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5 APPEAL OF DOYON, LIMITED *

6 From Decision of Bureau of *

7 Land Management *

8 No. F-19155-26 *

ANCAB RLS 76-2

Navigability of Kandik
and Nation Rivers

9
10 VOLUME IV

11 TRANSCRIPT OF PROCEEDINGS

12
13 Pages 613 through 835

14
15
16 September 29, 1978

17 9:00 a.m.

18 Federal Building

19 U. S. District Court

20 Room 340

21 101 Twelfth Avenue

22 Fairbanks, Alaska

23
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25
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TABLE OF CONTENTS - VOLUME IV

1. Joseph Childers

Direct Examination by Mr. Allen	Page	613
Cross Examination by Ms. Taylor		672
Cross Examination by Ms. Higgins		684
ReDirect Examination by Mr. Allen		709
Cross Examination by Mr. Luoma		712
Second Direct by Mr. Allen		715

2. Charlie Biederman

Direct Examination by Ms. Taylor	Page	716
Cross Examination by Mr. Allen		737
Cross Examination by Mr. Luoma		761
ReCross Examination by Mr. Allen		765
ReDirect Examination by Ms. Taylor		767

3. William Long

Direct Examination by Ms. Higgins	Page	769
Cross Examination by Mr. Allen		783
Cross Examination by Mr. Luoma		783

4. Richard Stern

Direct Examination by Ms. Higgins	Page	784
Cross Examination by Ms. Taylor		811
Cross Examination by Mr. Allen		825

* * *

EXHIBITS

✓B-38	Hydrograph of Chena River at Fairbanks	Page	625
✓B-39	Hydrograph of Hess Creek		625
✓B-40	1978 discharge measurement		627
✓B-41	Monthly mean discharge hydrograph		643
✓B-42	Model unit run-off hydrograph		649
✓B-43	Field notes		681
✓B-44	Summary of field notes		682

R & R COURT REPORTERS

TABLE OF CONTENTS - VOLUME IV (cont.)

✓A-1	Map	Page	776
✓A-2	Historian report of Richard Sterns not received in evidence		792
✓A-3	Pictures of boats		801
✓A-4	Joint historian report, not received into evidence		832

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P R O C E E D I N G S

JUDGE LUOMA: This hearing will come to order.
Let's see, who's leading off this morning?

MR. ALLEN: We're calling Joe Childers.

JUDGE LUOMA: Alright.

JOSEPH CHILDERS

Being first duly sworn under Oath, testified as follows:

BY MR. ALLEN:

Q Mr. Childers, would you state your name and address
for the record, please?

A Joseph William Childers, 1410 Patterson Street,
Anchorage, Alaska.

Q What is your present occupation?

A Hydrologist for the U.S. Geological Survey Water Resources
Division, Anchorage, Alaska.

Q What is your position within the Water Resources Division?

A I'm now the Chief of the Arctic Hydrology Section of the
division.

Q How long have you been with the Geological Survey as a
hydrologist?

A Twenty-five years.

Q How much of that was in Alaska?

A Twenty-two years.

Q What are your basic responsibilities as a hydrologist,
Chief of the Hydro--Arctic Hydrology Section?

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1 A Basically doing studies of water resources, characteris-
2 stream flow characteristics in frontier area of the
3 State, remote areas where conventional stream gauging
4 data hasn't been collected. There--in--in enough detail
5 to give us grid estimates. Plus I've been doing channel
6 geometry to help evaluate channel characteristics of
7 streams, particularly in the Arctic part of the State,
8 in the last few years.

9 Q Have you measured and computed the flow characteristics
10 of streams all over the State?

11 A Yes.

12 Q What is your educational background?

13 A Bachelor of Science in Civil Engineering, University
14 of Colorado, 1950. Graduate training in hydrology and
15 hydraulics of rivers, University of Arizona, 1965.

16 And I'm a pro--registered professional engineer in the
17 State of Alaska in Civil Engineering. And I've ob--at--
18 attended and participated as both instructor and as
19 student in numerous seminars on hydraulics of rivers--
20 and on hydro--service water hydrology.

21 Q Have you had any publications published in the area
22 of hydrology?

23 A Yes.

24 Q Could you identify them?

25 A I--I can list three I think are pertinent to the--the

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1 definition of stream flow characteristics. These would
2 be an open file report entitled, "A Proposed Stream
3 Flow Data Program for Alaska", dated 1970. A--a U.S.
4 Geological Survey open file reported, dated--or entitled,
5 "Water Resources of Alaska", dated 1970. A--a U.S.G.S.
6 open file report entitled, "Flood Frequency in Alaska",
7 dated 1970. Other reports that might be pertinent to
8 evaluation of channel geometry and channel features
9 would include a series of open file reports entitled,
10 "Channel Errosions Surveys Along the Trans-Alaska Pipe-
11 line". These were annual reports.

12 Q What are the practical applications of the general
13 work--of the work that you and the hydrology division
14 in general perform in Alaska?

15 A We are--the Water Resources Division of the U.S. Geological
16 Survey has a mission of being the water data collection
17 agency with the Federal Government. And the Alaska
18 District has charge of the Water Resources data collection
19 for the Federal Agencies throughout the State of Alaska.
20 Our work entails operating a network of basic data
21 collection stations throughout the State. These include
22 stream gauging stations and water quality sampling
23 stations. In addition we do specialized project work,
24 both Statewide and in selected areas of the State for
25 purposes of evaluating the regional or aerial, or in

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1 some cases Statewide water resources characteristics.
2 That, basically, is our mission.

3 Q What types of agencies or organizations benefit from
4 your data gathering and for what purposes?

5 A The Federal Agencies benefit in many ways. The--the
6 action agency, such as the--as the Corp of Engineers,
7 the Alaska Power Administration, the Environmental
8 Protection Agency, the Forest Service, the Bureau of
9 Land Management, and many other agencies use our data
10 and use our interpretations of the Water Resources
11 characteristics for planning and building and managing
12 water resources projects in the State. We--you--you
13 mentioned just Federal Agencies--

14 Q No, I mentioned any organizations, private--

15 A The State--the State of Alaska, in its various depart-
16 ments, have utilized our services for many years in
17 cooperative ventures to--to fulfill the State's respons-
18 ibilities.

19 Q How would the State Department of Highways, for example,
20 use your work?

21 A The Department of Highways uses our--our stream flow
22 data in particular for evaluating flood characteristics
23 in regions of the State to which they build highways.
24 They use our flood information in sizing their bridges,
25 culverts. They've also used our hydraulic exper--en-

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1 gineering expertise in evaluating the full characteristics
2 pass their bridges and other structures.

3 Q Is it correct then that they're attempting to predict
4 the flow characteristics in the future for rivers at
5 which they're putting bridges across?

6 A Precisely.

7 Q And would the Fish and Wildlife people also be attempting
8 to predict flow characteristics in the future?

9 A The Fish and Wildlife Service have used our services
10 in many--for many purposes. Certainly one would be
11 in giving them information about the flood characteristics
12 of streams where they've planned to build structures.
13 And also their interested in the low flow characteristics
14 of streams in selected places, such as in locating
15 fish hatcheries to--to find sustained or dependable
16 water supplies. And they also use our data in evaluating
17 stream flow characteristics in general for helping manage
18 the fish resources.

19 JUDGE LUOMA: Is--excuse me, is that the
20 Federal service you're talking about or State Fish and Game?

21 A Both.

22 Q Are many of the rivers in Interior Alaska gauged? And
23 maybe if you'd explain what gauged means, first.

24 A A ga--a stream gauging station is--is a--is a site
25 on a stream, with a--with an installation of specialized

1 equipment that allows us to collect a record of the
2 discharge that passes that site that's on that stream.
3 And the stream gauging stations do provide a--the basic
4 data used in evaluating the stream flow characteristics.
5 Actually stream gauging stations have many purposes.
6 And one purpose is for current data, such as flood
7 forecasting information for the National Weather Service
8 where we are interested in the current conditions of
9 the river and with the idea of being able to predict
10 the near future conditions of the river. Another type
11 of use of stream gauging data is in collecting long
12 records or record in sufficient length to allow
13 statistical analysis of the data records to evaluate the
14 characteristics of the stream flow at the site. A
15 third purpose of the stream gauging data is to collect
16 sufficient samples in a region to allow generalization
17 or, as we call it, regionalization of the stream flow
18 characteristics throughout the region.

19 Q Are--do many of the rivers in Interior Alaska have a
20 long history of gau--of gauging?

21 A By many--is that what you ask?

22 Q Yes.

23 A Pardon me. By many, I'd say no. By many in comparison,
24 say with most of the rest of the nation, in fact Alaska
25 is probably one of the sparsely gauged areas in the--it

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1 is the sparsely gauged area in the--in the U.S., I'm
2 sure--certain. And it ranks--and parts of Alaska rank
3 as some of the sparsely gauged areas in the world. But
4 there are long records, relatively long records, in
5 some or parts of Alaska. By long I mean fifty--twenty-
6 five to fifty years of record.

7 Q In developing reports on rivers for use by say the State
8 Highway Department is your job and the job of the
9 division in general largely devoted to trying to inter-
10 polate from the existing available data what the
11 characteristics of an ungauged stream would be?

12 A In many cases this is true.

13 Q Would you say from your background as a professional
14 hydrologist and your twenty-two years working in that
15 field in Alaska, that you would consider yourself an
16 expert in evaluating and analyzing the flow characteris-
17 tics of ungauged streams?

18 A I'm sure I would have to be considered an expert, although
19 I don't like the term. I'm called on frequently by
20 consulting engineers and--and managers of water resources
21 or planners of water resources in Alaska to provide
22 information about stream flow characteristics throughout
23 the State.

24 Q You mentioned some of the types of measurements that
25 are taken on streams. Perhaps you could amplify that

1 a little bit. What, for example, do you mean by channel
2 geometry?

3 A Channel geomety in the--in the practical sense of the
4 term as I use it refers to the dimensions of the channel.
5 Such--perhaps such measurements as the bank full width,
6 the bank full depth. In another sense hydraulic--or
7 channel geometry refers to the--the relation of the
8 width to the mean depth and the water surface slope,
9 with a changing discharge.

10 Q Are the measurements of channel geometry you're talking
11 about basically cross-sectional measurements?

12 A Cross-sections of the channel are the--are the important
13 part of the channel geometry determination.

14 Q What do you mean by discharge?

15 A Discharge of a stream refers to the time rate of flow
16 of volume of the water passed a section--passed a
17 cross-section in the stream.

18 Q In layman's language does that simply mean the amount
19 of water that's flowing down a river at a given point
20 and a given time?

21 A Yes.

22 Q What do you mean by stage?

23 A Stage refers to the elevation of the water surface above
24 a datum, a zero point.

25 Q In layman's language again, this just would be the

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1 height of the water at any given point?

2 A Yes.

3 Q Can you state generally what the relationship between
4 the height of the water or stage, as you call it, and
5 the discharge is?

6 A In general the--not in general. Usually the--the stage
7 increases as the discharge increases. And more--more
8 particularly at selected sites on a stream, in general.
9 We are able to get a very definite relation--a very
10 well-defined relationship between the stage and dis-
11 charge showing an increasing relation of stage to
12 discharge.

13 Q Where does the--typically does a stream carry the bulk
14 of its flow, in what portion of the channel? Near the
15 bottom, near the sides?

16 A Oh, well the velocity distribution in a cross-section
17 of a stream characteristically is high--the maximum
18 velocities will be near--near the center of the stream,
19 near the surface. If it's on a bend, it'd normally be
20 toward the outer side of the bend, but near the surface.
21 In general the maximum velocities will be at the surface
22 Most of the water will be transport--will be moving near
23 the surface.

24 Q Could you explain what a hydro-graph is?

25 A A hydro-graph is a--an illustration of--of the time rate

1 of variation of the discharge at a site on a stream.

2 Q Is is generally measured on a daily basis or what time--
3 what unit of time is used for a standard hydro-graph?

4 A Well, the--hydro-graphs can--can be developed for various
5 purposes with different units of time used to--for it
6 to show the discharge. In other words, you--you can
7 show an instantaneous hydro-graph where you would show
8 the instantaneous changes in the discharge--variation
9 in the discharge. Or you can show--you can--you can
10 average the discharge over a day--over each day and
11 plot that. And that is a very commonly used tool for
12 our purposes. In other words, using the daily mean
13 discharge, but we also can use the da--the monthly mean
14 discharge, or various time pur--time units.

15 Q What do you mean when you call--what is the term flashy
16 mean in connection with a stream?

17 A Flashy really represents the--the relative short time
18 variations in discharge at a site on a stream or on
19 a stream.

20 Q Can you explain that in layman's language?

21 A A--a flashy stream would be one where one could expect
22 changes of discharge of several fold within a very
23 short time period, say a week, or perhaps a day. Or,
24 as a matter of fact, a very flashy stream, where one
25 could get a peak discharge of three to five times the

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1 daily mean discharge during selected days.

2 Q Are the smaller stream in the region of Interior Alaska,
3 which we've been referring to as the middle Yukon Area,
4 and I am not including the Yukon, are the tributaries
5 of the Yukon considered generally to be flashy streams?

6 A I'm sure they are. We've heard testimony here that
7 personal observations of--of witnesses that--that give
8 me that impression. Myself, I--I know that streams in
9 similar hydrolo--hydrologic settings in the State that
10 we have stream gauging records on do show a very flashy
11 hydro-graph, very flashy conditions.

12 Q Can you give some examples of gauged streams that you
13 are talking about that ha--that are considered flashy?

14 A Yes. The Chena River, the Hess Creek, Wiseman Creek,
15 the Middle Fork of the Koyukuk River, the Jim River,
16 the Salcha River, Berry Creek, and numerous others in
17 the State are definitely flashy--

18 Q What climatic zone would you consider these streams
19 to be in?

20 A They're all in the Interior climatic zone, as shown
21 by the National Weather Service. Characterized by
22 continental climate.

23 Q Do you know roughly what the annual average rainfall
24 in this area is?

25 A It's been mapped by the National Weather Service. It

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1 varies, but it's generally in the--in the range of--of
2 eight to twelve inches, per year. That'd be annual.

3 Q I meant to include all precipitation. Did--did you--
4 does the eight to twelve inches include snowfall in the
5 winter time?

6 A Yes.

7 Q I'll show you what has been marked as Appella te's
8 Exhibit Thirty-eight and Thirty-nine, B-Thirty-eight and
9 Thirty-nine, and ask if you can recognize those exhibits?

10 A Yes.

11 Q What are they?

12 A Hydro-graphs of the daily mean discharge for Chena
13 River at Fairbanks for a given water near October '71
14 to September '72. And--

15 Q That would be Thirty-nine.

16 A Likewise, a--a daily mean discharge hydro-graph for
17 Hess Creek near Livengood for the water near 19--
18 October 1973 to September 1974.

19 Q Were these exhibits prepared under your direction?

20 A Yes.

21 MR. ALLEN: I offer these exhibits as--
22 into evidence.

23 MS. TAYLOR: I have no objection.

24 MS. HIGGINS: No objection.

25 JUDGE LUOMA: Exhibits B-Thirty-eight and

1 Thirty-nine are received in evidence.

2 Q Would you--can--can you determine from this hydro-graph
3 whether these rivers would be considered flashy or
4 not? And how can you so determine?

5 A They--I would consider these flashy. By examining the
6 shape of the hydro-graph. As shown we can select some
7 of the sharper rises that have occurred, such as in
8 the July on Chena River, the discharge changing from
9 about a thousand second feet--a thousand cubic feet
10 per second discharged to something over five thousand
11 cubic feet per second in about a day. And likewise
12 in June we had a similar rise. That would be the basis
13 of it.

14 Q On--as--as illustrated on these two exhibits would you
15 say that the high water would tend to be the norm or the
16 low water? That is to say, are the peaks more repre-
17 sentative of the normal condition or are the valleys?

18 A The--the peaks are infrequent. And the recessions--the--
19 the more--less varying portions of the discharge are
20 more frequent, more common.

21 Q Were these two periods of time selected for any particular
22 reason or are they--would you imagine representative of
23 other years on these same creeks?

24 A They were selected pretty much at random. Although, we
25 did--I didn't select very carefully. I wanted them

1 to demonstrate the--the flashiness, actually, of these
2 streams. They're fairly typical. I would guess.

3 Q And would you say these--scratch that. Are you familiar
4 with the Kandik and the Nation Rivers?

5 A Limited--in a limited sense, yes.

6 Q What is the extent of your familiarity?

7 A I have studied the drainage basins and the stream
8 channels on topographic maps, climatic maps, and I have
9 visited the--both streams during 19--during June of 1978

10 Q Have you spent considerable time studying those streams
11 in connection with preparation for this hearing?

12 A Yes.

13 Q And have you been present throughout the hearing up to
14 this date?

15 A Yes.

16 Q And you observed the slides and heard the testimony?

17 A Yes.

18 Q From what you have seen and heard would you conclude
19 that these rivers, in terms of flashiness, are similar
20 to the Chena River and Hess Creek?

21 A I would.

22 Q Did you take some measurements of these streams in June?

23 A Yes.

24 Q Did someone from the Geological Survey go back to these
25 streams to take measurements in August, to your knowledge?

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1 A Yes.

2 Q Were these people under your supervision?

3 A Yes.

4 Q Do you have the measurements that were taken by both
5 you and by the employees in August who were acting under
6 your supervision?

7 A Yes.

8 Q Have you directed that a table be prepared showing the
9 tabulating these measurements?

10 A I selected some of the selected data, yes.

11 Q I'll show you what's been marked as Exhibit B-Forty and
12 ask if that is the table that you have directed to be
13 prepared?

14 A It is, yes.

15 MR. ALLEN: I offer this as--as an Exhibit
16 in evidence.

17 JUDGE LUOMA: Any objection?

18 MS. TAYLOR: Mr. Childers, what do the lines
19 on the tables . . .

20 A Oh, the--it means we haven't the data, we did compute
21 that.

22 MS. TAYLOR: Okay. Fine. I have no objection

23 MS. HIGGINS: No objection.

24 JUDGE LUOMA: Exhibit B-Forty is received
25 in evidence.

1 Q Can you explain generally how the measurements are
2 taken of--of stream discharge? What is the physical
3 process?

4 A Discharge is measured by measuring the cross-sectional
5 area of the stream. And by measuring the mean velocity
6 of the stream. To get this data we customarily divide
7 the cross-section width into increments of width so
8 spaced as to give us in general at least twenty incre-
9 ments.

10 Q What do you use to divide the river this way?

11 A On a wide stream, such as the Nation and Kandik, wide
12 in sense--a relative sense here, we use a--what we
13 call a tag line. It's a steel line of various
14 dimensions, depending upon how--how much width we have,
15 which is graduated in--in increments of distance, such
16 as two feet. This tag line is fastened to one bank,
17 stretched across the stream, normal to the dis--to the
18 flow lines, if possible. That is perpendicular to the
19 flow direction. And it allows us a very convenient
20 way of measuring the--it--width increments across the
21 section.

22 Q Then what'd you do, once you stretched this tag line
23 across the stream?

24 A We then determined the depth for each increment of
25 width by various means. If we are able to wade the

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1 stream, we use a wading rod, which is a steel staff
2 graduated in feet and tenths of feet. If the depth
3 is--of if the flow conditions do not allow wading, then
4 we normally use--in--in either a boat or a bridge or
5 a cable weight. On the Kandik and Nation Rivers we--
6 we used a boat. We were able then to suspend a weight
7 on a graduated suspending--suspension line and thus
8 read the depths by suspending--hanging the weight over
9 the side of the boat in a vertical de--position and
10 determining depth.

11 Q And each of these depths at--what in--increments--what
12 intervals were used on the Kandik and the Nation?

13 A Tenths of feet.

14 Q I'm sorry, what horizontal increments, how often did
15 you take a depth--a depth reading on the tag line?

16 A We--we tried to divide the cross-sections in--into a
17 minimum of about twenty increments. So I think they
18 were, oh, along the vicinity of five feet. I can't--
19 I'd have to look at my measurements individually to
20 determine.

21 Q What--in addition to recording the depth at each
22 increment, what other reading would you make?

23 A The current velocity of the water at selected depths
24 within that stream to--to allow us to evaluate the
25 mean depth.

1 Q The mean depth?

2 A In the vertical plane at that section, at that width
3 increment.

4 Q What does the instrument look like which measures stream
5 velocity?

6 A The current meter that we use is a very--is a--a vane
7 meter. That is, it has cups that rotate about a vertical
8 access. And the speed of rotation is directly related
9 to the velocity of the stream current at that point,
10 when they're in use.

11 Q Is there a little electronic meter that registers the
12 speed which you can read it off of?

13 A The--the mechanical rotation of the vanes is--breaks a--
14 is--causes an electrical current to be interrupted for
15 ever one or five revolutions, depending upon the setting
16 by the hydrographer, so that the--the method of obtaining
17 the velocity of the current is to count clicks, as we
18 say. In other words, an electrical circuit interruptions.

19 Q And do you use a stop watch to time the intervals at
20 which these clicks are counted?

21 A That's right--right.

22 Q Do you take these readings near the top or near the
23 bottom of this stream?

24 A We take readings at six-tenths of the depth from the
25 surface, or at--or we average the readings at two and

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1 eight-tenths of the depth. These have been determined
2 in our studies to give us the mean depth in the
3 vertical, at that location.

4 Q Calling your attention specifically to the Kandik and ←
5 the Nation Rivers and referring you to Exhibit B-Forty,
6 do the three locations listed under each river indicate
7 locations at which discharge measurements were made
8 either in June or in August?

9 A Yes.

10 Q How many discharge measurements did we make in June--
11 or did you make in June?

12 A There are three shown here. Three.

13 Q And what were the sites that they were taken at?

14 A We measured the discharge of the Kandik River below
15 Big Sitdown Creek. We measured the discharge of the
16 Nation River below Jungle Creek and above Hard Luck ←
17 Creek.

18 Q What does the column refer to which is entitled, "drainage
19 area, miles squared"?

20 A That is--that shows the--the drainage area of the drain-
21 age basin above that discharge measurement point, as
22 determined by a technician in my office for--using
23 U.S. Geological Survey topographic maps.

24 Q Why is there no drainage area listed under below Indian
25 Grave on the Kandik and above Hard Luck on the Nation?

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1 A Apparently we didn't compute it, I don't know.

2 Q Could that be computed?

3 A Yes.

4 Q And the figures that are listed were computed under
5 your supervision?

6 A Yes.

7 Q Referring you to the measurement taken below Big Sitdown
8 at the Kandik, would you describe any difficulties that
9 you had in making that measurement?

10 A Yes. The--the conditions--the flow conditions were
11 such that it was dangerous and extremely difficult to
12 measure the discharge with the equipment we have, at
13 the time. We had no motor on our inflatable boat.
14 So we were forced to--we--we--we had to paddle the boat
15 across the stream, dragging the tag line through the
16 water behind us to try to get it across the stream.
17 This required us to fasten the tag line on one bank
18 and stretch it to its maximum width--or length upstream,
19 along the bank. And getting into the inflatable boat, two
20 of us paddling with all of our strength to get across, and
21 hoped that we would reach the other bank before the current
22 swept us downstream.

23 Q How many people were helping you?

24 A There was just myself and one other . . .

25 Q Who was that other?

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1 A It was Jack Allen.

2 Q Me?

3 A Yes.

4 Q Did we, in fact, finally get the tag line stretched
5 across?

6 A We did.

7 Q And then what did we do?

8 A We then began our measurement, using a sound--a sounding
9 weight and current meter and suspension hand line cable.
10 I could--do you want me to describe the difficulties?

11 Q Yes, please.

12 A We were able to--to successfully measure depth and
13 velocity for several cross--for several increments
14 of width along the bank that we--from which we commenced
15 But after a time the--the depth and velocity were such
16 that our drag on the tag line, which we were using to
17 hold the boat, snapped the tag line.

18 Q How were we holding onto the tag line, with the--with
19 the boat?

20 A You were in the bow holding the tag line by hand.

21 Q Were you surprised at the--or had you excepted measure-
22 ments to--the measurements to present those difficulties?

23 A Actually no. I was--otherwise I would of--wouldn't have
24 made the trip. The reason being that we--we had short
25 time to plan this trip. But in my looking at the hydro-

1 graphs of similar--of--of sta--gauging stations at sim--
2 on similar streams, I concluded that the chances were
3 good that we would find conditions that would be
4 easily measured with the equipment we took. But as it
5 turned out, when we reached the area, we found that
6 considerable rain was falling and had fallen in the
7 previous days, so that the river was--rivers were very
8 high, relatively, for that time of year, I thought.
9 And you can--and the con--but yet we had made the trip,
10 we were there, we didn't want to go away empty-handed.
11 We gave it all that I thought was reasonably possible.
12 In fact, I requested that we not try any more measurements
13 on the Kandik during that trip. Because I felt we were
14 endangering our lives with the measurement we made,
15 actually.

16 Q (Pause) Did you observe any visual evidence along the
17 Kandik that the river was in an abnormally high state?

18 A Yes. The Kandik was--in some reaches the stage was
19 into the vegetation along the banks. This was--this
20 seemed to be--to be abnormally high for that time of
21 year.

22 Q What other indications are there that the river is
23 higher than normal?

24 A The water was extremely--well, not extremely, but it
25 was quite turbid. That is, it--although we didn't measure

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1 the turbidity we were not able to see more than a
2 half a foot beneath the surface, which is fairly turbid
3 for a stream in that hydrologic setting.

4 Q Was there evidence--vi--visible evidence that the river
5 at some time in the past had reached even higher levels?

6 A Yes, there were deposits of flood debris--debris that
7 had been deposited by floods considerably higher.

8 Q Were there any water stains on rock walls?

9 A Yes.

10 Q (Pause) Did you make generally the same observations
11 when we reached the Nation River?

12 A Yes. The Nation was likewise in a--in a high water
13 stage--or condition for that time of year. We observed,
14 as--as was testified to Jules Tileston, we observed flow
15 and--or the water stage up in lar--bank vegetation in
16 some locations. And tur--and the water was quite turbid.
17 Which indicates high water in these streams. And then
18 also there were, at times, considerable floating debris,
19 such as logs and drift material, wooden material. So
20 it was definitely fairly high for that time of year.

21 Q Are the three locations for each river that--which are
22 shown on Exhibit B-Forty also marked on the overlays
23 to the aerial photos, which are B--Exhibits B-Sixteen
24 and B-Seventeen?

25 A Yes.

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1 Q Can you go to those Exhibits and point out for the
2 Court where those three locations are on each river?

3 A On the Nation River the site near the mouth . . . is a--
4 just at the head of the distributary (sic) near the
5 delta.

6 Q What symbol is shown on the overlay to . . .

7 A It's a circle with a--a darkened cross.

8 Q And what is written?

9 A It says, "G.S. flow measuring station".

10 Q And where are the other two, if you recall?

11 A Let's see, the other on the Nation or one of the others
12 is above Hard Luck Creek. And it's at this location.

13 Q Is that just below the solid yellow line?

14 A It is.

15 Q And where is the final station?

16 A It is below Jungle Creek and it is located at this
17 point.

18 Q And is that just upstream from the dotted yellow line?

19 A Yes, from the dashed line.

20 Q And are the places on the Kandik similarly spaced above
21 and below the dotted yellow line?

22 A Near the mouth . . . yes. And below Indian Grave Creek
23 Oh. I don't see it. Yes, there is one below Indian
24 Grave Creek, but it--it's clear down--way down from
25 Indian Grave Creek. Yes. It looks like its within that

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1 boundary.

2 Q Is there one up at--

3 MS. TAYLOR: Are we--

4 Q --Big Sitdown Creek?

5 A Below Big Sitdown Creek? Yes.

6 Q (Indiscernible--simultaneous conversation)--

7 JUDGE LUOMA: (Indiscernible--simultaneous
8 conversation)--are they marked with these similar circles
9 that you've--

10 MR. ALLEN: Yes, they are. There does appear
11 to be one discrepancy. The one below--that is listed here
12 as below Indian Grave is shown a number of miles below. I'm
13 not sure whether the discrepancy is on the Exhibit or on the
14 overlay. And we will clarify that after the first recess.

15 Q (By Mr. Allen) In taking discharge measurements is it
16 important to take them at intervals of say every quarter
17 or half mile along the stream?

18 A Depending upon your purpose. For our purpose I thought
19 not.

20 Q What factors serve to increase the flow in a stream
21 at any given point in time?

22 A Con--if--if I understand correctly you mean during a
23 steady flow period or essentially a steady flow--

24 Q Right.

25 A --where--where you're not getting storm run-off. Dis-

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1 charge will tend to increase with drainage area size, so
2 that as you get significant tributaries, intervening
3 tributaries entering a stream, you would, of course,
4 increase the discharge downstream.

5 Q Now, looking at the Government's Exhibit B-Forty can you
6 state any conclusions from comparing the June measurements
7 to the August measurements?

8 A It's very apparent that the discharge decreased signifi-
9 cantly between June and August, as shown by the--on the
10 Kandik, the--the only me--site we measured in June. Which
11 changed from sixteen hundred and ten cubic feet per second,
12 at the time of the measurement in June, to a hundred ninety
13 three cubic feet per second, at the time of the measurement
14 in August. And similarly on the Nation River, where we
15 had--it appears to comparative measurements. The dis-
16 charge in June--at the time of measurement in June at
17 above Hard Luck Creek was three thousand a hundred forty
18 cubic feet per second. And in August three hundred and
19 twenty-four at the time of measurement. And below
20 Jungle Creek it was twelve hundred cubic feet per second
21 at the time of measurement in June, decreasing to one
22 hundred seventy-one cubic feet per second at the time
23 of measurement in August. So, considerably lower
24 discharge in August.

25 Q Referring you to the measurement below Jungle Creek on

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1 the Nation with an increase in discharge of a--so--some
2 six to eight times, from one hundred and seventy-one
3 to twelve hundred, why did the maximum depth increase
4 less than two-fold?

5 A This isn't surprising to me, because the--in--it is
6 not uncommon to have a rating, that is a relationship
7 between stage and discharge, that shows this on these
8 streams--on streams of this type. The--a very small
9 increase in stage will accommodate a very large increase
10 in discharge. Is that what you were--

11 Q Yes, that's exactly--

12 A --asking about?

13 Q --what I was referring to. Do you have a graph showing
14 this relationship for some other creek?

15 A I do.

16 Q What creek is that?

17 A Well, I--I . . . (Pause) I think I brought two rating
18 curve--or rating--yeah, rating curves, we call them.
19 Rela--curves of relation between stage and discharge
20 at gauging stations that we operate that are in similar--
21 or that are in--that have similar channels. One is
22 Wiseman Creek at Wiseman. I can show you--

23 Q No, I--I don't think we need to introduce it. But, can
24 you--

25 A Well--

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1 Q --simply give the . . .

2 A Illustrate this--

3 Q --give the figures show--yeah, illustrate the increase
4 by showing how many inches the river rised (sic) for
5 what proportional increase in discharge?

6 A Okay. The--this is a smaller basin than--than the
7 Nation at any point we measured it, but we--for a rise
8 in stage of one foot we have a twenty-five fold increase
9 in discharge at that gauging station, right in the
10 middle of the range of discharge that we've measured.
11 On the Kuparuk River, at Prudhoe Bay, a--it's a--a
12 similar gravel bed stream with wide--large width to
13 depth ratio. We have a--a discharge--a nine-fold in-
14 crease in discharge for a one foot rise in stage. So,
15 these are two examples that can illustrate that for our
16 gauging stations we do have, in many cases . . .

