the Monte Carlo simulation is -- it's two -- two
24 factors: Rock size and rock location, left to right?

25 A No.

1 Q What other factors does it take into account?

2 A It's the rock size that is randomly sampled.

3 Q Right.

4 A And then the vertical position of that rock, once you
5 decide horizontally where it is in the cross-section, then
6 the question is: Where is it relative to the reference
7 plane? In some cases it can be sitting right on top; in
8 some cases just the very top of it can be touching.

9 Q What -- and what is the reference plane?

10 A It's a straight line that is drawn between the two
11 adjacent survey points.

12 Q So some volume -- I still am not understanding how
13 it's potentially scouring or reducing or increasing flow
14 depth in the eight-foot channel.

15 A So when you -- you take two survey points.

16 Q Okay.

17 A You drawn a straight line between them.

18 Q Sure.

19 A That's the reference plane.

20 Q Okay.

21 A Now, the rock at the point where you took the survey
22 could be -- actually, that doesn't define the reference
23 plane; you have to decide, where does that rock
24 statistically fit, vertically. Is it right on the
25 reference plane, is it sitting on top of it, is it sitting

1 below it? So you start out with that. And the reference
2 plane is actually the center of that -- becomes the center
3 of that rock, which could be up here; it could be down
4 here (indicating). And then you work your way across.
5 And in some cases, if that -- if the rock that you put in
6 the initial spot is high relative to the reference plane,
7 then as you go across, a lot of the rocks in between there
8 will actually fall below the straight line between those
9 two points.

10 Q Where are the rocks coming from? So the straight
11 line between the two survey points, is there a diagram in
12 here that would help us?

13 A There is.

14 Q Which one?

15 A I wondered when you would get there. Figure 62 on
16 page 68.

17 Q So how does the reference plane end up below the
18 survey bed?

19 A Well, as you can see, if you look at the top left
20 figure, the point that is down on the dashed line just to
21 the left of the first vertical dashed black line. Do you
22 see the point I'm talking about?

23 Q Yup.

24 A This -- that's the top of the rock that defines the
25 edge of that boundary. So that defines the reference

1 plane. And then we randomly sample the vertical location
2 of all the rocks across relative to that location, and
3 some of those rocks, as you can see, fall below -- if we
4 take the -- the two survey points are -- that we're
5 talking about here are the 63.38 that's outside the
6 eight-foot zone, and 67.5 which is in the middle of it.
7 So we locate the first rock relative to that line; it
8 happens to be down lower. And then, as we go across,
9 based on the size of the rock and the position relative to
10 that line, some of them actually fall below the solid red
11 line.

12 Q Let's look at the top left picture for a second.

13 A Sure.

14 Q Go back to my earlier question. That's a two
15 foot-pile over the bed. And it's at 70 CFS. I mean, that
16 would -- if that existed, that would be there. Would that
17 be fair? It would be easy to see sticking up?

18 A You're talking about the point that's up close to
19 16.1?

20 Q Yes.

21 A Yeah, you'd be able to see that.

22 Q Okay But if that existed, that might not have been
23 surveyed?

24 A It might not have been. In this particular case, it
25 probably would have been, but it may not have been.

1 Q And if it was surveyed, then this may not be
2 the deepest eight-foot channel?

3 A The red lines wouldn't be where they are.

4 Q Why -- I understand that. But if something of that
5 size were there, sticking up at 70 CFS, this may not be
6 the eight-foot channel?

7 A It may not.

8 Q Okay. All right. So you're distributing random
9 rocks at random locations, based on your sampling, and
10 attempting to -- sorry. You're -- I mean, we're taking
11 random rocks, based on the samples --

12 A Right.

13 Q -- and putting them in random locations in the
14 eight-foot box?

15 A Not necessarily. That's not precisely correct, no.

16 Q Okay. Why not?

17 A We start on the left side.

18 Q Okay.

19 A We sample the rock distribution. From that we get a
20 rock size. We place it at the end, horizontally. Then we
21 say, okay, where is it -- where would that be rock be
22 relative to the reference plane based on a separate
23 statistical sample. We place that rock.

24 Then we pick another rock from the distribution;
25 we put it next to it, so the diameter of those two rocks

1 basically defines the horizontal position. And then we do
2 the same process of deciding, where does it fall relative
3 to the reference plane. And then we build across in that
4 direction. So it's not truly random locations.

5 Q Okay. So -- and the rock that you're sampling, is
6 that from the sediment sampling locations that are shown
7 on your survey sites?

8 A From the pebble-count samples, yes.

9 Q Okay.

10 A The linear samples across the cross-sections.

11 Q So let's -- let's look at page 2 for Site P-8. Make
12 sure we're all talking about the same things.

13 So the limiting section here is XS-8
14 cross-section eight; is that correct?

15 A I believe that's correct. Yes.

16 Q Okay. And the sampling locations for this field site
17 are just upstream of cross-section 9, at cross-section 7,
18 and at cross-section 3; is that correct?

19 A Yes.

20 Q So what happens with the sampling location? Is it
21 one scoop?

22 A No, it's -- it's a sampling of all the material that
23 falls across that cross-section line.

24 Q Okay. So you go all the way across the cross-section
25 line?

1 A Right.

2 Q Okay. Do -- in riffles and bars, do rivers sort
3 material upstream to downstream?

4 A Well, they sort material. I wouldn't necessarily say
5 upstream to downstream. But there is a hydraulic sorting
6 effect.

7 Q So is the material at the upstream side of a riffle
8 or bar necessarily representative of what's at the
9 downstream edge of the riffle or bar?

10 A Within a given geomorphic feature, generally the
11 distribution of particle sizes is fairly consistent,
12 certainly within the riffles, they are. There's some
13 sorting effect. There's some variability for sure, but
14 generally we picked our sampling locations in places where
15 we felt the sample distribution would represent the range
16 of sizes that were present in that riffle, if it was a
17 riffle sample.

18 Q So now you've placed the rocks into your -- into the
19 eight-foot channel?

20 A Right.

21 Q Okay. Now what do you do?

22 A Well, as we discussed, we have a distribution of the
23 highest rocks that occurred within there, the tops of the
24 highest rocks that occurred within that. We've picked the
25 median value of that. And we base the -- that becomes the

1 height that we base our required depth on. In other
2 words, we need to have enough depth above that particular
3 rock to float the boat.

4 Q Okay. Now once you -- we'll come back to how that
5 works a little bit later. All right. So now you have the
6 depth?

7 A Right.

8 Q And what the limiting depth is, how do you apply that
9 to the rest of your work? What happens next?

10 A Well, then we compare, from the model results, the
11 water surface elevations, correlated with the discharges,
12 and we basically figure out what is the -- what is the
13 discharge that would create just enough height in the
14 water surface elevation to give you the required draft for
15 whichever version of the draft we're analyzing. If it's
16 12 inches, we want to have 12 inches of depth above that
17 rock.

18 Q And that's it? Then you're done?

19 A Well, then you go back to the flows record and figure
20 out how often that happens.

21 Q And then you're done?

22 A Then you're done.

23 Q Okay. Then you write a big report, you get paid,
24 it's all good. Something along those lines?

25 A Something along those lines. Okay. And then you get

1 to answer a lot of questions about it later.

2 Q And keeps everybody in business.

3 Let's talk about boats.

4 A Okay.

5 Q You based your analysis on a specific type of boat?

6 A I used two specific boats to support my analysis,
7 yes.

8 Q Okay. And how did you -- what were those boats?

9 A There was -- we talked about this earlier --
10 the roughly 20-foot small poling boat, and then a 30-foot
11 river boat.

12 Q 30 feet?

13 A Roughly 30 feet. It's a little less than 30.

14 Q And what kind of load in those boats?

15 A The criteria boat, I assumed -- well, for the
16 criteria load in boat was the river boat, with a
17 2,000-pound load.

18 Q Did you evaluate any other loads?

19 A Yes. I looked at a thousand pounds up to, I believe,
20 3,000 pounds.

21 Q Why did you evaluate all those if the criterion load
22 was 2,000?

23 A Because I wanted to see what the sensitivity and the
24 variability of the required draft would be.

25 Q And how did you determine what boat type and load to

1 use in your analysis?

2 A Primarily through discussions with the historian for
3 the U.S.

4 Q And you said "primarily." Were there any other --
5 anything else that helped or decided how you would
6 determine what boat type and load to use?

7 A Well, I had some discussions with some of the other
8 BLM folks about types of boats and so on. But I -- again,
9 my selection of the 2,000-pound load and the river boat
10 came essentially from the historian.

