2-13-1975

Record of Proceedings at the Trial, Vol. VI

Wayne C. Lenhart
Court Reporter, Spokane, Washington

IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE EASTERN DISTRICT OF WASHINGTON

UNITED STATES OF AMERICA,

Plaintiff,

v

BARBARA J. ANDERSON, et al,

Defendants.

No. 3643

VOLUME VI

pgs 1001-1200

wandered around, and we found a large creek which I assume was Chamokane Creek, I couldn't quite locate myself on the map, taking pictures all the while, and then we went on to Colville.

Q Did you see the springs?

A No, we didn't.

Q And that's the fourth time?

A That was the fourth time.

Q And when was the last time?

A The last time was in late January or early February of this year, Mr. Kauffman was over here, we were talking about Chamokane Creek, it was on a Saturday, and we drove out and he tried to show me some of the areas from Ford on south to where Chamokane Creek disappears into the Spokane River, that he had looked at when he was district engineer over here, in arriving at his conclusions.

Q Did you discuss with him his conclusion?

A We generally discussed his conclusions as he could remember them then, yes.

Q Did you discuss with him this report that he wrote?

A He mentioned having written, and he referred to it as a "memorandum", he mentioned having written a memorandum for the file.

Q And yet you never saw that until here in court?

A No, I didn't.
Q And you're complaining as to the inadequacy of Mr. Woodward's fact-findings?
A No, I wasn't complaining of the inadequacy of it.
Q Haven't I understood you to say he didn't do enough?
A He may-- I wouldn't say that he didn't do enough, I will say that the information contained in there in inadequate to make an analysis. There may not have been any other information he could have developed. For instance, if there were no other wells, he couldn't have measured them.
Q Since you knew, and I can't put my hand on it, since you knew that Mr. Kauffman had written a report, and that he had been the district engineer here, and had investigated the Chamokane substantially in the past, would not the ordinary course have been for you to refer to the work he did?
A No, not generally, because I don't do that type of work. As I have indicated earlier, I wanted to confine any analysis I did to Mr. Woodward's report, because I had never made any reconnaissance in the area myself, I had no data to put in.
Q Why would you confine it to Mr. Woodward?
A Well, as I understood from Mr. Kauffman's memorandum, from what he told me, is that he had no information, it

was just impressions that he put into his report.

Q And his report doesn't say that; have you read this?

A I have glanced through it, yes.

Q The easterly and westerly ground water boundaries--

MR. REKOFKE: I object to this, Your Honor. This is not in evidence.

MR. TORVE: Your Honor, this is not in evidence, is it?

MR. : Your Honor, I don't believe that's admitted in evidence, and secondly, this is improper cross-examination.

MR. REKOFKE: Wait a minute, wait a minute.

MR. RUDOLPH: Improper cross-examination?

MR. : Beyond the scope of the Direct.

THE COURT: That's 41, Defendant's 41?

MR. REKOFKE: It wasn't admitted, that was my understanding.

MR. RUDOLPH: Well, you're right, it hasn't been, because Your Honor wasn't sure who Mr. Kauffman was, but I think it's been well established now who he is, and I'll offer Defendant's Exhibit 41. He had this position before Dr. Maddox did.

MR. DUFFORD: Your Honor, we discussed this yesterday to some extent, and it was our proposition at that time that at some subsequent point in time when

the case, that the Court is taking up further evidence in the case, that we bring Mr. Kauffman here and allow him to testify what he, himself, did, and what his impressions were about his own work. I still think that would be desirable, and we would be most willing to do that.

THE COURT: Well, the only thing the Court has before it at the moment is that this was written by Mr. Kauffman and it had something to do with the Department, and the present testimony is that he made this from impressions and not from a study. I don't think that--

MR. GERMERAAD: Your Honor, I believe it would be proper cross-examination for the plaintiff, or the plaintiff intervenor, to take the report, the same Department that now employs the personality on the stand, and ask him whether he agrees and, or disagrees, and why; I think that is a perfectly reasonable request. Going to his credibility, certainly we have already established his, I believe we have established that certain assumptions were and were not made, do and do not have factual bases, and I think we have to be allowed this latitude; otherwise, you would have to, we must wait until Mr. Kauffman is available, we would then have to wait to finish the Cross-examination of

Dr. Maddox until after Mr. Kauffman has testified, unless we're going to have a whole second--

THE COURT: I recognize we have a timing problem, and I guess the best way to solve it, I will permit this cross-examination, subject to being stricken if we don't get this report into evidence.

MR. DUFFORD: Okay.

MR. RUDOLPH: All right, let me seek to establish what else is needed.

Q (By Mr. Rudolph) Tell me who Mr. Kauffman is.

A Mr. Kauffman is an employee of the Washington State Department of Ecology at the present time, and he is a hydraulic engineer for, assigned to duties for the Washington State Water Program.

Q When did he come to work with the Department of Ecology?

A I don't know the exact date, but it was late in 1968.

Q And where was he assigned?

A He was assigned at that time to the Water Management Division of what at that time was the Washington State Department of Water Resources.

Q And his responsibility was Eastern Washington, was it not?

A I believe it was limited to the Monterrey, Stevens, Ferry and possibly Okanogan County area in Eastern Washington. I'm not sure of the extent of his area.

Q Now, within the organization of the Department of Water Resources at that time, within the boundaries that you mentioned, Mr. Kauffman had the primary field responsibility for the Department of Water Resources, didn't he?

A That is right.

Q Now, would you look at-- Well, excuse me, I've got my copy of it, what is that, 41-- Would you look at 41, please, and indicate, or look at the last paragraph, first, on the last page.

A Under "Conclusions"?

Q Yes.

A Right.

Q Now, does that indicate to you that this memorandum by Mr. Kauffman was written by him in the course of the performance of his duties as the person having the primary responsibility for the Chamokane Basin and that such was brought to the attention of his superiors and was filed and made a part of the Department of Ecology's records?

A Yes, I would have some such conclusion by reading that paragraph.

MR. RUDOLPH: Your Honor, I will offer 41.

MR. CERUTTI: Your Honor, I would object, based on hearsay, and I certainly don't believe the business

records exception to the Hearsay Rule extends to conclusions authored by somebody that I will never have the opportunity to cross-examine. The gentleman could have been brought here to give his opinions, he certainly was available,-- That's what we discussed yesterday.

THE COURT: That's what we discussed yesterday, and that's my concern, the fact where a conclusion has been drawn without any, we have no information as to a basis on which the conclusion was made, the witness isn't here to testify, but what I think we're talking about now is really a timely offer of proof, and I have indicated I think the way to do this, probably, is the best way, to let him proceed, and it will be stricken if this doesn't tie in.

MR. RUDOLPH: Well, Your Honor, it seems to me that, we've got all of the Department files in there, every report of field examination is in there, saying the very thing that he's saying here, and now these gentlemen, they like all of this, and yet they say we can't be bound by hearsay. Well, we're both bound by hearsay, to the extent that it's in those files, those are business records, this is a report of fact, there aren't any particular conclusions in there, this is what he found to be fact. The, more importantly, what

I'm attempting to bring out with Dr. Maddox is, here's something within the Department which conflicts with him. Now, whether Mr. Kauffman is right or not, it certainly is a fact that within the Department, uh, is, was factual information, and I'm trying to find out right now why he didn't even bother looking at it.

THE COURT: Well, we're talking about two different things at the moment, then. Are you entering this for the truth of the facts contained therein, or merely for his statement, whether he agrees with it or not? I think it makes a, quite a difference.

MR. RUDOLPH: It is offered for the purpose of showing that someone in the Department, a person in responsibility, did make a certain finding. We're not, we already have testimony as to the truth of that, and this happens to agree with it, but it isn't offered to put Mr. Kauffman to the test of the accuracy of it, but the fact that he did do it, and that it's in the Department files. I think that is the basis that it is offered, I mean, it's an adverse exhibit, actually. I don't think that we're bound by it, if there is something we disagree with in there. It's offered to show he did make certain findings, and I think that's why it's in the record.

MR. REKOFKE: If Your Honor please, I'll object on

behalf of Boise Cascade. My impression yesterday was that the Court ruled that the document would not be admissible, that the Department of Ecology could make Mr. Kauffman available, he could be examined to whatever extent the plaintiffs sought to examine, or cross-examine; him; Dr. Maddox is here, they can cross-examine anything that was brought up on Direct Examination; they are trying to compare his testimony with Dr. Kauffman, that is obviously incorrect, you can't compare testimony of witnesses. I don't know precisely why they're trying to get this particular document in, other than to say, or to show, I guess, that Dr. Maddox's testimony may not be exactly the same as the data contained in that exhibit, and I object.

MR. RUDOLPH: Your Honor, he just made the statement that you can't compare testimony of the witnesses, and I heard about six different attorneys examining him as if he agreed with Mr. Woodward.

MR. REKOFKE: Well, if you thought it was improper, you should have objected, counsel.

MR. RUDOLPH: I didn't think it was improper.

THE COURT: Mr. Dufford?

MR. DUFFORD: Your Honor, I think maybe part of the problem may be the somewhat conclusionary characterization of what this is, being propounded by Mr.