17 Q Have--have you found, from your experience, that layman
18 tend to exaggerate the increase in rise when a river is
19 rising?

20 A I believe so, in my--in listening to the testimony here.
21 It seems to be. In fact, I'm reasonably certain that
22 there have been some over-estimations of the change
23 in depth accommodating discharge changes. It's very
24 common. And there's several reasons for it. People
25 don't recog--realize, usually, how--how wide a channel

1 is in relation to its depth. We plot it usually, in
2 cross-sections, exaggerating the vertical scale. As
3 many times as much as twenty to one in order to see
4 very small changes in the vertical dimensions and
5 accommodating the significant change in the horizontal
6 dimensions. The turbidity of water often fools a person.
7 I've been out with people that were experienced river
8 boaters, in fact, on streams during turbid conditions
9 and frequently I'll ask, "how deep is the water in this
10 channel" and I've had people over estimate it considerably,
11 when it's real turbid.

12 Q Are there any gauges on either the Nation or the Kandik
13 River?

14 A No.

15 Q So have you--

16 A Not to my knowledge, Jack. There--I've heard here that
17 Doyon might have operated something in the area. And
18 some people might have had gauges--staff gauges, but
19 I--I'm not aware of any gauges.

20 Q No Geological Survey gauges?

21 A Absolutely not.

22 Q In for pre--preparation for this hearing have you made
23 an attempt to compare these two rivers with other similar
24 rivers which do have a history of gauges?

25 A Yes.

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1 Q (Pause) I'll show you what's been marked as Exhibit
2 B-Forty-one and ask you if this is the--if this is a
3 chart showing the results of your comparison?

4 A Yes.

5 MR. ALLEN: I would like to offer this as
6 an Exhibit.

7 MS. TAYLOR: I have no objection.

8 MR. ALLEN: Do you have a copy, Your Honor?

9 JUDGE LUOMA: Yes, I do.

10 MS. HIGGINS: Exhibit B-Forty-one is received
11 in evidence.

12 Q Would you explain what this Exhibit shows?

13 A This exhibit illustrates the--a--the results of statistical
14 analysis of stream flow data records collected by the
15 U.S.G.S. at selected sta--gauging stations in the Interior
16 Alaska in similar climatic--in--in the same climatic
17 zone. And in--in some--in most cases quite similar
18 physiography conditions. The--

19 Q What rivers were--are shown on there?

20 A Hess Creek, near Livengood. Berry Creek, near Dot
21 Lake. Salcha River, near Salcha Camp (ph). The Chena
22 River, near--near Two Rivers. Chena River, near Fair-
23 banks. Wiseman Creek at Wiseman. Jim River, near Prospect
24 Creek Camp. And Koyukuk River--or Middle Fork of the
25 Koyukuk River, near Wiseman.

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1 Q What does unit run-off mean?

2 A Unit run-off is a--is the comparative run-off figure
3 to show the--the . . . discharge from a region. It's--
4 it's--you take the total discharge of the river, divide
5 it by the drainage area above that site and you come
6 out with unit run-off. It's--I use it and it's used
7 customarily or characteristically by--by hydrologists
8 to compare rates of flow from--at different sites in an
9 area.

10 Q In other words, the scale on the left of the chart shows
11 the number of cubic feet those rivers discharge in each
12 month per square mile of their drainage area, is that
13 correct?

14 A That's right. It's a three feet per second per square
15 mile yard--units. And that's what that represents.

16 Q Now, what do--what does each bar--the--the--the bars for
17 each month represent?

18 A They represent the--the normal monthly mean discharge
19 for those sites at the gauging stations. The--

20 Q Why does it show a range?

21 A Okay. The--our purpose was to try to depict what would
22 be normal. And we, in the Geological Survey Water
23 Resource Division, computed a normality for gauging
24 stations with sufficient record by, in this case, taking
25 all the monthly mean discharges for each month at a

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1 gauging station. Arraying them in magnitude--in--in
2 order of magnitude. And then computing the simple
3 statistics of the quartiles. The--so the twenty-five
4 percent would be that discharge which--that monthly
5 mean discharge which would have been only--only twenty-
6 five percent of the time would the discharge have been
7 less than that. The fifty percent would be the median
8 or the--the one right in the middle of the array. And
9 the seventy-five percentile would be the--the upper
10 quartile, or that would mean that one quarter of the
11 time the monthly mean discharge would have exceeded that
12 figure.

13 Q In other words, if you had a stream which had been
14 gauged for twenty years, for example, you would take
15 the mean August discharge for each of those twenty years,
16 array them in order, through out the top and bottom five,
17 and that would be the limits of your range, both of the
18 high and the low end, is that correct?

19 A Yes. That would be our normal--

20 Q And which one would be the line that would represent
21 the line in the middle?

22 A That would be the median or the fifty percentile.

23 Q Now, do you consider this a normal range?

24 A Yes, I do. That is, between the twenty-five percentile
25 and the seventy-five percentile. We define it that way

1 in our Water Resources Review, which is a monthly
2 publication by the Water Resources Division showing
3 conditions of streams in the area. And in Alaska we
4 have some index pages for which we publish the current
5 month's flow conditions and we relate it to normal or
6 deficient or excessive. It--depending upon its position
7 on its normality graph.

8 Q Judging from the graphs of these eight rivers do you
9 consider any of them to be dissimilar to the others?

10 A Yes.

11 Q Which rivers?

12 A Most are--most different, certainly, is Berry Creek.
13 Now, by examining these different--and making a visual
14 inspection of the monthly changes, you'll note that
15 Berry Creek is--its peak--or its highest normal range
16 is in June. It's later than, I believe--Wiseman Creek
17 is--the median is a little higher, but it--the total
18 normal range is lower. But all the rest of them, I
19 think, are--the peak occurs in May. But Berry Creek is
20 most different here.

21 Q What accounts for that dissimilarity do you think?

22 A Physiography. Berry Creek has significant glacier area
23 in its basin. And the glacier--the presence of signifi-
24 cant glaciers in a basin in Interior Alaska will--or
25 anyplace will--that I'm familiar with, will tend to

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1 indicate higher flows later in--for these--for normal
2 monthlies in the year, later in the summer.

3 Q Do any of the other creeks that you have graphed here
4 have glaciers in their drainage?

5 A Not significant. Koyukuk River has some in its basin,
6 but they're very insignificant.

7 Q Are they all in the same climatic zone, did you say?

8 A Yes.

9 Q Have you attempted to extrapolate a similar unit run-
10 off graph for the Kandik and the Nation Rivers, based
11 on your analysis of these gauged streams that are shown
12 on Exhibit B-Forty-one?

13 A Yes.

14 Q I'll show you what's been marked as Exhibit B-Forty-two
15 and ask if this is the model unit run-off gauge that
16 you prepared?

17 A Yes.

18 Q (Pause) Can you explained how your derived--how you
19 derived the graphs for each of these months?

20 A I selected those stream gauging records--or those
21 stream gauging stations that I felt were similar to
22 the Nation and Kandik River drainage basins. And
23 averaged their normality ranges for each month, in
24 terms of unit run-off and used that averaged hydro-graph
25 for--as a model.

1 Q Did you use each of the eight streams that are
2 shown on Exhibit Forty-one?

3 A No.

4 Q Which--which ones did you not use?

5 A Let's see, I know I eliminated Berry Creek. (Pause)
6 I used Chena River at Fairbanks--

7 COURT REPORTER: Just a minute. I can't hear
8 you with the paper on the microphone.

9 A I used the Chena River at Fairbanks, the Chena River at--
10 near Two Rivers, the Salcha River near Salcha Camp,
11 Hess Creek, Wiseman Creek, and the Middle Fork Koyukuk
12 River.

13 Q So you did not use Jim River?

14 A I did not use Jim River.

15 Q Given the absence of gauging stations on the Kandik
16 and Nation River do you feel that the model unit run-
17 off chart that you have prepared, which is Exhibit B-
18 Forty-two, is as accurate as you could do, based--using
19 your experience with predicting flows in Alaska streams?

20 A It's as good as I feel that I can do.

21 Q Is it as good as can be done, given the available data?

22 A In my opinion, yes.

23 MR. ALLEN: I'd like to offer Exhibit B-Forty-
24 two into evidence.

25 MS. TAYLOR: I have no objection.

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1 MS. HIGGINS: No objection.

2 JUDGE LUOMA: Exhibit B-Forty-two is received
3 in evidence.

4 Q Now, have you caused to be marked on Exhibit B-Forty-two
5 the actual water levels that were measured by you or
6 your people on the Kandik and the Nation Rivers?

7 A Yes.

8 Q And how did those mar--measurements show on the chart?

9 A They're represented by dashed lines with the name of the
10 site and ta--date, or the month, at least, a date for
11 the measurements.

12 Q Using your analysis as shown on Exhibit B-Forty-two,
13 what conclusions can you draw as to the water levels
14 that were encountered both in June and August on these
15 two rivers?

16 A First, I--I noted that the--that the measurements in
17 June at--at both Nation and Kandik, at these sites,
18 were considerably above the--the normal ranges for all
19 of these months. And that the me--the measurements made
20 in August at these two sites were at or below the normals--
21 the low normal ranges for most months.

22 Q Referring your attention to Exhibit--Exhibits B-Thirty-
23 eight and Thirty-nine, which are the daily discharges
24 for Hess Creek and the Chena River, is it unusual to find
25 a reading that is significantly higher than the normal

R & R COURT REPORTERS

1 range?

2 A It is unusual.

3 Q But are there such readings on Exhibits Thirty-eight
4 and Thirty-nine that are . . .

5 A Oh, yes.

6 Q --way up?

7 A Way up, yes.

8 Q So do you feel that the fact that the June levels that
9 you encountered are so high above the normal range
10 would discredit the accuracy of your graph?

11 A No, not for the purpose.

12 Q (Pause) How would you derive from your chart, which
13 is Exhibit B-Forty-two, for example, the normal discharge
14 for the--either of those rivers in the month of June
15 using, for example, the median? Defining normal as the--
16 as the median level.

17 A It would be--you could take the--the ordinate value
18 for that par-graph (ph) for that month, which is a
19 unit run-off figure, multiply it by drainage area as
20 site and have an estimate of a discharge.

21 Q Can you go through that computation with actual figures?

22 A Yes.

23 Q Would you do that? (Pause)

24 JUDGE LUOMA: Will this take a little while?

25 MR. ALLEN: I don't believe so.

1 A It shouldn't take long.

2 JUDGE LUOMA: Well, why don't we take a
3 ten minute recess and you can do it in the ten minutes.

4 (OFF THE RECORD)

5 (ON THE RECORD)

6 MR. ALLEN: Your Honor, during the recess
7 we have verified the discrepancy in Appellant's Exhibit B-
8 Forty. And the indication under the Kandik River below
9 Indian Grave should be directed to read, "in selection areas".
10 And I have, in fact, corrected it on the Exhibit.

11 JUDGE LUOMA: Alright. That correction is
12 noted.

13 MR. ALLEN: The location marked on Exhibit B-
14 Seventeen is correct.

15 Q (By Mr. Allen) Mr. Childers, I call your attention to
16 Exhibit B-Forty-two and ask if there is an error in
17 the key up in the upper left hand corner?

18 A Yes. We have the quartiles reversed. As you note the
19 seventy-five--it should be the upper one, as shown on
20 the lower one. We'd like to reverse that.

21 Q In other words, twenty-five and seventy-five should
22 simply be reversed?

23 A Yes.

24 JUDGE LUOMA: Have you made that correction?

25 MR. ALLEN: I have made that correction, Your

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1 Honor., yes.

2 JUDGE LUOMA: Alright.

3 Q (By Mr. Allen) Recalling the question I asked you before
4 the break, could you show how the computation could be
5 made from Appellant--from Government's Exhibit B-Forty-
6 two to determine what the discharge of the Kandik would
7 be in the month of June at the median or normal level
8 of discharge?

9 A Using Exhibit B-Forty-two for June, going to the--the
10 fifty percentile mark and estimating along the ordinate
11 scale, a unit run-off of approximately one point five,
12 that value multiplied by drainage area for a given site,
13 say the Kandik River near the mouth or the Nation River
14 near the mouth, would be one point five times eight hundred
15 ninety-eight square miles, to give you the--the median
16 normal monthly discharge for June. It'd be approximately
17 thirteen hundred and fifty cubic feet per second. (Pause)

18 JUDGE LUOMA: Is that the only one you're going
19 to calculate?

20 MR. ALLEN: Yes, it is.

21 JUDGE LUOMA: Just as an example?

22 MR. ALLEN: Just as an example, correct. (Pause)
23 Unless you would like us to calculate--

24 JUDGE LUOMA: Well, I don't know. It's--what-
25 ever you think.

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1 MR. ALLEN: Well, I--I wanted to give the
2 example. The rest of them can be calculated using the same
3 rather simple formula.

4 JUDGE LUOMA: Yeah, I understand the formula
5 now, but it's a matter of interpreting the scale.

6 MR. ALLEN: I--the principal purpose of this
7 Exhibit is to show that the actual readings we took in August
8 were to show how they relate to the normal range.

9 JUDGE LUOMA: I understand. Okay. I would
10 like to have one further explanation at this point. One
11 more explanation of your key.

12 A Yes. You want me to explain the--the key?

13 JUDGE LUOMA: Just--just give me a short
14 explanation of the key again.

15 A That's--

16 JUDGE LUOMA: So I'm sure that I understand
17 it.

18 A That's this block up in the--

19 JUDGE LUOMA: Yes.

20 A --left hand corner--upper left corner. The--as a key
21 to the understanding of this graph--this hydro-graph,
22 the yellow block is the above median, but within normal
23 range of discharge. The blue block would be the--below
24 median, but within normal range of discharge. The
25 figure seventy-five percent would be the upper limit

1 of what I consider normal for that discharge. And the
2 twenty-five percent would be the lower limit of what I
3 would consider to be the normal discharge. The fifty
4 percent would be the median value.

5 JUDGE LUOMA: And that's the line that always
6 appears between the two colors?

7 A Exactly, yes.

8 Q (By Mr. Allen) To further illustrate, if you had a
9 hundred monthly annual readings of historical gauging,
10 how many of them would fall within the yellow area on
11 that chart?

12 A Twenty-five percent.

13 Q And how many--

14 A Out of a hundred--

15 Q --would fall under the blue?

16 A --twenty-five.

17 Q And how many would not be shown on--within the yellow
18 or blue?

19 A Fifty percent.

20 Q Twenty-five would be--

21 A Twenty-five above.

22 Q --above and twenty-five below?

23 A Twenty-five below.

24 Q Can you derive from Exhibit Forty-two any information
25 as to river stage at normal flows during a given month?

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1 A Yes.

2 Q How could you do that?

3 A By examining cross--the relationship between stage and
4 discharge at a site. We can immediately convert--we
5 can see what that normal discharge would mean in terms
6 of stage at that--at a site.

7 Q Does Government Exhibit B-Forty, the table of measure-
8 ments that you prepared show the relationship between
9 discharge and stage at six specific sites?

10 A Yes.

11 Q Taking, for example, the reading for the--for the Nation
12 River at Jungle Creek in August, what is the discharge
13 and what is the stage?

14 A In August the--the discharge was one hundred seventy-
15 one cubic feet per second. The stage--the maximum
16 depth, now, was one point eight feet. I use maximum
17 depth as a measure of stage so that I can compare.
18 I did not establish any datums in the field. But this
19 allows us to use the lowest point in the cross-section
20 as a datum.

21 Q Now, if the Nation River were flowing at what is shown
22 on Government Exhibit B-Forty-two as the median level
23 for August, can you compute how much higher the maximum
24 depth would be at the precise location which you measured
25 near Jungle Creek?

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1 A I could--I could do it by knowledge of 'the relation
2 between stage and discharge for a channel such as this--
3 for a cross-section such as this.

4 Q Is it possible for you, at this point, to make an
5 estimate of how much additional--how much the river
6 would have to rise at Jungle Creek to accommodate the
7 additional discharge which Exhibit B-Forty-two shows
8 would occur--would occur at the median, as shown on
9 that graph?

10 A Yes.

11 Q What is your estimate?

12 A Well, let me give it this way. If we note that for
13 hundred one seventy-one cubic feet per second we have
14 a maximum depth of one point eight feet, that's the
15 stage above the lowest point in the cross-section. And
16 if we note that for twelve hundred cubic feet per second
17 we have a maximum depth of three point zero feet, that
18 would be the stage above that same--wha--the lowest
19 point in that cross-section. The difference being
20 approximately one point two--one point two feet for that
21 change in discharge. As we go over to the unit hydro-
22 graph and convert those figures--those unit--unit run-
23 off values to actual discharge for that site, we then
24 can see where that twelve hundred would be.

25 Q Perhaps the--let me ask you this. What would the dis-

1 charge be at Jungle Creek on the Nation in August, if
2 it were flowing according to the median level on this
3 graph, B-Forty-two?

4 A I would have to go through that again, Jack, I . . .

5 Q What is the value for the median level in August on
6 your model unit run-off hydro-graph, B-Forty-two?

7 A Approximately one.

8 Q Now, what is the drainage area of the Nation River at
9 Jungle Creek, as shown on Exhibit B-Forty--

10 A Two hundred and fifty-three. So, two hundred and fifty-
11 three cubic feet per second would be--be the discharge
12 for that value median.

13 Q In other words, your analysis shows that the normal
14 discharge at Jungle Creek in August would be about
15 two hundred and fifty-three cubic feet per second?

16 A The median.

17 Q The median?

18 A Yes.

19 JUDGE LUOMA: Is that just coincidence that
20 it's the same as the drainage area?

21 A No, the--the unit run-off is about one.

22 JUDGE LUOMA: Oh, so it's one to wha--okay.

23 A One times the drainage area.

24 JUDGE LUOMA: I understand.

25 A It's very close to that, as I look at the--

1 JUDGE LUOMA: Yes, I see now.

2 Q How much higher, in fact, is that in cubic feet per
3 second than the levels which were measured on the
4 ground in August of 1978?

5 A It appears to be . . . it appears to be the same.

6 Q What does the chart, Government Exhibit B-Forty, show
7 as the cubic feet per second measured in August at the
8 site below Jungle Creek?

9 A Two hundred and fifty-three--no, one hundred and seventy-
10 one, pardon me. One hundred and seventy-one.

11 Q Is that above or below what your graph, B-Forty-two,
12 shows would be the expected median level?

13 A It's below.

14 Q How much below?

15 A Well, two hundred and fifty-three minus a hundred and
16 seventy-one, so it's--

17 Q Roughly eighty--

18 JUDGE LUOMA: Eighty-two.

19 Q --two--

20 A Eight-two, yes.

21 Q --cubic feet. How much higher do you estimate the
22 river would have to have risen at Jungle Creek to
23 accommodate that additional eighty-two cubic feet per
24 second of flow?

25 A Certainly much less than a foot. Possibly three to four

1 inches. I say that looking at the total change in stage
2 to accommodate the difference in discharge as shown
3 between a hundred and seventy-one and twelve hundred.
4 In other words, for that entire change in discharge we
5 only change one point two feet, therefore going up to
6 two hundred and fifty-three cubic feet per second.
7 It would be very small.

8 Q Almost a negligible rise, would you say?

9 A Well, I'd say about two to three tenths at the most.

10 Q Was the measurements taken that are reflected on
11 Exhibit B-Forty, were they taken across gravel bars or
12 at some other place on the river?

13 A No, they were--they were taken in--in the vicinity of
14 locations that we needed the information. But they were
15 taken in reaches of the channel or reaches of the stream
16 which exhibited good hydraulic properties for measuring
17 discharge. That is, they were taken in reaches of the
18 channel that have a fairly uniform cross-sectional shape
19 over a reasonable distance of the channel, length of the
20 channel. And . . . so they were--were not at gravel,
21 as--as they were shown yesterday in the--in the slides
22 by Jules where he made his rod measurements.

23 Q Is it customary to make discharge measurements in the
24 deeper, slower channels or across the faster riffles?

25 A As I say, we--we--our criteria for measurement is such

1 that we get very uni--fairly uniform cross-sectional
2 shape and a very even distribution of velocity and
3 depth across the section. We--of course we have to
4 compromise conditions and select the best that we can.
5 But--so . . .

6 Q Would you describe the section that you select as a
7 deeper, slower channel or a riffle?

8 A It tends to be, under the conditions we measured, a
9 deeper, slower channel.

10 Q If the river rose, I believe you said several--two to
11 three inches to accommodate the additional eight-two
12 cubic feet, or no more than--what was your testimony?

13 A About two to three tenths of a foot, maximum, I would
14 guess. I would--I would estimate.

15 Q To accommodate the additional eight-two cubic feet of
16 flow that would be expected in August. Would it rise
17 the same amount over a riffle or gravel bar?

18 A Very unlikely. The reason being that--it depends, of
19 course, on the geometry on the site. The actual cross-
20 sectional shape and the--the water--the energy radiant
21 pass the section. But basically those gra--those--those
22 bars that were measured were, as we noted, much longer
23 normal to the direction of flow than the cross-sections
24 that we measured. Or--for using discharge--for measuring
25 discharge. Therefore, a--a vivid increase in depth would

1 it--would be accommodated by a much greater increase
2 in width than would be likely at our measuring sections.

3 Q Can you translate that into layman explanation of how
4 high you would expect the river to rise over a gravel
5 bar if it rose three to four inches in a broad, slower,
6 deeper reach?

7 A If we were to have a--a bar where the width would increase
8 twice as much for a given discharge increase as where
9 we measured, then the depth, of course, would increase
10 significantly less, with the stage with possibly half.
11 Although at that--there--there--the exact hydraulic
12 relationship wouldn't be that precisely, but that would
13 be a good approximation.

14 Q Does the velocity of the river over the gravel bars tend
15 to be faster or slower than the velocity in a deeper,
16 broad--broader channel?

17 A For the--for the range of discharge we are looking at in
18 this case, the velocity--the mean velocity would likely
19 be higher. In the--in the--over the gravel bar. Or
20 at least in the--in the deeper part of that cross-section.
21 The mean velocity would probably be higher as well.

22 Q What did you estimate to be the speed of this current?
23 In general.

24 A I--I think that--you mean for that particular measurement?

25 Q No, for the river as a whole. Was it a swift river or

1 a slow river?

2 A It was swift.

3 Q Running at an average of how many miles per hour would
4 you say?

5 A Well, the--at our measurements we were getting velocities--
6 mean velocities of--of three to seven--three to five
7 feet per second. So that's two to four miles per hour.

8 JUDGE LUOMA: Is that both rivers?

9 A Pardon?

10 JUDGE LUOMA: Is this testimony as to both of
11 the rivers?

12 A That's for this site.

13 Q Which site is that?

14 A The Nation River, at this--at this low discharge we were
15 measuring. Is that what you asked? I--I'm not sure
16 I understood that.

17 Q Well, yesterday Mr. Tileston estimated that--as I recall,
18 that the river was flowing, he would imagine, at about
19 six miles per hour. Would you agree with that testimony?

20 A During June?

21 Q During June.

22 A During our float on the Nation? I would think that would
23 be reasonable.

24 Q Do you have any--

25 A That is--no. The--the velo--the surface velocities would

R & R COURT REPORTERS

1 be that. The velocity at which we drifted would probably
2 be close to that, but not the mean section, however, it
3 would be less than that.

4 Q Do you have experience wading across swift rivers?

5 A Yes.

6 Q Is there a rough formula that you apply to determine
7 whether a given stretch of river is wadable?

8 A We have a rule of thumb of the depth times velocity at--
9 at a tenth. That is, depth in feet times the velocity
10 in feet per second would probably--if it's about ten,
11 that's--that's about the limit that we feel it's safe
12 to wade with good footing and with a--an experienced
13 wader. So, in other words, if you had a depth of--of
14 three feet and you had a mean velocity of three and
15 a little--three feet per second, that's getting close
16 to your maximum wadable.

17 Q Is it possible that a river where there is only one
18 foot of water flowing can, nevertheless, be unwadable
19 at that point?

20 A Oh, yes. There are many conditions that affect his
21 rule of thumb as far as being applied to wading safely.
22 If you have a bottom stream bed that is either very
23 loose material, sand or smaller gravel, or even medium
24 gravel, and very unstable, very loose, just putting your
25 foot on it will allow it to scour out from under your feet.

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1 And this can certainly be difficult to wade. In fact,
2 it can easily dis--I think that was the case testi--
3 in which one of the fellows testified yesterday. He
4 mentioned trying to wade some of the gravel bars at
5 low stage and being unable to wade that in the chute--
6 in the--I suspect that the--the gravel was probably a
7 uniform gravel and by putting his weight on it, it
8 scoured out from under his feet. It makes it--

9 Q So--

10 A --very unstable.

11 Q --from your knowledge of the--these two rivers and your
12 experience with wading streams in general would you
13 say it was not inconsistent to find a bar that could
14 not be waded across, but at the same time a fairly
15 large or medium size motor boat could also not be able
16 to pass across?

17 A I'm not sure I understood that, Jack.

18 Q Well, you referred to the testimony yesterday where
19 at low stages--I believe it was Mr. Bailey testified
20 that they were unable to bring a jet boat up the river
21 past a certain point and at the same time he could
22 not wade across the river at either that point or
23 some point further upstream. Are those two facts
24 inconsistent in your mind?

25 A They--not really, no. Ge--depending upon his experience

R & R COURT REPORTERS

1 of wading and where he actually attempted to wade. He
2 may very well in that area or along that stream en-
3 countered a very unstable gravel bar that at--with high
4 velocity and when he put his foot out into the high
5 velocity, it--it scoured out from under his feet.

6 That's what I expect happened.

7 Q Did you hear--where you here for the testimony of Mr.
8 Tileston describing the extent of gravel bars and riffles
9 that he encountered on the river--on both of the rivers
10 in August?

11 A Yes.

12 Q Based on your calculations and your preparation of this
13 model unit run-off hydrograph would you conclude that
14 the levels--the river levels that he encountered in
15 August could be expected on these rivers for a--an
16 appreciable length of time during the summer?

17 A Yes.

18 Q (Pause) Would you also expect that there might be
19 periods of time in which the river would rise for short
20 periods of time?

21 A Yes.

22 Q And would there also be periods of time in which the
23 river would be running at an extremely high level?

24 A Infrequently.

25 Q Would it be possible, from your knowledge of rivers of

R & R COURT REPORTERS

1 this sort, to predict when those high levels would occur
2 during the summer?

3 A Predict--in that area, no. Not now.

4 Q In other words, plan a trip for a particular high water
5 time?

6 A Only if you were waiting there at the time and you could
7 look ahead, because of the rain in the area, and the
8 river rising rapidly. Very short prediction time.

9 Q (Pause) Have you had an occasion to compute the gradient
10 of these two rivers?

11 A You mean the--the river profile?

12 Q The drop verti--the drop in miles per--in feet per mile.

13 A The gradient. Yes.

14 Q How do you do that, normally?

15 A You measure the stream length and then the intersection of
16 the contour--selected contours and then the--the gradient
17 is--is determined by dividing the difference in elevation
18 between selected contours by the horizontal distances
19 measured along the river between those contours.

20 Q What is the average drop in feet per mile of the Kandik
21 River, between the selection area and the mouth?

22 A I think it was ten feet per mile.

23 Q What is the average drop on the Nation River, between
24 the selection area and the mouth, as you computed it?

25 A Approximately fifteen feet per mile.

R & R COURT REPORTERS

1 JUDGE LUOMA: How do you state that as a
2 precentage gradient?

3 A If you want to use precentage, then you convert both to
4 the same unit. In other words, if you were to take the
5 miles times five thousand two hundred eighty, divide
6 the--the--the . . . the slope, and then if you multiply
7 it by a hundred, you'd get the precent.

8 JUDGE LUOMA: Can--can you do that now, at
9 this point in your testimony?

10 A You can do it. I haven't, but I can, yes. (Pause)
11 Let's see, you have ten per mile. (Pause) I would
12 be--let's see . . . approximately twenty percent.

13 JUDGE LUOMA: For which?

14 A For the Kandik. It looks like. Maybe you can check
15 my figures, Jack.

16 Q I--I'm not sure what you're computing.

17 A He's trying to get the percentage for the gradient. The
18 gradient in percent. So if you multiply the--the miles
19 times five thousand two hundred eighty to get it in
20 feet per foot, and then multiply it by one hundred to
21 get it in percent, you'd have the gradient in percent.

22 JUDGE LUOMA: Well, I think you'd better
23 look at the--twenty percent sounds pretty steep to me.

24 A It sounds really steep. But--

25 Q Is--is gradient normally computed in precentage or in

1 feet per mile?

2 A Well, I--I put in it feet per mile. But--

3 Q What is normal in the--in your profession?

4 A Feet per mile. Although if you're going to use it--
5 it depends on your purpose. If you're going to try to
6 use the--the water--the gradient of the stream in some
7 hydraulic formula, well, you--you would normally put it
8 in--in terms of--it's dimensionless in feet per foot.
9 I think you're right. That does sound high. Let's
10 see, ten--

11 JUDGE LUOMA: Well, don't take the time now.

12 I--I would like to have--get this testimony--while we're on
13 this subject matter, I would like to have in layman's language
14 as you say, the precent gradient, cause I understand that.
15 And I think any--everyone readily understands that. And
16 secondly, I would like to have the elevation of the headwater,
17 the elevation at the--at the selections point, and the elevation
18 at the mouth, where it enters the Yu--where they enter the
19 Yukon. For both rivers. Now, maybe you intend to do that,
20 I don't know.

21 A We can do it.

22 Q We can do part of it. Mr. Childers, what was the
23 elevation of the Kandik River in the selection area
24 as you read it upon a contour map this morning?

25 A Let's see, twelve hundred feet.

1 Q And what was the elevation of the Kandik River at--where
2 it entered the Yukon?

3 A Seven hundred feet.

4 Q And what was the total drop?

5 A Five hundred feet.

6 Q And what did you compute to be the distance from the
7 selection area to the Yukon?

8 A Fifty-one miles.

9 Q Would you state the same--the--the similar figures for
10 the Nation River?

11 A Twelve hundred fifty feet elevation at the selection
12 area boundary, we used. And seven hundred and fifty
13 feet elevation at the mouth of the stream at the Yukon.
14 A difference of five hundred feet in thirty-seven miles
15 or fifteen feet per mile.

16 JUDGE LUOMA: Excuse me. At which point of
17 the selection area are you measuring from? The upper point?

18 A Was it the upper, I don't remember?

19 Q No, I believe we took the lower end of the selection
20 area.

21 JUDGE LUOMA: Well, this--this mileage, is
22 that shown in some place in some exhibit?

23 MR. ALLEN: Mr. Tileston, I believe, in going
24 through the slides gave the mileage for each slide, from both
25 the mouth and the selection area. And it was from his notes

1 that we computed the mileage that Mr. Childers has just
2 testified to.

3 JUDGE LUOMA: You don't remember whether it's
4 the lower or the upper portion of the selection area--

5 MR. ALLEN: No, I do. It was the lower portion.

6 JUDGE LUOMA: It was the lower?

7 MR. ALLEN: It was the lower portion.

8 JUDGE LUOMA: Alright. Thank you.

9 Q (By Mr. Allen) Referring you to Exhibit B-Two, which
10 is a E-series map of the entire State of Alaska, can
11 you tell what the general elevations are in the western
12 end of the Ogilvie Mountains, where I believe the
13 testimony indicated these two rivers rise?