11 Q Is that Mike Brown?

12 A Mike Brown. A different Mike Brown from the one we
13 were previously referring to.

14 Q That isn't confusing at all.

15 Do you agree with Mike Brown's opinion about
16 boat type?

17 A I have no basis to agree or disagree.

18 Q Is that the same criterion boat that you used in
19 other navigability analyses?

20 A No.

21 Q What have you used in other navigability analysis?

22 A The only other place where I explicitly defined the
23 character of a criteria boat was for the Yadkin River.
24 And I don't remember the exact dimensions, but it was a
25 much larger boat with -- I think the draft was somewhat on

1 the order of three feet in that case.

2 Q Is that a much larger river?

3 A The Yadkin is bigger than the Mosquito Fork, yes.

4 Q Is there a river in Alaska that it would be
5 comparable to in terms of size?

6 A Well, the geomorphology is quite different, so it's
7 hard to compare. But flow-wise, I'm sure there are rivers
8 here that have similar total quantities of flow.

9 Q And did you pick the criterion boat in the Yadkin
10 case?

11 A No.

12 Q Who did?

13 A Input from the historians.

14 Q Do you think that the criterion boat that you've been
15 given is the only kind of boat that can be used for trade
16 and travel on the Mosquito Fork?

17 A No, I don't think it's the only kind.

18 Q What other types of boats do you think could be used?

19 A I'm not prepared to say. I mean, I'm simply not
20 prepared to restrict it to say the only boat that could
21 have been used would be that river boat. I'm sure there
22 could be a wide variety of other boats.

23 Q So do you think smaller boats than the criterion boat
24 could have been used on the Mosquito Fork for travel and
25 trade?

1 A Again, I'm basing my opinion in that regard on the
2 input that I've gotten from Mr. Brown, and so I've stated
3 my opinion.

4 Q And your opinion is related only to the criterion
5 boat and that you have no ability to change from the
6 criterion boat?

7 A If I had a sound basis to do it, but that was not
8 part of my study.

9 Q You were directed to use the criterion boat?

10 A I wasn't directed to use it, but it was recommended
11 from the work that Mr. Brown did. His role was, at least
12 in part -- I don't know all the things he was asked to do,
13 but one of the things was to evaluate the types of boats
14 that could have been used -- that would have been in
15 customary use at the date of statehood in that area of
16 Alaska, and that was his conclusion.

17 Q Did you review his reports?

18 A I did a -- sort of a high-level review of them.

19 Q Why weren't they included in your references?

20 A Because at the time I wrote this report I didn't have
21 access to them. I had not read them before I wrote the
22 initial report for this.

23 Q When did you read them?

24 A Probably in the January time frame of this year.

25 Q And so how -- how did you receive -- so could you

1 describe Mr. Brown's communication with you as to the
2 criterion boat and why he believed it was this boat?

3 A Generally, he didn't give me a lot of the detailed
4 reasoning behind why he chose this boat. But we talked
5 about the various possibilities for kinds of boats that
6 could be used, and his conclusion was that this would be
7 the minimum size and load-carrying capacity that could
8 have been commercially viable. That was my understanding
9 of his recommendation to me.

10 Q Did he give other reasons for that?

11 A Other reasons?

12 Q Other reasons for why this boat and not the wide
13 variety of boats that you discussed?

14 A I don't recall the specifics of that.

15 Q Do you remember any reasons generally?

16 A Generally, I think he felt that it needed to be a big
17 enough boat to carry a load that would be commercially
18 viable. But you'd have to ask him those questions. I
19 can't really see into his mind.

20 Q Did his communication come -- was it phone call or
21 e-mail?

22 A A phone call and some in-person discussion during one
23 of the field reconnaissance efforts.

24 Q Is the Mosquito Fork boatable for boats smaller than
25 the criterion craft?

1 A Sometimes.

2 Q More frequently than the criterion crafts?

3 A Well, it's -- if they draw less water, then they
4 would be able to boat it more frequently, yes.

5 Q Is your -- I think you've stated you have no basis to
6 believe one way or the other whether the boats he chose
7 are reasonable or not; is that fair?

8 A Just from my commonsense perspective, it sounds
9 reasonable to me. But I -- you know, I have no hard facts
10 to base it on. I believe he's a competent historian.

11 Q I mean, you're not particularly versed in travel in
12 the Fortymile area or Alaska -- boats that were used at
13 Alaska statehood?

14 A I've not studied that matter, no.

15 Q Okay. Is your opinion limited to a wooden boat?

16 A It's heavily weighted to a wooden boat.

17 Q Why?

18 A Because it's my understanding that the majority of
19 the boats that would have been used for commercial
20 purposes at the time of statehood, in that area of Alaska,
21 would have been wooden.

22 Q What is the size of the boats that you used for your
23 analysis?

24 A The size?

25 Q Yeah, specifically.

1 A The physical dimensions?

2 Q Yes.

3 A They're spelled out in the drawings that are included
4 in my report. The wooden river boat that we were talking
5 about is shown on Figure 53 on page 58. And it's
6 nominally described as a 28-foot river boat, 28 foot long.

7 And I also analyzed the poling boat that's shown
8 on the next page, on Figure 54. It's roughly -- I think
9 it's 19-and-a-half inches, if I remember right, or
10 approximately that.

11 Q So the -- so the criterion boat is this 28-foot boat
12 as described in the document, with 2,000-pound load; is
13 that correct?

14 A That's -- yes.

15 Q Are there -- is there other details about that that
16 make it the criterion boat? It's wooden. You said
17 heavily weighted towards wooden.

18 A Yes.

19 Q Are there other details besides it being a wooden,
20 28-foot boat with 2,000-pound load?

21 A Well, the details of the boat shape, and how it would
22 sit in the water, and how it would behave in the water
23 with and without a motor and so on, or with the motor in
24 the water versus out of the water, affects that.

25 Q Does the criterion boat, the boat you analyzed, have

1 a motor?

2 A I accounted for the presence of a motor in my
3 analysis, yes.

4 Q Would the criterion boat be required to have a motor
5 to be considered the criterion boat?

6 A This type of -- my understanding is that this type of
7 boat, when used for that purpose that we're analyzing
8 here, would have been operated with a motor, so I
9 considered it with a motor.

10 Q What size motor?

11 A Again, I spelled that out in in my report. My
12 primary assumption was a 35-horse outboard motor. I also
13 loosely considered a slightly larger motor, but I based --
14 the curves that you see in the report are based on the
15 35-horse.

16 Q What does the load include?

17 A What does the load include?

18 Q What does the 2,000 pounds include?

19 A The 2,000 pounds is just the cargo.

20 Q So an operator would be in addition?

21 A Yes.

22 Q And fuel and the motor would all be in addition to
23 the 2,000 pounds?

24 A Yes.

25 Q So when your analysis shows the boat empty, that's

1 not really empty; it's with a person and a motor and fuel?

2 A Yes.

3 Q And what else? Anything else?

4 A Those are the factors that I considered.

5 Q How much do those weigh?

6 A Well, again, I spelled that out in my report. I'd
7 would rather not say from memory. Let's see here. Yeah,
8 at the middle of page 60, I say I assumed a hundred and
9 70-pound operator. The motor that we just talked about,
10 25 gallons of fuel, be 1170 pounds.

11 Q And do boat manufacturers typically -- when they say
12 this is the load capacity of a boat, do they usually
13 include those things in the boat capacity, or is it
14 additional?

15 A Well, I suppose, if they're -- if they're considering
16 how much the boat could carry, they would consider the
17 operator and any other things you're carrying in the boat
18 as part of the load capacity.

19 Q So your analysis, or the 2,000-pound load that you
20 were given, distinguishes from that a little bit?

21 There's --

22 A Yes. I'm assuming a 2,000-pound cargo load, plus
23 whatever other things, people you'd have in the boat with
24 you.

25 Q So in assuming that 2,000-pound cargo load, do you

1 assume anything about the cargo?

2 A Only that it's properly loaded in the boat -- in a
3 balanced way, I guess would be the easiest way to say it.
4 It's not heavily loaded in one end or the other.

5 Q So are there -- I mean, are there ways of loading a
6 boat or handling the boat and its load that would affect
7 its draft, its pitch, those sorts of things?

8 A Well, a balanced load would minimize the draft,
9 because it would distribute the weight and it would be
10 more centered on the boat; whereas, if you loaded it
11 heavier on one end or the other, then that part would
12 stick down farther into the water.

13 Q All right. And the -- in taking the -- both the --
14 so both the 20-foot poling boat and the 30-foot river
15 boat -- 28-foot river boat, you -- did you have to make
16 assumptions about their pitch, their draft, and how they
17 travel through the water?

18 A I made some assumptions about the pitch of the boat
19 under different conditions, yes.

20 Q What were those?

21 A Well, I assume that if it's going downstream in rough
22 water, the momentum of the boat, you know, bouncing up and
23 down in the waves, that it would periodically go down to
24 at least a one-degree pitch. In other words, if you have
25 it horizontally, it -- the front would stick down about

1 one degree.