Rudolph, he says it contains findings, he says that it's a report, it's a type of memorandum, and the words that are used there, I don't really thing purport to be findings, they represent something that a fellow wrote down, but I wouldn't, I don't think that characterizing in that fashion is really fair. If he wants to introduce this document-- Well, if he wants to use it non-introduced to ask Dr. Maddox questions about why he didn't consider it, that seems to me perfectly proper, but if he's offering it for the truth of the ultimate facts that might arguably be contained in it, it does seem improper, and we will bring Mr. Kauffman here and he can tell us about what he did.

MR. RUDOLPH: Your Honor, I don't think the Court ruled on what Mr. Rekofke said at all. It was proposed by the Department yesterday exactly what they propose now, and we're not interested in that. It seems to me that anytime you're examining an adverse party, if you can extract something from their files which shows a contrary position to what they're showing now, you're entitled to bring it in.

THE COURT: I don't think there's any question about that.

MR. RUDOLPH: And that's what I'm attempting to do.

THE COURT: That's why I tried to make a distinction

a while ago, are you offering for the truth of the matter that is in it, or merely as a matter of testing his opinion, and it makes a difference?

MR. RUDOLPH: I'm offering it on that, on that basis.

MR. REKOFKE: What basis?

MR. : Yeah.

MR. RUDOLPH: Aw, come on, fellows, the Court just said the basis and I agree on that basis.

MR. TRACY: There were two bases; which basis did you agree on?

THE COURT: Plaintiff's 41 will be admitted, and we will take a recess right at this time.

(Whereupon, Plaintiff's Exhibit 41 was admitted into evidence.)

(A recess was taken at this time.)

THE COURT: Sorry to keep you gentlemen waiting so long, but I had a conference call with about as many attorneys as you have got here, and it took a lot of time, but we will try and catch it up.

So, let's see, I guess you were still on Cross-examination.

MR. RUDOLPH: Yes, Your Honor.

CROSS-EXAMINATION, Continuing:

BY MR. RUDOLPH:

Q I'm not quite sure, Dr. Maddox, where we--

THE COURT: The first time we got into a difference into opinion about 41, we had a 41-A. Now, are they tied together in any particular way?

MR.GERMERAAD: Yes, Your Honor, we had testimony by Mr. Woodward, as you can see, he received a carbon copy, at the bottom, and this is how he received a copy of 41.

THE COURT: Well, I guess 41-A ought to be admitted. Proceed.

(Whereupon, Plaintiff's Exhibit 41-A was admitted into evidence.)

Q (By Mr. Rudolph) Now, you had made no study or analysis of Chamokane Creek in any way until you started to look at Mr. Woodward's findings?

A I had driven through, of course, I had some impressions as a result of that drive-through, but I had never sat down to concentrate on it.

Q I understood you to testify that you had prepared, or checked, at least, the drainage basin map?

A That's right.

Q And when did you do that?

A The checking or the preparing?

Q The checking of it.
A I believe that was in about August of 1972.
Q That's one of those trips you have already referred to?
A That's right.
Q And you agreed, and others in the State Department of Ecology agreed with the drainage basin of the Chamokane as defined by Mr. Woodward, didn't you?
A Eventually, at that time we finished a week, to give you some background, the State had contemplated adjudicating the rights to water within the Chamokane drainage basin, and I was at that time a referee and in charge of the responsibility of preparing an outline of the water.

Subsequent to that time, this suit was filed in federal court, and we turned all of our information over to Mr. Tuly of the Spokane Tribe. I didn't agree specifically with Mr. Woodward's boundaries prior to the time we turned our information over, but after that time, using our information, and his information, I presume he did this, because he altered his boundary lines, and I now agree that his boundaries generally reflect the boundaries that I found in the field.

Q --to be true?
A Yes.
Q When was it that you first took a look at Mr. Woodward's

data?

A I couldn't give you the exact date. If I remember right, it was sometime in December.

Q And what did this consist of, just reading it over?

A No. At that time, Mr. George Barber (phonetic), who was one of my district engineers responsible for the Chamokane Creek area, and I went to Mr. Woodward's office and we discussed his data, and he handed me a revised copy of his earlier report. The earlier report, I had briefly read through, just for the content and the general information of the area, and it was with the revised copy that he gave me at that time, I soon thereafter began some sort of analysis of the data up there.

Q Now, I think before recess, we were talking about Kris Kauffman's report. I just wanted to ask you this, his statement of fact here of the easterly and westerly ground water boundaries appear well defined with the remote possibility of some vertical leakage through the basalt and/or contact zones. On the northeasterly side of the surface drainage area, near Sprindale, the ground water divide is not defined; however, a large degree of ground water movement into or our of the basin in this particular region appears improbable. There is possible leakage from this basin into the

Little Chamokane Creek drainage, generally the Chamokane Creek Basin appears to be a relatively tight unit.

Q Now, were you aware of Mr. Kauffman's finding at the time you commenced your study?

A I was aware that he had written a memorandum, but I wasn't aware of what was in it.

Q You knew it was a memorandum as to the Chamokane Creek Basin?

A Yes.

Q And Mr. Kauffman had been, as Eastern Washington, or Northeastern Washington engineer, and had actually been out on the Chamokane many times, I assume, hadn't he?

A I presume so.

Q Since looking at Mr. Woodward's material-- I take it you have not been to the Chamokane?

A As I said, I was up to visit the Chamokane in, I believe it was late January or February, early February, with Mr. Kauffman, and during that time I had been reading Mr. Woodward's report, I hadn't begun a detailed analysis of it, so I did some of both.

Q Now, on Mr. Woodward's conclusions as to the ground water boundaries, and the situation of that ground water, they are very close to Mr. Kauffman's, aren't they?

(Three counsel objecting.)

MR. CERUTTI: I believe, if I understand the limited purpose of the proposal, proposed admission of this document, I don't think it goes to proof that these are, in fact, the opinions of Mr. Kauffman, assuming that he's even qualified to make those opinions in the first instance. To the extent that they might be an admission against interest, they certainly aren't the admission of my client, and it's highly prejudicial to him.

MR. RUDOLPH: All I can say, Your Honor, this is cross-examination.

MR. REKOFKE: I would like to make an objection, and that is, now, counsel is asking this witness to compare the testimony of Mr. Woodward with, apparently, the conclusions in this particular Exhibit 41, and I understood that the limited purpose for the admission of the document was to test, perhaps, the witnesses against the facts, or whatever is contained in the Kauffman report.

MR. RUDOLPH: And, Your Honor, to show inconsistencies in the position of an adverse party.

THE COURT: I think that's true. I will let him answer.

A I would generally presume that they say, their wording

is similar, they convey the same ideas, or similar ideas, at any rate.

Q (By Mr. Rudolph) When you were out there in January, we were at a high flood stage, weren't we?

A Yes, shortly after the flood.

Q And it would be extremely difficult at that time of year to ascertain anything about the true runoff, summertime-flow situation in the Chamokane?

A Well, yes, that would be generally true.

Q What factors are involved in the flow of water?

A The gradient; in surface water, it would be the roughness of the channel; the type of terrain that the precipitation would fall on; the availability--

Q Excuse me, I meant to ask you, ground water, Dr. Maddox, I'm sorry.

A Generally, ground water flow is based on the equation, Q, being the discharge, is equal to P, the permeability, times I, the hydrolic gradient, times the cross-sectional area, A.

Q What is the gradient in the Chamokane Basin-- Walker's Prairie?

A Referring to my notes from the flow net, I would make an estimate of about 35 feet per mile. This is a quick estimate.

Q Now, is it uniform throughout the middle and lower

Chamokane?

A It's not uniform, no. The gradient is not uniform.

Q What is the elevation of the springs?

A I don't have that information on my flow net.

Q What is the elevation of the water in the Hill Well?

A The time for which my analysis is made is early November, November 3 and 4, I believe, 1971. The altitude of the water in the Hill Well was 1791 feet above sea level.

Q What is the elevation of the water at that same time in the Newhouse Well?

A There was no information in Mr. Woodward's report indicating the depth of the water in the Newhouse Well at that time, so I didn't use it in my analysis.

Q Is there any exhibit that you can look at and verify if the elevation of the springs is not 1740 feet, do you have it in your notes, or can you look at something which would enable you to agree or disagree with me?

A I have nothing here. It might possibly be on a topographic map, which is on the board.

Q Would you care to look?

A I'll try. The topographic map indicates the Fish Hatchery is located between an altitude of 1700 and 1725, if I read it correctly. I imagine that the springs would lie somewhere in that, in those altitudes.

Q And roughly how much lower than the water level in the Hill Well would that be?

A At the present time, I couldn't say. From my analysis, 3 and 4 November, 1971, and on that basis, 1791 being the altitude of one level in the Hill Well, and we'll say, let's say 1700 being the altitude of the water surface at the springs, would be 91 difference, 91 feet of difference at the springs.

Q Now, excuse me, but did your notes show on that day what the Newhouse Well elevation was?

A Mr. Woodward's report didn't give a water level in the Newhouse Well for November 3 and 4, 1971, so therefore I didn't use it in my analysis.