14 A (Pause) We see peaks in Canada that are shown as
15 one--five thousand five hundred eighty-eight feet,
16 five thousand five hundred feet. That's about--that's
17 the only ones that are shown on this map. Those are
18 peaks.

19 MR. ALLEN: Was there one other point that
20 you wanted to have covered? I can't remember.

21 JUDGE LUOMA: Well, do--does this answer
22 the question on the headwater elevation, is that the test--

23 MR. ALLEN: I think so. That's the mountain
24 peaks, of course.

25 JUDGE LUOMA: Well, is that what's termed the

1 headwater of the river?

2 Q (By Mr. Allen) Do you know, Mr. Childers?

3 A I--I'm not sure. Is this a criteria--pardon me, may--
4 can I get off the record and ask him a question?

5 JUDGE LUOMA: Let's go off the record.

6 (OFF THE RECORD)

7 (ON THE RECORD)

8 Q Mr. Childers, can you tell us the elevation of the
9 Kandik River at the Canadian border?

10 A Yes. Seventeen hundred feet.

11 Q And how many miles is that from the mouth on the Yukon?

12 A Ninety-five.

13 Q And what is the elevation of the Nation River at the
14 border?

15 A Fifteen hundred fifty feet.

16 Q And what is the distance to the mouth?

17 A Forty-seven miles.

18 Q Are there rivers--is it possible in this portion of
19 Alaska that after a period of a--an--an extremely long
20 period of no appreciable rainfall, the flow in the
21 river would drop almost to zero? Is that conceivable?

22 A I--I didn't quite understand that, Jack.

23 Q For rivers in this part of Alaska, of the type that
24 we're talking about, the Nation and the Kandik, is it
25 possible that after an extremely long period of no

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1 appreciable rainfall, the flow in the river would drop
2 almost to zero?

3 A Yes.

4 Q And would there be places in such a river, even when the
5 flow was virtually zero, where there would be pools in
6 which you could float a boat for some distance?

7 A Oh, yes.

8 MR. ALLEN: That's all I have.

9 JUDGE LUOMA: Miss Taylor?

10 MS. TAYLOR: Thank you.

11 BY MS. TAYLOR:

12 Q Mr. Childers, as--as I understood your testimony you
13 were using Exhibit B-Thirty-eight, which is the--a graph
14 of the discharge in cubic feet per second of the Chena
15 River at Fairbanks, on a particular water year, to
16 illustrate what you've described as a flashy river--

17 A Yes.

18 Q --is that correct?

19 A Yes.

20 Q And it's my understanding that it was your testimony
21 that--that this river, for example, would be--would be
22 similar, in your opinion, to the Kandik or the Nation
23 River in terms of--of flashiness, if we can use that
24 term?

25 A Similar, yes.

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1 Q Okay. Now, if one were to take a--a graph such as B-
2 Thirty-eight, showing discharge in a particular water
3 year, over a period of many years--

4 A Yes.

5 Q --could an--couldn't an expert, such as yourself, then
6 arrive at a hydro-graph of the river, what you call the
7 hydro-graph?

8 A Oh, yes. I mean--

9 Q Okay. Is--is that what a hydro-graph is? Is it--what--
10 what is it, in layman's language?

11 A It's--this--these--this Exhibit Thirty-eight illustrates
12 a hydro-graph, one kind of hydro-graph. But a hydro-
13 graph, as I have defined it, is a graph showing the
14 variation in a--in discharge with time at a site on
15 a stream.

16 Q Okay. Is there any commonly accepted standard to define
17 what period of time one normally uses in developing a
18 hydro-graph?

19 A No, it depends on your purpose.

20 Q Okay. Taking the--the hydro-graphs that you have
21 in B-Forty-one for these eight rivers.

22 A Yes.

23 Q Now, how many years, for example, if you know, were used
24 to--to develop these hydro-graphs?

25 A A minimum of ten.

1 Q Okay. Would that be sort of a standard--

2 A Yes.

3 Q --do you think? Alright. Now, in comparing your
4 Exhibit B-Forty-two, this is what you've entitled a
5 model unit run-off hydro-graph for the Nation and the
6 Kandik Rivers.

7 A Yes.

8 Q Am I to understand that--that B-Forty-two is--is your
9 best educated estimate of what a--a ten year hydro-graph
10 on these rivers would look like, if you had the data to
11 do one?

12 A I'm not sure what you mean. Actually this graph--this
13 model graph would be my best estimate of what the long
14 term normal discharges would be for those months for a
15 se--a stream in that environment, in that hydrologic
16 setting.

17 Q Okay.

18 A It didn't matter whether--any year this would be the
19 best estimate I could make a this time for normality.

20 Q Alright. This is your best estimate then, B--B-Forty-
21 two?

22 A Yes.

23 Q Of--of what the long term hydro-graphs would look like?

24 A Yes.

25 Q Okay. And it's extrapolated from . . . two sets of

R & R COURT REPORTERS

1 measurements of the rivers?

2 A No. No. This--this model hydro-graph was made indepen-
3 dently of measurements of discharge. It's based strictly
4 on hydrologic similarity--

5 Q Alright.

6 A --of basins in that hydrological--

7 Q Okay.

8 A --region.

9 Q Alright. You--you didn't take your actual measurements--
10 your flow measurements of the river and--and do a graph
11 and use that to--to come up--

12 A Oh, no. No, those weren't us--

13 Q --with B-Forty-two?

14 A --those discharge measurements were plotted on here
15 only to show how they relate to--

16 Q Okay.

17 A --the normality for that--for those . . .

18 Q Okay. In looking at B-Forty-two, your--your--can I call
19 it a projected hydro-graph or--

20 A Model, I like.

21 Q Alright. I'll call a model hydro-graph then. Looking
22 at your model hydro-graph for the Kandik and the Nation
23 Rivers and comparing it to B-Forty-one, the--the eight--

24 A Yes.

25 Q --let's call them actual hydro-graphs that we have. Is

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1 there any reason for the--the striking similarity between
2 the--the model hydro-graph for the Nation and the Kandik
3 Rivers and the hydro-graph for the Chena River?

4 A Any reason for the striking--

5 Q Um-hm, is there any explanation?

6 A --similarity?

7 Q Do you have an explanation for the similarity?

8 A Coincidence is all I can say. They were all average--
9 all of these were averaged to come up with this model.
10 So, it's--it's--it--it isn't import--it's an interesting
11 point that our index station at Chena River is--it
12 apparently isn't given for that--that hydrologic region.

13 Q Where specifically is your index station on the Chena
14 River located?

15 A Well, we have the Chena River at Fairbanks.

16 Q Right. For this--for this particular hydro-graph on
17 Exhibit B-Forty-one the station's located at Fairbanks?

18 A One is. And then there's another up at Chena River near
19 Two Rivers that are shown here, I think. Yeah. We have
20 two--

21 Q Okay.

22 A --on the Chena River.

23 Q If--if you, as an expert, look at a--a hydrograph of a
24 river, can you draw any conclusions--im--immediate
25 conclusions as to the character of the river, just from

R & R COURT REPORTERS

1 looking at this graph?

2 A Yes.

3 Q What types of conclusions would you--would be most
4 easily drawn?

5 A The most important conclusion that I get from--from this
6 type of graph is an idea about the normality for these
7 months. The--what the flow conditions would be normally
8 during these months.

9 Q Okay. So if the hydro-graphs of two rivers are similar,
10 there are certain similarities in their flow character-
11 istics?

12 A Oh, yes.

13 Q Okay. Are--are--is there--how--how high is the degree
14 of correspondence is my question?

15 A Well, of course when you say the--the hydrographs, if
16 they're similar, then the flow characteristics are
17 similar, certainly they are. Because we're--the hydro-
18 graphs are the flo--a depiction of the flow characteristics.

19 Q But there--but there are other--there are other factors
20 to be taken into consideration, if you're describing
21 a river in--

22 A Oh, very definitely.

23 Q Okay. But--but there are obvi--there are obvious
24 similarities in the rivers if the hydro-graphs are--are
25 similar?

1 A Yes.

2 Q Okay. Going to your particular measurements of the
3 Kandik and the Nation Rivers--and we have an Exhibit
4 B-Forty, the 1978 discharge measurements chart--

5 A Yes.

6 Q --here's a copy of it. (Pause) Okay. Now, do you have--
7 le--let's take the Nation River, the measurement below
8 Jungle Creek, measurements in June and in August.

9 A Yes.

10 Q Now, as--as I understand what you did, you have a set
11 of measurements at periodic points across the river,
12 measuring the depth and the flow of the river, is that--
13 is that correct?

14 A That's correct.

15 Q Okay. Do you have written notes of those measurements
16 with you?

17 A Yes.

18 Q Okay. Could I see those, please?

19 A (Pause) These are copies. The originals are in our
20 sub-district office here down the hall--

21 Q Okay. Are these--are these all your notes for--for
22 all the measurements on both rivers?

23 A I think they are. They're all the discharge measure-
24 ments, yes.

25 Q Let's see, can we--why don't we--why don't we--why don't

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1 we see if you can locate your notes for the measurement
2 of the Nation River, for example, below Jungle Creek.

3 A For which month?

4 Q For both June and August.

5 A Okay. August 3rd, let's see, this is it, one hundred
6 seventy-one cubic feet per second. And here are the
7 actual data obtained across the section. The distance
8 from initial point, which would be the location of one
9 of the tag lines for the width increments, zero was the
10 left edge of water. Five feet from the left bank, that's
11 looking downstream, would be a depth of one point oh four
12 feet. Now, in this particular--no, it'd be point six
13 nine feet. And ten feet from the left edge of water
14 was one point oh four feet, one twelve, one fifty-two,
15 et cetera, down through. So . . . Now, the maximum
16 depth in the cross-section was one point seventy-five,
17 which I've rounded on this thing to one point eight
18 for maximum depth.

19 Q Okay. Now . . .

20 A Did you want Ju--June as well?

21 Q Well, let me--let me come back to June. I have another
22 question. Do your--do your field notes or these
23 water measurement notes that you've been referring to
24 indicate the location of your measurement of the Kandik
25 River that we've--that you've testified to was in the

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1 selection area?

2 A Do--do the field notes indicate the location?

3 Q Yes. Do you--do you have the field notes for all of the--
4 for all of the measurements on the Kandik also in that
5 group of notes?

6 A I believe so, yes.

7 Q Alright. I think probably what we should do is have
8 these marked as Exhibits.

9 JUDGE LUOMA: Let's go off the record.

10 (OFF THE RECORD)

11 (ON THE RECORD)

12 Q Okay. We have what's been marked as Exhibit B-Forty-
13 three. And I'd ask you to identify what that is?

14 A This is a--a set of dis--field notes for the discharge
15 measurements made on the Nation and Kandik Rivers
16 during June and August, 1978, by the U.S. Geological
17 Survey.

18 Q Okay. And let me hand you Exhibit B-Forty-four and
19 ask you to identify that, please.

20 A B-Forty-four is a copy of the listing--summary listing
21 of discharge measurements made at these sites, during--
22 (inaudible--witness trails off). And this will be a--
23 the form that will be published in our annual basin
24 data report for 197--for the 1978 water year.

25 Q Okay.

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1 MS. TAYLOR: And these two exhibits are
2 offered into evidence, Your Honor, by stipulation.

3 JUDGE LUOMA: Alright. Exhibits B-Forty-three
4 and B-Forty-four are received in evidence.

5 Q (By Ms. Taylor) (Pause) Alright. Looking at--at
6 Exhibit B-Forty-three, your--your field measurement
7 notes, can you identify the field measurement notes
8 for the measurement on the Kandik in August that is
9 within the selection area?

10 A Yes.

11 Q Alright. And . . . (Pause) What's the location that
12 you've stated on this--on this--

13 A Kandik River, eight point seven miles below Indian
14 Grave Creek.

15 Q Okay.

16 A Latitude and longitude would you like?

17 Q No, I don't think that's necessary.

18 A Okay.

19 Q Alright. It was eight point seven miles below Indian
20 Grave Creek. I wonder if we could take Exhibit B-Three
21 and have you indicate where that measurement was made?

22 JUDGE LUOMA: Off the record.

23 (OFF THE RECORD)

24 (ON THE RECORD)

25 Q Okay. For the record, Mr. Childers, you've taken Exhibit

1 B-Three and identified in pencil the location of your
2 August 1978 measurements on the Kandik River and your
3 June and August 1978 measurements on the Nation River
4 below Jungle Creek, is that correct?

5 A That is correct. Except in--on the Kandik River in
6 August we've got other measurements.

7 Q Okay. Let's--this is the location of the--of the August
8 measurement on the Kandik River that you've used on your
9 chart, B-Forty?

10 A I've got two. I've got another at the mouth.

11 Q Within the selection area?

12 A Yes, yes. Within the selection area.

13 Q Alright. Now, do you still have your copy of the
14 discharge measurement notes for the measurement on the
15 Kandik River, the August measurement?

16 A Yes.

17 Q Alright. Now, as I understand it then you made one--
18 you made discharge measurements at one location on the
19 Kandik River that was within the selection area?

20 A Yes.

21 Q Okay. And as far as the Nation River's concerned, you
22 didn't make any discharge measurements within the
23 selection area itself?

24 A I'd have to check that, I'm not sure yet. (Pause) Is
25 that true, Jack?

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1 JUDGE LUOMA: Just a minute.

2 A Yes.

3 JUDGE LUOMA: Do you know the answer?

4 A No, I'd have to check it to make sure.

5 JUDGE LUOMA: Alright. Off the record.

6 (OFF THE RECORD)

7 (ON THE RECORD)

8 Q Alright. And you--you didn't make any discharge measure-
9 ments on the Nation River within the actual selection
10 area, is that correct?

11 A No discharge measurements.

12 Q Okay. Thank you. Looking at your discharge measurement
13 notes on your measurements on the Kandik River within
14 the selection area--do you have those in front of you?

15 A Yes.

16 Q How did you describe the channel of the Kandik on the
17 bottom of page two of those discharge measurement notes?

18 A Shall I read from this?

19 Q Yes.

20 A "Right bank steep, forty-five degrees, approxi"--

21 Q Excuse me. Page two of the notes.

22 A Oh, page two. "Channel fifteen feet wide, two point
23 oh three feet deep" . . . Oh, this--this was a--an
24 estimate of the discharge in a side channel. Is that
25 what you're referring to?

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277-0572

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FAIRBANKS, ALASKA 99707
452-3589

1 Q Yes.

2 A That's--or this discharge measurement was made and an
3 estimate was made of the flow in a very small side
4 channel.

5 Q This was a very small side channel of the Kandik River
6 within the selection area?

7 A Right. Yes.

8 Q And how wide was that channel?

9 A Fifteen feet.

10 Q And how deep was it?

11 A Estimated two point oh three feet.

12 Q Thank you. Now, what did you mean on page one of
13 your discharge measurement notes on the same location
14 on the Kandik when you stated, "poor measurement,
15 position to show shallow water at riffles"?

16 A Just that, it--it--it--the accuracy of the measurement
17 is poor at--which would indicate that discharge--it
18 probably has an error as great as over eight percent.

19 MS. TAYLOR: Thank you. I have no further
20 questions.

21 JUDGE LUOMA: Miss Higgins?

22 BY MS. HIGGINS:

23 Q Referring to Exhibit B-Thirty-eight . . .--(indiscernible--
24 interference with microphone)--

25 COURT REPORTER: Just--just--I can't hear. Okay.

R & R COURT REPORTERS

1 A Yes.

2 Q Mr. Allen asked the question, are the peaks or valleys
3 more representative of normal conditions. I believe you
4 testified that the peaks are infrequent--what--what else
5 did you say about this or--or--or would you say now?

6 A I would say that that's correct, that the peaks are
7 infrequent.

8 Q Okay. Aren't there many days of relative high water
9 as you go up and down on this graph to and from the
10 peaks?

11 A I didn't understand.

12 Q Well . . . you can see from looking at the graph that
13 the pe--the peaks are confined to a relatively few
14 number of days over the--the span that this graph covers.

15 A Yes.

16 Q Which is, one, two, three, four, five months. But doesn't
17 the graph also--also show that there are a significant
18 number of days where the discharge is, for instance,
19 above four thousand?

20 A Yes.

21 Q Would you say then that the valleys on this graph repre-
22 sent normal conditions? I think that's what the inference
23 of Mr. Allen's question was and I'm trying to--to clarify
24 that.

25 A The . . . the rising parts of the hydro-graph represent

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1 a much less amount of the time than the falling parts,
2 the recessions. And the times between peaks, over the
3 entire summer span, are greater than the times that
4 are exhibited as part of the peaks, of the--above the
5 base flow condition. So in time more of it is more
6 common to be in a period not represented by a steep
7 rise or fall of the hydro-graph.

8 Q Could you break that down into a percentage from looking
9 at this?

10 A Very roughly there's a period of one--one period of
11 well over a month in June and July that represents a
12 period of the low in the steep. In other words, a
13 fairly flat consession. In--even in May and all that
14 there's a period that represents a fairly low period
15 from--for that month in--well, the beginning is very
16 low and then maybe ten days in the middle of the month
17 are low. The precentage is probably sixty percent of
18 the whole summer period, or--or more, that is below
19 the--the normal--the median.

20 Q Where is the median indicated on this graph?

21 A We haven't--I haven't indicated it.

22 Q Do you happen to have with you a hydro-graph for a
23 non-flashy stream in Interior Alaska?

24 A I didn't bring one. I can get one, but I don't have
25 it here.

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1 Q Are there more flashy streams than non-flashy streams?

2 A Most of the streams--stream gauging station records
3 that we operate in the Interior on basins of two thou-
4 sand sqaure miles or less are flashy. Most of them.

5 Q Do you happen to know whether the--the Chena River at
6 this flow measurement station at Fairbanks has been
7 determined to being navigable or not?

8 A I don't know.

9 Q What would your opinion be?

10 A I think it would be navigable.

11 Q Why?

12 A Because it's--it has properites that will allow a ri--
13 fairly large river boats to run very--reasonably for
14 some distance upstream in the summer time.

15 Q So--so the--the characteristic of being a flashy stream
16 doesn't necessarily sa--say anything about navigability?

17 A Not--well, it depends on the size of the drainage area
18 and the flashiness, yes. No--the--the answer to your
19 question is no.

20 Q Looking now at Exhibit B-Forty . . . The table of
21 1978 discharge measurements for the Kandik and Nation.
22 Can you supply from your field notes the width of the
23 channel at--at these measurement stations? The width
24 isn't located on this chart.

25 A Right. I can, yes. (Pause) Which one did you want first?

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1 I can go through them. I don't--I can't find . . .

2 Q In--in whatever order is con--most convenient to find
3 the figures.

4 JUDGE LUOMA: Are you looking at B-Forty-four?

5 A B-Forty-three I have here.

6 JUDGE LUOMA: Oh, it's B-Forty-three, excuse
7 me.

8 A That's the list of measurements--

9 JUDGE LUOMA: Are you looking at that partic--
10 specific exhibit?

11 A Yes.

12 JUDGE LUOMA: Alright.

13 A On B--on Exhibit B-Forty-three it's the Kandik River
14 below--in the--within the selection area, the width
15 of the channel measured was one hundred and sixty-seven
16 feet in the main channel, fifteen feet in a side channel.
17 The Nation River--now, that was--that was--I should give
18 the date on that measurement, because it varies with
19 the date. That was August 5th, 1978. The Nation River,
20 below Jungle Creek, August 3rd, 1978, width was eighty-
21 five feet, one channel.

22 Q Would you repeat that one, please?

23 A Nation River below Jungle Creek, August 3rd, 1978, width
24 eighty-five feet. Would you like others or the ones in
25 June?

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P.O. BOX 1208
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452-3589

1 JUDGE LUOMA: Just--just wait for the question,
2 please.

3 Q (Pause) Don't you have width measurements for--for
4 both June and August--flow measurements at--at each
5 of these stations?

6 A In June I only have measurements at--at one site on
7 the Kandik and that was below . . . What creek was it?
8 On the Kandik River I only have measurements in--in June
9 at below Big Sitdown Creek--

10 COURT REPORTER: I'm sorry, I can't hear you
11 at all.

12 JUDGE LUOMA: Let's start over again, after
13 the shuffling is through.

14 A On the Kandik River in June I have only one measurement
15 of discharge and that was just below Big Sitdown Creek.

16 Q And the width of the channel? The width of the channel
17 is the length of your line, is that right? That's
18 the measurement you've given?

19 A It's determined with that line. Now, the Kandik River
20 below Big Sitdown Creek in August--at August 4th, 1978,
21 width was one hundred sixty feet.

22 Q (Pause) Did you give me the measurement for June,
23 Big Sitdown on the Kandik?

24 A (Pause) In June--June 19th, the Kandik River, below
25 Big Sitdown Creek, width was two hundred five feet.

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1 Q (Pause) Do you have width measurements for the--the--
2 near the mouth and Hard Luck Creek flow measurement
3 stations during June and August?

4 A That's on the Nation River?

5 Q Nation River. You--you've given me Jungle Creek during
6 August.

7 A Yes. The Nation River, above Hard Luck Creek, June
8 1978, width two hundred forty feet. (Pause) The Nation
9 River above Hard Luck Creek, August 4th, 1978, width
10 one hundred eight feet. (Pause) The Nation River one
11 mile above the confluence with the Yukon, in other words
12 at mouth, August 3rd, 1978, width one hundred fifty-one
13 feet. I don't have it in June.

14 Q Do you have the Jungle Creek measurement for June?

15 A Yes. (Pause) The Nation River below Jungle Creek, June
16 20th, 1978, width one hundred twenty feet.

17 JUDGE LUOMA: Off the record.

18 (OFF THE RECORD)

19 (ON THE RECORD)

20 MS. TAYLOR: For the record, Exhibit B-Forty-
21 three contains eleven stapled packets of field notes, which
22 total forty-six pages of field notes in total. Is that
23 correct?

24 A Yes.

25 MS. TAYLOR: Alright.

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1 Q (By Ms. Higgins) Have you supplied all of the--the
2 width measurements that you have from your field notes
3 for these locations?

4 A Yes.

5 Q So you were unable to take width measurements in June
6 at the Kandik near the mouth, at the Kandik in the
7 selection area, on the Nation near the mouth?

8 A Yes. Qualify it, I--we possibly could have. It was
9 judged not reasonable to try.

10 Q Okay. Did you attempt to take measurements in June
11 at another station on the Nation River in the vicinity
12 of Hard Luck Creek?

13 A I believe so, yes.

14 Q Can you locate your--your field notes regarding that
15 attempted measurement site?

16 A I don't seem to be able to find it, but I--I can explain
17 that I think I gave you copies or I gave someone copies
18 of sites where we didn't measure discharge, we measured
19 only cross-sections shape in the wide of the (ph) channel.

20 Q Can you identify this note as the note you're referring
21 to?

22 A Yes, yes.

23 Q Does that have a width measurement?

24 A It's not summarized here, but I did plot it and I do have
25 that plotted cross-section in my file here. So I can

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277-0572

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1 determine width very easily.

2 Q Can you do that and also note the location of that un-
3 successful measurement?

4 A (Pause) Width at that site was . . . two hundred and
5 thirty feet in the left channel, in the main channel,
6 and a hundred and twenty feet in the right channel.

7 Q Thank you. Do your field notes indicate the maximum
8 depth?

9 A Yes. (Pause) The depth--the maximum depth in the cross-
10 section in the right channel was one point nine feet.

11 Q (Pause) What about the other channel?

12 A That was at that section. Now, there's another cross-
13 section we obtained further downstream that was two and
14 and a half miles upstream from Hard Luck Creek on Nation
15 River, which we have only cross-section as well, no
16 discharge measurement. Are you referring to that one?

17 JUDGE LUOMA: Before we go further, I'm not
18 sure that I know from your testimony which river we're on or
19 what point we're on.

20 MS. HIGGINS: We're on the Nation, somewhere
21 in the vicinity of Hard Luck Creek.

22 JUDGE LUOMA: Is that correct, Mr. Witness?

23 A Well, I have two cross-sections surveyed on the Nation
24 River at which we did not measure discharge and they
25 are between Jungle Creek and Hard Luck Creek. I gave you

1 first the widths and the maximum depth for the upstream
2 of those two cross-sections. I can now give you the
3 cross-section properties for the downstream section.
4 And you would like location as well as . . .

5 MS. TAYLOR: Your Honor, I have a suggestion.
6 My suggestion is that the witness take Exhibit B-Forty and--
7 and, if counsel agrees, write on B-Forty from his field notes
8 what the width measurements are. These are some of the width
9 measure--measurements that Miss Higgins has solicited orally,
10 but it'd certainly be clearer to me to have them in written
11 form, with the--with the locations that we've been talking
12 about, which are only six of the eleven locations.

13 MR. ALLEN: Why don't we go off the record
14 and--

15 JUDGE LUOMA: Let's go off the record, first.
16 Okay?

17 (OFF THE RECORD)

18 (ON THE RECORD)

19 A Cross-sections measured on the Nation River on a split
20 channel at a site of about one and one half miles down-
21 stream from Jungle Creek. (Pause) The width of the
22 right channel was two hundred and thirty-three feet,
23 with a maximum depth of one point nine feet. The right
24 channel--no, the left channel was sixty feet, with a
25 maximum depth of one point five feet. The--the other side--

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1 JUDGE LUOMA: What--what was the date of that
2 one?

3 A That was dated June 20, 1978.

4 JUDGE LUOMA: Now, is that different from the
5 measurement already shown on B-Sixty (sic) as a--as measurement
6 made below Jungle Creek on the Nation River?

7 A Yes.

8 JUDGE LUOMA: It's another one?

9 A It's another.

10 JUDGE LUOMA: Okay.

11 A It was . . . yeah. The other side on Jungle Creek that
12 where we obtained a cross-section, but no discharge
13 measurement, was made at a site about two and one half
14 miles upstream from Hard Luck Creek. The width of that
15 channel was about three hundred and--about three hundred
16 feet. The maximum depth in that channel was--that was
17 measured, was eight point seven feet. The date of that
18 measurement--did I give that? I don't think I did.
19 June 21, 1978. There was also a small right bank side
20 channel unsurveyed.

21 Q (Pause) Thank you. In your opinion what--what would
22 the flood level for the Nation River be in June?

23 A It would be about at the--in--in general terms?

24 Q Would the flood level be higher than--than what we've
25 just described in the--in the June measurements?

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277-0572

P.O. BOX 1208
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1 A Yes.

2 Q How much higher?

3 A By flood, of course, it depends on what you mean by flood
4 level. The top of the banks was considerably higher
5 than it--than the level of the water at the time we
6 were there, the top of the maturely vegetated flood
7 plains, from one to four feet higher, by our observations.

8 Q I believe . . . And did you see any indications that the
9 water, in fact, had been higher--

10 A Oh, yes.

11 Q --than when you measured it?

12 A Oh, yes.

13 Q And what were those indications, again?

14 A Basically deposits of logs and de--flood carried--floating
15 debris.

16 Q (Pause) You testified on direct examination that you
17 abandon your attempts to measure the flow in June, because
18 you felt it was--it was dangerous to measure with--with
19 the equipment that you had available.

20 A (Pause) That's correct.

21 Q Okay. Is it--

22 A Attempts on the Kandik.

23 Q --is it correct that you were in a rubber raft with no
24 motor?

25 A Yes.

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1 Q And you were trying to cross the river in order to make
2 these measurements?

3 A That's correct.

4 Q Okay. Your te--is it your testimony then that it was
5 difficult and dangerous to cross the river in a raft
6 without a--a motor?

7 A Yes.

8 Q Okay. Did you mean to imply that it would be difficult
9 or dangerous to navigate the river going up and down
10 the river instead of across?

11 A No, not really. I--I can't re--the--the two are--certainly
12 are different. The--the basic problem we had, if--if
13 you'd like me to explain, is that the currents--that--the
14 water current velocity was so high, ranging about seven
15 to ten feet per second on the surface, in these uniform
16 reaches of channel that we would select for measurement,
17 that we couldn't hold the boat with the tag line. It
18 was dangerous. And we did, indeed, break the steel
19 tag line on numerous occasions attempting that. So to
20 try to measure the width or to try to measure the--the
21 cross-section by--along a line normal to the flow, it
22 was not feasible. We didn't have heavy enough equipment
23 for--for that purpose. That's different, really, than
24 floating the river, where you don't--

25 Q I was--I was trying to clarify the fact that we've been

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1 talking about navigating up and down these rivers and
2 your remarks regarding difficulty and dangerousness
3 was really addressed to crossing the river instead of
4 navigating up and down--

5 A That's correct.

6 Q --is that right?

7 A That's correct.

8 Q Thank you. (Pause) You also testified, I believe, that
9 you were somewhat surprised at the water conditions
10 you did encounter in June, because you had looked at
11 hydro-graphs of similar rivers and--and based on that
12 study thought that the equipment you were taking up
13 there would be sufficient. Is--is that an accurate
14 summary of the--your testimony?

15 A I was surprised, but it certainly is--there was a good
16 probability of finding high water in June. But it--it
17 was--we were kind of troubled by timing, there were
18 other--I couldn't go later in the summer.

19 Q What hydro-graphs did you look at before you went out
20 there? Would it be the hydro-graphs of the same rivers
21 that are--are represented in Exhibit B-Forty-one?

22 A Yes. And others.

23 Q Those are the rivers that you used for comparison--

24 A And others.

25 Q --comparison purposes?

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1 A Right.

2 Q Okay.

3 A But many others as well.

4 Q (Pause) Can you look at the hydro-graphs of these
5 comparative rivers represented in Exhibit B-Forty-one
6 and make a prediction as to the general water level
7 that you'd expect to find in the Kandik and Nation in--
8 in June?

9 A Yes.

10 Q That's what you meant by saying you'd looked at--at
11 hydro-graphs and you didn't really expect to find--

12 A That's correct.

13 Q --water as high as you did encounter? Okay. (Pause)
14 And couldn't you--you also look at the same hydro-graphs
15 for the--these gauge streams and estimate periods during
16 the summer when--when you--you would have high water?

17 A Well, yes, definitely.

18 Q Well, I believe you testified in response to one of
19 Mr. Allen's questions that you can not predict when high
20 water will occur on the Kandik and Nation. In--

21 A And I--and I stand by that.

22 Q Would you ex--explain to me the--

23 A Okay. These are probability estimates. These show
24 characteristics. The probability is good that you'll
25 be in the normal range and--but we also know that there

1 are many values that lie outside the normal range. And
2 to say when any particular event will occur, we can't
3 do that. But we can say what the probabilities are.

4 Q So there's no--there's no way to--to accurately predict
5 the water level on the Kandik at any particular day--
6 date or days during the summer, is that right?

7 A That's right. Within--you know, except for maybe an
8 hour ahead. You can watch the--if you're there and
9 you see the--and--and if you were able to be present,
10 you could predict that it's rising and it might rise
11 a certain amount. But for a week ahead to plan, absolutely
12 not.

13 Q Could you--could you predict, though, that there'd be
14 a--a greater likelihood of--of high water during certain
15 week long periods during the summer?

16 A Yes.

17 Q Okay. Do you think that inability to predict precisely
18 when there will be a significant rise in water level
19 from rain is--is a significant impediment to use of these
20 rivers by--by resident of the area?