2 Q Where does the rough water come from?

3 A From the river running over the rocks.

4 Q And what other -- how did you develop your analysis
5 of, I guess, what we've called earlier, the boat's box?
6 What is the draft, and size, and sort of window box
7 through the water which both boats need to fit through?

8 A Sure. Well, I developed an electronic --
9 three-dimensional, electronic drawing, basically, of each
10 of the two boats. I estimated the weights, as we just
11 talked about. And then I used Archimedes principle to
12 figure out how far the boat, either level or at different
13 pitches, would sink down into the water under different
14 loading conditions.

15 Q So you didn't take measurements of any actual boats?

16 A Well, these drawings are based on actual boats. But
17 I didn't physically go out and measure the depth --

18 Q The draft of the boat?

19 A Right.

20 Q Okay. No boat?

21 A Not for this analysis, no.

22 Q And you haven't weighed any loads that someone
23 presented to you as a commercially viable load?

24 A No one said, this is a load that would have been
25 carried on the Mosquito Fork in 1959, no.

1 Q And you -- you haven't -- you obviously haven't
2 measured the draft of any of those boats with that kind of
3 a load?

4 A I have not.

5 Q So your -- so your calculations indicated draft --
6 certain depth of draft for these boats under certain
7 conditions --

8 A Yes.

9 Q -- based on your calculations in Archimedes
10 principle?

11 A Yes.

12 Q And were you also furnished with material from
13 interviews with people who have used boats on the Mosquito
14 Fork river?

15 A Well, I read the anecdotes, if you will, from some of
16 the previous depositions. And I had -- I believe at the
17 time I wrote this report, I had your primary expert
18 reports as well.

19 Q And are your -- in fact, in your report, you
20 reference a number of folks' testimonies about the boats
21 that they used on the river, and the drafts, and how those
22 boats operated in the water; is that correct?

23 A Yes.

24 Q And do your calculated measurements for draft and
25 such match what that testimony was?

1 A I think for the most part. For the types of boats
2 and loading conditions that were equivalent to what I used
3 for my criteria boat, they're very similar, yes.

4 Q So the -- Mr. Reardon had testified that his river
5 boat drafted three to four inches empty and up to six
6 inches carrying a load of 1500 pounds. It seems the
7 poling boat analysis is at least eight inches at a
8 thousand pounds, if not more. How is that similar?

9 A Can you, first of all, point me to what you just read
10 them from?

11 Q I'm on the top of page 57.

12 A Okay. You're reading in the footnote, which is not
13 consistent with some of other statements here.

14 Q Okay. How is it not consistent?

15 A Well, for example, in the previous paragraph from Mr.
16 Gray's deposition, he says an 800-pound load would require
17 nine inches of water. And a river boat with a 22-horse
18 motor, 1500-pound boat, would take about nine inches of
19 water.

20 Q Okay. And you think that all -- so what do you do
21 with Mr. Reardon? How do you pick and choose among these
22 guys?

23 A Well, the first thing is, I'm basing it on the
24 criterion boat that I defined, which is a 28-foot river
25 boat, with the operators, the fuel, the motor, and a

1 2,000-pound load. And simple physics tells you that the
2 draft is in the range that I calculated. Whether these
3 boats are boats that would fit Mr. Brown's definition of
4 "commercially viable," I can't really say.

5 Q Do you have any reason to believe that the statements
6 about the boats on pages 56 and 57 from Mr. Gray, Mr.
7 Reardon, Mr. Bayless, are not true?

8 A I don't have a reason to believe they're not true
9 statements, no.

10 Q Are they supported by physics?

11 A Well, I think, for the most part, they're supported
12 by memory of things many years ago. So how accurate they
13 are is a -- is another question. Not that they're being
14 dishonest in their statement, but I don't -- you know,
15 since it's so long ago, whether they remember clearly, and
16 when they say, about six inches, what is "about six
17 inches"?

18 Q And that's all reasonable. But my question to you
19 is: Assuming their memory is correct, you looking at this
20 as a hydraulic engineer, someone who has some
21 understanding of physics and boats, is what they've said
22 about these boats and their drafts and their loads,
23 reasonable?

24 A Some of the statements sound kind of minimalist to
25 me. But generally they're in a reasonable ballpark for

1 the boats that they were discussing.

2 Q Which statements sound minimalist to you?

3 A Well, to say that -- to imply that you could operate
4 a boat in -- let's see; let me find this thing before I
5 start talking. There are statements in here about, you
6 know, three inches of water. Yeah, "The flat boat drew
7 three inches of water when empty." That's probably
8 reasonable. "Carrying two to three people it would float
9 in three inches of water," I'm skeptical of that. I'm
10 skeptical that it drew 1500 -- or drew six inches with
11 1500-pound load. I don't think physics supports that, if
12 it's the same boat that I'm analyzing here.

13 Q What about the tunnel river boat that Mr. Gray is
14 describing on page 57?

15 A That's what I was just talking about. But there
16 again, my curves on page 62 are supportive of roughly, you
17 know, in the three- to four-inch range, sitting flat with
18 no load on it. So in general, my results are very
19 consistent with these statements.

20 Q For the empty boat?

21 A For the empty boat.

22 Q So are you familiar with the State's reports where
23 they use modern raft with eight inches -- and had eight
24 inches of draft for a thousand-pound load?

25 A I have read those statements in the report, yes.

1 Q Non-motorized raft?

2 A Yes.

3 Q Is that a reasonable estimate of the draft?

4 A From my experience with similar rafts, it sounds
5 about right.

6 Q And for a raft with a kicker motor, similarly loaded,
7 16-inch draft; is that reasonable?

8 A It sounds plausible, yes.

9 Q Okay. How would plausible be different than
10 reasonable?

11 A Okay. It's reasonable.

12 Q And so if -- would those boats fit into your boxes of
13 what can get down the river, if we used your eight-inch
14 draft box or your 16-inch draft box?

15 A If modern river rafts were viable for boats in
16 customary use in that part of Alaska at the date of
17 statehood, physically, yes, they would fit in that box.

18 Q Well, not that they were something that was used
19 then, but I think we discussed before that, you know, if
20 something similar, it might be evidence of, it might be
21 something that you thought would be useful and indicative
22 of boats that would have been customary and traditional at
23 statehood.

24 Sorry. Go ahead.

25 A No, go ahead.

1 Q So we discussed earlier that a boat that fits in the
2 same box, has approximately the same draft, same
3 characteristics as a boat that was customary and
4 traditional at statehood, if we didn't have that boat that
5 was customary and traditional at statehood on hand to run
6 down the river, a boat that had similar characteristics
7 might be something we would look at and say, this is --
8 this provides us some evidence about our -- whether our
9 assumptions of the criterion craft are reasonable or not.

10 Do you agree with that?

11 A The general proposition I agree with. But what I
12 don't agree with is that modern inflatable rafts are
13 similar to the kinds of boats that would have been used --
14 in customary use for commercial purposes in the state of
15 Alaska in the Tanana River drainage for Tanana and Yukon
16 River drainage at that time.

17 Q Why not?

18 A Because it's my understanding that there was little
19 or no commercial rafting going on at that time.

20 Q Well, I think we're getting sideways on two points.
21 And so, whether they were used then or not, do they have a
22 similar characteristic in the water as something that --
23 like the criterion boat that might have been used back
24 then?

25 A Well, to the extent that they stick down eight inches

1 or 16 inches or whatever number you pick into the water,
2 yes, that would be in the same range and similar. But
3 there's another big difference; and that is, that you
4 know, with a wooden boat, the consequences of hitting
5 rocks and so on is quite different from hitting rocks with
6 a inflatable raft that's made out of durable material like
7 the modern rafts that are used.

8 Q How are those consequences different?

9 A You're not likely to knock a hole in your inflatable
10 raft; you are very likely to knock a hole in your wooden
11 boat.

12 Q To some degree, are -- what does a wooden boat do
13 when it hits a rock?

14 A Depends on how hard you hit it. It can knock a hole
15 in; it can turn you sideways. As you see from the
16 drawings, they're quite narrow, especially when you're,
17 you know, floating in a downstream direction, you hit a
18 rock; you turn a bit sideways; you'll -- you're in danger
19 of breaching -- swamping the boat. It's much different
20 from a raft. A raft, you often go sideways down through
21 rough water so you can see what you're doing. And you
22 also -- it's not uncommon to intentionally bump rocks to
23 help maneuver around things; you wouldn't do that with a
24 wooden boat.

25 Q And you know that -- how do you know that about

1 wooden boat maneuvering?

2 A Common sense.

3 Q So you don't have any particular experience with
4 maneuverability of wooden boats in -- down rivers?

5 A I have casually rode in wooden boats in rivers. I've
6 been in dories and those sorts of things that are -- you
7 know, I'm not doryman myself, but I've certainly ridden
8 and I understand from the boatmen that they get very edgy
9 in rapids; whereas, if I go through in my raft and I bump
10 a rock here and there, what the heck. And they're really
11 edgy about hitting rocks with it.