Q His evidence, his testimony, has included the water level in the Newhouse Well, has it not?

A At various times, I believe he has referred to it, yes.

Q And would you agree with me that the water level in the Newhouse Well is approximately that as it is in the Hill Well?

A It should be very similar, yes.

Q So we have a 91-foot drop, and that's 91 feet of head between the Newhouse Well and the springs?

A That's correct.

Q And how much do we have flowing out of the springs?

A I believe Mr. Woodward testified something less than 10

cubic feet per second.

Now, I believe that was just from the Fish Hatchery Springs, and he tripled that, and the low flow would indicate that there's somewhere between 20 and 25 cubic feet per second for the entire spring area.

Q For the entire spring area?

A Right.

Q And what is coming out of the Newhouse Well?

A He has an authorization to pump, I believe, it is 1800 gallons per minute, though I don't know what he's actually pumping.

Q Is the effect of the springs that of a gigantic hole, in that alluvial deposit, taking out, let us say, the 20 to 25 second feet?

A I wouldn't describe it as a "gigantic hole". What happens at the springs is that the water surface intercepts land surface and the ground water discharges as surface water at the springs.

Q A very large discharge at a relatively small point?

A That is generally correct, yes.

Q With 91 feet of slope, would not the common sense thought be that there would be a movement of water towards that outpouring of water at the Massive Springs area?

A Not if the 91 feet in slope were between the Hill Well

and the springs, uh, well.

Q Well, we're also talking about 91 feet of slope between the Newhouse Well and the springs?

A Or 91 feet of slope between the Newhouse Well and the springs well wouldn't necessarily mean that the water that flows by the Newhouse Well would flow out the springs.

Q How wet is the radius of influence; as you move outwards, you have 20-some second feet moving out of the springs area; what is the radius of influence at which you would expect water to rapidly slope in towards this unresisting outlet?

A The spring outlet?

Q Yes.

A --the unresisting outlet?

Q Yes.

A According to my flow-net analysis, and this is, again, just a rough figure, I would say a diameter of two miles, with the springs being in the center, and this is just a rough estimate, so a mile either side of the springs, my flow net indicates this would be the flow into the spring area.

Q For how long a period?

A I guess as long as the spring is full.

Q And is there any effect as the springs diminish?

A Yes, if the springs diminish, that would imply that the water table had decreased, or had lowered itself until it was no longer in connection with the land surface at the springs, and one of several things could happen. One thing, the springs could break out lower down on the slope towards that new water table, or the discharge could be into Chamokane Creek, or the entire Chamokane Creek spring area would dry up as the water table passed somewhere, I don't know, the information didn't indicate it.

Q Now, as I understand the situation, we have a level of water in this basin that's 90 feet higher up at Newhouse?

A That's correct.

Q Than it is down at the springs?

A That's right.

Q And yet you're saying that the pressure of the water throughout that basin would not cause all of that water to push through the permeable soil, that top layer, and out the springs?

A What I'm saying is that the water wouldn't push from the Newhouse Well down to the springs due to the 91 feet differential in head, or approximately 91 feet difference in head.

Q Doesn't that slope create a hydraulic pressure throughout

all the water from point to point and cause it to move?
A That is true, but water follows the shortest path that it can, and the contours which I have used as a basis for my flow net would indicate that the water discharging at the springs would have its 91 feet of head occur somewhere near the, on the north half of Sections 13 and 14 of Township 28 North, Range 39 E.W.M., and the--
Q That doesn't mean anything to me. Where is that?
A Could I show you on the exhibit?
Q Please. Or tell it by reference to a name, if you can.
A That would be generally south, about a mile south and about a, oh, we'll say a half a mile to the west, would be the center of the area where the 71, or what did we say, 91 feet of head, would be affected by the, through the discharge to the springs, and, of course, these are approximate numbers, and I don't have the exact spring altitude nor does the flow net extend as far as the springs.
Q Doesn't water flow towards the direction of the least pressure?
A That's correct.
Q Okay, where is the least pressure here in this space; it's at the springs, isn't it?
A That's correct.
Q Now, will you agree with me that there is a movement of

water from the Newhouse area down towards the springs?

A No, I will not, not from the Newhouse area towards the springs. The flow net indicates the water from the Newhouse area is moving to the south and east and off the reservation. The water also follows the shortest path.

Q Well, what are those elevations?

A Which elevations?

Q The ones you based that statement you just made on.

A As I pointed out earlier, the 91 feet of differential, taking the springs and going back up the flow path until we have the 91 feet in head differential to which we are referring, wouldn't occur at the Newhouse Well; it would be somewhere, as I say, about one mile south and a mile west of the Schaffner diversion.

Q How do you arrive at that?

A By looking at the flow path indicated on the flow net.

Q I can't see your flow net as doing anything on the east side of Chamokane Creek. It doesn't look to me as if you looked at anything on the east side of Chamokane Creek.

A I was referring to the west side of Chamokane Creek. It's true, it doesn't show anything on the east side of Chamokane Creek.

Q It doesn't show anything with regard to the flow of

Newhouse.

A Well, that's true, the Newhouse Well, it's about the last point on my flow net.

Q Well, I can't see it. Is it on your flow net?

A It's not on the flow net, but where the Newhouse Well would be would be approximately the last point about the northeast quarter of the northwest quarter of the southwest quarter of Section 9, Township 38 North, Range 40 E.W.M.

Q And you ended there?

A I have no information to go any farther, and I drew the flow net without the benefit of Newhouse's Well, it just happened to fall within that point.

Q So you're making a determination as to the effect of Mr. Newhouse's well without any information about his well?

A I didn't include his well in my flow-net analysis, that is correct. I made a determination as to his cone of influence based on the maximum amount of allowed to withdraw under the terms of his permit, and some assumptions as to the coefficient of transmissivity and coefficient of storage, and the assumption that he would pump for 180 days.

Q What are the relative elevations between Mr. Newhouse and any point to the east of him-- I am looking for my

map--

A I have no information on my flow net. Again, I could refer to the topographic sheets to determine that.

Q Well, since this is not in evidence, would you mind looking at the green quadrangle?

A Yes, sir.

Q Let me just ask, as far as land elevations are concerned, it's higher to the east of the Newhouse Well, is it not?

A That is correct.

Q Is that also true as far as the Seagle Well is concerned?

A That's generally correct, yes.

Q Now, we're talking land elevation?

A That is correct.

Q And you have nothing, as you say, to go on, other than those facts?

A The facts of the land elevation?

Q Yes, because you have no well readings.

A I have no well readings. There are some wells distributed out throughout that area, but they were quite a ways outside the boundaries of the drainage, and so I didn't include those in my analysis, but I have no ground water information.

Q Do you know for a fact that those are very low-producing wells?

A I didn't know that until the, in the courtroom, I

believe Mr. Woodward testified to the fact that they were low-producing.

Q From your review of the geology in that area, you would agree that any wells off to the east of the Chamokane Basin there would be very low-producing wells?

A I would guess this might be a general conclusion.

Q Now, if in fact Walker's Prairie and the Chamokane trough is a closed basin, the water that comes into it is going to have to go out through the, over the falls and through the gauge at the mouth, isn't it?

A If it's a closed basin, yes.

Q Yes. And you have no fact before you, have you, indicating that it is not a closed basin?

A My flow net would indicate that movement is the, to the south and east.

Q Now, wait a minute, excuse me, I hate to interrupt your answer, but my question was, I think you can answer yes or no; do you have any facts before you, and your flow net is not a fact?

A I can't answer the question because I have no fact that it is a closed basin.

Q Assuming that it is a closed basin as Mr. Kauffman said and as Mr. Woodward said--

A On the basis of that assumption, there is no other way.

Q And you have no facts before you indicating that Mr.

Woodward's statement as to it being a closed system and a closed basin is not correct?

A That is correct.

Q Now, you were asked by various counsel as to the possibility of leakage out of the system; my question to you is, you have no knowledge of any leakage out of the system and no basis for thinking there is any leakage out of the system, have you?

A I have a basis for thinking there may be leakage out of the system, but I have no factual basis the follow this.

Q You have observed at no time, and there is nothing in the Department of Ecology records to indicate that anyone has ever seen, at any time, any evidence of leakage out of the Chamokane Basin, have you?

A The only thing I have is my flow net.

Q I don't think you answered the question, Dr. Maddox.

A I agree with your statement--

Q All right.

A --that no one, other than me.

Q What is the drop in pressure between the, where it is at the Newhouse Well and the springs?

A As we generally indicated, it would be 91 feet of altitude-- Do you want the pressure in pounds?

Q Yes.

A All right, there are 3.2 pounds pressure for each-- 3.2 feet of pressure for each pound, so dividing the 91 feet, if we say there are 91 feet in here, by 3.2--

Q I always thought that 2.3 was closer, instead of 3.4.

A All right, 2.3, we'll divide one way by 2.3.

Q I had to refer to my co-counsel to verify my rule of thumb.

A There would be approximately four-- There would be about 40, I would see, if my question mark is right, about 40 pounds.

Q Now that's-- Can we describe that as a "push" of water that would tend to move it towards the area of low pressure?