21 A I could only give an opinion from my own way of looking
22 at it. I'd say that to plan an operation there, to spend
23 a lot of money to go to there and expect to do something
24 depend--which depended on having flow conditions right,
25 it would be risky. I'd say that'd be--could be a serious

1 costly problem. As it probably was in our case. We
2 spent a good deal of money with the idea that we would
3 find conditions in June that would of been considerably--
4 as we show on the model, you know, considerably more
5 reasonable for our operation. But we got there--we had
6 to abort part of the trip which we really wanted to do,
7 because it was just very difficult. So it's costly.
8 I'd say it would be definitely an impediment.

9 Q You're talking about an impediment to--to . . . let's
10 call it travel plans, commerce, that required advance
11 preparation?

12 A I certainly would.

13 Q Okay. But it--would--would that impediment be--be
14 less of a problem to residents of the area who are
15 right there to take advantage of a change in water level
16 when it happens--

17 A That--

18 Q --and may not--I'll let you answer, I'm sorry.

19 A That would certainly help, being ready, on the river,
20 with your equipment and as the water came up, go.
21 Yes, I--in fact, I suspect that's what they do.

22 Q And it would also be a--a less significant problem
23 to people who aren't concerned with--with precise
24 timing of the trip?

25 A Yes.

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1 Q Okay. (Pause) You also testified in response to direct
2 examination that it would be possible after an extremely
3 long period of no appreciable rainfall that the flow
4 in the Kandik or Nation would drop almost to zero.

5 A Yes.

6 Q Is it likely?

7 A During the open water period it's not likely.

8 Q Do you have any basis for--for predicting that it--it
9 actually has happened?

10 A No.

11 Q (Pause) I believe you've testified that the rivers
12 for which we have hydro-graphs, in Exhibit B-Forty-one,
13 have all been gauged for at least ten years.

14 A Yes.

15 Q Is that the type of--of hydrologic record that ordinarily
16 required for accuracy and reliability?

17 A Well, the--this is an information product. It--it is
18 used to evaluate the normal flow characteristics of
19 these--of these--of streams. As far as accurate, it's
20 as accurate as the data allow us--allows us to make it.
21 It's a computer process, it's automatically generated
22 each year for those stations that we have ten years
23 minimum record. These are selected ones that--our
24 records aren't generated from these. These are
25 information products for users. Someone comes to me

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1 and says, "Joe, do you--can you tell me what the normal
2 flow is likely to be on any creek, on any site on any
3 stream in the State". And I'll go to our computer
4 results and generate a similar model hydrograph and tell
5 them. These are accurate--it's a--there was a--a way
6 to get at a crude measure of the reliability. But it--
7 the actual accuracy or reliability is not very easy to--
8 to evaluate. Let's say it's the best that I know of
9 that can be done with the available data.

10 Q In your opinion is the data that we have available for
11 the Kandik and Nation, the rod measurements, the flow
12 measurements, taken on two different dates one summer
13 season, sufficient to make any accurate or reliable
14 predictions about the--the characteristics of those
15 rivers?

16 A Standing alone, I would say no. If all we had were the
17 measurements made on the Nation and Kandik River, we'd
18 have an extremely poor basis for--for evaluating the
19 stream flow characteristics on those rivers. Two mis-
20 cellaneous measurements in time at any site on that--
21 on those flashy streams would be reasonably useless.

22 Q (Pause) Do you have hydro-graphs showing the discharge
23 for any of the comparative rivers represented in Exhibit
24 B-Forty-one for the--the 1978 summer season?

25 A No, not yet.

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1 Q You--you don't have those?

2 A Are records are computed, generally, in the winter following
3 the collection. They--they are--they will begin to be--
4 well, the end of our water year is September 30th, so the
5 data will begin to be processed--it's tentatively processed
6 by computer for some of these stations. But the data--the
7 hydro-graphs haven't been prepared for publication and
8 for insertion in our compute file as--as yet. It'll be
9 some time along about Christmas to March that they'll be
10 available.

11 Q If you had data showing that any two or three of the streams
12 that you've chosen for comparative purposes were at a
13 stage of very low, in fact lowest flow for the summer--

14 A Um-hm.

15 Q --during early August, could you make any predictions
16 based on that as to the--the level of water in the Kandik
17 and Nations?

18 A In other words, could I generalize about the conditions
19 on the Nation and Kandik from conditions on a similar
20 stream--

21 Q That--

22 A --one of these--

23 Q Right.

24 A --during the contemporary period?

25 Q Right.

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277-0572

P.O. BOX 1208
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452-3589

1 A Not really. Not really.

2 Q Why no--then why is it valid to--to take these ten year
3 figures and make generalizations about . . .

4 A Okay. As I mentioned before, these are characteristics,
5 they give probabilities in time that you're likely
6 to get a condition. But they do not point--pin-point
7 at a particular time period what you're going to get
8 at a different site. In other words, if you were close--
9 if we had a gauging station on the Nation River, the
10 hydro-graph for that one would give you information
11 about the--the short term hydro-gra--you know, the daily
12 mean discharge hydro-graph for the Kandik River. But
13 to take the Chena River at Fairbanks for a given day
14 or week and try to generalize about the Kandik or Nation
15 for that same day or week, no way. But the characteris-
16 tics for it, the probabilities of getting the events--

17 Q Couldn't you even make an--an--an estimation as to
18 the probability that it was the lowest water of the
19 summer?

20 A No. (Pause) See, our--we don't have a gauging station
21 that reflects the conditions for current purposes in
22 that area. If we have a gauge on the Fortymile River,
23 that's the closest. It's reasonable that we might be
24 able to gen--we would generalize. In fact, we will
25 compare hydro-graphs for all nearby similar stream

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1 gauging stations. But we find in studying that--that
2 these summer rain storms events are not--they--they
3 can be--at least generally they're--they're--they're not
4 very similar.

5 MS. HIGGINS: Your Honor, may I have a short
6 recess?

7 JUDGE LUOMA: We'll recess until two o'clock.

8 (OFF THE RECORD)

9 (LUNCH RECESS)

10 * * *

11
12 (PROCEEDINGS CONTINUE ON NEXT PAGE)

13
14 * * *

1 2:00 p.m.

(ON THE RECORD)

2 Q Mr. Childers, I believe you testified that the rivers
3 which you've chosen for comparative purposes represented
4 in Exhibit B41 are in the same climatic zone and have similar
5 physiographic conditions as the Kandik and the Nation, is
6 that correct?

7 A Yes, with two exceptions.

8 Q The exceptions are which?

9 A Berry Creek was one and the other was the Jim River, I
10 think, yeah.

11 Q Okay. Are any of those rivers located in the Yukon Charley
12 area?

13 A No -- not to my knowledge -- no.

14 Q Do any of them drain the Ogilvie Mountains as do the Kandik
15 and Nation?

16 A No.

17 Q Can you generally describe where these rivers are located
18 in Alaska, or perhaps it would save time to just generally
19 point out on the map of Alaska, which I think is Exhibit B2,
20 where these rivers are located?

21 A Yes. Hess Creek is located near Livengood on the -- the
22 Elliot Highway. Let's see -- in this area.

23 JUDGE LUOMA: Is it marked in some fashion?

24 A Yes, it is. It's at the intersection of the Elliot -- or
25 of the TAPS Haul Road and the Hess Creek. That's Hess --

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1 your gauging station is there.

2 Q Is a tributary of the Yukon?

3 A Yes, it is.

4 Q And what other rivers (ph)?

5 A Okay, it'd be Chena River near Fairbanks -- here in Fairbanks.

6 Q And that's on --

7 A Berry Creek near Dot Lake is a tributary to the Tanana and
8 it is marked on this map too -- no it isn't.

9 JUDGE LUOMA: You're not comparing that one
10 anyway, are you?

11 A No, I'm not.

12 JUDGE LUOMA: Is it necessary to identify?

13 A Wiseman Creek on the TAPS Haul Road north of the -- up north
14 of the Yukon. It's in -- right here. The Salcha River near
15 Fairbanks. The river near Salcha Camp, and it's at this
16 location at the Alaska -- or the Richardson Highway at
17 -- at the Salcha River. The Chena River near Two Rivers
18 is at the Chena River at -- up in the -- along the Chena
19 Hot Springs Road north of Fairbanks -- or east of Fairbanks,
20 approximately at this location. The Koyukuk River -- the
21 middle fork of the Koyukuk River is very near Wiseman Creek
22 but on the main -- middle part of the -- about three --
23 about five miles north of Wiseman.

24 Q Okay, thank you. Is Alaska divided into hydrologic sub-
25 regions -- you hydrologists for purpose of reference and

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1 study?

2 A Yes.

3 Q Is -- is there --

4 A A map of it?

5 Q A map or a common definition of how many sub-regions there
6 are and where they're located?

7 A Yes. I mentioned in a report, stream flow -- date of pro-
8 -- proposed stream flow, date of program in Alaska. It
9 contains a description of physiographic and climatic zones
10 that are covering the State, and that's the basics.

11 Q Are any of the rivers that you've just pointed out on the
12 map been used for comparative analysis in the same hydrologic
13 sub-region as the Kandik and Nation?

14 A Yes.

15 Q Which are...?

16 A It's in the Yukon Mountains and -- and drainage area sizes
17 that are between 100 and 500 square miles and between 500
18 and 1,000 square miles. That's the way I've catagorized
19 that.

20 Q You're -- you're breaking sub-regions -- defining sub-regions
21 in terms of area of drainage?

22 A Geographic region according to the water resources council,
23 sub-regions of the State, and then within that into mountains
24 and plateaus and lowlands.

25 Q Okay. So when -- when you said that all of these rivers --

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1 oh, I'm sorry. You didn't say. You would describe all of
2 those rivers as being in the same hydrologic sub-region then?

3 A Not in the same one, but in -- in -- well, yeah, they would
4 be all in the same one, right.

5 Ms. HIGGENS: Okay. Thank you. No -- no further
6 questions.

7 JUDGE LUOMA: Mr. Allen, anything else?

8 Mr. ALLEN: Very few.

9 BY MR. ALLEN:

10 Q I don't think we established on direct what the conditions
11 are in a basin that contributes to the flashiness or non-
12 flashiness of a particular stream. Could you explain what
13 makes a stream flashy in general?

14 A The -- the relief, the ruggedness of the drainage basin
15 topographically, the presence or absence of significant
16 permafrost, --

17 Q Could -- could you be more specific and say whether the
18 presence contributes to flashiness or the absence contributes
19 to flashiness?

20 A Okay. The flashiness is a function primarily of -- well,
21 one, the size of the drainage basin. That's probably most --

22 Q Well, again, is a big drainage basin flashy or a little
23 drainage?

24 A A small basin tends to be flashy compared with a wide basin.

25 Q List the characteristics that make for a flashy river.

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1 A Okay, a small drainage basin, a steep drainage basin, a
2 drainage basin that's thoroughly impermeable at the surface,
3 such as would be the case in either a -- a thin soil covered
4 drainage basin or a -- an area with significant permafrost.
5 The absence of lakes. I think that's the basic charac-
6 teristics --

7 Q What would be an example in the middle Yukon area of a non-
8 flashy river or stream?

9 A Oh, the Yukon River because of its size.

10 Q Why does a large drainage basin make for a non-flashy stream
11 generally?

12 A Well, the -- the contributing drainage area that affects
13 the -- the high flow conditions, the smaller the basin, the
14 more likely you'll get high run-off over more of the area.
15 A basin the size of the Yukon, it's very unlikely you'll
16 get high rates of run-off over large areas or certainly
17 -- relative to the size of the basin in comparison with
18 a small drainage basin.

19 Q High run-offs at the same time do you mean?

20 A Yes.

21 Q Is flashiness by itself a -- an impediment to navigation,
22 referring for example to the Chena River at Fairbanks?

23 A It -- the only way it could be that I know of is in pre-
24 senting flood problems or high water problems if these are
25 impediments to navigation. The other end -- the other

possibility is that flashy streams do tend to become very low for long periods of time, so that could be it -- yeah, that could be an impediment.

Q During the period of the 1967 flood in Fairbanks, what river was it that flooded that caused that flood?

A Well, there were many floods over a large area in east-central Alaska.

Q Was the Chena River one of the rivers that flooded?

A Yes.

Q Was -- do you know -- do you have any knowledge of the behavior of Hess Creek during that same period?

A Yes. Hess Creek didn't flood.

Q Did it raise significantly to your knowledge?

A Yeah, it was high, but not flooding at all. In fact, west fork Tolovana Creek -- River didn't flood either during the '67 flood here.

Q And are these rivers in basins that are adjacent to the basins that were flooding?

A Yes.

Q The floating debris that you noticed on the Nation River which you said was from one to four feet above the levels that we were floating it at, do you have any way of estimating how recently that debris had been deposited? Did I say floating debris? I meant flood deposited --

A Deposited?

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1 Q -- flood deposited debris that you mentioned.

2 A Not really I don't.

3 Q Could it have been deposited some years ago?

4 A Oh, yes. Twenty-five to fifty I would estimate would be
5 not unreasonable.

6 Mr. ALLEN: That's all I have.

7 JUDGE LUOMA: Miss Taylor?

8 Ms. TAYLOR: I have nothing.

9 JUDGE LUOMA: Miss Higgens?

10 Ms. HIGGENS: No.

11 JUDGE LUOMA: All right, thank you. I do want
12 to ask you a couple of questions.

13 BY JUDGE LUOMA:

14 Q You mentioned in your testimony that you estimated the
15 -- the surface speed of the water on one of the rivers to
16 be from five to six feet -- five to six miles per hour.
17 Now, to which river did that apply?

18 A Definitely the Nation River.

19 Q Do you have any similar es- -- opinion as to the Kandik?

20 A Only from the one measurement we made. I have the surf- --
21 or the velocities near the surface at that one cross section.

22 Q And what was that estimate in miles per hour if you can
23 give it to us?

24 A It'd be very close to five miles per hour.

25 Q And on what date?

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1 A June 19th, 1978.

2 Q Is June the date also for the Nation River estimate?

3 A June is, yes.

4 Q Would you have an opinion as to what -- as to whether that
5 speed would be the same, greater or less in -- later in the
6 year, like in August?

7 A I -- it would definitely be much slower in August.

8 Q Like how much?

9 A Probably less than one mile per hour.

10 Q In August?

11 A In August.

12 Q That's to both rivers?

13 A On the Kandik.

14 Q On the Kandik.

15 A Let's see...Nation... Probably between two and one miles
16 per hour on the Nation.

17 Q On the Nation. Now, to what extent of the -- of the stretches
18 of these two rivers would these estimates apply?

19 A Between the -- now the one on the Kandik in June would have
20 -- well, let's see. They were taken from just -- the one
21 on the Kandik would apply from just below Big Sitdown Creek
22 to -- for June for the Nation and down to -- I don't know
23 how far down in -- on -- in June for the -- for the Kandik.
24 The -- in August, they would probably apply from the -- from
25 the same location just below Big Sitdown Creek probably at

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1 the mouth.

2 Q Is it possible to -- to estimate this type of -- of velocity
3 estimation for the whole river as a general proposition?

4 A I don't -- it's very difficult. The velocity -- the surface
5 velocities vary considerably from cross section to cross
6 section and even across the section. We choose our measuring
7 sections in reasonably uniform reaches of channel, so that
8 we tend to have relatively uniform flow properties, but they
9 do tend to be rather typical. So --

10 Q Is it possible for you to estimate for a given period of
11 time, either June or August for either of the rivers, a
12 miles per hour movement for the length of the stream from
13 the mouth on up above the selection area? In other words,
14 can you give estimates of the outside speeds?

15 A No, these are surface velocities.

16 Q Yes, surface velocity.

17 A Within reason, I think we can.

18 Q What would that be?

19 A Okay, in June, I'd say that the surface velocities -- or
20 at least during our measurement period, the surface velocities
21 would probably average on the Kandik River and the Nation
22 between four and six miles per hour.

23 Q For this stretch of river that we're talking about?

24 A Yes, for the --

25 Q All right. How about -- how about in August?

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1 A I would -- for the flow conditions that we've measured in
2 August, I would say between a half a mile per hour and
3 two miles per hour.

4 Q As to both rivers?

5 A As to both rivers.

6 Q For that stretch of --

7 A For that stretch of water.

8 JUDGE LUOMA: All right. Thank you Mr. Childers.

9 Mr. ALLEN: I have one further question, Your
10 Honor.

11 JUDGE LUOMA: All right.

12 BY MR. ALLEN:

13 Q You've testified as to the average rate of drop on these
14 streams. I believe you said the Kandik was ten feet per
15 mile and the Nation was fifteen feet per mile. From your
16 observations, is that drop fairly uniform throughout the
17 length from the selectionary to the mouth or does it -- are
18 there large drops in the nature of waterfalls during that
19 course of that river?

20 A There's reasonable constant gradient. It was -- there were
21 no major breaks that I have detected.

22 Mr. ALLEN: That's all.

23 Ms. HIGGENS: I have nothing.

24 JUDGE LUOMA: Thank you Mr. Childers.

25 Mr. ALLEN: That concludes our case subject to

1 possible rebuttal.

2 JUDGE LUOMA: All right. Miss Taylor, did you
3 wish to make an opening statement now?

4 Ms. TAYLOR: Well, I can if the Court wishes.

5 JUDGE LUOMA: It's up to you.

6 Ms TAYLOR: What we had wanted to do, Your
7 Honor, was have the State go next and then Doyon, but I wanted
8 to interrupt the order to present a witness who's waiting to
9 testify. I -- I don't feel that an opening statement is necessary
10 at this point after four days. And I'd like to just go ahead and
11 call Mr. Beiderman and have his testimony. And then we'll have
12 the State go on -- the State's case. Call Charlie Beiderman
13 to the stand.

14 CHARLIE BIEDERMAN

15 Having been first duly sworn under Oath, testified as follows:
16 BY MS. TAYLOR:

17 Q Mr. Biederman, could you state your name please?

18 A Charlie Biederman.

19 Q And where do you live?

20 A At this time, I'm living in Tok.

21 Q Okay. And when and where were you born?

22 A Born November 3rd, 1918 in Eagle, Alaska.

23 Q And where did you grow up?

24 A At -- I went to school in Eagle, but in the summer, we spent
25 the first twenty-four years of my life opposite the mouth
of the Kandik River known as Biederman's Camp (ph).

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1 Q Who's your -- who's your father?

2 A Ed Biederman.

3 Q Is your father the man that Biederman's Bluff is named for?

4 A Yes.

5 Q And until what year did you live in the summers at the mouth
6 of the Kandik River?

7 A Until I went in the service in 1942, and my dad and sisters
8 operated the fish camp until '44.

9 Q And then what happened to the fish camp?

10 A My mother sold it to my brother-in-law, George (indiscernible)

11 Q After -- after the war, where did you live in Alaska?

12 A In -- in Eagle for a few years, and then down in Fort Yukon
13 and then back in Eagle again.

14 Q Okay. And do you have relatives in Fairbanks, Alaska now?

15 A Yes.

16 Q Who -- who are they?

17 A Doris Fry (ph) and Jesse Wells (ph).

18 Q Okay. Are you the Charlie Biederman that -- that Melody
19 Drawman (ph), who's sitting back here, mentioned in her
20 book?

21 A I guess so.

22 Q Okay. Are you more familiar with the -- the Kandik River
23 or the -- or the Nation River?

24 A With the Kandik.

25 Q And -- and is the Kandik River the same as Charley Creek?

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1 A Yes, that's all we ever called it. We knew it was -- we
2 seen it on the map it was called Kandik, but everybody
3 along the river referred to it as Charley Creek.

4 Q Okay. Now, when you lived at the mouth of the Kandik River,
5 what sorts of uses did you or your family make of the river?

6 A Well, we fished right on the Yukon. The only time that we
7 ever had to go up the Kandik, we went up there to get logs,
8 and then there was a time or two my brother and I went up
9 hunting.

10 Q How far up would you go to hunt approximately?

11 A We never had to go over about five miles up.

12 Q Okay.

13 A In later years, we did go up -- him and I used to go up
14 in the Spring beaver hunting by boat, and -- well, he made
15 more trips than I did, but I made about three up there with
16 him. And...

17 Q What -- what time of year would you go up in the Spring?

18 A Well, we went up in the end of May right after the river
19 would open --

20 Q Is that af- --

21 A -- right after the season was open.

22 Q That's after breakup?

23 A Yes.

24 Q What ti- -- what time of year is the Kandik generally a
25 running stream?

1 A We used to go up there right after the Yukon would break,
2 and that would be anywhere from the middle of May to the
3 20th.

4 Q And then how late in the Fall did you use the Kandik as --
5 as running water?

6 A I've been up as late as the end of September.

7 Q What was that for?

8 A Well, at that time, it was hunting and -- because I never --
9 when I trapped up there, we lived at the mouth. I didn't
10 have to haul our stuff in like some other fellows did.
11 I went in -- waited 'til winter and went up with dog team.

12 Q 'Cause you lived so close to the mouth?

13 A Yeah.

14 Q Oh. Do you hunt in that area -- or have you hunted in that
15 area in the last, say, ten years?

16 A On the Nation, I did, but the Kandik, I never had to go that
17 far from Eagle. I've been down in that country up until
18 three years.

19 Q Do you have any boats presently?

20 A Yes.

21 Q What type of boats do you own?

22 A A 32-foot river boat, four foot bottom that I built myself.

23 Q Okay. Explain to the judge what a river boat is.

24 A Well, my boat is flat bottom. It has about 45 degree
25 flare (ph) on the sides, and it's got a long turn-up --

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1 -- turn-up of ten -- ten feet back to give it long turn-up
2 on the nose for easy running.

3 Q What type of motor does it have? Can you talk up just a
4 little bit louder?

5 A I have a 25 Horse Johnson on it.

6 Q Okay. Do you have a kicker on your boat?

7 A Well, that's what it is. It's an outboard.

8 Q Okay, and what does that do?

9 A Well, that's the one I use on there. I haven't got no lift
10 on there.

11 Q Okay, what's a lift?

12 A That's the one that they use to lift the motor up if you're
13 going to go into shallow water.

14 Q What -- what's the most commonly used boat on the river now
15 on -- when we were talking about the Kandik?

16 A The ones who really go way up there now are using -- the
17 hunters that go up there,...There is quite a few hunters
18 go up every year, and they use these, what they call, river
19 boats that Compeau -- some of 'em call 'em Compeau boats,
20 and I know Persinger Marine has some of them too. They're
21 24 and 26-foot with probably a 42-inch or 46-inch bottom,
22 metal boat. They usually have a lift that the outboard
23 motor sits on, and the last few years, a lot of 'em are
24 using these jet units on 'em. I've never used a jet unit
25 on mine. That's supposed to --

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1 Q Are these hunters from Fairbanks?

2 A Yes.

3 Q How do they get to the -- to the Kandik to go hunting?

4 A They go over from here to Circle and then they put in their
5 boats from there and run up the Kandik.

6 Q Is there a highway from Fairbanks to Circle?

7 A Yes, the Steese Highway.

8 Q How far up do these -- how far up the Kandik do these hunters
9 go moose hunting?

10 A I've talked to some of 'em, and they've been up as high as
11 -- as far as 60, 70 miles.

12 Q How do they load their boats when they're going up the river
13 to go moose hunting?

14 A Well, there's usually two -- two of 'em together, and then
15 they have their gas, and then their -- their -- all their
16 camping outfit 'cause they usually go up there to spend
17 four or five days or a week.

18 Q And how do they bring their moose down?

19 A Load that in the boat with their stuff and come down with it.

20 Q About how much does a moose weigh dressed?

21 A I'd say five or six hundred pounds. Some of 'em are bigger.

22 Q Okay. What are these jet boats like that are used on the
23 river today?

24 A The jet boats, well, them are inboard motors, and instead
25 of using a prop on 'em, they got this jet on the -- mounted

1 on the back there.

2 Q How much water do they draw?

3 A They don't -- the jet itself don't take much more than what
4 -- a few inches more. If you get it down where you get too
5 shallow water, well, you might suck up gravel in it. But
6 otherwise, you -- you're just going to take a few inches
7 more than what's going to float that boat.

8 Q Do you know what the capacity of a -- of a -- say, a 24-foot
9 or a 26-foot river boat is, how much it can carry?

10 A You can put a ton in it.

11 Q What about a -- what about a jet boat, how much can it carry?

12 A Well, it depends on the size of your boat.

13 Q Is there -- is there a range of sizes?

14 A Well, like some of 'em are 24-foot and I think mine is about
15 longest there -- that any of us uses up there in the last
16 year or two. And my brother, he -- his boat was -- there
17 was three boats longer than mine that they used up the Nation
18 and the Kandik.

19 Q When was this?

20 A That was -- that was back in -- in the 40's, and clean up to
21 about '50, between '40 -- 1940 and 1950.

22 MR. ALLEN: I'm sorry. I wasn't here. When
23 you said, "when was this", what were you referring to?

24 Ms. TAYLOR: These -- these are the river boats--

25 A Yeah, they were -- they were them --

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1 -- that your brother had?

2 A Well, they weren't jets. They were tunnel boats.

3 Q They were tunnel boats.

4 A Yeah.

5 Q And they were used in the '30's and the '40's?

6 A No, in the '40's.

7 Q 40's and -- '40's, okay. What were these tunnel boats
8 used for?

9 A That was an inboard, and like most inboards would have shaft
10 and prop running down underneath the boat. Well, they build
11 a tunnel inside the -- from the back up they build a tunnel.
12 It come up like this and go down, and it's just like a box
13 in there.

14 Q Um-hm.

15 A And so the prop would sit inside of that turned by shaft to
16 the motor in here. So your prop was really inside of this
17 tunnel, but you had to have about three inches sticking
18 below the boat to make sure that there was enough when you
19 started that it would fill that tunnel with water. See,
20 you couldn't have the tunnel just running straight out be-
21 cause then you'd get gravitation. It'd be just air there --

22 Q Now, were these tunnel boats --

23 A -- in back -- in back.

24 Q Were these tunnel boats taken up the Kandik then in the '40's?

25 A Yes.

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1 Q What was the reason for taking --

2 A Larry --

3 COURT REPORTER: Just a minute. You can't touch
4 the microphone.

5 A Oh. Larry -- it was Chris Peterson and Larry Dennis (ph),
6 they -- they went up both the Kandik and the Nation, but
7 then they -- they trapped on the Kandik, so the last few
8 years they went up with a 36-foot boat, an -- an inboard.
9 They would take their outfit all the way up. They would
10 go as high as -- as far as about 50 -- approximately 50
11 miles up. And that's where they take their -- their whole
12 winters outfit.

13 Q What time of year would they do that -- would they go up?

14 A They would go up there sometime in August and make a trip
15 up, and then they would make another one. The last trip
16 they'd go up when they'd take their dogs and everything up
17 for when they go up in September.

18 Q And then when would they come down after the second trip?

19 A Well, some -- some years they would bring the boat out and
20 leave it down the mouth because they plan to come out in
21 the winter with dogs, and this way here, then they could
22 go down the river and pick up the boat on the Yukon. They
23 wouldn't have to hike overland to get their boat.

24 Q When -- when Dennis and Peterson would take these boats
25 up the Kandik in August, would they leave them up there, or

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1 would they bring 'em back down again in August?

2 A Well, they'd go up and take their stuff up and fix their
3 cabins up, and then they'd maybe make one more trip back
4 again and go up to Eagle and get supplies, and then the last
5 trip. And that's what Dan Vanvibber (ph) did on -- on the
6 Nation.

7 Q So -- so they used the tunnel boats to supply their trapping
8 camp?

9 A Yes.

10 Q Okay. Wasn't one of the -- either Dennis or Peterson a
11 Canadian?

12 A This was -- yeah, one of 'em was, but he finally got his
13 paper.

14 Q Did -- did he ever trap in Canada?

15 A Yes. Dan Vanvibber was a Canadian, and he came from Dawson.
16 He would come down, and he would go up the Nation. He has
17 a long boat. I'm pretty sure. I think it was 34-foot long.
18 It was 25 Universal and a tunnel boat. He used to go up
19 in the latter part of September. I met him one time at the
20 mouth of the Nation. I know he was going up. It was, I
21 think, the 25th of September, and he made two trips. He
22 went clean to the border, which we call 40 Mile. I know he
23 went up there one day and the next day, he was back down at
24 the mouth of the Nation, and he took another load up. And
25 he came back and left his boat at -- pulled it off there.

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1 Q What type of boat was he in?

2 A It's one of them tunnel boats. It's a 34-foot --

3 Mr. ALLEN: Your Honor, I'm wondering if -- I'm
4 going to object at this point and ask opposing counsel if they're
5 going to make any attempt to verify this hearsay corroborated
6 through any other witnesses. We're getting a lot of, I assume,
7 uncorroboratable hearsay out of this witness.

8 JUDGE LUOMA: What's your answer to that?

9 Ms. TAYLOR: Why an objection?

10 JUDGE LUOMA: Yes.

11 Ms. TAYLOR: Well, Your Honor, first of all,
12 this is an administrative proceeding (simultaneous speech).

13 JUDGE LUOMA: I recognize that.

14 Ms. TAYLOR: Pard' me?

15 JUDGE LUOMA: I recognize that. Go ahead.

16 Ms. TAYLOR: Okay. And hearsay in and of itself
17 is not inadmissible. Mr. Beederman is recognized by BLM's own
18 historical witness as having a tremendous amount of knowledge of
19 20th century use of the rivers, and I would request that he be
20 allowed to testify as to his knowledge of the customary use of
21 the rivers. It's pretty late in this hearing to start objecting
22 to hearsay. All of the -- all of the historical evidence that
23 we've had is hearsay of necessity. The people are dead. They're
24 gone.

25 JUDGE LUOMA: Mr. Allen's question was to whether

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1 you intend to substantiate it in any way?

2 Ms. TAYLOR: Do I intend to call other witnesses?

3 JUDGE LUOMA: I don't know what -- what he means.

4 Mr. ALLEN: I think I've -- I've admitted quite
5 a bit of an attitude in hearsay, but you say you're recognized as
6 a -- as a person who lives on the river, and that's correct. And
7 I'm happy to have him testify as to his own knowledge. But when
8 he goes on and on and talks about something that somebody else
9 told him about a trip that he was not on -- somebody else took
10 the boat up to the border and whatnot, this is getting pretty
11 far afield.

12 Ms. TAYLOR: I think -- I think his testimony's
13 corroborated by the evidence that's already in the record, and
14 I don't intend to introduce any other witnesses to corroborate
15 this particular testimony.

16 JUDGE LUOMA: All right. The objection's
17 overruled.

18 Ms. TAYLOR: Thank you.

19 Q Now, when were -- when were tunnel boats -- how long were
20 tunnel boats used on the Kandik?

21 A Well, at that time, I would say in the '50's and --

22 Q What were they -- what were they replaced by?

23 A By the jet unit --

24 Q Excuse me, I can't hear you.

25 A -- the jet unit that they used on the outboards.

1 Q Okay. Now, --

2 A Then they came up with this lift that they -- like the out-
3 boards with the prop on it that they could lift the motor
4 up and down as you go.

5 Q And is that in common use today?

6 A Well, for going up them creeks, a jet unit is a whole lot
7 better.

8 Q Okay. Which -- which do you think is more common?

9 A If you're going to go up any -- most of 'em that are going
10 up are using jets now.

11 Mr. ALLEN: I didn't hear that.

12 A Most of them that are going up these side streams on both
13 the Kandik and the Nation, are using jets.

14 Q The hunters that use the river today that go up -- that
15 want to go far up the river, what type of boat do they use
16 most often?