12 Q And when did you have this experience?

13 A Several times.

14 Q Can you give me some examples?

15 A I often float the reach of the Green River below
16 Flaming Gorge Dam in Wyoming and Colorado. And, you know,
17 that reach has some rapids, some riffles that are not
18 unlike the Mosquito Fork, actually. And I've ridden
19 through that in dories; I've rode my raft through it many
20 times.

21 Q Can you describe a dory to me?

22 A Well, it's a solid boat. Most of the modern dories
23 are made with some type of fiberglass material; I don't
24 know exactly know what it is. But they're commonly also
25 made from wood. They're turned up at the ends. They're a

1 row boat, basically, that's used for fishing.

2 Q But you're not personally familiar with the kinds of
3 wooden boats that were used in Alaska around statehood?

4 A I have not personally ridden or driven one of these
5 types of boats that I analyzed, no.

6 Q And are you aware that folks occasionally would, you
7 know, build wooden boats in Alaska and, you know, use them
8 in a disposable manner?

9 A I have heard stories to that effect, yes.

10 Q How would that affect your analysis of how the boat
11 is used?

12 A Well, it doesn't affect my analysis, because the --
13 my role in developing the federal case in this matter
14 didn't involve the historical aspects of the use of those
15 kinds of boats that we discussed before. I selected a
16 particular boat because that was the boat that was
17 recommended to me by the historian.

18 Q Would a boat that was used commonly and intended to
19 be used in one direction for one trip change your analysis
20 of, you know, concerns over impact on wooden boats?

21 A Well, in my analysis I've considered conditions both
22 floating passively down the river, and particularly with
23 the river boat with the motor raised, as well as moving
24 upstream. I don't believe that it's necessary for a
25 finding of navigability to be able to go both directions,

1 but I've considered both.

2 Q So in your report you thought that you -- the week of
3 June 2, 2014 -- you couldn't get down the river in a
4 modern raft. What's a modern raft to you?

5 A Well, I think we talked about that this morning. My
6 understanding of the raft that BLM was going to provide
7 for us was -- it was either a 14- or a 16-foot; I'm not
8 sure, as I say it right now. But it's an inflatable raft,
9 tubes, use force to control it.

10 Q Okay. So does -- does the material that a boat's
11 made from, is that important when you're thinking about
12 the box that it fits through?

13 A I think it's important in the sense that you need to
14 consider the likelihood of hitting rocks, and reaches of a
15 river could be navigable with a modern raft where you
16 don't so much care if you bump or drag across the bottom.
17 That would be different from a boat, where you would care
18 if you hit rocks or drag the boat on the bottom and, you
19 know, on this -- particularly a wooden boat that would be
20 somewhat fragile.

21 Q And what -- let's talk about boatability.

22 What do you mean by that?

23 A Can you maneuver the boat through the reach --
24 floating.

25 Q Floating. Okay. So what -- what is - a boatable

1 day?

2 A It's a day when there's enough water in the river
3 that you can float or maneuver your boat through the
4 reach.

5 Q And so what does that mean in the context of this
6 specific reach? What is a boatable day on the Mosquito
7 Fork?

8 A Well, if you -- if there's enough water in the river
9 that you can maneuver the 28-foot river boat with a
10 2,000-pound load through the reach, then that's a boatable
11 day.

12 Q And let's -- I think we might be looking at page 57
13 in a little bit.

14 Does running aground make the river unboatable?

15 A Well, I wouldn't consider -- hitting rocks, stopping,
16 dragging the boat, is not boating.

17 Q Well, so let's unpack that a little bit at a time.
18 What does running "aground" mean to you? You use that
19 phrase specifically on page 57.

20 A Right. It means you hit the ground; stops the boat.

21 Q Stops completely. That's running aground?

22 A Yes. Running aground generally means it stops.

23 Q Okay. Is that the standard you used in reaching your
24 opinions about the necessary flows for boatability?

25 A Not necessarily. I mean, the limiting depths were

1 based on that exact height where you would hit the rock.

2 Q Okay. Is that the -- the ability to traverse through
3 each of the study sites, that is the language you used --

4 A I think that's the language I used, yes.

5 Q Okay. So can you explain to me the difference
6 between running aground and not being able to traverse
7 through each of the study sites, or are they synonymous?

8 A They're more or less synonymous, although you -- you
9 know, in the context of our discussion a few minutes ago,
10 if you're in a wooden boat and you're hitting rocks,
11 that's probably not a good thing, and I don't think you'd
12 want to be traversing through the reach on a commercial
13 basis under those conditions. You might be able to make
14 it through.

15 Q All right. So if we have one CFS less than the flows
16 you have in Table 6, the boat will run aground?

17 A It will hit the rock.

18 Q Does that mean it will run aground?

19 A Not necessarily.

20 Q What does it mean?

21 A It means it will hit the rock.

22 Q Okay. Is that game over, the day's unboatable?

23 A Not necessarily. Depends on how hard you hit and
24 whether you -- whether it damaged your boat and so on.

25 Q It seems necessary, from your table, though. Are

1 your boatable days bright lines? Above and below a
2 certain number is boatable -- above the number is
3 boatable; below the number is unboatable?

4 A Well, in any quantitative scientific study there is a
5 fuzzy band around a number that you come up with. The
6 width of that fuzzy band varies. You know, if I said that
7 the limit is 280 and you said, at 279 can you get through,
8 you still might be able to get through. If you said, it's
9 285, am I absolutely sure I'm not going to hit the rock,
10 yeah, you still might hit the rock.

11 Q Dr. Mussetter, how big is your fuzzy band?

12 A I have no response to that.

13 Q Well, I mean, it's an important question here. I'm
14 being a little glib, but -- I'm trying to understand. So
15 your analysis tells us, at these flows the river is
16 boatable and below that it's not boatable. And so what
17 happens -- I mean, how big is the fuzzy band and what
18 happens to the boat, to your criterion craft, in that
19 fuzzy band? What is happening to the operator, what's
20 going on with him, where the reach becomes not passable?

21 A Well, what you're trying to do is get me to give you
22 an absolutely precise answer, and I can't do that. What I
23 would say is that, under the conditions, if you're -- if I
24 say it's -- I'm going to pick a number -- 280 CFS is the
25 threshold based on my analysis. The first thing is, when

1 I say 280, that's probably rounded off to the nearest 10.
2 So a precise number, if you dig into the spreadsheet,
3 might have been 283 or 277 or something. Okay.

4 And I would say, given all the things you need
5 to think about for commercial liability, if you're -- if
6 you're below that number in terms of the discharge, the
7 odds are you might be okay and you might not be okay. And
8 the farther you get away from that number, the more
9 certainty you have that you're not going to be okay.

10 And on the other side of that line, 5 CFS, 10
11 CFS, you may get through without hitting the rock. The
12 odds are you're going to hit the rock. And the farther
13 away you get from that 280, the more likely you are to
14 make it through without hitting the rock.

15 So that's the most precise answer that I can
16 give you.

17 Q Okay. And -- all right. So let's talk about this in
18 terms of worst day, P-8.

19 A Okay.

20 Q That's the most limiting reach?

21 A Yes.

22 Q And it requires significantly more flow than any of
23 the other reaches; is that fair to say?

24 A Yes.

25 Q You know, in the order of one and a half to two times

1 more, or more; is that fair?

2 A It's a very shallow riffle there.

3 Q And let's say you're -- and can we also agree that
4 there's a pretty -- there's a -- probably in most cases,
5 depending on which rock you're using, a couple hundred CFS
6 band between the next most limiting reach and P-8?

7 A We're on --

8 Q Table 6, page 7.

9 A In some cases, there are a few hundred CFS range --
10 there is a 2- to 300 CFS range.

11 Q Or 600? The highest rock, a 15-inch craft [sic] --
12 15-inch draft -- 560 is the next -- excuse me -- 680 --
13 580; my math is terrible today. I'm sorry. 650 was
14 right. I'll try that again: 550 was correct. There's a
15 550 CFS difference.

16 A I don't actually see the number you're talking about.

17 Q So on Table 6, it's -- the draft -- the minimum
18 indicated draft for the highest particle, which is -- for
19 Site P-8 --

20 A Yes.

21 Q -- is 1210 CFS?

22 A Yes.

23 Q The next highest is 660 CFS, at P-2?

24 A Oh, I see. Among sites?

25 Q Yes.

1 A Yes. Yes, it varies among sites.

2 Q Okay. So -- and P-2 and P-8 is a poor example.

3 Let's use P-8 and P-9.

4 A Okay.

5 Q All right. So we still have a -- a large five -- 4-
6 or 500 plus CFS difference?

7 A Yes.

8 Q Okay. Now, so river's rip-roaring along at 800,
9 900 --

10 A Okay.

11 Q -- a thousand, 1100. River's 1100 CFS that day.
12 Everything else on the river is completely inundated. You
13 would agree that every other site is much more than
14 boatable for that 15-inch boat?