A That is correct.

Q If the water-- Strike that. If there is no other outlet out of this basin, then, as described by Mr. Woodward, then the gauge is catching all, or substantially all, of the water that comes into the basin, isn't it?

A If there is no other outlet, that would be correct.

Q Then, what is the, in your opinion, the input?

A The recharge, or the general precip.-- I don't know what you mean by the question.

Q Well, how much input, recharge, first?

A Recharge for the ground water system?

Q Yes, what is your projection of what the recharge would

be in an average year?

A I, the basis of my concept of recharge can only be analyzed by my flow net and the limited data therein. If I may, if I make the assumption that the coefficient of transmissivity is 100,000 gallons a day per foot, I would make a rough calculation that there is something like 43 cubic feet per second for each of my flow units, and there are nine of these, so it would be nine times approximately 43, so that would be--

Q 387.

A 387, and I would guess error in that and would be willing to round that off to 400 cubic feet per second crossing the, what I call my 1840 ground water contour.

Q And that would produce how many acre feet?

A Well, it would be twice, three, say 400--

Q Times two?

A --cubic feet per second times two, so that is 100 acre feet per day--

Q Times 360?

A --365--

Q Is that 292,000?

A That's approximately what I calculate, yes.

Q Now, what is the area of Chamokane Basin?

A I believe Mr. Woodward reports it to be something like 175 square miles, but I could be in error on this.

Q Well, from the precipitation over that area, can you figure what that would produce in total acre feet of precipitation?

A I could get an estimate, yes.

Q Would you mind going over to the board and doing a little calculating?

A (Does so.)

Q And I believe his estimate was 180 square miles, by the way, if you want to use that figure, and I'm interesting in knowing what, what we wind up with, in terms of recharge into the system, and runoff out through the Chamokane Creek drainage system.

A I can't tell you how much would go as recharge or runoff. I can only figure how much precipitation there would be on the land area, and this is only within a broad precip.

Q All right, figure that first.

A I believe, in using the gauge at Wellpinit, and assuming we have a long-term average of somewhere around 20 inches of precipitation, we have 20 inches divided by 12, and convert that to feet, that would be 1.66 times 180-- (figuring out loud)-- That would be 298 acre feet per year, by, uh, this is feet per mile, I'm sorry, not per year, then we have 640 acres for each mile. Let's make that nine-- Take that out-- (more figuring at

the board)-- I get roughly 19,000-- No, 193,160. That would be acre feet per year.

Q That's total precipitation?

A Right.

Q Now, what is the rule of thumb for how much of that becomes runoff?

A Generally, hydrologists in the area of semiarid climit use, as a quick estimate, three percent of the precipitation occurs as runoff.

Q Would you buy 20 percent?

A No, I think that is too high.

Q Are you familiar with Water Supply Bulletin No. 27 issued by the Department, State Department of Water Resources in 1969 in cooperation with the U. S. Geological Survey?

A What is the title of it?

Q Ground Water Resources and Related Geology, North Central Spokane, and Southeastern Stevens County.

A That's by--?

Q Here. Kline (phonetic).

A Yes, I'm generally familiar with it.

Q Now, on page 22 is a statement, the quantity of recharge that is added to the ground water reservoir in the Little Spokane Basin is estimated to be about one-fifth of the average annual precipitation that falls

on the basin. Now, do you agree with that?

A I would have to know how he determined that figure.

Q Well, he stated it in here. Now, I will also ask, you heard Mr. Woodward testify as to the hydrologists' rule of thumb of 20 inches of precipitation, you figure a 20-percent runoff, and I will ask you if you agree with that?

A No, I won't agree with it just generally, but perhaps there is specific areas where Mr. Woodward has more experience than I do. It may be valid. I always used three percent for runoff.

Q Well, for purposes of our computation, the only evidence we have in the record, actually, is the 20 percent. Now, would you mind, for your computation, using 20 percent, then?

A I'll use 20 percent, although I don't agree with it.

Q All right.

A It would be something like 38,632 acre feet.

Q Of runoff?

A Using 20 percent as a runoff coefficient, yes.

Q What would it be using your figures?

A Approximately 5,795.

Q Acre feet?

A Yes, acre feet.

Q And that's the total, using your three percent, that's

the total runoff out of the entire Chamokane Basin of 180 square miles?

A That would be the total average runoff, yes.

Q What's it been flowing through the Chamokane gaging station; how many acre feet?

A As I understand it, using Mr. Woodward's figures, I would estimate somewhere between 20 and 25 cubic feet per second as the low flow. The high flow, I haven't analyzed at all.

Q Well, have you not heard evidence as to what the acre feet computed to?

A I can quickly convert it to acre feet. Assuming that 25 CFS, converts to 50 acre feet per day, and we'll just use 365 times 50, and this is calculated-- (inaudible at the board)-- roughly 18,250 acre feet per year,uh-- as a low flow constant.

Q As a low flow constant?

A Yes.

Q Then, anything in addition to that would be your flood-season runoff?

A That is correct, which would-- The low flow constant is what would--

Q --be a benefit during the summer, then?

A That would continue to flow throughout the summer if there were no precipitation to increase the flow.

Q Now, where does this water come from if you use your three percent?

A The 18,250 acre feet?

Q Yes.

A I believe, from the analysis of Mr. Woodward's report, that it comes from the discharge of the springs.

Q Isn't there a basic principle that input has to equal output?

A Generally, that's correct.

Q What's input, what's the input?

A The input to the system?

Q Yes.

A On the basis of your figure, it would be 38,632 acre feet plus whatever amount came from the snow pack.

Q Wait a minute-- Plus?

A Yes.

Q Well, the precipitation is 20 inches, that's total, including snow pack.

A That is no precipitation at Wellpinit gauge. The effect of pack back in the hills would not be represented by the Wellpinit weather gauge. You would have another factor on your snow, uh, your watershed, your snow course that Mr. Woodward referred to in his testimony. My three percent, by using 5,795, of course, would be based strictly on precipitation.

Q Well, doesn't precipitation include snow and rain?
A That is true, in a gauge.
Q And so there certainly hasn't been an average of 20 inches of rainfall, that 20 inches includes snow and rain?
A That is correct.
Q Including snow pack?
A That is correct, at the gauge.
Q I ask again, then, if you use your three percent, you're nowhere near having input to equal output.
A No, I disagree; my three percent only represents the runoff from the amount measured at the gauge from precipitation, it does not take into the snow pack on the watershed, which is another .
Q What factor do you give to snow pack, then?
A This will vary extremely, it depends how much forestation there is, and how the forestation has been cut-- It's, you know, many factors. I believe that probably the 20 percent used by Mr. Klein in his report represents a combination of both snow pack and precipitation, but to put them both together as precipitation is erroneous and misleading, you couldn't use 20 percent, if someone went in and logged off the watershed, this factor would change drastically.
Q Now, in your flow net figures, we have a computation of

292,000 acre feet of input?

A That would be 292,000, if those numbers are correct, moving across, I believe I said the 1840 line, that would be ground water moving within the ground water system.

Q All right. And for it to move, and effectively move, and continue to be there, there is going to have to be that much intake, I take it?

A I would presume so, someplace.

Q And there was nowhere near that much input even possible here, is there?

A Depending on which figure you use, and concentrating solely on the Chamokane Creek drainage basin, it would appear to go from the most optimistic figures, the 20 percent figure for the precip., that there is nowhere near that amount of water, that is correct.

Q All right. Now, Mr. Woodward's findings, in his report, which you reviewed, and his testimony, all was to the effect that the precipitation included snow and rain, and that using the 20-percent factor, he had a projection of around 35,000 acre feet; do you recall that figure?

A Yes, I do.

Q And that was his estimated input and his projection of output, which was running very close, in the year 1972,

to what it was. Do you agree with all those figures?
A I agree that Mr. Woodward testified to those figures, yes.
Q And those, against, are the only facts that you had before you in reaching your conclusion?
A I had those facts, in the sense that Mr. Woodward indicated the low flow of Chamokane Creek at the U.S.G.S. gauge and some indication of the flow at the Fish Hatchery Springs, I believe it was, within his report, when I made my analysis.
Q Yes.
A That is correct.
Q Now, was there a discussion of precipitation in his report?
A There was.
Q Did you review it?
A Yes, I did.
Q Did you take it into account?
A No, I didn't.
Q Well, you disregarded his precipitation finding?
A That is correct. For the forming of a component analysis, it wasn't necessary.
Q Your flow-net analysis has, again, 292-- A flow of 400 second feet, and 292,000 acre feet, which you said would be the input, and all I can do is ask you again,

where does this water come from, and where does it go?

A Well, that's water moving across what I call the 1840 contour. Where it comes from, I couldn't say, my information doesn't extend far enough above the watershed. It goes down, according to my flow net, to the 1820 contour, which is my next contour. Now, there could be gains and losses between the 1840 contour and the 1820 contour, but what the extent of what the gains and losses are, my flow-net analysis won't show. The only thing it will show, in the uppermost contour, how much water is moving across that contour, and then I know certain things happen to it, but quantatively I couldn't tell you what happens to it.