17 A They use metal river boats that they have -- that you see
18 here around Fairbanks here from Compeaus and Persinger Marine.

19 Q Okay.

20 A -- with a jet unit and lift on it (ph).

21 Q How far up the Kandik River have you been in a boat?

22 A Up to the canyon. I think --

23 Q What's the canyon?

24 A -- what they call now -- they have -- Coast Geodetic Survey
25 has been up like they did along the river and have changed --

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1 -- a lot of them creeks and changed the names on 'em and
2 looking at a map -- or somebody referring to a certain creek
3 or something, we get confused. I think that that's what they
4 call Johnson Gorge, but there is --

5 Q Do you know about how --

6 A -- a canyon up there what we call 24 Miles. It's good long
7 miles from here.

8 Q Is that -- is that how far it is up the river?

9 A Yes.

10 Q Okay. And -- and what type of boat did you take up the
11 river to the canyon?

12 A I went up there with my brother -- with him, and this was
13 a 33-foot wood -- wood river boat.

14 Q What type of motor?

15 A We went up there once with a -- we only used a 7 horse, and
16 another time we went up, we used a 22.

17 Q And what time -- what time of year have you -- have you been
18 up to the canyon?

19 A That was in the spring of the year when we was up there
20 to -- trapping beaver. That's -- at that time, we would
21 trap beaver until the end of May.

22 Q Okay. You haven't been up that far moose hunting, up the
23 Kandik?

24 A I never had to go that far.

25 Q Okay. Are you planning a trip on the Kandik next summer?

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1 A Yes. I would --

2 Q Where --

3 A -- have liked to make the trip this summer, but I just
4 couldn't get the time.

5 Q Where are you planning on going, and what type of boat are
6 you going to use?

7 A I'm planning on taking my 23-foot boat with -- with my
8 25 horse motor, but I'm considering getting a 35 with a jet
9 unit on it because when you get a jet unit, you lose a
10 certain percentage of your horsepower. If I'm going to
11 take that long of boat up there, I want a little more power
12 than the 25.

13 Q Okay. How far up are you planning on going with the 35-foot
14 (sic) boat?

15 A Twenty-four miles.

16 Q And what's the purpose of that trip?

17 A Well, it's quite a few years ago altogether we got three
18 mastodon tusks out of there. And just to settle my curiosity
19 I want to go up there and my son has talked about going with
20 me, and I want to go up and look at that clay bank and see
21 if the river has washed -- or the -- washed any more of them
22 out of there. I know there's a lot of people went by there
23 and they didn't notice them. I don't think they even knew
24 about that bank having 'em in there.

25 Q Okay.

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1 A I just thought it would be a good trip, and I would like to
2 make before I get so that I'd be unable.

3 Q Do you know any of the people who are trapping on the Kandik
4 now, today?

5 A Right now, I know they're down there and same with the Nation
6 but see, I haven't been there.

7 Q Right.

8 A I just met them in Eagle, and you meet 'em when I went over
9 there hunting, they're just right on the river. But I know
10 that it's just not -- the other day my son said there were
11 six of 'em down at the mouth of the Nation fishing there.
12 Well, they're all intending to trap in that area.

13 Q Okay. When you've been out in your river boat on -- on the
14 river, have you ever rescued canoers?

15 A Yes.

16 Q When did that happen?

17 A Four or five years ago I knew I got on the river. To my
18 notion (sic), the canoe is not the proper boat to be used
19 on the Kandik or the -- or the Nation.

20 Q Is it --

21 A As far as that goes, it's not even to haul anything on the
22 rivers. It's good to paddle around, but not to haul a load
23 with.

24 Q Why is that?

25 A Well, for one thing, it draws more water than a boat. I can

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1 put what you could put in three canoes in my 32-foot boat,
2 and I don't think I'll be drawing any more water than what
3 any one canoe would to their boat.

4 Q Did the old time residents -- did they ever use canoes on
5 the river?

6 A No, not years ago, but they need all them -- that's the
7 reason they used them flat-bottom pulling boats.

8 Q Do you know who Dave Roy is?

9 A Huh?

10 Q Do you Dave Roy? Do you know who Dave Roy is?

11 A Yes.

12 Q Were you here yesterday when -- when Phil Bailey was talking
13 about Dave Roy trying to get up the Kandik in his jet boat?

14 A Yes, I was here at that time.

15 Q Okay. What's -- what's Dave Roy's jet boat like?

16 A Well, it's a -- it's a boat that's all right for the Yukon.

17 Q It's what?

18 A It's all right to be used on the Yukon.

19 Q Why is that?

20 A It's -- it's wide, it's got a lot of power, and it takes
21 a lot of power to get that big of motor and everything.
22 It's not made for going up side creeks.

23 Q Is it the type of boat you'd take up the Kandik?

24 A No. A person would be foolish to try it.

25 Q Have you ever been on the -- on the Kandik River at a point

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1 that -- that you couldn't get a boat over a gravel bar, but
2 that you also couldn't wade across that same gravel bar?

3 A No. It -- it's -- if it's -- if I couldn't wade across it,
4 there's plenty of water to take the boat over. And if you
5 can take the boat over and up river, you can come down it.
6 I've never had no problem.

7 Q Which is easier with a -- with a river boat, going up or
8 going down?

9 A I'd much rather come down.

10 Q Okay. Have you ever had any trouble getting up the river
11 if you had a reason to go?

12 A Well, in extreme low water. Any -- all rivers if you have
13 real low water, you're going to have problems.

14 Q How often might that happen?

15 A All depends on-- on the weather.

16 Q Did it ever hap- --

17 A I've seen the Kandik and I've seen the Nation in a flood
18 stage. I've seen it in -- I mean, it happens every year,
19 both of 'em flood. In the Spring they're bank full, and
20 then I've seen it again in July. I've seen it in August --
21 especially in August sometime when it rains, and you get
22 a cloudburst up there like that, and it's only a matter
23 of hours, that creek can be bank full. There'll be trees
24 and everything else coming down.

25 Q What about the old time trappers, did they ever have any

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1 trouble getting up the river, Vanvibber or --

2 A No, they always seemed to got up there. At that time, they
3 didn't have motor boats or anything, but they lined them (ph)

4 Q Would you sometimes wait for the water if -- if it was low
5 water?

6 A Well, if you got the time, yes, you might as well wait 'til
7 the sta- -- the stage is too -- is just right. You don't
8 want to go up when it's high because it's that much swifter.

9 Q Okay. What -- what are sweepers?

10 A That's where the -- the current cuts into a bank, and there's
11 a lot of trees there and they'll cave over, and them are the
12 things you've got to watch out for.

13 Q Are there sweepers on the Kandik?

14 A Yes. Like it is on all side creeks. There's -- and on the
15 Tanana.

16 Q What do you when there are sweepers?

17 A Well, you can -- there's usually room to -- to go on the
18 other side where them sweepers are leaning over that way.

19 Q Have they ever presented a serious obstacle to -- to your
20 getting up the river?

21 A Not too much getting -- going up as -- if you're going up
22 and going to come down, sometimes they do because they
23 will get down in the water and get -- they are -- if you see
24 that they're going to cause you problems, on your way up,
25 you can cut 'em off. Otherwise, just watch it when you come

1 down.

2 Q So if you know you're going to be coming back down, what
3 do you do about the sweepers if you see 'em --

4 A Well, you know where they're at. You can see how you can
5 get by it, and then you'll watch for that place when you
6 come to it and make sure that you get control of your boat.
7 Most of the time I come down the rivers, I'd much rather
8 come down and -- by using oars and just drifting rather
9 than use power.

10 Q What's the Kandik River like? Can you -- can you just
11 describe it as a river?

12 A Well, how do you mean?

13 Q Well, --

14 A Well, in places -- there are some places it splits up into
15 channels just like -- well, the mouth, you get up there,
16 and it split into three different channels, and I know in
17 my time, I've seen it there when the channel changed three
18 times.

19 Q This is right above the mouth?

20 A Yes.

21 Q What do you -- what do you do when your -- when your channel's
22 braided like that?

23 A Well, you -- you take the one the most water's coming down.
24 That's what I've said when I -- I remember the first time
25 I was there when I was a kid there, well one channel, the

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1 lower channel had all the water, and later on the two ice-
2 jammed or whatnot (ph) and the next thing, the middle channel
3 was always the best. And I went up there one time and we
4 went up it, but coming down, we racked the logs, so we -- we
5 ran into problems. We had to take the rack apart and take
6 them down one log at a time.

7 Q Yeah, but this was --

8 A All the water had shifted -- then it filled in a little and
9 all the water had shifted to the upper channel, and that's
10 the one that stayed there for years.

11 Q This was on a log raft; not in your river boat?

12 A No, we -- we had the boat there, but we was trying to bring
13 some logs down -- 42-foot logs down there for a fishwheel

14 Q Have you ever run into serious problems with log jams on the
15 Kandik?

16 A Not on the Kandik.

17 Q What about other rivers?

18 A The other rivers, well, the mouth of Sheep Creek and then
19 the mouth of the Sevenmile River, we ran into a log jam
20 there. That was pretty hard to get by.

21 Q How many -- how many other rivers in this area have you
22 been on around the Yukon, in that area?

23 A Up in that area, the Sevenmile River, the Tatondik (ph) or
24 Sheep Creek, the Nation and the Kandik, and a little ways
25 up the Charley River.

1 Q If you had a reason to take a 24 or a 26-foot river boat
2 up the Kandik River, is -- is -- in your opinion, is there
3 anything that would stop you?

4 A No. If I was going to go up there like I said, I would
5 put a jet unit on my outboard and I would look for any --
6 too much problems.

7 Q And what's -- when is -- when is -- when is moose season?

8 A This year they opened it north of the Yukon. That's in
9 unit 2- -- 26 like this, but it's -- the Yukon River and
10 then the north side of it was open from the 10th to the 30th.

11 Q Of what month?

12 A Of September.

13 Q Okay. And what -- and what are the daylight conditions, say,
14 from May through September? Can -- can you tell us how
15 many hours of daylight there is, you know, in the spring
16 and the summer and the fall about?

17 A Well, I don't keep track when I go in the summertime, you
18 know, in June and July, there's daylight I would say almost
19 all the time. In August it starts getting darker.

20 Q Okay.

21 Ms. TAYLOR: That's all the questions I have.

22 JUDGE LUOMA: Miss Higgins?

23 Ms. HIGGENS: No questions.

24 JUDGE LUOMA: Mr. Allen?

25 BY MR. ALLEN:

1 Q You just a few minutes ago testified that if you had a reason
2 to get up either the Kandik or the Nation, nothing would
3 stop you; is that what you said?

4 A Not on the Kandik -- I mean if I had -- no, I couldn't see
5 no -- what would stop me. We've always went up before.
6 These other people are going up there all the time.

7 Q You can't imagine anything that might stop you?

8 A Well, like I said, there is times like on all rivers, if
9 you had a long dry spell, the water might be shallow. If
10 you could afford to wait maybe a little while, it's going
11 to be --

12 Q Well, there might be times when you would have to wait a
13 little while?

14 A But if -- I don't think I've ever seen the Kandik ever that
15 low that I couldn't get a boat over it by -- by walking it
16 up. I don't -- but if you can walk it up, you can almost
17 use a jet.

18 Q Have you ever used a jet on your boat?

19 A Not on that 32-foot one 'cause I just built it a few years
20 ago.

21 Q What boat have you used the jet on?

22 A It's -- my brother's got a bigger one, but I've always used
23 just an outboard?

24 Q Have you ever used your brother's boat with a jet on it?

25 A No, not that -- that one he's got.

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1 Q Have you ever operated a boat -- a river boat with a jet
2 on it?

3 A Yeah, on the Yukon. Like I said, I've never -- but that's
4 what I go up with. But as far as you questioned me about
5 whether that can go up, I'll tell you, there's a lot of
6 people right here in Fairbanks that go up that river every
7 year, and there's a few of 'em that just come back from
8 there with jet units on.

9 Q Let me ask you, can you imagine the water being high -- so
10 high that you could not go up it?

11 A Well, the only thing that stops you then is -- is like I
12 said, the drift and trees coming down --

13 Q Would that --

14 A -- and that don't last very long.

15 Q So you'd have to wait for that to --

16 A Yes.

17 Q -- float by?

18 A That will -- that will run through. Usually a flood stage
19 (ph) the crest of it with all that -- where the banks have
20 caved in. Usually it'll run out in a day or two, and then
21 the water starts dropping.

22 Q So when you said there's nothing that you can imagine
23 that would stop you from that --

24 A Well, yeah --

25 Q -- if you were willing to wait until the hazards have passed--

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1 A Yeah.

2 Q -- or the water level is at the right state?

3 A Yeah.

4 Q Is that correct?

5 A Yeah. You can get up there.

6 Q Have you ever had close encounters with sweepers or drifting
7 logs or log jams in running your boat on any river?

8 A Yes.

9 Q Will you tell us about it?

10 A Usually was -- I've been pretty careful. I only -- I only
11 sunk one -- one boat in all my times that I've been on the
12 river. I sunk a barge under on the Yukon in a slough.

13 Q Have you ever lost power going up a swift channel?

14 A Yes, I did once.

15 Q What happened?

16 A Motor quit.

17 Q And then what happened?

18 A Jumped up, pulled it over to the shore. Going up the riffle,
19 I just swung the boat over with an oar to get it over into
20 the side where it's going to go into the eddie. With a
21 riffle, you come down whichever way the river -- the current
22 -- the main current's going, it usually has an eddie on
23 one side of it, and you just try to swing your boat into
24 it.

25 Q Do you consider that a hazardous situation, losing power

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1 in a swift channel?

2 A Yes, it would be.

3 Q What if there was a strainer of some kind, either a sweeper
4 or a log jam directly down below the channel, what would
5 happen?

6 A Well, like I said, in them situations, you want to take
7 precautions when you're going up just in case if that motor
8 does quit. That's the reason a lot of them use two motors,
9 but I can see that sometime when I go up, it's good to have
10 a little extra motor there.

11 Q Are there strainers such as sweepers and log jams on the
12 Kandik?

13 A You mean a sweeper? Yes.

14 Q Do you know what I mean when I talk about a strainer?

15 A I don't know what you're referring to.

16 Q I'm referring to a sweeper where the branches are in the
17 water, and the water is flowing through the branches.

18 A Oh, yeah.

19 Q And is that a hazardous --

20 A Well, we call them sweepers. They're a hazard on almost
21 any river where you've got -- on the Tanana, and every once
22 in awhile, you hear somebody tips over because they run
23 under (ph). You want to make almost -- be sure and watch
24 them in case you do -- like your motor quits, have everything
25 ready that you can get yourself 'cause that sweeper's usually

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1 pretty close to the bank where you can get it either with
2 an oar or something to swing your boat away from 'em.

3 Q Are boats occasionally lost by drifting into sweepers,
4 swamping (ph) and breaking up in the current?

5 A Yeah, more so I think than -- I think more of 'em right here
6 on the Tanana than anyplace.

7 Q When the flood waters are subsiding, are there still occasion
8 when uprooted trees might be drifting down, largely submerged
9 under the water?

10 A They -- there's a few, but the biggest part of 'em, the
11 ones that are really bad or something are usually already
12 hanging up on -- on them bars or in the middle --

13 Q Are the waters usually --

14 A -- (simultaneous speech).

15 Q Excuse me. Are the waters usually somewhat cloudy during
16 the flood, and while the flood is subsiding?

17 A Yes, because they're cutting into them banks and everything.
18 It's full of roots and something's that usually real dark
19 colored.

20 Q And if you were waiting for a flood to subside to get up
21 the river, would there be any risk at all that there might
22 be an occasional drifting snag submerged under the murky
23 water that you might not see?

24 A Well, yes, you've got to -- like I said, you've got to
25 watch. In fact, some of 'em stick on the bottom where the

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1 current isn't too swift, and usually you can see them. You'll
2 see a swell there, a little swell ahead. Well, then you just
3 swing away from it, because what it is, it might be a...
4 In fact you'll see sometimes where the bank is caved in,
5 the roots of the trees are still attached on the dirt that's
6 -- and the tree'll be float down like that. And it'll be
7 just under the water, but the it'll -- the current will make
8 a riffle, and there's stumps that way down in there too
9 because there isn't enough current to really to wash that
10 on down.

11 Q I take it you have pretty much been around river boats
12 most of your life, is that correct?

13 A Yes. The last couple, three years, I haven't had a chance
14 to get back over there.

15 Q Have you developed a pretty good eye at spotting these
16 submerged snags and other hazards on the river?

17 A Well, I guess you would say it because more or less I --
18 I keep a -- I keep a watch for 'em.

19 Q Does it take --

20 A I know what to look for. I mean, I can tell what it is if
21 you see it -- you know, if you see marks in the water or
22 riffle on it, well --

23 Q Does it take a certain amount of experience to be able to
24 spot these hazards and keep away from 'em?

25 A No, I don't -- I don't know if I can be the judge of that

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1 or not because see, I've been at it all my life. I know
2 other people who have come up here as strangers, but have
3 went out with somebody, and they pointed them things out.
4 And after that, they didn't have no problem at all. They
5 new what them riffles are, and they know where to look for
6 snags.

7 Q How many times would you say you have been up the Nation
8 River?

9 A I never did go up the Nation -- only a short distance.

10 Q So most of the testimony you've given relates to the Kandik,
11 is that correct?

12 A Yeah, but I know these people there who have gone up the
13 Nation.

14 Q But from your own personal experience, your testimony is
15 confined to the Kandik River?

16 A Yes, that's the one I'm really familiar with.

17 Q How many times did you go more than five miles up the Kandik?

18 A Gosh, I couldn't count back.

19 Q How many times have you been above Johnson Gorge on the
20 Kandik?

21 A I've only went up that far--that's only far as I ever wanted
22 to go with a boat.

23 Q Were there ever occasions in going up to Johnson Gorge where
24 you had to get out of your boat and drag it over a gravel
25 bar?

1 A Well, I went up there because -- without motor. We lined
2 it up and pulled it up because we didn't have a motor.

3 Q Have you ever been up to Johnson Gorge with a motor?

4 A Yeah.

5 Q Did you ever have to get out of your boat and drag it
6 over a bar?

7 A No, the water was at good stage.

8 Q How many times have you been up there with a motor?

9 A Right through the gorge, twice, and then another time when
10 we was up below there, but that's the only time. Like I
11 said, we never had no occasion to go there. The only time
12 was when --

13 Q Was this when you were living at the mouth of the Kandik?

14 A Yeah, that was before we moved down. We moved down on
15 the 1st of June, but my brother and I used to go down the
16 Yukon right after breakup and then go up there. We'd go
17 up and shoot beaver up there.

18 Q When you were pulling up before you went up in a motor boat,
19 how many times did you have to get out and drag the boat?

20 A Well, most of the time when you're pulling, this is the
21 only way to get it over a riffle because -- just -- yeah,
22 get out in hip boots and just get a hold of the nose of the
23 boat and one of us in the front and one in the back, and
24 we'd just grab ahold and just walk up the -- up the riffle
25 with it.

1 Q Are you in the boat more than you're out of the boat would
2 you say?

3 A No, it's just getting up to the top of the riffle and -- and
4 get into slacker (ph) water and we get in and pole.

5 Q How long are some of these riffles?

6 A The ones that are real -- some of 'em are pretty long and
7 some of 'em -- some of 'em are short. There's no way to
8 say that everyone is the same.

9 Q No, I realize that.

10 A They can be 50 feet and some of 'em can be 200 feet. It
11 depends on how your water spreads out from one place.

12 Q Is the boat that you -- the pole -- the poling boat that
13 you made these trips in, is that the one that you made
14 yourself?

15 A No, this is the one -- this is the one that I got up there
16 now. It was -- my brother designed it, and then I finished
17 it.

18 Q How much would that boat weigh would you estimate?

19 A Well, when it was new, I would say it weighed about 500
20 pounds, but I think now it's heavier because, you know,
21 water's soaked in. It's double -- I got double plywood on
22 it.

23 Q How many of you would take this boat up -- up to Johnson
24 Gorge?

25 A If I took this boat now or --

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1 Q No, I -- I was talking --

2 A Well, before, just me and my brother.

3 Q The two of you?

4 A Yeah.

5 Q Is that an easy job to drag that boat over a bar that might
6 be 200 feet long?

7 A Well, any -- to my knowledge, anytime you're going to take
8 any boat and try to pole it in swift water, it's no easy
9 job. In fact, there's a lot of jobs that ain't easy, but
10 you still do 'em.

11 Q I realize that. Imagine or try to recollect one of the
12 trips that you took in this poling boat when the water was
13 at what you would consider a low stage. Can you tell the
14 Court how many miles you might make in an hour moving up-
15 stream?

16 A Up them creeks, you don't -- if we was going to pole it up
17 and everything, we used to figure it was -- it was good
18 to make ten miles a day.

19 Q Would you consider a thousand pounds of --

20 A And that was, say, in about an eight hour day.

21 Q Excuse me. What is that again?

22 A In about an eight or nine hour day, so it's only -- sometimes
23 you make a mile, a mile and a half an hour if you've got any
24 kind of a load in one of the boats. (ph)

25 Q Would you consider a thousand pounds of cargo in that boat

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1 to be a pretty heavy load?

2 A That's -- well, that would be about the best load.

3 Q Did you frequently take the boat up with a lighter load
4 than that?

5 A Oh, yes.

6 Q Was it frequently just your own personal camping gear?

7 A Yeah, and our gear and stuff like that.

8 Q And is it --

9 A I have never had occasion to haul a big load. I did take
10 a -- a big load up the Sheep Creek, and that was -- I had
11 about 1,500 pounds in that boat. And that's worse than
12 the Kandik or the -- or the Nation 'cause the way I could
13 only describe the Tatondik is there is one riffle on that
14 from there to the boundary, and that's where it starts;
15 starts at the mouth and ends up there. It's steep -- an
16 awful steep creek.

17 Q Just one big riffle?

18 A Yes. It took all day to make eight miles up there.

19 Q When was the last time you poled a boat up the Kandik River?

20 A Gee, that's -- come right back down -- right to the -- the
21 year almost, it's hard to do. It's quite a few years ago.

22 Q Within five years, can you give an estimate?

23 A In the last five years, I said I wasn't --

24 Q No, I'm sorry. Can you estimate --

25 A Oh, back there. Well, see, we was up there in -- before

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1 I went in the Service in '42, and that's really the last
2 time that my brother and I went up there. After that, I
3 didn't -- we didn't go down there...Well, he went up there.
4 I did go down, but I didn't go up there. In '43 when I was
5 in the Service, I came home, but after that when we sold --
6 my mother sold our place at Biederman's Camp to my brother-
7 in-law, well, I more or less didn't feel that we should go
8 down and trap beaver down there when he was there. We didn't
9 want to infringe on -- on him.

10 Q I guess I'm a little confused. Does that mean you have not
11 been up the Nation --

12 A I've been down there, but I've never had no reason to go
13 up there. But then I met all these other hunters that's
14 going up there.

15 Q So the trips you have described where you have been up the
16 Nation River in a boat all occurred before -- I'm sorry, the
17 Kandik.

18 A Yeah.

19 Q The trips you have described where you went up the Kandik
20 in a boat, did those all occur before the war?

21 A Yeah, and then I'm trying to think when I was up there.
22 Yeah, I was up there afterwards, but I didn't go very far.
23 That was afterwards in '47. We went down there, just hunting
24 trip.

25 Q Would you say that, leaving aside the trips where you only

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1 went up, say, five miles, would you say that the number of
2 trips where you went up further than five miles would be
3 less than six?

4 A How many come down...

5 Q I realize (simultaneous speech), but I'm not trying --

6 A Yeah, that's -- that's a long time ago.

7 Q I know, and I don't mean to pin you down.

8 A Yeah.

9 Q But I am simply trying to get a rough -- a rough idea.

10 A It's really come right down to it, I wouldn't say exactly
11 how many trips it was because that's quite awhile ago.

12 Q But you do remember some of the trips very vividly?

13 A Oh, yes.

14 Q Now, --

15 A There was -- I know one trip I can remember, but I did not
16 go very far, only up there three miles. I went up because
17 a fellow did come down and he was trying to come down with
18 two boats, one tied behind the other and one of 'em coming
19 over a riffle, he got the one boat by, but the other one
20 swung into a sweeper and it rolled it over. So I went up
21 there to help him get that stuff out of there. He even said
22 himself that it was his fault because he shouldn't have
23 tried to come down the riffle with two boats, one of 'em
24 tied behind the other.

25 Q What kind of boats was he in?

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1 A He had a poling boat. It was about 24 feet long, and it
2 was pointed at each end, and then he had smaller one tied
3 on behind.

4 Q This was on the Kandik?

5 A Yeah. I -- I went up there to help him pick that boat up,
6 and then we fished some of the stuff out. He could salvage
7 some of the stuff out.

8 Q He lost -- he lost all his gear?

9 A What?

10 Q Or his gear got all dumped into the water?

11 A From that one boat, but we recovered traps and stuff like
12 that because it was right in deep water there too. When
13 we went up, I tied my boat up to the line so we could get
14 out and we could look down through the water there and we
15 could fish down with a little pike pole and pulled up some
16 of the traps and stuff.

17 Q Who was that man if you can recall?

18 A Bill Grinell (ph).

19 Q And he was a trapper up the Kandik?

20 A Yes, he used to trap up the -- what we used to call Easy
21 Moose Creek. That's up about 35 miles.

22 Q Now, I think you testified that you went up to Johnson Gorge
23 at least twice with a motor boat.

24 A Yeah, that was with motor boat.

25 Q Was that before the war?

1 A Yeah.

2 Q And you --

3 A That was the time my brother was there with me.

4 Q And is your memory of that trip very clear or is it a little
5 fuzzy?

6 A The one with the 7 horse was because that time, we did --
7 the water did raise quite good there and we found out we
8 had lots of water, but we didn't have quite enough power.

9 Q Is there something particular that makes that trip stand
10 out in your memory that --

11 A Well, that -- that's the one we...

12 Q What happened because you didn't have enough power?

13 A Well, I mean it's like that -- you'd get up there, so a
14 couple of them riffles, well -- well, one of us would be
15 running the motor, the other would get to the nose of the
16 boat with a pipe pole and help -- help it along.

17 Q In other words, you didn't quite have enough power to push
18 yourself --

19 A No, the water was -- at that stage, it was up pretty high,
20 so she got pretty swift because of all the bank pole (ph).

21 Q Now, was this a pretty reliable 7 horsepower motor?

22 A Yes, it was one of them old (indiscernible), but it was --
23 it was pretty reliable.

24 Q Were you ever concerned that it might kick off while you
25 were in a very swift --

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1 A When the water was that high, no, not with the two of us.
2 We -- no, I don't think either one of us thought about even
3 -- that there was any danger or anything.

4 Q Was this a time when the water was dropping after a flood
5 or was it the middle of the flood stage?

6 A No, it was -- it was just about, what you'd say, the drift
7 had kind of quit, so it was right after when the -- they
8 call cresting, you know, and it had dropped a little.

9 Q And most of the heavy debris had already --

10 A Um-hm.

11 Q -- either floated by or hung up on snags.

12 A The reason I said that I -- we both remembered that trip
13 so much is because here we was going up there with a motor
14 that we had to go help the motor up, see, and we had plenty
15 of water.

16 Q Have you ever had occasion on the river when you're trying
17 to get up it after a flood that's crested, referring to any
18 of the rivers you've gone up, where the complete channel
19 you've found blocked by logs or stuff that had drifted down
20 and hung up on a log jam or something?

21 A Not on the -- on the Kandik. There's -- there it didn't
22 seem like -- I seen some pretty bad log jams come in there,
23 but not the way you'd say that it would close the whole
24 channel.

25 Q And that -- your answer there is based on the two trips you

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1 went up with motor --

2 A Well, then I seen it on -- like I said, one time on the --
3 I tried to go up the Nation, and this one channel did have
4 a log jam there, but the other one was still clear yet.

5 Q You didn't --

6 A At that time, we was only going to go up there about a
7 mile and a half and that was right at the mouth. We just
8 went up there and then I turned back and went up the other --

9 Q Would you be very surprised if you were going up next summer
10 and found that a log jam had blocked one of the channels?

11 A Well, I could look for the other channel, because I don't
12 think that a log would never stay in Charley Creek. The
13 next high water would come down and wash it out, 'cause
14 when it comes down from there, it'll -- it'll go bank pole.
15 In fact, sometimes it'll go over the bank if we get a big
16 cloudburst up there or a big spring runoff.

17 Q And that usually flushes the channels clear?

18 A Yeah.

19 Q But isn't -- don't these log jams occur because of drift
20 carried by a flood when the flood subsides leaving the
21 drift hung up in the middle of the jam?

22 A Yes, but then a lot of -- most of that stuff hangs up on
23 -- you've got two or three different channels, but I always
24 -- almost always have seen them that there's always one
25 channel that's open. In fact, there's only one -- one river

1 I know of that was really -- what I've been up that was
2 blocked -- blocked by a log jam, and it still is, and that's
3 over at -- back at Fort Yukon what they call -- you go up
4 Sucker River, and it comes out four miles up the mouth of
5 the Porcupine. And you can go up, well, 75 miles and you
6 run into a log jam there that is -- it might be seven, eight
7 miles long because that's a permanent one. Yeah, that one
8 there because that's a slow moving stream. It never has
9 no big current in it. That one there is what I'd call a
10 log jam. You can't get by that.

11 Q Is the Kandik River larger than the Nation?

12 A Yes.

13 Q Quite a bit larger?

14 A I would say it is quite a bit.

15 Q Would you expect that there might be places on the Nation
16 where log jams block the entire channel?

17 A Well, almost anything could happen, but it's got more tendency
18 to be on the Nation than -- than on the Kandik. The Kandik
19 is the bigger river just like the Charley River is bigger
20 than the Kandik.

21 Q You say you've talked to hunters that had taken loads up
22 the Kandik. Did you ever have a hunter tell you that they
23 got fed up having to get out of their boat and drag it across
24 riffles?

25 A Not with -- with a jet unit, they never seemed to have no

R & R COURT REPORTERS

1 trouble.

2 Q (Simultaneous speech).

3 A Ones in the last few years -- the last couple years, I know
4 that some of 'em had been up there this fall because Mr.
5 O'Leary (ph) told me yesterday that her son had just come
6 back from there about a week ago.

7 Q Is he the person that traps with Brown?

8 A Eddie O'Leary? No, Eddie is the one that stays at Charley
9 Creek.

10 Q Do you know Randy Brown?

11 A No, I don't recollect.

12 Q Did you mean to suggest that any boat with a jet motor could
13 get up that river with no trouble?

14 A No, it's like I said, with --

15 Q It has to be the right size boat in the river --

16 A A river boat.

17 Q Excuse me?

18 A A river boat. I would say that you take like the one that
19 Dave Roy's got or one of them -- something like that, no.

20 Q How large is Dave --

21 A I wouldn't even attempt to try to --

22 Q How large is Dave Roy's boat?

23 A Well, that big motor he's got in. It's not a type river
24 boat.

25 Q You don't how large it is?

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1 A No, I wouldn't -- I just seen it. I wouldn't say how long
2 or how big it is.