15 A Based on my analysis, it would be boatable, yes.

16 Q Okay. Now we get to P-8.

17 A Right.

18 Q We're running 1100, 1150 CFS; we're a little bit
19 below. Is now the whole reach of the river unboatable?

20 A I didn't say that.

21 Q But your numbers do.

22 A No, they don't.

23 Q You don't believe that that -- that your boatable
24 days -- that that would be a non-boatable day on your next
25 chart?

1 A That would be a day that you couldn't boat through
2 that particular site.

3 Q So we're looking at the river as a reach, right?

4 A Yes.

5 Q And we're looking at it from mile -- at this in
6 particular -- from 3 to 33.5?

7 A Right.

8 Q Let me get that wrong again. Excuse me. From 3.3 to
9 36.3?

10 A Right.

11 Q Okay. We're trying to figure out what days the river
12 is boatable or not?

13 A Right.

14 Q And you've looked at a number of these limiting sites
15 and said, oh, okay, we're going to try and figure out what
16 is going to derail us --

17 A Right.

18 Q -- on those particular days. So now I have a day
19 where there's a lot of water in the river for most of
20 these sites, and I get to a place in the river where I'm
21 just a little bit below.

22 Is that a boatable or unboatable day?

23 A You're probably within the fuzzy band, and so I would
24 say the odds are you're going to have a problem passing
25 through Site P-8.

1 Q How bad of a problem?

2 A I don't know. Depends. You might have to get out
3 and carry your boat around, unload it, portage around the
4 site. You might be able to drag it. You might get lucky
5 and get through without a problem.

6 Q Well, I mean, which -- I mean, you're telling me that
7 I can't get through, right? You're telling me it's not
8 boatable?

9 A At that particular site on that day, you're likely to
10 have a problem.

11 Q What's the problem going to be, though? Is it going
12 to be a drag?

13 A I can't predict that. You're going to hit a rock;
14 you're going to run aground.

15 Q Is it -- well, all right. Is a drag -- does a drag
16 made a non-boatable day? That's the only place I have to
17 drag that day. I have to drag it that cross-section of
18 P-8.

19 A I would say, if you can boat the rest of the reach,
20 that probably would about a fairly minimal problem.

21 Q And that would would be a boatable day?

22 A Could be.

23 Q I mean, is one drag okay?

24 A Well, it depends on what you're doing. I think that
25 one minor drag probably isn't a huge issue.

1 Q I'm coming down from the -- from the hills in the
2 winter with my 2,000 pounds of beaver pelts and my
3 30-horsepower motor, and my -- I'm not a hundred and 70
4 pounds -- right -- and my 25 gallons of fuel.

5 A Right.

6 Q And I'm in my boat. I'm cruising down. I get to
7 P-8. I got to pull the motor up and drag the boat.

8 Boatable day?

9 A You're probably going to have a hard time dragging
10 your boat with 2,000 pounds of load on it, but you might
11 be able to unload the boat and drag the boat around and
12 reload it and so on. You could -- I'm -- you could
13 probably get through there, yeah.

14 Q I mean, you think I'm going to do have to do all
15 that to get it around?

16 A I don't know. You may or you may not. It depends on
17 the conditions.

18 Q Eleven 50, 1200 CFS, just below, just a little bit
19 below?

20 A It depends on the conditions. I don't know.

21 Q What if we agree the conditions are such that I can
22 drag the boat. One drag.

23 A Then I'd say you'd probably make it to Chicken.

24 Q Okay. So is that a boatable day?

25 MS. ROBERTS: Objection; asked and answered.

1 MR. SCHECHTER: It hasn't really been answered.

2 THE WITNESS: You boated through the reach. You
3 had to drag your boat once.

4 BY MR. SCHECHTER:

5 Q I mean, is that a boatable day under your standard?

6 A Look, my boatable day analysis considered each of the
7 sites independently. And I looked at the suite, among all
8 of those sites, of the times when it was and wasn't
9 boatable, and I made an overall judgment of, you know,
10 given the loads, and the draft, and the conditions that
11 that boat would operate under, that it was not reliable
12 enough; there were times when you could make it through;
13 there were times you could not make it through. My
14 boatable day analysis considered the sites on an
15 individual basis. I did not say, oh, Site 8, it's 1200
16 CFS, so, therefore, you can never boat this reach at any
17 flow less than 1200 CFS.

18 Q So how am I supposed to figure out -- is navigability
19 based on that boatable analysis for someone else to decide
20 besides you?

21 A I think it is a question that needs to -- other
22 considerations, whether the number of boatable versus
23 non-boatable days and the somewhat erratic nature of when
24 those boatable days occur, in my opinion, I wouldn't want
25 to be doing commercial navigation on the Mosquito Fork.

1 But that's a question that goes beyond the
2 question I was asked to answer. I can tell you, among the
3 suite of eight sites I analyzed, the frequency and the
4 conditions under which you could physically float through
5 the reach. That needs to be combined together with the
6 other questions, with the other information, to decide
7 whether it meets the standard for navigability.

8 Q If we -- if we'd run through all those other
9 questions, we have a criterion boat, we have the ordinary
10 and natural condition of the river, we have a commercially
11 viable load on that boat, aren't we down to how boatable
12 or non-boatable is the river? That's the last question --
13 that's your question, isn't it?

14 A Yes, and I've answered that.

15 Q Okay. And so you think, even though you say that
16 that particular reach, Site P-8, is not boatable, maybe
17 for purposes of the greater navigability picture, if
18 you're running that high in your fuzzy band, right, you
19 are well over the numbers for all the other sites in the
20 reach, maybe you have a boatable day?

21 A I think I've answered that. If you're asking me, do
22 you have to have a minimum of 1210 CSF in the river to
23 traverse the reach in the criteria boat, no, I'm not
24 saying that.

25 Q What does it mean to not traverse the reach? What

1 happens when you -- what happens on your not boatable day
2 on that reach?

3 A Well, and -- you'd need several places -- places that
4 would basically obstruct your progress to the point where
5 it no longer becomes commercially viable to basically drag
6 your boat down the river.

7 Q Several places in one reach?

8 A Well, in the segment 3 to 36.3. Or 3.3 to 36.3.

9 Q But -- all right. So to be clear: Your not boatable
10 day, it could be a drag; it could be a stop; it could be
11 running aground and destroying the boat; it could be a
12 range of things?

13 A A boatable day or a non-boatable?

14 Q A non-boatable day.

15 A A non-boatable day?

16 Q As you use it in Table 7.

17 A Generally, running aground and destroying the boat is
18 a non-boatable day.

19 Q I agree.

20 A Okay.

21 Q But what I'm asking is: What are the things that you
22 believe will happen as a result of the flow not being
23 above the limiting rock that makes it a non-boatable day?

24 A Well, if there are enough of those places along the
25 reach --

1 Q Not along the reach, along one cross-section.
2 Because, as you've told me, you're doing it on a
3 cross-section by cross-section basis.

4 A Okay. By the definition that I've used for boatable
5 days at the individual sites, if you hit a rock, then that
6 makes it a questionably boatable day. It's questionable
7 whether it's boatable or not.

8 Q It makes it a non-boatable day, if you're below that
9 number?

10 A Based on the assumption, yes.

11 Q Okay. And what I'm trying to clarify is, you're not
12 really making a statement as to what the impact to the
13 boat is going to be, and the operator. It could be a
14 drag; it could be the boat is destroyed; it could be a
15 range of things?

16 A The conditions for these thresholds are: Are you
17 likely to hit the rock?

18 Q Okay. And what -- so the next -- my next question
19 is: What does it mean to hit the rock? Is that just
20 tapping it?

21 A If the flow is substantially less than that, you're
22 going to -- you're very likely to run aground; you're
23 going to hit the rock hard; you're going to damage your
24 boat; you're to have a problem.

25 Q But, I mean, if it's -- if it's in the fuzzy band, it

1 could be a lot of things. It could be a drag; it could
2 run aground; it could be nothing?

3 A Could be.

4 THE REPORTER: Can we have a break?

5 MR. SCHECHTER: Yes.

6 THE REPORTER: Thank you.

7 (Recess taken.)

8 BY MR. SCHECHTER:

9 Q When you say "hit," is -- do you mean "touch"? There
10 will be contact between the rock and the boat?

11 A Well, for the precise limit I've calculated, that
12 would be a touch, yes.

13 Q And if -- and in that boat, in the criterion boat,
14 you got one guy and 2,000 pounds and the motor and 25
15 gallons of fuel, right?

16 And if the 170-pound guy pops out of the boat,
17 is the boat going to get over the obstacle?

18 A And maybe the guy? Probably.

19 Q Okay.

20 A If it's just barely touching.

21 Q Well -- okay. Let's talk about the pitch and
22 vertical accelerations. Is -- do those come about from
23 the ruffles themselves or from the boat's travel
24 downstream on the water?