Q How deep is that flow net?

A On the surface of the saturated zone we refer to as the "water table".

Q It has no depth?

A No, sir.

Q Does depth of water-bearing strata have an effect on the conclusion you reach?

A Yes, it does.

Q What depth did you use?

A I used no depth; you analyze it, it's a two-dimensional diagram, you can see, it has a north-south passage and an east-west passage, and what you analyze is the

manner in which the contour lines close on themselves, that is, the gradient steepens, or the manner in which the gradient falls away from itself and the gradient lessens, and this can be due to very many factors, it can be due to gain and loss of water in the system, it can be due to thinning of the saturated zone, it can be due to changes in the water-transmitting characteristics of the media, and, of course, you have to analyze all this with the best, your best eye and knowledge as to what went on in there.

Q In a 45-pound drop in pressure in 91 feet in difference in elevation, doesn't common sense say that there is going to be a movement of water towards the lower pressure?

A That's true, but--

Q You agree that it does?

A I won't agree that water moves from the Newhouse Well to the springs, but I will agree with your theoretical statement that water would flow to the lower pressure.

Q Now, we're back to your net, and you were talking about variable factors, and what depth of water-bearing strata did you use?

A I used none. It's not necessary in making a flow-net analysis.

Q Well, you had to make something to compute 292,000 acre

feet of water that wasn't there.

A That's based on the theory of the word "transmissivity". Transmissivity, to explain it for the record, is the amount of water that would move through the saturated zone, no matter what it is, from the top of the saturated zone to the bottom of the saturated zone.

For instance, if the saturated zone were only 20 feet thick, and I assume the coefficient of transmissivity of 100,000, and if you divided that by 20, I imagine, two into 100,000, that would be five into 20,000, so that would be, uh, approximately 10,000, is that correct, five into 20,000?

Q No, that would be four, wouldn't it?

A All right, four.

Q So you come up with a transmissivity of four, 4,000?

A It would be 4,000 per foot. That would be permeability. Then you go from permeability-- Permeability multiplied by the thickness of the aquifer indicates transmissivity. When you don't know the thickness of the aquifer, then you refer to the, to it as transmissivity, and transmissivity refers to whatever thickness the aquifer may have, for, as an example, I have seen sand beds, wells drilled through a sand bed, and all the rest is clay, and calculated from a pumping test, it has the transmissivity of 100,000, and this is from an 11-foot

sand bed, so this meant, really, if you took it to the permeability, by permeability per foot through that sand bed, it was extremely permeable, but we did it with the entire thickness of the well, depth of the well .

Q I guess you can have your seat again, Dr. Maddox.

A (Resumes witness stand.)

Q Do I take it from your illustration that that theoretical water just keeps on going to the center of the earth?

A It would go to whatever bottom of the aquifer that there is. It's just to the bottom of the well, usually, is what it turns out, so you say 100,000, and you don't have to talk about depth, because you really never know what the depth is.

Q You know the depth here!

A No, I don't know the depth.

Q Mr. Woodward does.

A I don't know if Mr. Woodward knows.

Q Well, I thought you read his report?

A I read his report, but nowhere in there does he give the depths throughout the basin.

Q Does he not give some estimates based on the seismic studies as to where bedrock is?

A He gives a depth of bedrock.

Q Where is that?
A Again, it's on the board, I believe it's a maximum of four or 500 feet, at a maximum.
Q And varying amounts under that?
A That is correct.
Q And does he also not give the depth of the permeable layer, the porous layer on top?
A That is correct.
Q Which is what?
A Again, looking at the board, I would guess a maximum of 100 feet, and generally around 50 feet.
Q Are you sure there's a maximum of 100 feet?
A I was looking at the right-hand side of that graph, the center one.
Q And the maximum of 100 feet, if that's-- I can't find the scale.

MR. GERMERAAD: It's on the left-hand side, is your scale. Each line is 50.

Q (By Mr. Rudolph) Here, take a closer look, will you, I, I don't compute that to be 100 feet. You're looking at Exhibit, your Exhibit 8?
A If I just use my fingers as a scale, this distance is the greatest thickness of loose, what we call "loose overburden", it's maybe 90 feet.
Q Well, isn't each space 50?

A That is correct.
Q And isn't this, at a maximum, a space and a-half?
A Well, it goes down a bit below that. Maybe just graphic error.
Q All right. We're arguing between a maximum of 75 to 90, and a minimum of what?
A Ten feet maybe.
Q And an average of what, looking at the Traverse No. 1?
A Twenty-five feet, 30 feet.
Q All right. What is the permeability of-- I guess you can go back again-- What is the permeability of that layer?
A I have no idea.
Q What is the-- And you have no idea of what it consists of?
A I know what it consists of, but I have no idea what the permeability is.
Q Are you in agreement that it consists of far (phonetic), loose materials, that is in the layer below it?
A Yes, I would agree with that.
Q Mr. Woodward's description of it, the aquifer is a confined channel of a glacial gouge filled with glacial drift. "Though the gouge extends to a depth of up to 600 feet, all except the top 35 to 50 feet is fine sands and silt. The top layer is predominantly open

and porous gravel and sands, with a good yield and transmissibility." Do you agree with all of that?

A I would agree, with one correction. On the term "bedrock", I don't know what bedrock is.

Q I had taken, from that, to indicate that it was something less capable of holding water than the fine sand and silt layer which has the, occupied the area between bedrock and the top layer.

A I have no knowledge--

Q Is that reasonable?

A No, I don't think it is reasonable.

Q I mean bedrock has absolutely no meaning to you?

A On the context with which the bedrock was determined on this seismic survey, it has no meaning to me as far as the water-transmitting characteristics. What it means there is that there is a rock unit which has a greater density and would transmit sound waves more rapidly than will the rock bodies, say, opposite from the bedrock.

Q All right, now, you assumed in your predictions here, you assumed the 100,000 coefficient of--

A Transmissivity.

Q --transmissivity?

A That's correct.

Q I notice in Johnson's book-- Is that the one you

referred to this morning?
A That is right.
Q And Johnson's book on ground water and wells, I notice that he refers to it as "transmissibility". Why do you say "transmissivity"?
A Well,--
Q I can't find that in any book.
A About 1965, or '66, there had been some agitation for many years to change the term, that "transmissibility" was an active term indicating that the rock would actively transmit water, and due to the English language, the physical phenomena happening, this was telling a lie, so about 1965, or '66, the U. S. Geological Survey changed its definition from transmissibility to transmissivity, since the rock is a passive body and the water is moving through the rock, and you're measuring the ability of the rock to allow the water to through.
Q Is that only rock; are we only talking about rock?
A I'm talking about rock in the broad sense. It includes, it could include sediment as well.
Q And we're talking about the aquifer?
A All right, the aquifer.
Q Apparently that change happened right after 1966, then, because Johnson still calls it transmissibility in 1966.

A It happened about 1965 or 1966, and some publications yet refer to it as coefficient of--

Q But what Johnson has to say under the terms of transmissibility would be applicable to what you're calling transmissivity?

A That is correct, although I may not agree with what they say.

Q All right. Now, Johnson says that the coefficient of transmissibility of an aquifer is the rate at which water will flow through a vertical strip of the aquifer one foot wide and extending through the whole saturated thickness under a hydraulic gradient of one, or 100 percent. Do you agree with that?

A Uh, except for the hydraulic gradient. The hydraulic gradient is generally measured in what is termed as "survey units", and that is whatever hydraulic gradient is existing in the field.

Q Now, this uses the term, "through the full saturated thickness". Now, doesn't that require a determination of the depth of the aquifer?

A No.

Q Going on, from Johnson, "Values of the coefficient of" transmissility-- "transmissibility", excuse me, I came up with a third term-- "range from less than 1,000 to over 1,000,000." And you used what?

A 100,000.
Q You used 100,000. How did you arrive at 100,000?
A Just a number that, generally, hydrologists, when we're talking in ground water, especially, you refer to sand and gravel, why, the other guy will automatically think 100,000, maybe 200,000, or maybe 50,000, but it's never a million, or is it 10,000.
Q What is it if it were down to 1,000?
A This would be extremely tight, something like a shale bed, possibly a real tight glacial fill.
Q Would you think that the transmissibility, transmissivity in the lower level, clay, sand and gravel area, would be in the neighborhood of 1,000?
A I would guess that it might be less than 100,000. I doubt if it would be down in the vicinity of 1,000. By comparison, and my one reason in saying this, looking at the Columbia River basalt, say, in the center part of the state, values for transmissivity there range anywhere from 25,000 to 50,000, and this all comes from the picture.
Q Now, we're at your mercy here when you come in and assume 100,000 and say that that is the coefficient to apply on this water-bearing strata, unless you tell us how you arrive at that.
A Well, I have tried to say that it's just my opinion that

it's somewhere around 100,000. I doubt that it's below 50,000 and I determined it's under 200,000.

Q And if you are grossly in error, your conclusions would be grossly in error, wouldn't they?

A That is correct.

Q And if you are partly in error, your conclusions would be at least partly in error?

A That is right.

Q What kind of water, or what kind of coefficient do you need to produce water in a well from three to 15 gallons per minute?