3 Q Do you know how much water it draws?

4 A It -- not, but if you got no power -- you cut the power off,
5 you're going sink in. That's one reason why I'd rather use
6 the longer boat. Like I said, the 30-foot boat or 28-foot
7 boat with about a 42-inch bottom, you're not going to draw
8 as much water as you would a shorter boat.

9 Q Do you know how long Dave Roy's boat, could you say?

10 A No, I wouldn't --

11 Q Do you know whether it draws more water than your boat?

12 A Yes, it does when it's not running. He's got to have power
13 when he gets up and planing, well, then it lifts up. In
14 them kind of boats, you can't -- make them --

15 Q Is he an experienced -- is he an experienced river boat --

16 A No, I wouldn't say that he was. I know that type boat, I
17 wouldn't even attempt to take it up river. Boats like that
18 are made for, like out on the Yukon or in a lake or -- where
19 you've got lots of room. You've got to have a boat in --
20 up them side streams that's not going to be drawing too
21 much water and yet be able to handle, 'cause the deeper it
22 sets in the water, the harder you're going to have -- the
23 harder time you are going to have to handle it.

24 Q Have you ever heard of anyone trying to go up the river in
25 a boat with a motor who said he had to drag the boat repeatedl

R & R COURT REPORTERS

1 over bars?

2 A There's been, you know, maybe when the water's real low
3 like any river is. Sometimes after a long dry spell, all the
4 rivers are low.

5 Q When did they start using jet boats in this area?

6 A Really about -- on outboards, I've seen more of 'em. Almost
7 everybody's using 'em up around that -- going hunting, because
8 they want to go up the -- even on the Yukon they use 'em
9 because they want to go up these shallow Yukon sloughs,
10 and I'd say more in the last seven, eight years.

11 Q Did they ever --

12 A Four or five years ago when I was down there hunting, we
13 seen quite a few of 'em then.

14 Q Did you ever see any before the war?

15 A No, we didn't. That's -- up there, the ones that went
16 up there, they was using the tunnel boats. Now, they
17 kind of out -- done away with the tunnel boats, 'cause they
18 got these jet units. There is a difference in the tunnel
19 boat too is because when you use in inboard, you're using
20 a -- a four cylinder motor that's weighing probably four
21 or five hundred pounds. Then your prop and all your other
22 gear on, it's -- that's a lot of extra weight, where you
23 can get the same horsepower in an outboard and a jet that
24 maybe'll only weigh a hundred pounds. (Simultaneous speech).

25 Q Did anyone ever pay you to take cargo up the Kandik River?

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1 A Take cargo up?

2 Q To carry goods up there for 'em.

3 A You mean has anybody hauled stuff up there?

4 Q Has anybody paid you to haul goods for them?

5 A Only one up there is when I was up the -- when the geological
6 surveyor was up the Tatondik. We was supposed to go down and
7 go up the -- the Nation and a little ways up the Kandik, but
8 we never did finish up in the upper end there.

9 Q The upper end -- upper end of what?

10 A From the Tatondik down.

11 Q But you were hired by the geological surveyor to take goods --

12 A Yeah.

13 Q -- up the Tatondik?

14 A I went up the Tatondik with him.

15 Q But you never took any goods for anybody up the Nation --
16 or up the Kandik?

17 A No, just mostly for ourselves.

18 Q Did you ever hear of anyone else being paid to take goods
19 up the Kandik?

20 A Well, years ago, I knew -- I knew Sandy and Alfred Johnson
21 and Frank and Al Fish, and they were up before I could
22 remember they did it, but I knew them people, and I know
23 that they -- they freighted stuff up there for the survey
24 when they were surveying the boundary, and they -- they
25 lined and poled their boats up.

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1 Q Did they have a rough time?

2 A No, they -- they were good rivermen. They had pretty good
3 poling boats. They had two to a boat, and I know that they
4 said that they took a ton to a load, and they would go all
5 the way to the border, which they called 90 Mile.

6 Q How long did it take 'em?

7 A They said they'd been anywhere from a week to ten days going
8 up.

9 Q Did they ever have to dig channels in through the riffles,
10 the bars?

11 A No, they -- never heard 'em say that. There is one fellow
12 that I know that...When I was building this boat about five
13 years ago, I was painting my boat when he came through and
14 that was Earl Brabb (ph), a geologist for one of the oil
15 companies. And he came up to Eagle to see me there to get
16 some back history on my brother, because they said they were
17 going to name a hill up there or a creek after him. And
18 when he was looking at my boat, well then he told me that
19 the year before he had made a trip up by boat from the mouth
20 of the Kandik all the way to the border. And I told him
21 that time, I would -- I would like to make one more trip up
22 the Kandik before -- just make a trip. I never intend to go
23 to the boundary. I know he told me, he said that when I got
24 up -- if I ever tried to go up there that the upper end,
25 I might have a little problem taking the -- that big a boat

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1 up there. He thought that a 24 -- a 24-foot boat would be
2 more feasible up the -- because the river forks up there,
3 and it would be a little narrow he said. But I know Earl
4 Brabb has told me that he made it up there and back.

5 Q Do you have any relationship with Doyon, Limited? Are you
6 a stockholder in Doyon?

7 A Well, yeah, I'm a stockholder, and that's about all I can
8 say. I haven't got no connections with 'em.

9 Q Are you also a stockholder in Hungwinshun (ph)?

10 A Yeah, as much as I -- I've been trying to fight for the
11 last forty years to get out of it; had no business to be
12 in it. I can't seem to -- to get in there -- our family
13 shouldn't have been included in that.

14 Mr. ALLEN: That's all the questions I have.

15 Thank you.

16 JUDGE LUOMA: Miss Taylor, anything else?

17 MS. TAYLOR: I don't have any more questions,
18 no.

19 JUDGE LUOMA: Miss Higgins?

20 Ms. HIGGENS: No.

21 JUDGE LUOMA: I have just a couple questions.

22 BY JUDGE LUOMA:

23 Q Have you ever heard of anyone taking passengers up the
24 Kandik River or higher or down the river?

25 A Well, they -- oh, you mean, somebody wanting to go in there?

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1 Q Yes. Somebody who's wanting to pay to be hauled up the
2 river or down the river?

3 A They probably -- no, I wouldn't say -- no. (Simultaneous
4 speech), like some of 'em I know have taken hunters or
5 somebody like that, guiding 'em up there, but...

6 Q In other words -- you don't know whether there is -- there
7 are guides who take -- professional guides who take hunters
8 up for pay?

9 Q There -- they wouldn't be professional guides 'cause they're
10 not allowing 'em to guide in that country, but a lot of 'em,
11 like I said, are taking them this way. They're saying you'll
12 charter -- you charter my boat, and I'll take you up there.
13 It's just the same as guiding, but they don't do that out
14 of Eagle. Like I said before, all that traffic goes through
15 Circle. They go the Steese Highway to Circle, and then
16 they go up.

17 Q But are you aware of this type of activity taking place on
18 the Kandik?

19 A I've -- I've heard of it, but not -- I wouldn't say because
20 I wasn't there and talked to them people.

21 Q Now, what was the reason that you never went beyond Johnson
22 Gorge?

23 A That's as far as -- 'cause we was after beaver. And even
24 when I trapped up there, that's as far as I went. There
25 was other fellows up above it.

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1 Q That's because that's as far as you wanted to go?

2 A Yeah, because through there from there on up, you didn't run
3 into beaver, see, until you got farther up, like what we
4 call Easy Moose about 35 miles up. Well then, see, we'd
5 run into beaver again. Well, it wasn't really -- we could
6 get what we wanted down at the lower end.

7 Q Does a poling boat ever use mechanical type power along
8 with the poling? Or is the -- is the power strictly by
9 use of the poles?

10 A You mean a poling boat?

11 Q Yes, a poling boat.

12 A Well, that's -- a few years ago, that's the only -- we didn't
13 have motors, and that's what we called a poling boat because
14 then you get in and pole -- you pole it up.

15 Q Yes, but you never have a combination of power and poling
16 on a boat. It was strictly just poling, is that right?

17 A Yeah. The only time is like I said the time we went up
18 and we had that 7 horse motor, we did have to use a pole
19 to help.

20 Q You didn't plan it?

21 A No..

22 Q You were forced into it. Now, I would gather that we've
23 been talking about two kinds of jet-powered boats, the
24 inboard and the outboard. Is that correct?

25 A Yeah, yes.

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1 Q Now, is it your testimony that the -- the only feasible
2 jet-powered boats are the -- to be used on the Kandik, are
3 the jet outboards, is that correct?

4 A Yes.

5 Q Now, this other boat that we've talked about, that was a
6 jet inboard, I guess?

7 A Yes.

8 Q And are you saying then that jet inboard boats are not
9 designed to go up the Kandik?

10 A Most of 'em is either too short, and like I said, you've
11 got that much extra weight, and when -- of course, when
12 they're running, the boat will lift up, but if you slow
13 down, you know, they sink in the water.

14 Q Um-hm.

15 A So if you're going to get down into shallow water, and
16 you're going to try to go slow, well, you're going to draw
17 more water.

18 Q Anyway, the substance of your testimony is that it's the
19 jet outboards that are feasible for use on the Kandik, --

20 A Yes, that's --

21 Q -- and not the inboards?

22 A Yeah. There are times when like you said in flood stage,
23 you take -- take an inboard up there and -- without a tunnel
24 or a jet on it 'cause the kind of water that you get on
25 there would be -- if it's bank full, well, you could have

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1 five feet -- five and six foot of water over them riffles.

2 Q Um-hm.

3 JUDGE LUOMA: All right. Thank you, Mr. Biederman

4 MR. ALLEN: You suggested one more question to me.

5 JUDGE LUOMA: All right.

6 BY MR. ALLEN:

7 Q Do you know whether a jet outboard motor has ever been taken
8 up the Tatondik?

9 A Yes. They -- I was up there sheep hunting about seven, eight
10 years ago. Me and my son went up there, and we didn't --
11 we poled a boat up that time, because at that time I didn't
12 have this motor. I borrowed an 18 horse motor from a fellow
13 and he didn't want us to take it up there and use it. He
14 thought we might break the shaft on it, so we just used it
15 down the river and then we only went up there eight miles
16 to Pass (ph) Creek, and so we went back up, and when we come
17 back out and here a fellow come by with a jet -- jet outfit,
18 and up there where we had necked (ph) the boat up in there.
19 And he -- he went sailing up there and come back down again.

20 Q If you were planning --

21 A And he made it sound-- look so easy when we was pulling
22 that boat up.

23 Q If you were planning a trip up a river where you expected
24 there might be low water, would a jet boat with an outboard
25 motor be the boat you would be most likely to pick to give

R & R COURT REPORTERS

1 yourself the maximum assurance of getting over the low spots?

2 A Oh, yes.

3 Q Is it correct to say that you can take a jet boat with an
4 outboard motor up a lot of places where you could not take
5 a poling a boat or even a tunnel boat?

6 A Well, there's -- no, poling boats, you can take that up.

7 Q Even if you have (simultaneous speech).

8 A But I'm talking about going with power. Yeah, you can take
9 that up. If you can take a poling boat up there, you can
10 almost use a jet unit, because -- with an outboard.

11 Q So it can get over areas where there's very little water
12 flowing?

13 A Yes. A tunnel boat, like I said, you've got the prop sticking
14 underneath, and of course, you've got added weight to that
15 motor and everything, but it has tendency, a tunnel boat,
16 to suck gravel up in there. So when you're getting down
17 and it's starting to get almost touching bottom, your --
18 bottom of your boat is almost going to be on the gravel.
19 You're going to suck gravel up it. Of course, if you've
20 only got a short ways and don't care whether you batter up
21 the prop a little, well, you can -- you can go on through.

22 Q Is the Tantondik, in your estimation, an easier river to
23 navigate than the Seventymile?

24 A Them two -- come right down to it, I wouldn't want to
25 navigate either one of 'em.

R & R COURT REPORTERS

1 Q Let's say about --

2 A Because then you're -- you're really getting into --
3 you're getting into work.

4 Q Real work?

5 A Yeah. Them riffles and -- Tatondik, them riffles are swift.
6 There's an awful drop in it, and --

7 Q How about Fourth of July Creek, is that an easy one to
8 navigate?

9 A Fourth of July Creek, you wouldn't call that anywhere
10 navigatable. You couldn't even get a boat up or anything.
11 That's -- them kind of creeks aren't really -- there are
12 what we'd call creeks. They're creeks, that's all. But
13 they're not for taking boats up. You couldn't even class
14 'em in with, like the Tatondik and Nation and Kandik and
15 the Charley River.

16 Q Could you take a jet boat up the Seventymile?

17 A Yes, there have -- some of 'em, they have went up there.
18 Years ago, I know they took the boat up there with a lift
19 on it and an outboard. They went as far as the falls up
20 there, and they couldn't get by the falls though. That's
21 up -- up below -- around Barney (ph) Creek they call it.

22 MR. ALLEN: That's all. Thank you.

23 MS. TAYLOR: One more.

24 BY MS. TAYLOR:

25 Q The -- the poling boat can go anywhere a jet boat can go,

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1 is that right?

2 A Well, it all depends on how hard you want to work, if you
3 want to pole it.

4 Q Can you take a poling boat places were you -- you couldn't
5 take a jet boat?

6 A No, it depends on how much water you have.

7 Q One's harder to work than the other?

8 A Some little creeks -- yeah. Some little creeks you haven't
9 got enough water to put a boat in, --

10 Q Okay.

11 A -- let alone take it up there, there wouldn't be enough
12 water to float (ph) in, like I said Fourth of July Creek
13 is that way.

14 JUDGE LUOMA: Thank you Mr. Biederman.

15 MS. TAYLOR: Okay, thank you.

16 JUDGE LUOMA: Miss Higgins, do I understand
17 that you're going to now take over?

18 MS. HIGGINS: Yes, very briefly. I'd like to
19 call Mr. Bill Long to the stand. May we have a short recess,
20 Your Honor?

21 JUDGE LUOMA: All right, let's make it about
22 a ten minute recess.

23 (OFF THE RECORD)

24 (ON THE RECORD)

25 WILLIAM E. LONG,

R & R COURT REPORTERS

1 Having been first duly sworn under Oath, testified as follows:

2 BY MS. HIGGENS:

3 Q Would you state your name --

4 JUDGE LUOMA: Just a moment please. Are you
5 through --

6 COURT REPORTER: Oh, no I'm sorry. You're on
7 the record.

8 JUDGE LUOMA: All right. On the record.

9 Q Would you state your name for the record, please?

10 A My name is William E. Long.

11 Q And what is your present occupation?

12 A My present occupation is hydrologist for the State of Alaska.

13 Q Could you describe generally your -- your responsibilities
14 as hydrologist for the State of Alaska?

15 A The responsibilities are fairly varied. They deal with
16 hydrologic problems that might arise for the State, but
17 generally they involve a responsibility for collecting
18 and maintaining and being able to retrieve hydrologic
19 data, conducting collection programs for various programs
20 that the State might be interested in, and that also involves
21 working with the United States Geological Survey in a
22 cooperative program, which the State and the U.S. jointly
23 contribute funds to.

24 Q How long have you been in your present job?

25 A I've been in this present job a little more than a year.

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1 Q What did you do before that? Would --

2 A Okay.

3 Q -- you briefly summarize your -- your previous employment
4 and educational background?

5 A Roger. Let's see. I was educated with a BS degree in
6 geology, and by the way my profession at this point would
7 be called a hydro-geologist, not a hydrologist as a profes-
8 sional title. But my BS in geology was from University of
9 Nevada in, I think, '57. In 1961, it was a Masters of
10 science and geology from Ohio State University. In 1964,
11 a PhD in geology at Ohio State University. My work -- for
12 the last thirteen years -- starting about thirteen years
13 ago really was when I came to Alaska Methodist University
14 as a professor of geology there, and I taught at AMU for
15 eleven years until AMU folded financially. And the next
16 position I took was a planner for the Matanuska/Susitna
17 Borough for one year, and that takes us to my present
18 position.

19 Q Thank you. We've heard repeated references to the term,
20 braided stream. In fact, I believe Mr. Tileston, in comparing
21 the Nation to the Kandik, stated that the Nation is braided
22 at many places; in fact, is almost entirely braided, is not
23 a well defined channel. Do you agree with -- with that
24 description of the Nation?

25 A When looking at the maps or looking at the beautiful U-2

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1 photographs that we have here would not call the Nation
2 River braided.

3 Q But let's make it clear first of all, you've never been
4 to the Kandik or Nation River, have you?

5 A That is correct. I've never been there.

6 Q And your testimony today will be based on the evidence
7 presented during this hearing as well as your own steady--

8 A That's right.

9 Q -- flow measurements which are public record and various
10 maps, is that correct?

11 A That's correct, yes.

12 Q Okay. Could you give us a definition of a braided stream?
13 What's your definition?

14 A Well, if I were talking to a class, I'd say that a braided
15 stream is one where the channel braids up into many channels,
16 and often the stream bed is very wide. It might be -- as
17 the case of the old Platte (ph) River on the order of 2,000
18 feet wide with many intricate channels going various direc-
19 tions at various times. They result from there being too
20 much load for the stream to carry, and it can only carry
21 the load during time of high flow. Typically a braided
22 stream has very erratic flow, and so the result is that
23 they -- this quite varied pattern develops. Now, there
24 are classic end members of a spectrum going from -- by the
25 way, people talk -- in the modern knowledge, now they talk

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1 about in many of the river texts, and I can show examples
2 of that if necessary. They talk about the conditions at
3 which a river meanders and the conditions for which a river
4 braids, and they are beginning to -- quantitatively begin
5 to make interpretations of the physical parameters necessary
6 for braiding or meandering. All right. And in anything
7 geologic, there tends to be a spectrum, so there is a place
8 where a stream is borderline. It can be either braided or
9 a meandering stream. And they would have been documented,
10 the transition from one stream type to another. As a matter
11 of fact, the Platte is a beautiful example because the
12 Platte River in Colorado just recently in the last -- in
13 -- within recorded time has gone through this metamorphic
14 process from a 2,000 foot wide channel, which was intricately
15 braided to one in which at the present time is still considere
16 braided, but has sort of the -- the -- it's a -- it's a very
17 much more narrow channel, and it breaks up into -- the stream
18 breaks up into several islands, and it has diamond-shaped
19 bars in it and so forth. And eventually, presumably this
20 stream can, under the proper conditions of discharge, of
21 bank full flood -- flow characteristics and sediment load
22 and slope could further change to become a meandering stream.
23 Okay. So at any rate, it's not too difficult to identify
24 a meandering stream. A meandering stream has, by and large,
25 a single channel which occasionally breaks up around an

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1 island or a sandbar, in bars and streams are very common.
2 Most texts that any of us in beginning geology have seen
3 will show the typical bars to be found in this stream,
4 and they're found in the point bar, and they're also found
5 just down the straight reach a little bit past the meander
6 and so far as are present in meandering streams.

7 Q To summarize then, is the basic distinction between a braided
8 stream and a meandered stream, that the meandered has basically
9 one channel?

10 A And it has a meander form.

11 Q Okay. And you wouldn't call a meandered stream with gravel
12 bars across which the water flow breaks into several channels
13 a -- a braided stream?

14 A I wouldn't call it that as geomorphic terminology, no -- a
15 geomorphic name.

16 Q Based on -- on the photographs we've seen of the Nation
17 and your examination of the maps, how much of it do you
18 think is -- is braided?

19 A Well, if onewere going to characterize this stream generally,
20 he certainly would call the stream for its -- most of its
21 length. In fact, all of the length that I have seen with
22 -- with a few exceptions, there are a few places where it's
23 not...I would call it a meandering stream. And then it does
24 have some other areas, like it has a distributory deltaic
25 part of the river where it meets the Yukon and distributory

R & R COURT REPORTERS

1 channels are present there, but to answer your question
2 directly, I would say a very small percent, and I haven't
3 measured the distances, but less than ten.

4 Q Is it your testimony then that the Nation has basically one
5 channel --

6 A Yes, I think it's possible to go to that remarkable photo-
7 graph, put your pen on the channel and follow that single,
8 major channel right the length of the river.

9 Q Apart from the braiding versus meandering characteristics
10 of -- of the stream -- of the Nation, can you generally
11 describe the Nation in terms of its major characteristics
12 including such things as grading it which -- which the Judge
13 has indicated he's interested in?

14 A Yeah, I think --

15 Mr. ALLEN: I wonder if I could -- I'm going to
16 make an objection there in that I don't believe this witness has
17 -- I don't believe you've laid foundation for asking him to
18 describe the physical characteristics of the river. All he knows
19 is what he has heard which is already in evidence. So he is
20 simply giving his editorial interpretation of the evidence.

21 JUDGE LUOMA: I'm -- I'm going to overrule that.
22 You may answer the question.

23 A I forgot what the question was.

24 Q Give us a general description of the major features of the
25 Nation.

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1 A Oh, sure. Okay. I -- I see the Nation as -- from a geomorphic
2 point of view, from a landscape point of view, the Nation is
3 a stream which is draining in area which is a little -- is
4 a fairly old landscape for Alaska. The stream system is
5 fairly well developed. It has -- it's a somewhat asym-
6 metrical dendritic system arising in the --

7 Q Would you describe that in lay terms?

8 A If you look at the pattern of the Nation River as has been
9 described here by others, and as shows on this navigational
10 chart a little more clearly than it has on some of the
11 other charts that are either such a large scale that we
12 can't see it all, or the trouble with the USGS sheet is
13 that -- that the Canadian Border goes across about the middle
14 of the drainage basin, and therefore, it's hard to see it
15 all in one nice map. Well, this aeronautical chart puts
16 it all on one, and you can see that the -- the main channel
17 of the Nation is on the -- sort of the northwest side of
18 the basin, and the major tributaries come from the southeast
19 over to it in a normal stream basin, if there is such a
20 thing, and I suppose we could say there was. In a homogenous
21 bedrock area, one would expect to see a more equal-sided
22 stream pattern develop.

23 Q Can I interrupt you at this point, and ask you if this is
24 the aeronautical map that you referred to?

25 COURT REPORTER: Excuse me. You can't touch the

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1 microphone. I can't pick you up.

2 A Yes, it is.

3 Q And what -- what do the orange lines on this map indicate?

4 A The orange -- the orange lines on the map outline the
5 drainage areas of the two rivers in question.

6 Q I'd like to mark this aeronautical chart as Exhibit A-1.

7 JUDGE LUOMA: Do that now please.

8 Q I'd like to offer Exhibit A-1 into evidence.

9 JUDGE LUOMA: Any objections?

10 MR. ALLEN: No objections.

11 MS. TAYLOR: No objections.

12 JUDGE LUOMA: Exhibit A-1 is received in evidence.

13 Q Continue with your description.

14 A All right. From this map and others, one could say that the
15 stream is -- particularly the part of the stream that we're
16 looking at, any stream has its head waters area -- any fairly
17 well developed stream has a head waters area, an area where
18 it's flowing on its own alluvium, its own sediment deposited
19 material, and it also might have a deltaic area of some type,
20 probably would have. This -- when it seems to be flowing
21 and it's mostly in alluvial valley, and it has developed
22 the meandering stream characteristics that one might expect
23 for such a river. The relief of the area; not the stream,
24 but the area from which the stream is coming, is on the order
25 of 5,000 feet with about 5,750 being the highest point in

R & R COURT REPORTERS

1 the drainage basin and the river level of the Yukon River
2 level being about 750 feet leaving about 5,000 feet. Those
3 are taken from the inch-to-the-mile USGS sheet-- yeah, okay.
4 -- and in conjunction with it. The nation river in the part
5 of Alaska -- in Alaska has a -- the river itself, only the
6 part in Alaska, has a relief or a drop of about 850 feet,
7 and that in percent slope is a .19 percent slope using the
8 numbers that were given today. And again, that would be an
9 approximation based on fairly quick and not careful distance
10 measurements. And that would be a -- a valley slope, not
11 a water surface slope. Because as was also mentioned earlier,
12 the stream does meander; it does have a very sinuous course,
13 and that course is longer than the valley course -- or the
14 valley distance as that's referred to as the...that's not...
15 It's referred to as -- often as a ratio between the stream
16 length and the valley length and -- and this ratio for a
17 very strongly meandering stream, is -- is often two. So in
18 other words, the stream is -- can be twice as long. In the
19 case of the Nation, it is not that long. It's somewhere --
20 I haven't actually worked that ratio out, but it's somewhere
21 around 1.5 or less I would assume. So it's -- it's not a
22 highly sinuous stream, but it is -- it is sinuous. And also
23 any property of the stream can vary at different positions
24 on a stream. So this is essentially the type of river. It
25 seems like a river which is a fairly well developed river at

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1 the present time; draining an area that's been pretty well
2 dissected by erosion. It's been fairly well -- the waters
3 flowing on it will reach the stream fairly quickly, and I
4 think we heard testimony to that effect earlier today. If
5 we look at the channel characteristics, we -- themselves
6 on the Nation River, we see a stream which at the highest
7 measurement taken by a USGS personnel is 120 feet in June
8 during a high flow time. It was 120 feet wide. Further
9 down stream was 240 feet wide, and further down stream
10 yet at its mouth was 313 feet wide. Depths varying between
11 -- at this time, between 1.5 and 8.7 feet deep in the various
12 measurements given. In -- at a time of low flow, we see
13 a channel which is 85, 108 and 151 feet wide, and varying
14 from 1.75 to 3 feet in -- in depth as based on the measure-
15 ments from the USGS readings. Also it would be -- it would
16 -- it would be remiss to not include the fact that the bars
17 are shallower, and we saw evidence that -- at -- during low
18 flow, the bars can be very shallow with only a few inches
19 of water over them.

20 Q Based on the USGS figures supplied by Mr. Childers, what
21 discharge could we expect for the Nation, May through
22 September? Have you calculated that?

23 A By using Mr. Childer's models and applying the formulae
24 that was suggested, I see a discharge -- I'm going -- I guess
25 it depends whether you want, the means, 'the max', but I'll

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1 -- let me go by his -- by the max' here, I mean his 75 per-
2 centile. It was a 75, a 50 and a 25 if I remember correctly.
3 I picked those three different levels from the USGS Chart,
4 did the multiplication. On the high side, we would see
5 2,700 cubic feet per second in May, 2,070 in June, 1,080
6 in July, 1,350 in August and 900 for September with a mean
7 max' then of about 1,620. But if we take the means, the
8 50 percentile, the mean for that period would be 954 for the
9 Nation River and the mean low for the five month period
10 would be 612. This suggests to me a stream that is fairly
11 wide channel. It's shallow, has bars in it that flow sig-
12 nificant amounts of water.

13 Q Could you generally describe the Kandik for --

14 A I'll take the mean instead of the high for the Kandik, because
15 I think they perhaps are more meaningful, if you'll pardon
16 the word.

17 Q You're going to give us the discharge figures, same ones for
18 the Kandik?

19 A Yeah, this would be predicted discharges using the USGS
20 presented model. May, 2,160 cubic feet per second mean;
21 June, 1,680; July, 960; August, 1,200; September, 840 with
22 a mean for the five month period of 1,368 cubic feet per
23 second. Regarding the velocities, there's a space for
24 velocities of these streams on the notes that have been
25 put into evidence, and a review of the maximum velocities

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1 on those was taken on June 21st at the -- at a site that was
2 used for a stream measurement. It was 7.02 feet per second,
3 which by my calculation and any of my calculations for any
4 of these numbers, of course, is subject to my mathematical
5 prowess, and I'm not a mathematician. But I came up with
6 7.2 feet, the percent being equivalent to approximately
7 4.8 miles per hour, and that would be the maximum indicated
8 by the instrument in the stream. So that -- that is a
9 measured velocity, and minimums are down in the August
10 measurements at about 1.3 miles per hour. About -- that's
11 a min- -- that's not actually -- take that back. That's
12 a max' -- it's a low maximum, so minimum is going to be as
13 was indicated, less than a mile per hour.

14 Q Is -- is that all of the velocity figures?

15 A Yes. I have more numbers, but I just wanted to give an idea
16 of the types of velocities that were in the stream as -- that
17 have been measured in the stream.

18 Q How would you generally describe the Kandik River? We've had
19 a general description of the Nation. Could you give us a
20 similar description of the Kandik --

21 A Yeah, --

22 Q -- with attention to -- to differences that you see between
23 the two, if any?

24 A The -- the Kandik's basin characteristics are a little bit
25 different than the Nation's. For one thing, it's a long,

R & R COURT REPORTERS

1 narrow basin relative to the Nation, which is a -- just
2 looking at here as you can do later on, will see it's sort
3 of triangular in shape. So we see in the case of the Kandik
4 River, a longer, narrower stream. It's drainage area is
5 quite a bit more. My drainage area figures are very close
6 to those which have been presented earlier, so I round them
7 off at 1,200 square miles for the Kandik as compared to
8 about 900 square miles for the Nation. So the Kandik is --
9 is a larger stream, approximately 25 percent larger. Most
10 of the testimony we've heard would indicate that it is
11 larger, and ev- -- the USGS data also shows it to be larger.
12 And -- I've already indicated the -- the Kandik discharge
13 figures using the model as a predictive tool.

14 Q Could you describe the process by which sweepers are created?

15 A Well, yeah, okay. The -- the process is the erosion of
16 the outside of a meanderer or an erosion -- erosion on a
17 bank anywhere. But the most common place in a meandering
18 stream for erosion to occur is on the outside of a meanderer
19 -- well, simultaneously, deposition is taking place on the
20 inside of the meanderer, and the result is that with time,
21 the meanderer moves or changes (ph) or migrates across the
22 valley creating what we call meander scrolls, and they can
23 be seen in the photographs in the Nation River Valley and
24 the Kandik River Valleys, and a fairly common feature, they
25 create oxbow legs and so forth -- and sloughs. They're

R & R COURT REPORTERS

1 commonly called sloughs in Alaska.

2 Q Okay. So am I correct in stating that the continuing
3 erosion of the bank is what creates sweepers --

4 A Yes, I think that's --

5 Q -- in very simplistic terms?

6 A -- reasonable -- or fairly reasonable.

7 Q Are sweepers likely to stay rooted to the bank for long?

8 A They can do -- they'll stay there until the water washes
9 away the soil in which they're rooted or the current gets
10 strong enough to pull the root out, I suppose.

11 Q How long --

12 A It seems -- well, it's -- geologically speaking or even
13 river- -- river-wise speaking, it's a very -- it's a very
14 short time. There are sweepers on the Matanuska River and
15 on Moose Creek -- Moose Creek that I've observed. We used
16 to use one that came all the way across. It was a bridge,
17 and we were able to use it for a couple of years, and now
18 it's gone.

19 Q Would you call sweepers --

20 A On the other hand, I've seen 'em last... That one lasted a
21 couple of years to my knowledge. It might have been there
22 ten...not ten, I don't know, but it might have been there
23 several years before I observed it. And there are other ones
24 that stay a few years. So we're just talking anywhere from
25 months to years I suppose.

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1 Q Would you call sweepers a permanent obstacle in --

2 A I'm sure if --

3 Q -- with respect to either of the rivers that are at issue
4 in this appeal?

5 A I think in the sense that permanency -- in my sense of a
6 permanent part of the river channel, I would say they are
7 not. I would say they are a temporary feature.