25 A The assumption with the downstream travel is that the

1 pitch comes about because of the roughness of the water
2 and the action of the boat as it's going down through the
3 waves.

4 Q So is it -- is it momentary that that 13 inches is
5 required, that extra draft is required?

6 A Well, I'd call it periodic. It's not always at that
7 depth.

8 Q And how is that accounted for in the
9 boatable/non-boatable analysis?

10 A Well, it's just another one of the factors.

11 Q It's something for someone else to consider when
12 seeing, is it boatable -- are these boatable days made for
13 a navigable or nonnavigable river?

14 A No, I'm saying that if you -- you know, if you go
15 down through the reach, and the rock is within that zone,
16 and you're going through rough water, and the boat's going
17 like this (indicating), you're liable to hit the rock.

18 Q Well, at least touch the rock.

19 A Those are your words.

20 Q And we talked about "touch" versus "hit." I mean, at
21 the exact number it will touch?

22 A At the exact number it will touch.

23 Q Which under the calculations that you did would be a
24 non-boatable day for that reach?

25 A Based on the criteria I applied, yes.

1 MR. SCHECHTER: Can we have another time out?

2 (Recess taken.)

3 BY MR. SCHECHTER:

4 Q Dr. Mussetter, do you have any changes or corrections
5 you want to make to any of your earlier answers?

6 A No.

7 (Exhibit 5 was marked.)

8 BY MR. SCHECHTER:

9 Q Dr. Mussetter, you've been handed what has been
10 marked as Exhibit 5 for purposes of this deposition.

11 Do you recognize this document?

12 A I do.

13 Q What is it?

14 A It appears to be the Supreme Court syllabus of the
15 Supreme Court ruling in the PPL Montana versus Montana
16 case.

17 Q And you refer to PPL Montana on page 24 several times
18 in your report; is that correct?

19 A I'm not sure "several" is correct, but I certainly
20 did refer to it.

21 Q At least once?

22 A At least once.

23 Q Maybe twice?

24 A Maybe.

25 Q And is this the case that you're referring to when

1 you mention it in your report?

2 A I believe so, yes.

3 Q Okay. And is this pagination, this page 24, the
4 correct page 24?

5 A Well, I'm having trouble finding the precise
6 language. Let's see.

7 Q I would represent that it might be midway through the
8 top paragraph, the sentence that starts with "while."

9 A Oh, yes. Sorry. I see that now. Yes.

10 Q And so this -- this is -- is this where the phrase
11 "commercial reality" comes from in your report, what
12 you're referring to?

13 A Yeah.

14 Q What does "commercial reality" mean as you've applied
15 it in your report?

16 A Well, I think, from a -- just a common language use
17 of the words, it means that you could -- in the context as
18 they describe it here, it has to be long enough that you
19 could -- it has to be navigable for a long enough period
20 that you could do a viable commercial operation that, you
21 know, is practical.

22 Q What is "it" in that sentence?

23 A Well, in this case, carry -- or carry out some
24 commercial activity on the river with a boat.

25 Q And what do you mean in your -- is that what you mean

1 in your report when you use "commercial reality"?

2 A Yes.

3 Q And is your understanding of commercial reality that
4 applies to the commercial load or the amount -- the amount
5 of material that has to be carried in the boat?

6 A I think that would be a factor, yes.

7 Q Do you believe that that came from this decision,
8 that standard?

9 A I'm not sure that standard explicitly came from this
10 decision. I think this decision clarified that that's a
11 necessary requirement for navigability.

12 Q A commercial load?

13 A Well, that -- whatever activity, it has to be
14 commercially viable.

15 Q Was the Supreme Court talking about load in this
16 sentence?

17 A I don't think they explicitly had load in mind when
18 they wrote this sentence -- rather, they don't refer to
19 it.

20 Q Well, did they something specific in mind?

21 A I think they were referring specifically to
22 recreational use in the general discussion. But common
23 sense says that the idea of -- I mean, the statement says
24 it can be -- that it doesn't have to be susceptible to
25 navigation at every point in the year, but it has to -- it

1 can't be so brief that it's not a commercial reality. I
2 think that applies to anything relating to carrying out
3 commercial boating activities on a river.

4 Q So you don't think it's limited to only the issue of
5 how long the boating season might be?

6 A Well, it's limited to how long the boating season
7 might be for whatever commercial activity you're carrying
8 out.

9 Q What I mean is? Is the Supreme Court's using that in
10 this sense. Are they -- are they -- what are they
11 addressing, specifically?

12 A They're talking about the length of the boating
13 season.

14 Q And when you're using commercial reality in your
15 analysis, are you applying it only to the length of the
16 boating season, or are you applying it to other things?

17 A Well, I'm talking about -- I'm applying it to the
18 periods of time when the reach in question wouldn't be
19 boatable using the criteria craft.

20 Q And so can you -- you also use the term "commercially
21 viable" a couple of times. Is that different from
22 "commercial reality"?

23 A Not really, in my use of the terms.

24 Q Does it mean that the enterprise needs to be
25 profitable?

1 A Not necessarily.

2 Q You've cited a definition of navigability from the
3 Daniel Ball case; is that --

4 A Yes.

5 Q -- correct? Do you believe that applies in this
6 case?

7 A Sure.

8 Q Do you believe that the PPL Montana case changed the
9 Daniel Ball standard?

10 A I think now you're getting into legal questions that
11 I'm not prepared to answer.

12 Q Well, I mean, you talked about both cases in your
13 report. You must have some thoughts or ideas on what they
14 both mean.

15 A Well, the primary thing with the PPL Montana case was
16 that they clarified the issue of segmentation. The entire
17 river doesn't have to be -- you can have segments of a
18 river that are navigable and other segments that are not.

19 Q Do you think that changed anything about what you're
20 supposed to do with Daniel Ball?

21 A Not directly, no.

22 Q Do you believe that someone traveling with a thousand
23 pounds of material could have been participating in a
24 commercial activity?

25 A It's possible.

1 Q Do you think that it's possible that what they were
2 doing would have been commercially viable or
3 commercially -- a commercial reality?

4 A I think I don't have an opinion on that matter. I
5 think that the -- the definition, the criteria that was
6 used to set my criteria boat was developed by the
7 historian in the case, and that's what I used.

8 Q Okay. Would you bear with me for just a second,
9 please.

10 A Sure.

11 Q What if -- and believe me this is a hypothetical --
12 the federal government conceded the poling boat with a
13 thousand pounds was customary and traditional at the time
14 of statehood. Would that do anything for you?

15 A It would say that there would be more boatable days
16 than what I have represented in my report. Whether that
17 would still meet the criteria to make the reach navigable,
18 I'm not sure. I'd have to sit down and re-study my
19 numbers with that in mind.

20 Q Would you agree that, for the -- would you agree
21 that, for the -- that boat, it would require an eight-inch
22 draft?

23 A Under some conditions. With a thousand-pound load
24 and fairly quiescent level of water, it's about eight
25 inches.

1 I just noticed something I need to correct in my
2 report. Figures 58 and 59 are switched.

3 Q I noticed that also, but I was going to let it go.

4 You mean the labeling for each?

5 A Well, I think the labeling is in the correct order;
6 the figures got associated with the wrong label.

7 Q Right. Okay. So the -- well -- and if we have a
8 smaller criterion craft like a poling boat, would the
9 second rock become a more reasonable assumption again?
10 Eight-foot shorter boat?

11 A I'd have to think my way through that. It -- you
12 know, a narrower corridor might be more appropriate for
13 that particular boat. Although the consequences of
14 breaching in a poling boat are probably more dire than
15 they are in the river boat, so I'm not sure about that
16 one.

17 Q Okay. But certainly more boatable days?

18 A Yes.

19 Q Did the boats need to be used on the river at the
20 time of statehood? Your criterion craft, did it have to
21 have already been in use on the Mosquito Fork at the time
22 of statehood?

23 A Well, I think the language in the definition says
24 either used or susceptible to use.

25 Q What does "susceptible to use" mean to you?

1 A Means that, if the boats were in customary use in
2 that area at the time of statehood, could have been used
3 for commercial purposes, then that's good enough; you
4 don't have to actually have direct evidence that they were
5 used.

6 Q Have you testified about the Mosquito Fork in other
7 situations?

8 A About the Mosquito Fork?

9 Q Yes.

10 A No.

11 Q You don't recall testifying about the Mosquito Fork
12 in the Gila hearings?

13 THE REPORTER: I'm sorry. The what?

14 MR. SCHECHTER: Gila, G-i-l-a.

15 THE WITNESS: Gila, would be the right
16 pronunciation, but...

17 I showed some photographs as examples of -- just
18 to talk about the general character of different rivers.

19 BY MR. SCHECHTER:

20 Q And you talked that you were working on the Mosquito
21 Fork as work that you were doing?

22 A Yes.

23 Q Okay. So -- so you did testify about the Mosquito
24 Fork in that case, in August of 2014?

25 A Well, yeah, and to the extent that I agreed that I

1 was working on it, and I used a couple of photographs as
2 examples of what certain types of rivers look like.