A You couldn't really tell a coefficient on that, that depends on many factors, not the least of which is the draw-down in the well. Another is the efficiency of the well, which might be measured by how the well is cased, or if it has a screen in the well. There are many factors involved. Although, generally, when you have a low-yielding well like that, I would expect a correspondingly low coefficient of transmissivity, but I couldn't tell you what it is. One factor you could use, one estimate of transmissivity, is, take the specific capacity of the gallons per minute and divide that by the number of feet of draw-down, so you have gallons per minute per foot of draw-down, and multiply that number by 2,000, for just a quick guess.

Q Did you study what Mr. Woodward's report had to say about the other wells in the Chamokane area?
A I looked at his tabulation showing other wells.
Q Did you look at the depth they were running to?
A Yes, on the wells within the Chamokane drainage basin.
Q I'm referring to the Public Health Service wells now.
A Yes.
Q And what depths, roughly, were those going?
A I have a few noted on my sheet here. I don't know which are Public Health Service wells, but the ones I have, Mr. Woodward's Well No. 108 is 48 feet deep, and it's gravel and produces approximately 10 gallons a minute. Mr. Woodward has another well, I believe that's No., uh, Section 24 A-1, is how I have it noted on my notes, 240 feet deep.
Q And producing what?
A I don't believe there was a production figure given for that. I just indicated that there was sand and gravel. Another well, 106, 25 feet deep, gravel, and produced eight gallons a minute. An additional well, No. 104, 230 feet deep, there is sand and gravel, mainly sand, I believe, and 10 gallons a minute. No. 105, 110 feet deep, sand, gravel, clay, no production figures given. No. 191, 300 feet deep, sand, at three gallons a minute is the production rate, and I believe that is--

Q That's enough.
A --that's No. 112, the Hill Well, and indicates that at 50 feet deep, and gravel, and produces up to 20 gallons a minute.
Q Now, the Newhouse Well is producing, again, 1500 gallons a minute, isn't it?
A I would guess it could produce up to that amount, yes.
Q And it's obvious that the Newhouse Well is pumping from the upper, porous strata?
A I don't know if it's obvious, but I would guess that it probably is producing most of its water from the upper strata.
Q And it's also obvious, isn't it, that those deep wells that you were describing, are tapping the lower, finer, tight strata as described by Mr. Woodward?
A I would guess that that is the case.
Q Now, what did you do on this 100,000, you've got two obviously ununiform areas, when did you, how did you pick out the 100,000 figure?
A Again, it was based mainly on the lithology of the information Mr. Woodward showed in his report, that is, the type cut by the wells, and it indicated sand and gravel, with clay in an occasional well. I had no figures to go by except those figures from the Public Health Service, or, I don't, as I say, you can't

tell anything from the production of a well without additional information, so looking at the rock type, I estimated there would be a coefficient of transmissivity of approximately 100,000.

Q Now, Mr. Woodward had a permeability test, didn't he?

A I don't really recall if he did or did not.

Q Anyway, you didn't ask for it or see it?

A No, I didn't read that, no.

Q Did he testify concerning it?

A He testified to a permeability test, that is correct.

Q And have you taken the information from that into account?

A No, I have not.

Q Wouldn't that be rather important in testing the validity of your 100,000 assumption?

A No, I think it might be misleading, since it's one check in one place.

Q Well, let me ask you this, what is three to 10 gallons per minute-- That is sufficient to, sufficient for a domestic well, isn't it?

A I would guess that it might be, yes.

Q Would you agree with this statement from Johnson, "An aquifer whose transmissibility is less than 1,000 can supply only enough water for domestic wells and the like."

A I would--
Q Do you agree with that?
A That might be generally the case.
Q If the lower level, and all the readings that I heard you give, produce only three to 10 gallons per minute, and if Mr. Johnson is correct, does it not then follow that the transmissibility in here is not 100,000 but 1,000?
A I couldn't comment on the transmissibility of just the lower aquifer. My transmissibility is for everything under the saturated surface, so it would include both the upper part and the lower part.
Q Dr. Maddox, I don't think you answered my question. Would you mind doing so?
A If I could have the question again, I'll--
(Read back by the Court Reporter.)
Q And in here I'm referring to the lower level.
A I can't answer the question as it's asked.
Q Isn't that aquifer what we are concerned with?
A I am concerned with the entire aquifer, the upper and the lower.
Q Doesn't it take that aquifer to work into this, these flow net figures of 43 CFS for each flow unit?
A Of which aquifer is that off of?
Q Yours, sir; from the figures you gave me from the flow

net.

A The figures from my flow net are based on the entire aquifer, the upper, more porous zone, and the lower, more porous zone, and I accepted the figure of 100,000.

Q You accepted it--

A Yes.

Q --you created it.

A No, I didn't create it; this is a general figure I thought was applicable to the area.

Q And I'm trying to find out how you picked that out of the air.

A It's just a figure, a general figure that is used amongst hydrologists.

Q Now, you said I didn't ask the question correctly about the lower aquifer. Now, I'm in an area where my knowledge certainly is about one to 100,000 compared with yours, so you will have to bear with me, I'm trying to ask questions that will bring out the common sense approach to this basin. If the lower aquifer, the lower level, has only a 1,000 coefficient, and that makes up most of the aquifer, how could you possibly come up with a 100,000 average?

A The upper aquifer has a much higher coefficient of transmissivity, it's higher than 100,000, I believe, so therefore by averageing the upper and the lower, I

didn't do this arithmetically, but just looking at it, and looking at Mr. Woodward's report, I estimated that the coefficient of transmissivity would be somewhere in between, and I gave greatest weight to the upper aquifer, and I arrived at the figure of 100,000, since this is a commonly-used figure.

Q Commonly used in what basins?

A Commonly used, I believe, throughout the United States, by most hydrologists working with ground water.

Q And the 100,000 applied to what kind of material?

A Sand and gravel.

Q Now, isn't,-- Okay, what figure did you use alone as applied to the 30-foot top layer?

A I actually didn't use any figure. I didn't have any figure available. Since that time, with the log on the Newhouse Well, which is Plaintiff's Exhibit No. 35, I just, to check myself, looked at it, and it had some information to, some information on it that could be used to analyze the upper aquifer--

Q Excuse me.

A --if we use the Newhouse Well as developed in the upper aquifer.

Q Excuse me, which exhibit again?

A That's Plaintiff's, uh, Plaintiff's Exhibit No. 35.

Q Oh, we're talking about the log?

A The log in the Newhouse Well.

Q And you've looked at that since you made your flow net?

A That's correct.

Q And how much, and you're unable to tell me, for the higher level, what you came up with?

A I know it was greater than the lower level, and the whole thing was sand and gravel, and I thought 100,000 would fit.

Q Keep in mind we're using a 1,000 on the lower level.

A I'm not going to put any--

MR. CERUTTI: Your Honor, I object to that, I'd object to that as not in evidence.

MR. : I object to that assumption.

MR. RUDOLPH: Well,--

MR. CERUTTI: There's no, absolutely no evidence to support that, Your Honor.

Q (By Mr. Rudolph) Well, when you average two figures, when you reach an average, don't you have to have two figures to average?

A At the time I made the average, I didn't have figures for either one. I looked at it, and thought this is greater than that, and therefore they should fit into the 100,000 category.

Q Dr. Maddox, at the time you were doing that, you thought the Newhouse Well was 150 feet deep?

A I didn't know how deep the Newhouse Well was, I didn't have any information on it at all at that time.

Q Obviously, you consider the transmissivity in the upper level would be something higher than the 100,000 then?

A That is correct.

Q Do we agree that far?

A That is correct.

Q All right. Now, that would make it most probable, would it not, that the flow 90 feet downhill to the springs would occur very easily in that upper layer?

A I would agree, yes, but I don't agree it moves from the Newhouse Well 90 feet downhill to the springs.

Q Well, I realize-- I realize you're stuck with that position, but we have got 90 feet of drop, haven't we?

A From where to where?

Q Newhouse to the springs.

A That is correct.

Q And now you have the upper strata being extremely porous, sufficiently to balance out a very tight 1,000 coefficient strata below?

A We have the upper strata very porous in relation to the lower one, yes, I agree to that.

Q And you would agree that on those facts you would expect the flow of water downhill, 90 feet downhill, would be accelerated?

A Yes, I will say, again, it will flow downhill, but I don't believe it will flow from the Newhouse Well to the springs.

Q And you have never told us why.

A Because water flows the shortest path between two points, and the point directly downhill from the Newhouse Well, although I don't have the information, the next point that would be 91 feet down gradient from the Newhouse Well would be somewhere outside the Spokane Indian Reservation and across, it would be south and east of the Chamokane Creek, whereas 91 feet up gradient from the springs would be somewhere approximately a mile south and a mile west from the well that's on, uh, Thomas, Thompson Creek, I believe it is, or the diversion, certified diversion on Thomas Creek.

Q If the more accurate, considering the 1,000 lower level, if a more accurate coefficient would have been 10,000, what would have been your opinion?

A A more accurate coefficient for the lower level, or--

Q No, the whole basin; for that aquifer.