8 MS. HIGGENS: That's all that I have.

9 JUDGE LUOMA: Miss Taylor?

10 MS. TAYLOR: I have no questions.

11 JUDGE LUOMA: Mr. Allen?

12 Mr. ALLEN: I believe I have just one.

13 BY MR. ALLEN:

14 Q On your last point, you said sweepers are a temporary feature.
15 Are you talking about an individual sweeper or the condition
16 of sweepers in general?

17 A I'm sure that -- in most of these streams, you'll always
18 find sweepers. I was talking about an individual sweeper.

19 Mr. ALLEN: That's all I have.

20 JUDGE LUOMA: Is that all you have?

21 BY JUDGE LUOMA:

22 Q The velocities that you spoke of, were those velocities
23 based upon measurements that were taken at the mean depth
24 or were they surface velocities?

25 A Those -- those were taken at the depth for the flow measure-

R & R COURT REPORTERS

1 ment, which would be a depth that is considered the mean.

2 Q Would you expect to find then that the surface velocity would
3 be greater than that?

4 A The velocities would be higher -- higher in the stream, that's
5 correct. Right on the surface itself, it slows down, but
6 just under the surface, it -- is the place of maximum velocity

7 Q Are you familiar with the Colorado River?

8 A Yes, sir.

9 Q Particularly the Mohave (ph) Valley area above Needles?
10 It's after the river comes out of the gorge.

11 A I -- I've never been there personally. I -- I've done some
12 reading about it.

13 Q Have you read -- would you class that as a braided stream?

14 A Oh, I haven't seen it to know.

15 Q You don't know.

16 A Yeah.

17 JUDGE LUOMA: All right. That's all. Thank
18 you very much.

19 MS. HIGGENS: I'd like to call Richard Stern
20 to the stand.

21 RICHARD O. STERN,

22 Having been duly sworn under Oath, testified as follows:

23 BY MS. HIGGENS:

24 Q State your name for the record please?

25 A My name is Richard Olof Stern.

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1 Q And what is your present occupation?

2 A I'm a historian for the State of Alaska and Department of
3 Natural Resources.

4 Q Could you briefly describe your responsibilities in that
5 position?

6 A I conduct historic research into topics and events that
7 are of interest to the State. I examine national register
8 nominations on behalf of the State, and generally am in-
9 volved in whatever historic preservation programs and his-
10 toric research that are not covered under the division of
11 park responsibilities.

12 Q What is your educational background?

13 A I hold a Bachelor's Degree from the State University of
14 New York, College of Potsdam, a Master's Degree from the
15 State University of New York at Binghamton, and I'm currently
16 a PhD candidate at Binghamton, New York.

17 Q In connection with your present job, have you researched
18 use of the Kandik and Nation Rivers?

19 A Yes, I have.

20 Q Could you summarize your reseach efforts and methodology
21 in that connection?

22 A When I began work with the State of Alaska, I was involved
23 in a research program on -- on the waters throughout the
24 State. We knew that there was going to be a board hearing
25 on the Kandik and Nation Rivers matter. I began research

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1 by reading through the file notes that were available at
2 the Division of Lands, and then began researching the
3 materials that were referred to in those notes. I examined
4 published reports and gathered bibliographic material and
5 references within those reports. I examined those materials
6 either at the libraries when they were available in Anchorage
7 or Fairbanks or ordered the materials on inter-library loan.
8 The unpublished materials when they were available on inter-
9 library loan were sent to Anchorage where I examined them.
10 We also requested and received approximately twelve or
11 fourteen notebooks from the U.S. Geological Survey at Memo'
12 Park and examined those at the USG- -- USGS offices in
13 Anchorage.

14 Q In addition to -- to researching available archival material
15 documented use of -- of the Kandik and Nation, did you have
16 an occasion to do any field interviews?

17 A Yes, I did, and the company with Mike Brown, historian
18 from the Bureau of Land Management at Anchorage. We went
19 to Eagle, Alaska and conducted interviews there during the
20 period August 25th through September 1st, this year.

21 Q How many people did you interview?

22 A I don't recall the exact number. I could look at my notes.
23 It was between eight and ten people, I believe.

24 Q Did you experience any difficulties contacting people or
25 getting interviewees to freely talk?

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1 A In a couple of cases we did, but for the most part, people
2 that we contacted were quite open and free and discussing
3 their experiences with us. Our single major problems
4 stemmed from a misunderstanding on the part of the people
5 about the role that we were playing in the upcoming board
6 hearing, and once that was straightened out with representa-
7 tives of Doyon, we were able to conduct the interviews.

8 Q Are you preparing a written report on historic uses of the
9 -- the Kandik and Nation?

10 A Yes, I am.

11 Q What is the status of that report?

12 A Right now there's a final rough draft. There are a number
13 of typographical errors that still need to be corrected,
14 and we intend to submit it as part of the record after
15 that's complete.

16 MS. HIGGENS: Your Honor, should I make an
17 offer of that now or wait until later? How -- how do we handle
18 this?

19 JUDGE LUOMA: Well, why don't you try to offer
20 it at this time and see what happens?

21 MS. HIGGENS: I so move.

22 JUDGE LUOMA: I would have to object to that,
23 Your Honor. As I -- I understand what Mr. Sterns and what Mr.
24 Brown were going to do was type of their notes of the interviews
25 of the people in Eagle, and after they both had agreed on the

R & R COURT REPORTERS

1 content of those summaries of interviews, they would be included
2 as a supplemental report to be observed on the record.

3 WITNESS: May I offer a point of clarification?

4 JUDGE LUOMA: Just a moment.

5 Mr. ALLEN: But if -- if I understand correctly,
6 this is a product solely of Mr. Sterns, and I'm not too happy
7 about leaving the record open for the State to put in something
8 I have no opportunity to look at ahead of time.

9 JUDGE LUOMA: Well, Miss Higgins, would his fears
10 be realized? Is it something from what he just stated he thought
11 it was going to be?

12 MS. HIGGENS: Perhaps I can clarify this, Your
13 Honor, by -- by asking Mr. Stern.

14 JUDGE LUOMA: All right. Go ahead.

15 Q Now, it's my understanding your report will include some
16 material that you -- you derived from these interviews, is
17 that right?

18 A We're speaking, I think, of two different reports. The
19 report referred to by Mr. Allen is different from the report
20 that I said is in the final rough draft form.

21 Q Okay.

22 A Mr. Brown and I will prepare the transcripts of those
23 interviews based on what we agree was said and submit them.
24 The report that I was referring to that I've been working
25 on and preparing has been done by myself, and will not be

R & R COURT REPORTERS

1 utilizing any of the information from the interviews at
2 Eagle?

3 Q Okay. It was my understanding that Mr. Sterns report would
4 incorporate some of the interview information that hasn't
5 been finally processed yet, but apparently it is correct
6 that to this date, we have not mentioned the possibility
7 of submitting his written report in addition to the written
8 summaries of the interviews that were conducted at Eagle.
9 But I believe there has been stipulation to -- to keep the
10 record open to receive different material --

11 JUDGE LUOMA: For the joint report.

12 MS. HIGGENS: Pard' me?

13 JUDGE LUOMA: For the joint report, is that
14 correct?

15 Ms. HIGGENS: Joint -- I'm not sure it was so
16 limited.

17 JUDGE LUOMA: You have agreed between counsel
18 -- amongst counsel that I can receive a joint report from these
19 two witnesses, is that correct?

20 Mr. ALLEN: That was my understanding of --

21 JUDGE LUOMA: Is that your understanding?

22 MS. HIGGENS: Not really a report, but it's --

23 JUDGE LUOMA: Well, call it what you wish. It's
24 a piece of paper, huh?

25 MS. HIGGENS: Okay, right, yes. Joint transcripts

R & R COURT REPORTERS

1 I guess is...Interviews.

2 Mr. ALLEN: I would further -- further, Your
3 Honor, in the interest of expediting this to say that I would
4 have no objection to having the record include a report prepared
5 solely by Mr. Sterns on the understanding that it would not be
6 considered evidence, but simply in the nature of just part of
7 the State's brief, if you will.

8 JUDGE LUOMA: I think that if it would have any
9 value, it would have to be considered as evidence. I don't see
10 how it could be of any value otherwise. On the other hand, I
11 agree with you that I'm not going to receive a final report from
12 the State's witness without you having an opportunity to cross-
13 examine on it, if you so wish.

14 Mr. ALLEN: Well, that is certainly my feeling,
15 if it's going to be used as evidence.

16 JUDGE LUOMA: Well, I can't see where it'd be
17 of any value if it weren't offered as evidence.

18 Mr. ALLEN: Well, I would see it possibly in
19 the nature of argument commenting on the evidence, but I agree
20 with you, it would have limited value.

21 JUDGE LUOMA: Well, I would have to at this
22 point, sustain Mr. Allen's objection.

23 MS. HIGGENS: I'll try another approach.

24 JUDGE LUOMA: All right.

25 MS. HIGGENS: This is a rough draft of the

R & R COURT REPORTERS

1 report. I'd like to offer this into evidence at this -- at this
2 time.

3 JUDGE LUOMA: Is there some reason that you
4 can't interrogate the witness who is here now about the things
5 that he would say about the report so Mr. Allen has a chance
6 to cross-examine him?

7 MS. HIGGENS: No, there's not. Frankly, we
8 planned a rather limited case in the nature of rebuttal, rather
9 than taking Mr. Stern through -- through all of the material
10 contained in the report.

11 JUDGE LUOMA: Well, for instance, if you -- if
12 you asked him -- if I were to ask you questions about everything
13 in this report, the answers you give me, are they contained in
14 this report and so forth. Okay, you would say yes to that. Now,
15 I'd have to then give Mr. Allen a chance to go through the report
16 sentence by sentence and let him cross-examine the witness.

17 Mr. ALLEN: I suspect that most of the report
18 is not terribly controversial. It may be that the fastest way to
19 resolve this would be for us to proceed with the witness as a
20 rebuttal witness, leave the record open, give me a chance to
21 read the report back in Anchorage, and then submit it with any
22 objection that I might make to specific parts of it at that time.

23 JUDGE LUOMA: All right. So -- does that sound
24 agreeable to you, Miss Higgens?

25 MS. HIGGENS: That sounds agreeable.

R & R COURT REPORTERS

1 JUDGE LUOMA: Okay, in that case, I will leave
2 the record open to receive the document after this hearing, after
3 Mr. Allen has had a chance to make his comments about it. Now,
4 the only problem it seems to me there is that you may wish after
5 you've read it to have the opportunity to actually ask questions
6 of the witness, and would you do that by -- on paper?

7 Mr. ALLEN: Well, I -- I realize to some extent,
8 I'm sticking my neck out here because I assume that it's in the
9 nature of a historical document, and we, of course, introduced
10 Melody Grauman's historical document which I assume is somewhat
11 equivalent. I am operating on the assumption that there are no
12 truly critical issues that are -- that would -- would hinge on
13 anything in this report, but if that turns out to be the case,
14 I suppose I would want an opportunity either to the deposition
15 of Mr. Sterns or some other way to present a full picture on
16 that point. But I --

17 JUDGE LUOMA: All right. What we'll do then is
18 we'll -- we'll leave the record open, and you can introduce it.
19 We'll have a number for it, and we might as well start that number
20 right now. We'll mark it as A-2. And you submit it to Mr. Allen
21 and give him a chance to study it, and then the two of you get
22 together and see if you can submit it to me on stipulation. If
23 you can't, then you can make the objections as you see fit, Mr.
24 Allen.

25 MR. ALLEN: That sounds acceptable.

R & R COURT REPORTERS

1 MS HIGGENS: That's fine, Your Honor.

2 Q Have you been present during the entirety of this hearing?

3 A Yes, I have.

4 Q Melody Grauman testified that thorough study of Native use
5 of the Kandik and Nation Region has not been made to date.
6 Would you agree with that?

7 A Yes, I would.

8 Q On what basis?

9 A The -- the Han Indians that live in that region have not
10 been subject to a full historical or anthropological investi-
11 gation. There are a couple of summary reports indicating
12 the nature and contents of some of the Ethno Restoric (ph)
13 materials. This is the one by Cornelius Osgood that's been
14 referred to. There also include Melody Grauman's own report
15 which includes some of that information, but as I recall, is
16 not primarily concerned with the Han Indians. The Han
17 Indians, living on both sides of the Canadian and U.S. border,
18 have been split to some extent by that border, and so ethnog-
19 raphers have tended to concentrate perhaps on one side rather
20 than the other.

21 Q Based on your research, do you have anything to add to what's
22 already been -- been stated with respect to Native use of
23 this region prior to the gold rush circa 1850?

24 A During the time that we conducted field work in Eagle, Mike
25 Brown and I had a couple of informants mention the use of

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277-0572

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1 the Charley River and the Kandik and Nation Rivers that I
2 don't believe has been recorded in the literature before.
3 Specifically there was mention of use of the Kechumstuk
4 and upper Fortymile area for caribou hunting with a caribou
5 fence in that area and coming down the river -- down the
6 Charley River with some of the meat from that caribou hunt
7 and caching it at or near the mouth of the Charley River.
8 There was also mention of the use of Charley -- of res- --
9 by residents of Charley Village, the village that was at
10 the mouth of the Kandik River and washed away in about 1914,
11 of going up the Kandik River to the Ogilvie Mountains and
12 hunting moose, caribou and sheep in the Ogilvie Mountains
13 area.

14 Mr. ALLEN: Can I interrupt here? Not in the
15 nature of an objection, but is this material you're testifying
16 to covered in the draft report that you're --

17 A It will be covered in the report that Mike Brown and I will
18 prepare jointly.

19 Mr. ALLEN: I would just request that we not
20 spend too much time duplicating stuff that we're going to stick
21 in, in view of the hour. Otherwise, I -- you know, if you're
22 going to cover everything in there, then I'd like to restate my
23 objection covering the oral testimony (ph).

24 MS. HIGGENS: I believe Mr. Brown testified to
25 -- to aspects of those reports.

R & R COURT REPORTERS

1 Mr. ALLEN: Well, I -- I was primarily talking
2 about this exhibit that we --

3 Ms. HIGGENS: I don't intend to go over the
4 exhibits in great detail.

5 Mr. ALLEN: Okay, fine, sorry.

6 Q Would you agree with Melody Grauman's testimony that there
7 was a lack of economic incentive to use the Kandik or
8 Nation as well as other northern tributaries -- tributaries
9 of the Yukon during the gold rush years because the mineral-
10 ization -- gold was located on the other side of the Yukon?

11 A Yes, I would agree with that characterization. It appears
12 from the U.S. geological survey reports from that era, and
13 by the historical evidence that people conducted gold ex-
14 ploration activities on the south side of the river; that
15 the basic geological structures were known and understood
16 during the early period of the gold rush; and that the gold
17 was found to the south side of the Yukon River and not to
18 the north.

19 Q Where an economic incentive did exist south of the Yukon to
20 move men and supplies into a mining area, how was this
21 accomplished?

22 A It depended on the season and the amount of material that
23 had to be moved. During the summer, men would be using
24 the rivers and water ways to transport their winter's outfit
25 into an area. During the wintertime, there were packing

R & R COURT REPORTERS

1 trails that were used. There were also a few summer overland
2 trails that were developed. The freight rates on the -- for
3 those different mean -- methods of transportation varied.
4 It was a good deal more expensive to go packing over land
5 with freight than it was to use the commercial steamboats
6 on the river, for example.

7 Q Addressing the activities of the International Boundary
8 Commission, you know, can you describe the logistics of --
9 of travel and supply used by the geologists or geographers
10 and surveyors who were members of the party?

11 A The information that I'll be giving is only going to be
12 speaking about the area in question, between the Yukon and
13 the river on the south part of the boundary and the Porcupine
14 River on the north. The 1911 parties came into the area,
15 and had four launches at their disposal. Two of these
16 launches were sister-ships, constructed especially for the
17 International Boundary Commission. They were forty feet
18 in length, nine feet wide and had a draft of approximately
19 eighteen inches. As it turned out in that first season
20 of use, these two stern-wheelers drew a little bit more
21 water than the designers had intended. Consequently, after
22 the survey work was finished during the summer of 1911, they
23 were laid up in Dawson and overhauled and redesigned during
24 that winter. The engine was moved approximately seven feet
25 forward, and the improvement was such that the next summer,

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1 during 1912 when the launches were used, there was a slight
2 increase in their overall speed, and the draft had been
3 reduced to somewhere between fourteen and sixteen inches.
4 Together the two launches, the Aurora which was owned by
5 the Canadians and the Midnight Sun, owned by the Americans
6 could handle a barge -- barges carrying seven to twelve
7 tons. In addition, in 1911, the International Boundary
8 Commission rented the launch, The Pelican, from the White
9 Pass and Yukon Railroad and the Frontiersmen, which was
10 rented from Mr. Thomas Smith. They also used poling boats
11 and had scows and barges that I mentioned that were attached
12 to these other boats. The commercial steamboats on the
13 Yukon were also utilized to transport men, horses, supplies
14 and equipment for that summer's work. In 1912, the vessels
15 -- the two vessels I mentioned, the Aurora and Midnight
16 Sun, were used again, and also the Falcon (ph), a vessel
17 similar in size. Poling boats for the use of the Boundary
18 Commission were constructed by a William Seth of Rampart
19 House and utilized by the Boundary Commission on those
20 rivers where they had found the previous summer that the
21 two launches couldn't operate. Now, if you'd like, I can
22 go into some details of overland transportation as well or
23 inland from the main waterways. The specific --

24 Q Please do.

25 A -- specifically in 1911, Dalon Klines (ph), the Canadian

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1 party chief, and an assistant travelled from the area around
2 Sheep Creek or the Tatondik River over land to meet up with
3 the Boundary Commission where they intended to start the
4 survey work at around the headwaters of the Black River,
5 and then northward to the Porcupine. It was the intent of
6 the Boundary Commission to move their supplies and equipment
7 and horses up the Black River to a point near the boundary,
8 and then proceed northward. In his published report, Klines
9 indicates that most of the geographic features and the
10 rivers trend parallel or rather perpendicular to the boundary.
11 The boundary, of course, is the 141st meridian, and this is
12 an artificial line placed on the map. They were able to
13 utilize the Black River in 1911 only to about -- a point
14 about 125 miles downstream from the border. They had rather
15 low water that year and were not able to carry out their
16 plans as they intended to. The next year in 1912 when they
17 brought supplies in up the Black River, they were able to
18 get within thirty miles of the border, and by using poling
19 boats were able to get the supplies to the border area and
20 then cover the distance southward that they had not finished
21 in 1911. The 1912 work also involved the use of bringing
22 supplies up the Kandik River. We heard testimony to that
23 previously and this is covered in some more detail in the
24 report, Exhibit A-2. From my reading the survey notes
25 which were requested from USGS at Mineral Park and sent to

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1 Anchorage, I'm only able to offer an interpretation, an
2 opinion about the use of the Nation River for bringing men
3 and supplies up to the boundary area. It appears that they
4 came up the Nation River and then up Hardluck Creek and
5 brought supplies, including mail, which is noted in the notes
6 from the geologist to the vicinity of the boundary area.
7 They were able to bring poling boats loaded with hay and
8 oats for the horses from the mouth of the Kandik River up
9 to the vicinity of the boundary.

10 Q Based on your consideration of -- of the documents you've
11 mentioned, is it your opinion that supplies were poled on
12 the Nation and/or it's tributaries to camps located?

13 A The notes are not specific about that point, but as I under-
14 stand the notes and am interpreting them, it appears that
15 the supplies were poled to that point. They don't mention
16 the use of horses or pack trains brought those particular
17 supplies in.

18 Q Okay. Why did the personnel involved, the surveyors and
19 the geologists, travel over land?

20 A Well, in 1911, it was the intention of Klines to reach the
21 upper portion of the -- the Black River area and meet up
22 with the -- the supplies rather than travel with the supplies
23 around the Yukon. He apparently wanted to scout that region
24 for the next year's work; and therefore, went over land
25 travelling very lightly with one assistant and each of them

R & R COURT REPORTERS

1 with a hor- -- two horses I believe, if I recollect the
2 notes correctly. When the -- the party was going -- was
3 actually surveying the boundary as I've mentioned, it goes
4 through a rather mountainous area, the Ogilvie Mountains
5 in that part of Alaska. And going over land to survey this
6 141st meridian was -- was necessary in order to accomplish
7 their task. The supplies, as I've mentioned, and personnel
8 and horses were carried on some of the waterways to drop-
9 off points, and then either continued on tributary streams
10 to the Yukon and Porcupine or went over land to their
11 destination.

12 Q What types of boats were used to transport supplies to
13 the surveyors and geographers -- to the camps and the upper
14 regions along -- along the boundary?

15 A In the drainage of the Yuk- -- of the Yukon River portion
16 of the boundary, the poling boats brought in supplies up
17 the Kandik River as I'd mentioned, to the vicinity of the
18 boundary. Once there -- there appears -- and again, the
19 field notes are incomplete in this respect. They don't give
20 a day-to-day description of -- of operations, but from
21 reading what events are recorded in those field notes, it
22 appears that the supplies were then packed over land once
23 they'd been brought to the boundary in order to follow the
24 boundary line directly south. No one river or stream flows
25 in that direction, and it was necessary to stick close to the

R & R COURT REPORTERS

1 boundary line. The routine seems to have been that the party
2 -- the packers would move ahead with the supplies and horses,
3 establish a camp. The geologists and topographers and
4 geologists (sic) would follow behind and leapfrog from camp
5 to camp as they proceeded southward.

6 Q Can you identify this document, please?

7 A Yes. This is a series of xeroxes of various kinds of boats
8 and pack trains and camps taken from the 1918 joint report
9 upon the survey and demarcation of the international boundary
10 between the United States and Canada along the 141st meridian
11 from the Arctic Ocean to Mt. St. Elias and was published by
12 the U.S. Department of State.

13 Q Does it contain a -- pictures of a variety of crafts that
14 were used at the time?

15 A Yes, it does. It's an appendix which lists the special
16 equipment that was utilized in the course of the boundary
17 survey, including the launches that I've mentioned and some
18 other items.

19 Ms. HIGGENS: I'd like to mark this as Exhibit
20 A-3, and offer it into evidence.

21 Mr. ALLEN: I'm sorry. Where did this report
22 come from?

23 A The reference source is taped at the top of that first page,
24 Mr. Allen. An actual copy of that document is in the
25 University of Alaska Library in Anchorage.

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1 Mr. ALLEN: Do you know who the individual is
2 that prepared it?

3 A I don't believe that a single author is listed. I imagine
4 that it was a group effort by members of the boundary party.

5 Ms. HIGGENS: Alice Eliff (ph) did the xeroxing
6 if that's --

7 Mr. ALLEN: No, I was talking about the author
8 of the document. I have no objection.

9 JUDGE LUOMA: Neither do you, Miss Taylor, or
10 do you?

11 Ms. TAYLOR: I have no objection.

12 JUDGE LUOMA: Exhibit A-3 is received in evidence.
13 Please describe for me what Exhibit A-3 is physically. What does
14 it consist of? How many pages and --

15 Ms. HIGGENS: It consists of -- sorry. The
16 pages aren't consecutively numbered. It appears to be about
17 twenty pages of xeroxed appendix material including photographs
18 on every page.

19 JUDGE LUOMA: The pages are not bound together,
20 are they?

21 Ms. HIGGENS: No.

22 JUDGE LUOMA: Would you please count them --

23 Ms. HIGGENS: Yes.

24 JUDGE LUOMA: -- with the exact count?

25 Mr. ALLEN: Did you say they are not consecutively

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1 numbered?

2 Ms. HIGGENS: No.

3 Mr. ALLEN: Do you know why not?

4 Ms. HIGGENS: Because the pages on which pictures
5 of boats were located is introduced only for the purpose of
6 showing sampling and types of crafts that were in use at the time.

7 Mr. ALLEN: I see.

8 Ms. HIGGENS: Not for the textual material
9 included there.

10 Mr. ALLEN: Are there references in the text to
11 the Nation and the Kandik Rivers, do you know?

12 A I believe there are. One page that I recall shows a --

13 JUDGE LUOMA: Will you first please just count
14 the pages and get it over with. She's tried two or three times
15 now.

16 A Sorry.

17 Ms. HIGGENS: Are you withdrawing your own
18 objection, Mr. Allen?

19 Mr. ALLEN: Am I withdrawing what?

20 Ms. HIGGENS: (Pause) Seventeen pages.

21 JUDGE LUOMA: All right, A-3 consists of 17
22 pages. Each of them contain apparently some pictures of boats.
23 It's introduced only for the purpose of my looking at the pictures
24 of the boats and not for the text material, is that correct?

25 Ms. HIGGENS: That's correct.

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1 JUDGE LUOMA: Exhibit A-3 is received in evidence
2 with that limited purpose.

3 Q Based on your knowledge of Alaskan history, what role did
4 water transporation play in the settlement of Interior
5 Alaska and in general, and in particular, the Yukon Charley
6 area that we're concerned in this appeal?

7 A In the area that's been termed the middle Yukon, the early
8 fur trappers and traders entered and travelled through the
9 region on the major water systems, the Yukon and Porcupine
10 River. During the 1850's, Russians from the lower portion
11 of the Yukon River area came up stream apparently and may
12 have made it to the vicinity of Fort Yukon. The historic
13 record is not entirely clear on that point. In 1869 after
14 the purchase of Russia -- or purchase of Alaska from Russia,
15 Captain Raymond (ph) travelled from Russia. Captain Raymond
16 travelled from St. Michael up the Yukon River to Fort Yukon
17 aboard a steamboat and notified the English residents at
18 Fort Yukon; members of the Hudson's Bay Company that they
19 were on American territory. He was able to inform them of
20 this after making the necessary astronomical observations
21 that Fort Yukon was in fact to the west of the international
22 boundary of the 141st meridian. During the period after
23 the purchase of Alaska, up until the time of the gold rush
24 around 1900, the rivers were utilized by traders, trappers,
25 and people coming into the country, as testified to by

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1 Miss Grauman. Jack Quest (ph) and Al Mayo (ph), Arthur
2 Harper and others utilized the waters to transport themselves
3 and the goods for the trading posts that they operated on
4 behalf of various trading companies. The United States
5 Military utilized the Yukon River from its mouth as far
6 as Eagle where Fort Egbert was constructed in 1899. There
7 is documentation of this in published sources and also in
8 unpublished notes by Farnsworth who was one of the commanders
9 of Fort Egbert and I believe also at Fort Gibben (ph) at
10 the modern village of Tanana. During the gold rush period,
11 the rivers were used by the stampedeers as Miss Grauman
12 testified, and there were two main ways of getting into
13 the gold fields, one from Seattle through the inside passage
14 over the pass at -- from Skagway into the upper portion of
15 the Yukon River region and then down the Yukon River into
16 the -- Eagle and in earlier periods, Birch Creek and other
17 gold strike areas. Second route was from Seattle or other
18 points outside to St. Michael and their booking passage
19 on one of the steamers that made regular trips from that
20 area up the Yukon River to either Circle or Eagle, whatever
21 the miner's final destination was. In the 20th century,
22 we've heard various evidence about the use of the -- the
23 waterways for people moving themselves and equipment for
24 going out on trapping expeditions during the winter. There
25 certainly is information available that the Yukon, the

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1 Tanana and most of the other waterways in Interior Alaska
2 have been travelled upon for bringing freight and goods
3 to villages where villages were located.

4 Q Would -- would you say that water transportation has played
5 a very important role, a critical role in -- in settling
6 Interior Alaska?

7 A Alfred Brooks, who was the Director of the US -- of the
8 Alaska section of the U.S. Geological Survey for a number
9 of years, wrote in a book entitled, Blazing Alaska's Trails,
10 that it was his belief, water transportation was one of
11 the critical factors that enabled the Interior of Alaska
12 to be opened to exploration and settlement.

13 Mr. ALLEN: Can I make one quick (ph) statement
14 here. I don't want in any way to try to restrict the State's
15 ability to put on any evidence they want, but I did agree to a
16 stipulated -- a stipulation to receive a rather lengthy document
17 on your characterization of this witness as a rebuttal witness,
18 and from what I'm hearing, this is simply a rehash of what we've
19 had before. Which I'm happy to sit through, but it does color
20 my agreement to receive this lengthy document in -- in -- into
21 evidence at a later time.

22 Ms. HIGGENS: Well, I'll move onto other points.
23 I think we've been going all of about ten minutes now.

24 Q Based on your knowledge of Alaskan history and contemporary
25 trapping activities, would you say that contemporary trapping

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1 is similar to trapping of the 1920's and 1930's?

2 A From the information that I've been able to put together,
3 there seems to be some difference in the Yukon Charley
4 area between the intensity and the pattern of trapping
5 during the '20's and '30's and what is currently being done
6 in that area. One of the reasons for this is the increase
7 in prices of certain furs and the constant problem which
8 trappers face is to availability of various types of furs
9 and the seasons that the regulating body may put on -- to
10 take those furs. For example, muskrats do not appear to
11 be as significant a portion of the trapping take over the
12 last ten years as they were in an earlier period. Similarly,
13 beaver do not appear to be as intensely trapped as they were
14 in an earlier period. On the other hand, the contemporary
15 trappers such as Mr. Brown's son, who -- who was described
16 earlier, are apparently going after higher priced furs.
17 For example, a -- a single lynx pelt in 1976, '77 may have
18 brought as much as 275 to \$300.00, and wolf may have brought
19 150 to \$175.00. The physical effort involved in preparing
20 the traps set for beaver may be great -- much greater than
21 that involved in going after lynx and wolf. Consequently,
22 people are choosing to go after some of the higher priced
23 furs. The take from trapping according to a National Park
24 Service assistant's report on the Yukon Charley area is
25 from 600 to \$2,800.00 a year in -- over the last couple of

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1 years. I believe that there was evidence presented earlier
2 that at one time, one resident of the Yukon Charley area
3 was able to make as much as \$8,000.00 a year by trapping.
4 The life style of people in the Yukon Charley area who are
5 following this way of life could have been described as
6 being rather different and that it's a life style designed
7 to -- to go after certain values that are not available
8 in urban society elsewhere in the United States. Conse-
9 quently, the concentration on those particular furs may
10 be one of the reasons that they -- they're choosing to go
11 after them and limit the amount of cash income they can
12 consequently get.

13 Q Mr. Brown also testified that his son comes to Eagle two
14 times during the winter, once at Christmas time and once
15 in March or so to sell his furs. Do you think this is
16 a typical pattern of travel to Eagle to sell furs?

17 A I don't know how many people are actually following that
18 pattern, so it's difficult to say how typical a representa-
19 tive it is of the area. It seems that -- that if people
20 are not going after beaver or -- or muskrat, which are
21 generally hunted in the later part of the winter, there
22 may be a difference in the pattern based on -- on that
23 consideration. If people were going after muskrat and
24 after beaver, they would by necessity, have to stay out
25 in the bush longer in order to get those animals and

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1 consequently be coming into Eagle slightly later in the
2 winter or early spring.

3 Q We've heard testimony about the difficulties in getting
4 over gravel bars, shallow water and riffles on the Kandik
5 and -- and Nation Rivers. In the work of the International
6 Boundary Commission, did they encounter any difficulties,
7 and if so, what did they do about it, either on the Kandik
8 or Nation or other rivers?

9 A It appears from the field notes that I've examined from the
10 International Boundary Commission that whatever the diffi-
11 culties were that the polers encountered on the Kandik,
12 they were able to overcome them and to deliver the goods
13 at the boundary area for the Boundary Commission members.
14 I am speculating, of course, but the difficulties were
15 probably the same that are encountered today; varying stages
16 of water, the existence of the gravel bars and the sweepers.