3 Q Okay. After identifying that you were working on the
4 Mosquito Fork, do you recall saying: I don't have trouble
5 believing that a reasonable watercraft could be navigated
6 down a river like this?

7 A That specifically applied to the site in Mosquito
8 Flats.

9 Q And what was the reasonable watercraft that you were
10 indicating there?

11 A Could have been anything. Could have been a canoe or
12 a raft or -- I don't remember that I had a specific craft
13 in mind.

14 Q What was the point you were trying to make?

15 A I was asked, could a boat float through this reach,
16 or something to that effect, and I agreed you probably
17 could.

18 Q Were you showing a picture of Mosquito Flats as a
19 example of something in particular?

20 A Of a meandering river, actually.

21 Q To what purpose in that hearing?

22 A Just to contrast the different geomorphic character
23 of rivers. It was a really good photo of a meandering
24 river.

25 Q And what did you mean by "navigated" when you said

1 that?

2 A Boat. Float the boat. I did not mean it in the
3 legal term -- in the legal sense of the term, if that's
4 what you mean.

5 Q I'm asking what you meant.

6 A That's what I'm telling you.

7 Q Have you interviewed anyone who's been on the
8 Mosquito Fork?

9 A Have I interviewed anyone?

10 Q Yeah, who has boated on the Mosquito Fork.

11 A I've spoken with people who have boated on the
12 Mosquito Fork.

13 Q Like who? Who did you speak with that's boated on
14 the Mosquito Fork?

15 A Well, Mr. Kim Fellows. said, like who. I'm sorry, I
16 didn't hear what you said.

17 Q That's my fault.

18 A Mr. Kennedy, for one.

19 Q Anybody else?

20 A There's another gentleman with the BLM who has. He's
21 a ranger in that area. His name is Kevan Cooper.

22 Q Anybody else?

23 A Mr. Fuller.

24 Q Anyone else?

25 A I don't recall anyone else.

1 Q Did -- did those folks tell you about what kind of
2 boats and flows were involved when they were boating on
3 the river?

4 A Mr. Kennedy certainly related some of his
5 experiences.

6 Q What were those experiences?

7 A Well, that he was able to do it at higher flows.
8 And, based on his experience, it wasn't a good idea to try
9 it at the flows when we chose not to do the float trips
10 that we had planned.

11 Q By "higher flows," what range are you talking about?

12 A Gosh, I don't know. I think we were generally in the
13 range of 4- to 500 CFS, we felt would probably be enough
14 to do it. But I -- you know, that's, again, a fuzzy thing
15 to me. I don't remember the precise words that we used.

16 Q Did -- was -- did you talk about what kind of
17 boats -- what kind of boats he used?

18 A Yes.

19 Q What did he use?

20 A I think he's done it -- I think he told me he's done
21 it with a Alpaca Pack raft. Or he -- whether he has
22 actually done it or whether he said that would be an
23 appropriate craft, I'm a little fuzzy on at the moment.
24 And then a raft.

25 Q And do you mean like a one-person pack raft, sort

1 of --

2 A The Alpaca is a one-person raft that you can carry.

3 Q And would it -- would it be your opinion that the
4 pack raft would not -- whether it got down the river or
5 not -- add much in terms of your analysis?

6 A I don't think it can give us very much information on
7 the navigability of the Mosquito Fork.

8 Q Okay. And what about Mr. Kennedy -- excuse me -- Mr.
9 Cooper or Mr. Fuller?

10 A Well, I've -- I've not actually directly discussed it
11 with Mr. Fuller, but -- you asked me whether I talked to
12 anyone who had. I've read his reports, so I know what
13 I've read in his reports.

14 Q And Mr. Cooper?

15 A And Mr. Cooper, I'm not sure I've actually directly
16 discussed with him his experiences in boating the river.
17 He looked at my results and, just from a high level, said,
18 yeah, those look like reasonable numbers to me.

19 Q Did he look at the original report or the revised
20 report?

21 A He probably looked at the original report, actually,
22 and I expect he was more looking at the draft numbers than
23 the actual discharges. I don't know.

24 Q Did -- so did you take into account Mr. Kennedy's
25 trips at all in calibrating your analysis? Did you have

1 enough information to be able to make useful information
2 from that?

3 A No.

4 Q Did you learn anything qualitatively about the river
5 from these folks?

6 A Well, sure. In the case of Mr. Kennedy, I certainly
7 learned that, in his opinion, the river wouldn't be very
8 boatable in the 2- to 300 CFS range, and it wouldn't be a
9 good idea to try it. And we talked about other things
10 related to his experience, measuring flow and so on.

11 Q Let's talk about the area around Chicken a little
12 bit. You -- you have not floated above or below Chicken;
13 is that correct?

14 A I have not floated on the Mosquito Fork.

15 Q Did you assess any of the river characteristics below
16 Chicken?

17 A I -- I looked at them from the helicopter. I looked
18 at my photographs. As I related this morning, I went to
19 the river on the ground around the mouth of Chicken Creek.
20 I did no other quantitative evaluations.

21 Q Okay. And that would be roughly river mile zero to
22 3.3; is that --

23 A That's about right.

24 Q And do you have any thoughts on the similarity of the
25 river in mile zero to 3.3 with the segment above that?

1 A Well, the one thing I know is that it's been heavily
2 disturbed by dredging activity, and so I didn't pay a lot
3 of attention to it because I didn't feel that what I was
4 seeing was a natural condition, and I focused my energy
5 upstream.

6 Q And -- and that area's been found navigable?

7 A Well, the parties have agreed that it is navigable
8 for legal purposes. Whether it -- you know, if you went
9 in and did a rigorous scientific analysis of the
10 navigability of that reach, I'm not sure what you would
11 find. I don't think it was found to be navigable strictly
12 on the basis of you can float the criteria boat through
13 it, necessarily.

14 Q Do you have any thoughts about whether you could get
15 the criterion boat through there or not?

16 A At some flows I'm sure you could, and other flows I'm
17 not really sure.

18 Q But it's not in its natural conditions, though,
19 it's --

20 A That's right.

21 Q So it wouldn't tell us anything about the
22 navigability question just from floating?

23 A In my view, it would not add value to the study, no.

24 Q Do you have -- are you aware of any data that
25 suggests that the flows in that area are different than

1 the flows above?

2 A I wouldn't say I have any data. I expect they are
3 marginally different at some times because of flows from
4 Chicken Creek. But that's probably fairly insignificant.
5 So they're similar.

6 Q So for the area from approximately river mile 3 to
7 upstream of the Taylor bridge and the area between river
8 mile 6 and 7, your report discusses how they may not be in
9 their ordinary and natural condition due to some dredging
10 activities; is that fair?

11 A I do mention that there are some dredging activities
12 in that area, yes.

13 Q Okay. So particularly for river mile 6 and 7,
14 between river mile 6 and 7, how can you determine
15 navigability if you have not reconstructed the
16 pre-disturbance condition?

17 A I thought we were talking about the Taylor Highway
18 bridge.

19 Q We can talk about that one first. But same question.

20 A I based my opinion about the overall -- the
21 navigability of the overall reach on -- specifically on
22 the sites that I studied. I didn't study that site.

23 Q That would be true between 6 and 7 as well?

24 A Now, we've gotten totally confused.

25 Q Sorry.

1 A My previous statement referred to mile 6 and 7. We
2 did study the area around the Taylor Highway bridge.

3 Q Okay. And so you have not studied the area around 6
4 and 7?

5 A That's correct.

6 Q Okay.

7 A Except, perhaps, if Site 8 is within that range. It
8 looks like it may be within mile 7. I'm not sure of the
9 exact river mile of that. We studied Site P-8. So --
10 okay, it's 7.7, so it doesn't apply.

11 Q Okay. So then I guess the question is: How -- so
12 you're making your assessment of the overall reach based
13 on the areas that you studied. So you haven't -- you
14 haven't done anything to reconstruct the pre-disturbance
15 condition in that area?

16 A I have not.

17 Q Okay. You have not assessed commercial recreation
18 potential on the reach; is that correct?

19 A Commercial recreation potential?

20 Q Yes.

21 A No, I have not.

22 Q Okay. And that was not a part of your criterion
23 craft in your considerations?

24 A That's correct.

25 Q And you're not a historian?

1 A I am not a historian.

2 Q Okay. You have no particular expertise in historical
3 craft or poling boats or the river boat, things like that?

4 A Only to the extent that I've done technical analyses
5 of those for this report that we've talked about today.

6 Q Based on the information provided to you?

7 A That's correct.

8 Q Okay. You didn't do your own historical analysis and
9 research to find those materials?

10 A I did not.

11 Q Okay. To go back to HEC-RAS very generally for a
12 second. I know we talked about that there was a plus or
13 minus .1 error you were estimating for the analysis that
14 you did here in HEC-RAS.