A Would you please-- I don't understand the question.

Q You used an assumed 100,000?

A That's correct.

Q And I'm simply asking you, if you had assumed 10,000, what would your opinion be?

A My opinion, if I had assumed 10,000, is that the-- and storage remained the same-- I would have to have storage remain the same or else assume some different storage-- that the cone of depression from pumping the Newhouse Well would spread even less far than it does using a transmissivity of 100,000.

Q And it would have even less effect, are you saying, on the springs?

A That's right.

Q Now, if you assume for the upper layer 200,000, and that's where the effect is, where do you come up with?

A I don't understand your question. Are you continuing to assume--

THE COURT: The same thing, assuming 200,000.

A The same thing at 200,000, then I would expect a greater effect. In other words, I am calculating a hundred thousand, and assuming the coefficient of the storage is the same, and I came up with one-hundredth of a foot of draw-down at 1100 feet from Mr. Newhouse's well. If the coefficient of transmissivity had been 200,000, although I didn't calculate it, the one-hundredth-foot of draw-down might occur at 1500 feet from Mr. Newhouse's well, if storage remained the same.

Q Now, if I understood you correctly, you had figured

that after 180 days of pumping, the effect would be out only 1100 feet?

A On the basis of 100,000 transmissivity and storage of 12 percent, and pumping 180 days, that's correct, at 1500 gallons--

Q And how much effect would that have been?

A At one-hundredth of a foot of draw-down down at 1130 feet.

Q Well, in order to arrive at that, I mean, an 1100-foot area--

A It would be a radius of 1100.

Q A radius of 1100 feet?

A Yes.

Q Within the porous strata of that 1100 feet, you can compute the number of acre feet of storage in there, can you not?

A That would be generally correct, although you have to compute the draw-down at each increment back towards the well, and then you can calculate the volume of water that was stored in there. Of course, that's accounted for in your coefficient of storage.

Q Would it be very difficult for you to compute what one-hundredth of a foot would amount to in acre feet in a circle with an 1100-foot radius?

A No, I would, I could compute it, I would have to know

what the specific yield was, and I would assume the specific yield for this type of material to be something like 15 percent, I had a 12-percent storage, so I would assume 15 percent for the yield.

Q Well, in determining the effect of Mr. Newhouse's pumping, you had to take that into account, didn't you?

A No, not in conformance with the Thiess equation, you just plug in the numbers, and you have what is known as the "well function" and the augment to the well function, which are standard values that are calculated from a time series equation, and you just go to a standard table to pick these two factors out, and the equation is that transmissivity is equal to 114.6 times Q, the discharge, divided by S, the draw-down, times the well function, which is W times U, U being the augment, and the storage is equal to U, the augment, times transmissivity times time and days since pumping began, divided by 1.87 times R squared.

(Much laughter.)

THE COURT: You lost me about five minutes ago. I think we'd better recess, and I think we'd better start at 9:00 o'clock in the morning, and I may even finish this case up by noon, I hope, so we will start at 9:00 o'clock tomorrow morning. We will be in recess.

(Court adjourned for the day.)

Hon. Marshall A. Neill, Judge
Spokane, Washington
Thursday
March 21, 1974
9:00 A.M.

THE COURT: Let's see, Dr. Maddox was still on the stand, wasn't he?

(Dr. Maddox resumes the stand.)

CROSS-EXAMINATION, Continuing:

BY MR. RUDOLPH:

Q Dr. Maddox, directing your attention first to what I understood your remark to be yesterday, that the percentage of withdrawal in Chamokane Creek is less than other streams in Eastern Washington. You said, in essence, that, did you not?

A Yes, I said the amount of development to withdraw water is generally less.

Q Now, that comparison is by reason of what used to be the Department's position to run streams dry for irrigation purposes, would they not?

A That is correct.

Q And as a matter of fact, historically, the Department, the present Department, on many cases, has granted more water rights on streams than flow in that stream?

A That is correct.

Q And certainly that was a policy existing before the 1969 Minimum Flows Act, or before the 1971 Water Resources, both of which, if I may quote, included as fundamental principles the use of water for fish and wildlife maintenance and enhancement, recreational purposes, and preservation of environmental and esthetic values. Now, those are now declared goals and standards to be used in stream management, are they not?

A That is correct.

Q I believe it was to Mr. Rekofke that you said something to the effect that what happens between the Massive Springs area and the gauge at the mouth of the stream affects the flow at the gauge?

A I don't recall saying that, but I would say that is a true statement.

Q From all available information which you have, the springs furnish the entire flow into the Lower Chamokane which comes out the gauge, do they not?

A I couldn't say that they do or not. My information stops at the springs.

Q I mean, you have never walked it or made any investigation, visual or otherwise, to determine whether there is any input below the springs, I take it?

A That is correct.

Q Is it the discharge from the springs that, in your opinion, would cause the nearly uniform year-round flow of the Lower Chamokane?

A I couldn't limit it to just the springs. I could say it's the discharge of the ground water that causes the nearly year-round constant flow in the lower region of the Chamokane.

Q Again, as far as any facts which have been brought to your attention are concerned, that discharge from the ground water is almost entirely through the springs?

A Mr. Woodward testified to this. I have no direct information on it, nor does the data indicate whether it could be so or not be so.

Q That's a somewhat similar situation to the Little Spokane, is it not, where the uniform flow there is considered to be because of the discharge of springs?

A I'm not all that familiar with the Little Spokane, but I would assume that most, and I think it's generally assumed by most hydrologists, that most uniform flows, due to ground water contribution to its spring, uh, to its stream.

Q That's a stream that has basically a uniform flow and it doesn't slack off during the hot season?

A That would be correct.

Q You would agree, I take it, with this statement in the

States Water Bulletin No. 27, "Perennial discharge from the ground water reservoir by springs and subsurface seepage explains the nearly uniform year-round flow of the Little Spokane River. In fact, almost all of its flow during the summer and fall is derived from ground water discharge; thus, the continuous discharge from the ground water reservoir is reflected in water level decline in wells except when discharge is equaled or exceeded by recharge; thus, water levels in most wells throughout the area decline during much of the year and rise in the winter and spring and recharge occur."

MR. REKOFKE: If the Court please, I object. I don't know what he's talking about, the Little Spokane--

THE COURT: Counsel, I think that's repetitive. He's agreed with that, in essence.

MR. RUDOLPH: All right.

Q (By Mr. Rudolph) Now, that beings us to the principle of input equaling output, doesn't it?

A Yes.

Q And again, what do you say the input is into the Chamokane Basin, the Walker's Prairie underground?

A I made some broad estimates based upon the amount of water flowing across my 1840 contour. Now, I wouldn't say that this is total input on an annual basis, I just

say this is the volume of water moving across that line. There may be water gained or lost before it reaches the next contour line, so I couldn't really say that is the volume of input each year, it's just the volume of water that is moving across that line.

Q Well, do I understand you really are unable to say what the precipitation figures in the Chamokane Basin mean, then?

A Only in a relative sense, that if you have more precipitation, the water level rises, and if you have less precipitation, the water will decline. I can't say how much of the precipitation will go to the water level.

Q And those aspects of Mr. Woodward's study which dealt with precipitation, you simply did not take into account in the analysis you made?

A In constructing my flow net and analyzing my flow net, I did not take this into account, that is true.

Q Now, the flow net is only a graph, really, isn't it?

A That is correct.

Q I mean, it's simply a means of putting on paper a study which you made?

A That is correct.

Q Now, I searched rather diligently in Johnson's last night and I'm unable to find, and maybe you can help

me, I'm unable to find anyplace in which in making such an analysis, you're justified in assuming either the coefficient of storage or the coefficient of transmissivity.

A The coefficient of storage and the coefficient of transmissibility has nothing to do with the flow net, actually, that was based on the radius of influence of pumping the well, and was an assumption quite aside from the flow net.

Q Well, as I read, as I read Johnson, which we referred to yesterday, and that's the Ground Water and Wells, the purpose of studies of an aquifer, or ground water basin, for making any projections, is to acquire the essential, basic data to apply the formula which you have referred to.

A I would say that is partly correct.

Q I note on page 103 of Johnson, the coefficient of transmissibility and storage are especially important because they define the hydraulic characteristics of the water-bearing formation. The coefficient of transmissibility indicates how much water will move through the formation, and the coefficient of storage indicates how much can be removed by pumping or draining. If these two coefficients can be determined for a particular aquifer, predictions of great significance

can usually be made.

Now, how did you determine those?

A The coefficient of storage and transmissivity?

Q Yes.

A As I said yesterday, I made some broad assumptions for both, first that the coefficient of transmissivity was 100,000 gallons per day per foot, I based this assumption generally on the lithologic character of the aquifer itself, that is, sand and gravel, with some clay in it. The coefficient of storage, again, I made an assumption that it lay somewhere between eight percent and maybe 20 percent, and I just, on the basis of experience, I picked 12 percent. Someone else might pick 10 percent, or 15 percent, but I felt, in light of my experience, 12 percent was a good number to put for sand and gravel with a little clay in it.