17 Q With respect to the difficulties encountered today, did
18 any of the people that you interviewed in Eagle, indicate
19 that they were concerned about hazards posed by sweepers
20 or -- or gravel bars either in the Kandik or Nation? Did
21 anyone indicate that they thought those two rivers might
22 be dangerous for travel?

23 A People indicated that those conditions existed, but as I
24 recollect, did not seem to express a -- a particular con-
25 cern or dwell on their existence. They are part of the

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1 rivers and part of obstacles encountered when traveling
2 upon them and are simply something that have to be -- have
3 to be met and overcome during the course of travel on those
4 rivers. I would have to review some of the -- the written
5 notes, but I can't recall right now anybody indicating
6 that the -- they presented an insurmountable obstacle to
7 them.

8 Q Okay. Did the interviewees indicate that timing of use
9 of the river is important? What did they say about -- about
10 shallow water?

11 A Oh, a number of people indicated that in their travel plans,
12 they looked at the weather conditions and consequently
13 whether or not they expected a certain stage of water to
14 be available in the rivers. Depending on that condition
15 being met, they would travel accordingly and take advantage
16 of slight rises in water in order to make it up stream.
17 I believe it was Mr. Biederman who spoke about the -- the
18 timing of this and that when you have twenty-four hours of
19 daylight in the summer and need to get somewhere, it's not
20 an unusual situation to go when the water conditions are
21 right and continue travelling as long as they are correct.

22 Q Based on your knowledge of Alaskan history, could you
23 briefly summarize -- summarize the changes in water trans-
24 portation that have taken place in the last, oh, thirty
25 years?

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1 A Well, for the last thirty years, I suppose the major changes
2 are twofold. On the one hand, the availability of outboard
3 engines in a price range, that's affordable for many people,
4 has caused a change from the tunnel boats with their in-
5 board engines that existed up until around World War II to
6 boats that are equipped with outboard motors, and in some
7 cases with lifts. The others, part of that change is the
8 shift from homemade, wooden constructed boats to the purchase
9 of alumium craft, either canoes or flat-bottomed Yukon type
10 river boats. The other change in speaking of the last
11 thirty years, would be the disappearance of the steamboats
12 from the Yukon River and, in fact, from just about all of
13 the waterways in Alaska and where the waterways are still
14 used for inland transportation has shift to diesel-powered
15 vessels. In terms of the small boats, the overall changes,
16 one, of keeping up with the currently available technology,
17 whether it be the new -- the outboard motors that are avail-
18 able for aluminum boats or the purchase of the jet units
19 if that's seen as a viable option for the kind of river
20 travel that the person wants to use.

21 Ms. HIGGENS: (Pause) I think that's all.

22 JUDGE LUOMA: Miss Taylor?

23 Ms. TAYLOR: Thank you.

24 BY MS. TAYLOR:

25 Q Mr. Stern, I think it was Melody Grauman who testified about

R & R COURT REPORTERS

1 the U.S. boundary surveyors going over land and using horses
2 to get to the boundary to do their survey work, and you
3 mentioned on direct that supplies were poled up the Kandik
4 River to supply the -- the Boundary Commission. Were these
5 supplies for the horses or do you know what the supplies
6 were?

7 A I believe, and if I can consult my draft copy of the report
8 to refresh my memory, I can go directly from that, the --
9 that the load that they referred to is a ton of hay and
10 oats. May I read from this?

11 Q Yes.

12 JUDGE LUOMA: It's about four lines.

13 A It's about four lines.

14 JUDGE LUOMA: All right.

15 A For Thursday, June 15th, 1911, notes written by William --
16 or by DeDe Cranns (ph) state, "Alex Stewart and men arrived
17 about four p.m. with scow and small poling boat containing
18 together approximately two tons of outfit and supplies."
19 They arrived, I believe it was at the headwaters of the
20 Kandik.

21 Q How long did the Boundary Commission stay at the border
22 during this survey?

23 A They worked that section of the border between the Yukon
24 River and the Porcupine River over the course of two summers;
25 1911 and 1912.

R & R COURT REPORTERS

1 Q Okay, but -- but you don't know how many trips up the Kandik
2 might have been made by poling boats during this period?

3 A The reference from the field notes indicates only one. It
4 may be the case that when the -- that the -- the person
5 who kept the field notes was not there when the polers
6 arrived, so it's possible that there were more than one
7 trip.

8 Q Okay. What did the Boundary Commission do with the horses
9 when they got ready to leave?

10 A I don't believe that it's in the written record, but we've
11 had information given to us by people in Eagle that the
12 horses were simply shot at the boundary. It was too expen-
13 sive to bring them out of the country at that time, and there
14 was no market for them. Now, this was 1912. The year before
15 they had been brought out and overwintered in the Dawson
16 area.

17 Q The horses had been brought out or the -- or both the men
18 and the horses?

19 A The men and the horses. The men were not shot.

20 Q All right. Do you know how the Boundary Commission people
21 got -- got back out of the country when they finished after
22 they shot the horses?

23 A I don't recall a reference in the -- to it in the -- the
24 material in the Boundary Commission reports. They -- I
25 can speculate.

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1 Q That won't be necessary. Now, am I to understand that --
2 that there were in fact steamboats used on tributaries
3 of the Yukon?

4 A Yes.

5 Q Were some of those used on any rivers that are tributaries
6 of the Yukon that might be comparable to the Kandik, say,
7 for example?

8 A Well, the -- the two launches that were built for the Boundary
9 Commission, the Aurora and the Midnight Sun, were gasoline-
10 powered stern wheelers, and they operated on the Old Crow
11 River and the Black River, which are tributaries of the
12 Porcupine. The -- there were -- there are no tributaries
13 of the Yukon River that those two particular boats would
14 have had a -- a need to go on because of the -- the way
15 that the boundary runs. Steamboats have been used on the
16 tributaries of the Yukon, such as the Tanana, the Middle
17 Fork, the Koyokuk and -- and others further down stream.

18 Q Okay. Now, you mentioned Brooks work, Blazing Alaska
19 Trails, and -- and who is Brooks?

20 A Brooks was at one time the head of the Alaska Branch of
21 the U.S. Geological Survey.

22 Q All right. Is this book recognized as an authority on --
23 on Alaska history?

24 A It's considered a good summary of Alaskan history.

25 Q All right. Doesn't Brooks make an economic comparison among

R & R COURT REPORTERS

1 modes of travel on Alaska Interior rivers in that book?

2 A I believe he does in the chapter on transportation.

3 Q And if I recall correctly, doesn't he compare, for example,
4 poling -- canoes, poling boats and -- and steamboats on
5 Alaska rivers and come to the conclusion that steamboats
6 are the most economically feasible, and that poling boats
7 are second to steamboats?

8 A I would have to look at that exact comparison, but that
9 sounds right.

10 Q Okay, do you have a copy -- or we have a copy...

11 A I'm looking at a xerox copy of Blazing Alaska Trails by
12 Alfred Holtz (ph) Brooks, the second edition, and on page
13 400, he has a chart entitled, "The Relative Efficiency of
14 Alaska Means of Transport." I believe that's what you're
15 referring to. He compares backpacking, pack horses, dog
16 sleds, wagon roads, railroad, canoes or poling boats and
17 river steamers with regards to the weight they can carry,
18 the mileage they can travel in a twenty-four hour period,
19 the approximate cost per ton mile and some notes. The
20 comparison between canoes or poling boats and steamers that
21 you referred to indicates that the river steamers cost
22 approximately five cents per ton mile. That would be 2,000
23 pounds of goods tra- -- per mile travel. And the poling
24 boats, which are the only other means of water transporta-
25 tion compared, is \$1.50 per ton mile. Backpacking is \$25.00

R & R COURT REPORTERS

1 per ton mile. Pack horses, \$12.00 per ton mile. Dog sleds,
2 \$2.50 per ton mile.

3 Q Okay. Now, if we talk about the Kandik and the Nation Basins
4 as -- as an area, do you agree with -- with Melody Grauman's
5 testimony that -- that trapping in this area was at quite
6 a high level during the '40's?

7 A During the period, the 1920's through the 1940's, trapping
8 was generally -- the trapping fur prices were generally high
9 with some minor fluctuations within that period. Yes, I
10 would agree with those statements.

11 Q In -- in your interviews, did you -- did you come across
12 a lot of references to trapping activity in the period of
13 the 20's through the 40's?

14 A Yes, we did.

15 Q Was there any explanation given for the lack of trapping
16 activity in the '50's?

17 A One reason given was the lowered price of furs, and another
18 reason was that the -- partially as a result of that, the
19 region was relatively depopulated. One of our informants
20 made the comment that they built the Taylor Highway, and
21 everyone left, referring to Eagle.

22 Q What -- what's the Taylor Highway, and where does it go?

23 A The Taylor Highway runs from Tok on the -- on the Alaska
24 Highway to Eagle, Alaska through the Fortymile country. It
25 was constructed in about 1953 to 1955.

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1 Q Okay. So as a matter of fact, during the 1950's you could
2 -- you could say that this area was in a depression?

3 A Yes.

4 Q As a matter of fact would you have any estimate as to the
5 population of this area in the 1950's?

6 A I have some figures in my notes, and I'd feel safer consulting
7 them. The general trend of the population from 1900 to 1970
8 was downward if I recall by those figures correctly, and
9 has been increasing slowly since then at Eagle. Sometimes
10 those census figures do not include everybody within the
11 area, so they -- there may be a percentage variation in
12 what the population actually was. They're generally reliable.

13 Q Okay. Now, I understand that you and Mike Brown interviewed
14 a -- several people at Eagle, both Natives and -- and non-
15 Natives, is that correct?

16 A Yes.

17 Q Is there a relative portion of Native versus non-Native
18 interviewees?

19 A If I can look through my notes a second, --

20 Q Sure.

21 A -- I can answer that. We interviewed six non-Natives at
22 Eagle and three Natives.

23 Q Who were the Natives that you interviewed?

24 A They were Billy Junibee (ph), Harry David and Bob Stacy.
25 We also spoke with Jim Junibee, but we didn't really get

R & R COURT REPORTERS

1 sufficient amount of information that would characterize as
2 much of an interview.

3 Q And they're Athabascan Indians?

4 A Yes.

5 Q Okay. Now, did you inter- -- did -- didn't you interview
6 some people who are -- are relatively recent arrivals in
7 the country?

8 A Yes, we did.

9 Q And who were they?

10 A Mike -- Mike Sager (ph) and Brad Snow.

11 Q Okay. Now aren't Mike Sager and Brad Snow relatively
12 characteristic of a -- of an --

13 COURT REPORTER: We have to go off record.

14 (OFF THE RECORD)

15 (Court Reporter changes tape)

16 (ON THE RECORD)

17 Q Okay. Which were the two people that you interviewed that
18 were recent residents of the country?

19 A That would be Mike Sager and Brad Snow.

20 Q Okay, and aren't Mike Sager and Brad Snow characteristic
21 examples of people who have come into the country seeking
22 an alternate life style?

23 A I would characterize them as such.

24 Q As a matter of fact, isn't this a very popular area for
25 people who want to live that sort of life style these
days?

R & R COURT REPORTERS

1 A I understand there are a number of people living along the
2 Yukon River between Eagle and Circle who are carrying out
3 that life style.

4 Q As a matter of fact, while you were up there doing these
5 interviews, some of these people that you wanted to talk
6 to expressed reluctance to talk to you because of their
7 fears that BLM would find out where they were living, isn't
8 that true?

9 A Yes, that's true.

10 Q And aren't they living in trespass, what are now BLM lands?

11 A Yes. They -- they always have been BLM lands, I believe.

12 Q And -- and they're trying to keep their location secret
13 that BLM doesn't find them?

14 A That's true.

15 Q All right. Now, when did this influx of new residents into
16 the area start?

17 A I believe it occurred within the last ten to fifteen years.

18 Q All right. And at the same time, aren't some of the long
19 time residents of the areas -- of the area moving out to
20 other places to more settled areas?

21 A I don't have a lot of good figures on that, but a number
22 of people who have lived in Eagle for quite a period of
23 time have retired and moved elsewhere.

24 Q Okay. As a matter of fact, hasn't this area, the Kandik
25 and Nation River area, undergone a tremendous cultural

R & R COURT REPORTERS

1 change in the last fifteen years?

2 A I -- I'm not sure what you mean by a tremendous cultural
3 change?

4 Q Well, hasn't there been considerable -- I don't know if I
5 can phrase it right either. Hasn't the impact been consid-
6 erable of both the influx of newcomers who want to live
7 an alternate life style and correspondingly the changes
8 that have occurred in the life style of people who have
9 been long time residents of the area; for example, through
10 the Alaska Native Claims Settlement Act?

11 A Yes, based on those considerations, I'd say there have
12 been changes in that area in the last ten to fifteen years.

13 Q All right. Now, how does the -- how does the pattern of
14 trapping that these relative newcomers follow differ from
15 the Native pattern of trapping that occurred in, shall we
16 say, '20's -- '20's, '30's, and '40's?

17 A It's my impression from reading the literature and from
18 speaking to some of these people that the change is largely
19 one of degree. The people who trapped during the period
20 of the '20's and '30's and '40's, did it as an activity
21 that could bring them cash income and some furs for personal
22 use in conjunction with a number of other activities during
23 an entire twelve month cycle of events. Many -- or some,
24 perhaps I should say, of the people doing it now are doing
25 it for the experience of trapping and learning the techniques

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1 and knowledge required to trap successfully, but have alterna-
2 tive means of producing a cash income, such as wage labor in
3 the summer and are following the life style very much volun-
4 tarily. They've come into that area as part of an escape
5 from the life style in another part of the country; whereas
6 many of the residents of that area in the '20's, '30's and
7 '40's were the sons and daughters of people who had come in
8 previously. They were second generation. In the case of
9 the Natives, they were people who had lived within that area
10 for many generations. I believe that it's in the subsist-
11 ence study that Rick Crawfield (ph) conducted for the National
12 Park Service. He characterizes the river people, as they're
13 called, as being largely urban, non-Native, well-educated,
14 who deliberately are in the Yukon Charley area seeking this
15 alternative life style.

16 Q Okay. Bill Brown testified about his son's activities
17 trapping on the river, and he stated that -- that his son
18 and his friends use the river whenever feasible. Does
19 that comport with what you found in your interviews of
20 -- of Mike Sager and Brad Snow?

21 A Yes, I believe it does. They -- they indicated that they
22 would get out on the river and travel where they have, when
23 they have to. I believe it was Mike Sager who indicated
24 that he was willing to -- to put as much as a thousand
25 pounds into his canoe, which was a -- a Grumen (ph) 19 --

R & R COURT REPORTERS

1 19 foot canoe, a freighter with 15 horsepower -- horsepower
2 motor, and on the Yukon, he would limit it to about that
3 amount because of the current, the rock of motion that one
4 develops in that current, and the need to use the lift from
5 time to time. On the side streams, he indicated that he
6 was willing to load his canoe as much as fifteen hundred
7 pounds.

8 Q Okay. Don't these people who -- who -- such as Mike and
9 Brad who have settled on the river in relatively recent
10 times existed at a pretty low economic level?

11 A If by low economic level, you mean that they have a low
12 cash income throughout the year, yes.

13 Q Okay. Do these people own helicopters?

14 A No, not to my knowledge.

15 Q Then isn't their only means of access to the places where
16 they've settled by river?

17 A During the summer, the river offers one means of transporta-
18 tion. The alternative is going over land or chartering if
19 they have the money, and if there's an aircraft strip suitable
20 for landing in the vicinity that they want to go. In the
21 winter, of course, the options of travel are different.

22 Q All right. But in the summer, there aren't any roads to
23 thirty-five miles up the Kandik River, are there?

24 A No, there are not.

25 Q As a matter of fact, there aren't any roads in the area,

R & R COURT REPORTERS

1 except the road -- unless you call the road to Eagle the
2 area?

3 A It's south of the Yukon. There are no roads, to my knowledge,
4 on the north side of the Yukon in that area, with the excep-
5 tion of the short coal transportation road around Nation,
6 which I don't believe is any longer serviceable.

7 Q And historically, wouldn't you agree that settlement of
8 the area has depended absolutely on use of the rivers?

9 A It's depended on the rivers and to the extent that individuals
10 need it or want it to trap travel over land the -- the trails
11 on the sides of the rivers.

12 Q Okay, and whatever development of the area that there's been
13 or whatever use has in one way or another depended upon those
14 -- those rivers, isn't that correct?

15 A The large river steamers were bringing in a great majority
16 of the freight to Eagle and Circle in Bulk and were respon-
17 sible for bringing many people in during the summer.

18 Q Did anyone tell you when jet boats started to be used on
19 the rivers?

20 A I don't recall that we got any -- any information about that.

21 Q Okay. And you didn't get any information about when there
22 might have been a transition from, say, poling boats to
23 river boats in an area?

24 A The indication was that once motors became generally available
25 and within a price range that could be afforded, they were

R & R COURT REPORTERS

1 used on an experiental, innovative basis by a few indi-
2 viduals. And as there usefullness was demonstrated, more
3 and more people began to use them. I think that you might
4 draw a parallel between that technological change and the
5 introduction of snow machines in rural Alaska. The first
6 machines that were brought, were not bought by wholesale
7 by every person in the village. A few individuals experi-
8 mented with them over the course of a year or two. Once
9 their usefullness was demonstrated by experiment, other
10 people adopted it, and consequently, snow machines have by
11 and large replaced dog teams in rural Alaska as the dominant
12 winter mode of transportation. Similarly, the change has
13 been from poling boats and birch bark canoes to a new, more
14 efficient technology, the inboard motors, and those have
15 been replaced by a nother technological innovation, outboard
16 motors. They've been adopted by the people who live along
17 the rivers.

18 Q Okay. You mentioned the absence of evidence of hard rock
19 mineral development north of the Yukon. But isn't it true
20 that it's virtually impossible to tell from the mining
21 records whether there were, in fact, any mining claims
22 staked in this area north of the Yukon?

23 A Yes, that's true. Alice Eliff and I have attempted to
24 research the mining records that are located here in Fairbanks
25 from the Eagle Recording District. We found only one book

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1 during the time that we examined them, where the claims were
2 ordered by creeks. In the overwhelmingly majority of cases
3 that we looked at, the books are ordered by the names of
4 individuals alphabetically throughout the book, so that in
5 order to know whether the claim was staked, you have to
6 literally go through thousands and thousands of people's
7 names, and see which creek the claim was recorded on.

8 Q Okay. Now, I think Melody Grauman testified that she had
9 examined all the available sources on this area in her his-
10 torical research. But you -- you -- is it your testimony
11 that -- that she wouldn't have been able to examine, for
12 example, all the -- all the -- all the mining claims because
13 of the difficulties?

14 A I don't know for a fact whether she did or not. If -- if
15 she in fact did, a lot of time would have been spent on
16 that.

17 Q But I think as Melody testified, and maybe this is your
18 testimony too, that the Native use of this area has been
19 very sparsely studied?

20 A That's true.

21 MS. TAYLOR: Okay. I have no further questions.

22 JUDGE TAYLOR: Mr. Allen?

23 BY MR. ALLEN:

24 Q Would you say that snow machines are in common use today
25 in Alaska?

R & R COURT REPORTERS

1 A Yes, I would.

2 Q And that they are reasonably affordable by the average person
3 living in the bush?

4 A I don't know what your definition of reasonable is. By and
5 large, every household in most rural Alaskan villages owns
6 at least one snow machine.

7 Q When were motorized boats in similarly common use on the
8 Yukon, Eagle area?

9 A They came into use in the periods following World War I,
10 and continued through the -- being introduced in the sense
11 that a person had the first boat of that kind on through
12 perhaps the '30's and '40's. That's based on reading the
13 literature that's available and speaking with informants.

14 Q My question was, when were motorized boats in as common
15 use on the Yukon as snow machines are in Alaska today.
16 Maybe it was a confusing question. But do you mean that
17 it was as common for someone to have a motor boat after
18 World War I as it is to have a snow machine today?

19 A I'm not sure that that isn't an apples and oranges comparison.

20 Q I think it is (ph).

21 A And consequently, I'm not sure what kind of response I could
22 give to it.

23 Q Well, let's drop the question. Are you -- do you consider
24 yourself an expert on the trapping aspects of the middle
25 Yukon area?

R & R COURT REPORTERS

1 A The knowledge that I have about the trapping is derived from
2 reading published materials about it.

3 Q Would that include Melody Grauman's chapter on The Trapping
4 Frontier?

5 A Yes, it would.

6 Q Have you examined as -- as many sources as she indicates
7 she has in her bibliography on trapping?

8 A No, I haven't.

9 Q Would you consider yourself to be more familiar with the
10 methods of trapping in the middle Yukon area than she is?

11 A Based on reading the literature?

12 Q Based on any -- any source of knowledge.

13 A No, probably not. She indicated she spent over a year
14 conducting her study. I've not spent that much time on
15 this.

16 Q You indicated, I believe that muskrat -- a muskrat was a
17 common fur to be brought out of the Kandik/Nation area.
18 Would it surprise you to learn that muskrat were trapped
19 only in lakes?

20 A No.

21 Q Was there anything that Miss Grauman testified to when she
22 testified, that you would take issue with as far as trapping
23 is concerned?

24 A You would have to be more specific, Mr. Allen. I -- I don't
25 recall her entire testimony to draw a specific point of --

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1 Q Well, when you were listening to her testimony, did she
2 say anything about trapping that you flagged as something
3 that you would take exception to?

4 A No, not in Miss Grauman's testimony.

5 Q Do you consider from what you heard of Mr. Bill
6 testimony that he is reasonably knowledgeable about trapping?

7 A He appears to be.

8 Q And do you challenge his statement that his son has been
9 trapping for a livelihood?

10 A I don't recall that he made that specific statement. I
11 recall that he mentioned that trapping was one of the
12 activities that his son engaged in over the course of a
13 year.

14 Q Do you have any reason to suspect that his son's pattern
15 of activity is untypical of other trappers--present day
16 trappers in the Kandik and the Nation area?

17 A No, not in regard to other trappers currently in the Kandik
18 and Nation areas. My point of difference is that I don't
19 believe that the pattern currently is the same pattern as
20 existed in the '20's and '30's and '40's when fur prices
21 were all so high.

22 Q Do you recall the dimensions of the three like steamers
23 that were built in connection with the Boundary Commission's
24 study?

25 A I recall the dimensions of two that were built in connection

R & R COURT REPORTERS

1 with it.

2 Q What were those dimensions?

3 A Forty feet by nine feet with a design draft of eighteen
4 inches.

5 Q And you testified that they had to move the engine for some
6 reason. Why was that?

7 A During the Summer of 1911, they found that the design of
8 the boat was such that it settled deeper in the water than
9 they thought it would. During the Winter of 1911 - 1912,
10 they moved the engine forward approximately seven feet,
11 and found that during the following summer, there was a
12 slight increase in the speed of the vessel as a result of
13 doing that, and that the draft was reduced to fourteen to
14 sixteen inches.

15 Q This discovery they made that it settled deeper in the water,
16 was that when they applied power to it?

17 A I don't know. I don't recall anything in the literature
18 that said what the reason was. That would seem to be a
19 reasonable conclusion.

20 Q Referring you to what's been introduced as State Exhibit A-3,
21 particular this sentence, --

22 JUDGE LUOMA: The sentences are not in evidence.

23 Mr. ALLEN: No, I'm not putting 'em in. I --

24 I am going to put this sentence in, in evidence through this
25 witness.

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1 Q Does this ref- -- refresh your recollection as to the cause
2 of the increased draft?

3 A Would you like me to read the statement?

4 Q To yourself and then --

5 A Okay.

6 Q -- answer the question.

7 A Yes.

8 Q In other words, they found the vessels drop six inches
9 lower as the power was applied?

10 A My interpretation of the statement would be that they
11 settled six inches lower than the design had expected they
12 would settle when power was applied.

13 Q By what you have heard at the hearing and learned through
14 your research, would you expect that a city or a town the
15 size of Eagle were located in either of these selection
16 areas, that overland transportation would be -- that a road
17 would be built to supply those villages or would supplies
18 be -- would the rivers -- Kandik and Nation Rivers be used
19 for supplying that village?

20 A I'm uncertain what you mean by either of these selection
21 areas.

22 Q The portion so the Doyon selection that are upstream from
23 the mouth of the Yukon on both of these rivers.

24 A I suppose it would depend whether the Department of the
25 Interior allowed them to build a road over D-2 lands between

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1 the Yukon River and the selection area.

2 Q If the Department of Interior did not allow such an overland
3 road, is it likely that a town the size of Eagle would
4 develop in these two selection areas?

5 A I don't know whether or not speculation on that is -- is
6 possible. The factors that are inherent in the establishment
7 of any town are so varied that you would have to examine all
8 of the resources in the area, and all of the potential before
9 any kind of answer could be given to that statement.

10 MR. ALLEN: That's a fair enough answer. That's
11 all I have.

12 JUDGE LUOMA: Anything else?

13 MS. TAYLOR: No.

14 JUDGE LUOMA: Miss Higgens?

15 MS. HIGGENS: No.

16 JUDGE LUOMA: Is there anything else to present?

17 MS. TAYLOR: (Indiscernible) Doyon -- Doyon
18 rests.

19 MR. ALLEN: Other than the stuff we've talked
20 about to be submitted.

21 JUDGE LUOMA: Yes. And the State also rests?

22 MS. HIGGENS: Other than with respect to the
23 material -- the joint (simultaneous speech).

24 JUDGE LUOMA: Now, how do you want that marked,
25 as an Alaska exhibit, a Doyon exhibit or a BLM exhibit?

R & R COURT REPORTERS

1 MS. HIGGENS: What was the last exhibit?

2 The last exhibit being the agreed statements --

3 JUDGE LUOMA: Yes.

4 MS. HIGGENS: -- by the historians.

5 JUDGE LUOMA: So we mark it A-4?

6 MR. ALLEN: Five.

7 UNIDENTIFIED VOICE: Five.

8 JUDGE LUOMA: All right. Are you prepared to
9 stipulate at this time that I may receive it in evidence?

10 MS. HIGGENS: Yes.

11 MS. TAYLOR: Yes.

12 MR. ALLEN: I'm sorry. What number did we
13 reserve for the Richard Stern --

14 JUDGE LUOMA: That's A-2.

15 MR. ALLEN: I'm prepared, but my understanding
16 of the stipulation is that the BLM historian will -- it will
17 be in fact a joint report if they both will agree to the content
18 of it.

19 JUDGE LUOMA: Is there any reason to believe
20 that there will be disagreement on that?

21 MR. ALLEN: None that I know of.

22 MS. TAYLOR: No.

23 JUDGE LUOMA: All right. I'm going to receive
24 Exhibit A-4 in evidence and simply note that it will be submitted
25 to me on a later date. I assume that'll be shortly. So A-4.

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1 is received in evidence. That leaves only A-2 to be decided on
2 in the future. The record will remain open until such time as
3 you've completed your work on Exhibit A-2.

4 Mr. ALLEN: That's correct. This is a list of
5 the exhibits that we have withdrawn for copying.

6 JUDGE LUOMA: Okay, what have -- have you
7 physically withdrawn them?

8 MR. ALLEN: I physically have them in my
9 possession?

10 JUDGE LUOMA: And is that all right with counsel?

11 MS. TAYLOR: I've -- I've agreed that any of
12 the exhibits can be withdrawn to copy 'em.

13 MS. HIGGENS: No objection.

14 JUDGE LUOMA: All right. So the exhibits listed
15 on the sheet may be withdrawn for copying and be returned to me
16 later. Now, let's get into the briefing schedule.

17 MR. ALLEN: I would propose a simultaneous
18 brief thirty days from receipt of fanfare.

19 JUDGE LUOMA: What's the reaction to that
20 suggestion?

21 MR. ALLEN: With reasonable extensions left for
22 (indiscernible).

23 MS. TAYLOR: To tell you the truth, Your Honor,
24 I'm incapable of reacting. Whatever the Court wishes, I will do.

25 JUDGE LUOMA: All right, Miss Higgens?

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1 MS. HIGGENS: How long will it be before we
2 receive the transcripts? I'm not familiar with the process.

3 JUDGE LUOMA: You'll probably get the transcripts
4 within, I'd say, fifteen days, maybe twenty, I don't know. What
5 do you think?

6 COURT REPORTER: We'll have them done October
7 13th.

8 JUDGE LUOMA: You'll have them done October 13th?

9 COURT REPORTER: Um-hm.

10 JUDGE LUOMA: Now -- of course, I will provide
11 BLM's counsel a copy of transcript, but not the other two parties.
12 In other words, you have to make your own arrangements with the
13 reporter because we're not permitted to provide copies of the
14 transcript to the other parties. So --

15 MR. ALLEN: Perhaps forty-five days (indiscernible)

16 MS. HIGGENS: Yeah, that sounds more logical
17 to me.

18 JUDGE LUOMA: Let's first discuss -- do you
19 want to file them concurrently because it makes a difference?
20 Miss Taylor has indicated she doesn't care.

21 MS. TAYLOR: Let me ask a question. --

22 MR. ALLEN: Should we go off the record to
23 discuss briefing?

24 JUDGE LUOMA: All right. Off the record.

25 (OFF THE RECORD)

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1 (ON THE RECORD)

2 JUDGE LUOMA: The parties will have forty-five
3 days after receipt of the transcript in which to file concurrent
4 briefs. The briefs will be filed with me, and after all the
5 briefs are in, then I will do the distribution to the other
6 parties. The parties will be allowed another fifteen days after
7 receipt of their -- of their parties' briefs in which to file
8 reply briefs. Is there anything else to present? The hearing
9 is adjourned.

10 (OFF THE RECORD)

11 * * *

12 (END OR PROCEEDINGS)

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R & R COURT REPORTERS

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C E R T I F I C A T E

UNITED STATES OF AMERICA)
) ss.
STATE OF ALASKA)

I, Pamela G. Van Sickle, Notary Public in and for the
State of Alaska, residing at Fairbanks, Alaska, and electronic
reporter for R & R Court Reporters, do hereby certify:

That the annexed and foregoing ~~XXXXXXXXXXXX~~ Department of
Interior Hearing was taken before me on the 29th day of
September, 1978, beginning at the hour of 9:00 a.m.,
at the ~~XXXXXXXXXX~~ Federal Building, 101 12th Avenue,
Fairbanks, Alaska, pursuant to Notice to take the ~~XXXXXXXXXX~~
hearing
~~XXXXXXXXXXXXXXXXXXXX~~ on behalf of Bureau of Land Management;

~~XX~~
~~XX~~
~~XXXXXXXXXXXXXXXXXXXX~~

hearing

That this ~~XXXXXXXXXX~~, as heretofore annexed, is a true
and correct transcription of the testimony of said witness,
taken by me electronically and thereafter transcribed by me,

hearing

and Kitti Torkelson;

That the ~~XXXXXXXXXX~~ has been retained by me for the pur-
pose of filing the same with the ~~XXXXXXXXXX~~ Bureau of Land
~~XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX~~ Management
~~XXXXXXXXXXXXXXXXXXXX~~, as required by law.

I am not a relative or employee or attorney or counsel of
any of the parties, nor am I financially interested in this
action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed
my seal this 12th day of October, 1978.

Pamela G. Van Sickle
Notary Public in and for Alaska

My commission expires: 3/10/81