15 Is there -- what is your sort of general
16 perspective on error in HEC-RAS in other projects that
17 you've done? What's the general range of error?

18 A Well, first, I want to clarify: The statement I made
19 earlier, if I remember it correctly, I said that the
20 deviation between the rating curve -- the gauge rating
21 curve and the predicted values for some of the discharges
22 was in the range of a tenth of a foot. So I didn't mean
23 to imply from that that all the models were accurate to
24 within a tenth of a foot or less or more. I wasn't
25 speaking general error bands on models.

1 But with respect to your other question, I'm not
2 sure I can give you a number. It really depends on the
3 size of the river and the nature of the analysis, how
4 critical it is to be absolutely precise, how much data you
5 have. And I think, you know, that would be the main --
6 the main focus.

7 Q Well, what's the -- what error range have you seen on
8 the low end with HEC-RAS?

9 A If you have a lot of data, a lot of good measurement
10 data over a broad range of flows and you really dial in
11 the coefficients, you can get it -- you can get it within
12 a tenth or so, generally.

13 Q Okay. And what about at the high end?

14 A Oh, there are cases where you can be a foot or more
15 off.

16 Q And in this particular case, what -- where -- you
17 know, considering the data that you've collected and the
18 information -- the analyses that you've done, what would
19 you -- where would you place the HEC-RAS error?

20 A Well, the only specific data we have to evaluate is
21 the rating curve that we talked about. And if we
22 calibrate it to that curve, to within about a tenth over
23 the full range of flows, maximum of a tenth, and in other
24 places much better than that, the calibration to the low
25 flow measurements, there's probably somewhat more

1 deviation from that. If you look through the calibration
2 curves that are provided in my report -- I don't know the
3 exact numbers, but in some cases we might be a few tenths
4 off. As we get to higher flows at those sites, it's
5 probably in the range of a few tenths.

6 Q Is "a few" two-tenths, three-tenths or seven-tenths,
7 eight-tenths?

8 A I think more in the range of a few -- .2 to .3. I'm
9 not going to be held to those number precisely. It
10 certainly -- I'd be very unhappy if I learned that our
11 models were off by seven-tenths.

12 Q But it would be fair to expect some degree of error
13 at the higher flows?

14 A Well, we simply don't know.

15 Q Which cross-section at P-9 was used for calibration?

16 A Well, we looked -- from the low flow measurements, we
17 looked at all the cross-sections.

18 Q I mean to the -- to the rating curve.

19 A Up to the -- oh, the range of flows?

20 Q Yeah.

21 A I believe it was the upstream cross-section at the
22 bridge. I'd have to go back and see exactly. The gauge
23 is -- at one time the wire-weight gauge -- well, I
24 shouldn't say "at one time." The wire-weight gauge is on
25 the upstream side of the bridge; the now-automated gauge

1 is on the downstream side of the bridge. Precisely where
2 they took their measurements is a little bit unclear, so
3 it's generally in that area. But I think I used the
4 upstream cross-section.

5 Q I want to make sure that we're talking about the same
6 thing.

7 A I was just trying to see if I specifically said in
8 here what I did, and I didn't find it.

9 Q Yeah, but you think it would have -- it would have
10 been at the upstream side?

11 A I believe it was, yeah.

12 Q That would have been -- I'm looking at page A-1.
13 That would have been cross-section 12?

14 A Yes.

15 Q When -- for the drafts that you calculated for the
16 boats, is it -- how -- how -- is it just the boat sitting
17 in the water or are there other factors in terms of how
18 the draft is calculated?

19 A Well, we -- we discussed all those factors. It is
20 the boat sitting in the water. It's the load. And then
21 its pitch, depending on the operating conditions. And
22 also, for the -- in the case of the river boat, I -- for
23 upstream travel, I took into account the three inches for
24 the propeller.

25 Q So the initial -- the base measurement before there's

1 pitch or anything is based only on Archimedes principle?

2 A That's correct.

3 Q Okay. Let me take one second to look through here.

4 Are you familiar with the sort of expansion on
5 the navigability definition that states that one of the
6 things we consider when we're thinking about it is that
7 there need not be an absence of occasional difficulties in
8 navigation?

9 A I'm familiar with that, yes.

10 Q How did you account for it, if you did, in your
11 analysis?

12 A Well, it's not explicitly accounted for in the
13 analysis. But it is sort of implicit in the -- when you
14 evaluate the -- particularly these charts that show the
15 periods when it is and is not navigable.

16 As we discussed earlier, perhaps one hit of a
17 rock or one running aground at one site in the reach would
18 not disqualify it as a boatable day. But if you have
19 several, then it becomes more challenging. And at some
20 point -- I can't give you a specific number, but it's a
21 question of, if you have a lot of challenges, it's not
22 practical, it's not a commercial reality. And if you can
23 get through with an occasional problem but you're
24 generally okay, then it probably is navigable.

25 MR. SCHECHTER: No further questions. Thank

1 you, Dr. Mussetter.

2 Are you going to ask some questions?

3 MS. ROBERTS: Yeah, I've got a few questions on
4 redirect.

5 THE WITNESS: Okay.

6 EXAMINATION

7 BY MS. ROBERTS:

8 Q So you mentioned something about how you might have
9 more comfort if you had floated the river at certain flow
10 levels. Why would that have given you more comfort?
11 Would it have allowed you to do more measurement?

12 A It would have given me additional data to calibrate
13 the model, to be sure that it's giving accurate numbers at
14 the higher flows. It would have just given me a comfort
15 level that I had actually seen what the conditions are
16 like at the higher flows on the river.

17 Q But if you had gone on a boat trip, you would not --
18 you would have used a raft; is that correct?

19 A That's correct.

20 Q Okay. And you would agree with the type of boats
21 that the State used during their trip were not the types
22 of boats in use, from your understanding from Mr. Brown,
23 at the time of statehood?

24 A That's correct. Those are not the -- the types of
25 boats we considered.

1 Q So you would agree that, as an expert, you have a
2 duty to supplement or correct any errors in your previous
3 report?

4 A Yes.

5 Q And if you -- if you noticed that there was something
6 in your previous report that should have been given more
7 attention, such as the highest rock versus the second
8 highest rock, that you would -- you would feel you have a
9 duty to emphasize -- maybe discuss that more and -- when
10 you had an opportunity to supplement?

11 A Yes, absolutely.

12 Q So when you talked about Mike Brown being in a
13 helicopter with you, which Mike Brown was that?

14 A Actually both.

15 Q They were both in -- both Mike Brown from Tetra Tech
16 and Mike Brown, the historian, were in the helicopter with
17 you?

18 A At different times.

19 Q Okay.

20 A Yes.

21 Q And then Mr. Brown, the historian, his report was
22 produced concurrently with yours, correct?

23 A It was.

24 Q So you did not have the benefit of his report when
25 you issued your first report?

1 A That's correct.

2 Q All right.

3 MS. ROBERTS: No further questions.

4 MR. SCHECHTER: I have a brief...

5 FURTHER EXAMINATION

6 BY MR. SCHECHTER:

7 Q Dr. Mussetter, you understand that your duty to
8 supplement is a continuing duty; it's not an opportunity
9 to supplement?

10 A I understand that, yes.

11 Q Okay. And did -- prior to the errors being raised
12 the morning of your previous deposition date, had you had
13 any intention of supplementing your report with regards to
14 the first or second rock issue?

15 A I intended to let my report stand as I submitted it.

16 MR. SCHECHTER: No further questions.

17 MS. ROBERTS: Nothing further.

18 (Proceedings adjourned at 4:15 p.m.)

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1 REPORTER'S CERTIFICATE

2 I, SUSAN J. WARNICK, RPR, and Notary Public in
3 and for the State of Alaska do hereby certify:

4 That the witness in the foregoing proceedings was
5 duly sworn; that the proceedings were then taken before me
6 at the time and place herein set forth; that the testimony
7 and proceedings were reported stenographically by me and
8 later transcribed under my direction by computer
9 transcription; that the foregoing is a true record of the
10 testimony and proceedings taken at that time; and that I
11 am not a party to nor have I any interest in the outcome
12 of the action herein contained.

13 IN WITNESS WHEREOF, I have hereunto subscribed my
14 hand and affixed my seal this _____ day of _____,
15 2015.

16
17
18
19 _____
20 SUSAN J. WARNICK,
Registered Professional Reporter
Notary Public for Alaska

21 My Commission Expires: April 8, 2018
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Only the first pages of the above exhibits were copy as per agreement of counsel.

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