Q Now, in the section of Johnson's on Well and Aquifer Test Methods, the entire impression which I get is that the purpose for the monitoring of wells is to furnish you basic information as to those two coefficients so that you are not making assumptions, but you are basing it on actual fact.

A That is correct.

Q Do you agree?

A That is correct.

Q Now, you did not do that, did you?
A No, sir, I did not.
Q Would you agree that graphing on a flow net is only one tool or only one method of determining the characteristics of a ground water basin?
A I would agree with that, yes.
Q And that Mr. Woodward might well have one way and you another?
A I would say that is true, yes.
Q On page 35 of Johnson, "An aquifer performs two important functions, a storage function and a conduit function. It stores water, serving as a reservoir, and transmits water like a pipeline. The ground water is constantly moving over extensive distances from areas of recharge to areas of discharge." Where is the area of discharge in the Chamokane Basin, Dr. Maddox?
A Well, as shown by the flow net, one area of discharge--
Q No, no,--
A Pardon?
A Forget, the flow net is not the Bible, it's what you did from your studies. I'm asking where the area of recharge, uh, of discharge is.

MR. CERUTTI: Your Honor, I object.

THE COURT: I think the witness has a right to--

(Various people coughing.)

MR. RUDOLPH: Well, answer--

THE COURT: --approach to that.

MR. RUDOLPH: Whoops, excuse me, Your Honor.

Q (By Mr. Rudolph) Answer as you wish.

A I would say that the flow net would indicate that the springs serve as one point of discharge. The flow net also indicates there is water moving in a southeasterly direction, that would be to the northeast of the springs, and I don't know where the points of discharge for this is.

Q Now, your flow net ends at Chamokane Creek?

A Yes.

Q And you have no observation at any point east of Chamokane Creek?

A I believe that's generally true. I think Mr. Woodward had one or two wells that were immediately east of Chamokane Creek, but generally that is a true statement.

Q And from any observation which you made, for, or for any application of the data which you have in developing your flow net, it stops at Chamokane Creek, and we're talking about what lies west of Chamokane Creek?

A That would be correct; both statements would be correct.

Q And it's completely probable, is it not, that as the water crosses in a southeasterly direction, at the Hill

Well, Newhouse area, and goes into the north-south component, I believe you referrrd to, that it would then move southerly and then again southwesterly?

A I wouldn't say it's probable; it's possible.

Q And you have not one iota of factual data to establish to the contrary,have you?

A Not one iota of fact data, no.

Q Now, when you say it goes into the north-south component, I'm assuming that you mean it's flowing south in that component?

A Generally,yes.

Q The only reason it wouldn't flow south would be because of the cone of depression created by the Newhouse Well?

A I don't believe I understand that question.

Q Well, your answer to my question as to whether the flow was south,in the north-south component, and you said, generally, and I then asked, the only reason it would not be to the south would be because of a cone of depression created in the Newhouse Well?

A No, I don't agree with that.

Q What would cause it to flow uphill?

A Well, it doesn't flow uphill.

Q Well, we have got a 90-foot drop and, that we talked about yesterday--

MR. TORVE: If Your Honor please, we went into

that about an hour yesterday.

THE COURT: That was thoroughly explored yesterday, counsel.

MR. RUDOLPH: Well, Your Honor, I don't think he said yesterday that water was flowing uphill, and he just--

MR. : He didn't say it today, either.

MR. RUDOLPH: He just said it now.

THE COURT: He didn't today; you said that.

MR. RUDOLPH: Well, he said it's flowing north, and the gradient is the, to the south; now, that was my question. I probably should ask it better.

THE COURT: Well, maybe I misunderstood his answer. I didn't think he said it flowed north, but I will let you proceed, then, if there is some confusion about this.

Q (By Mr. Rudolph) The gradient is to the south, is it not?

A In the area of the springs, the gradient is to the, generally has a north-south component, with the flow being from the north to the south, or towards the springs.

Q You say in the area of the springs; as a matter of fact, as we covered yesterday, we have a 90-foot drop from the Newhouse Well to the springs.

MR. CAMPBELL: Your Honor, we went over that four times yesterday.

THE COURT: Counsel, I think this is right. I have heard nothing new this morning we didn't cover yesterday, yet. If you have got some new ground to cover, fine.

Q (By Mr. Rudolph) The level in the Hill Well and Newhouse Well are the same?

A I don't know that they're the same.

MR. TORVE: I object to that, that's the same question we heard yesterday.

THE COURT: I'll let him answer. I don't know what he's leading up to at this time, maybe it's a preliminary question. Go ahead and answer it, if you can.

A I don't know if they're the same. They should be somewhat near similar. If the Hill Well were 1791, I would expect the water in the Newhouse Well on 3 and 4 November of 1971, within, say, my contour would show between 1780 and 1785. I don't have any information, I'm just calculating from information I have. So, in that sense, they are similar, yes.

Q They're basically the same. You agree there is a flow from the Hill Well south to the spring?

A No, I do not agree with it.

Q You do not agree with that?
A No.
Q Your flow net would show a movement in that direction?
A My flow net would show a movement from the Hill Well towards the Newhouse Well, generally speaking.
Q And that's notwithstanding the fact that they have the same water surface level?
A Well, as I pointed out, there is a slight differential in the water surface. I don't know what it was in the Newhouse Well, but my flow net would indicate that it is a few feet lower than the water in the, the water level in the Hill Well, and water does flow from the higher potential to the lower potential.
Q When the Newhouse Well is pumping, or any wells in that area, if they were pumping, would not the cone of depression extend over to the Newhouse Well?
A You used "Newhouse Well" twice-- Did you--
Q Next-- Well, would not the cone of depression extend over to the Hill Well, excuse me.
A From the Newhouse Well, the cone of depression would extend to the Hill Well. Both, I believe Mr. Woodward measured that, and my assumptions and my calculations indicated it would extend to the Hill Well.
Q And actually, as you told Mr. Germeraad and myself, when we talked to you, actually beyond the Hill Well?

A Yes, my calculations would bear this out, that it possibly does extend beyond the Hill Well.

Q And when you have a cone of depression extending outward from a well, does not this cause a movement of water into that cone of depression, attracting water?

A Yes, that is correct.

Q Is it correct, then, that the Newhouse pumping is attracting water off the Reservation into the Newhouse area?

A That is correct.

Q And is it not also then correct that, to that extent, it is interfering with whatever movement of water that there would be from the Reservation side southerly towards the spring?

A I don't agree that that would intefere with movement of the water from the Reservation side southerly to the springs, no, I don't agree with that statement.

Q You do not agree that it's interfering with the flow of water other than towards the Newhouse area, is that what you said?

A No, I didn't say that. I said that it wouldn't influence the flow of water from the Reservation southerly towards the spring. I don't agree with that statement. I do agree that pumping in the Newhouse Well does influence the Hill Well which lies in the Reservation.

Q Now, what is the effect of the Newhouse Well on the subsurface of the stream, immediately below the stream?

A The subflow of the spring within the confined channels of the stream--

Q Yes.

A --as we can see it?

Q Yes.

A I believe there is some minor influence, in that there is probably, uh, we have no factual information on this, but it's a common occurring, natural phenomenon that there is water in the subsurface of a stream, and in this particular area, Mr. Woodward's data would lead me to believe that it's probably above the regional water table, so therefore I concluded that under the influence of gravity, it is, to some extent, percolating downward; however, it doesn't percolate downward under the rules of hydraulic flow, what's called "long saturated flow", and following an entirely different physical phenomenon, and I really couldn't predict where it goes down; however, I would admit that it does have some tenuous connection with the water table, that is, that it gradually is percolating into the water table in that area, so pumping in the Newhouse Well would, to that extent, affect that subsurface flow of the stream, but what the extent is, I couldn't say.

Q Some effect, but you are unable to say what?
A That is correct.
Q I understood you, that you agreed that you had previously advised Mr. Germeraad and myself that the well pumping from the Seagle wells appreciably affected the flow from the springs.
MR. CAMPBELL: I object, Your Honor.
MR. RUDOLPH: This is preliminary, Your Honor.
THE COURT: Overruled.
A I don't recall saying it would appreciably affect the flow of the stream, in the sense of making a flat statement. In comparison with the influence of the Newhouse Well, I think the Seagle Well has some influence, has an appreciable influence on the spring, but what quantitative term that influence is, I--
MR. RUDOLPH: Could we have that exhibit, the Seagle water right, and I can't give you the number.
THE CLERK OF THE COURT: 35?
MR. CERUTTI: The Seagle water right?
THE CLERK OF THE COURT: You mean this certificate, or that--
MR. RUDOLPH: Yes.
MR. CERUTTI: It hasn't been admitted yet.
MR. RUDOLPH: No, that's your trouble.
THE CLERK OF THE COURT: No, it has been marked.

MR. RUDOLPH: Excuse me, I thought all the Department files had been put in, Your Honor.

MR. CERUTTI: Your Honor, I have no objection to the admission of the Department of Ecology files relating to Mr. Seagle.

THE COURT: Let's get it in if it's going to be used. What will it be numbered?

MR. CERUTTI: I don't think they both should be admitted.

THE COURT: Defendant's?

THE CLERK OF THE COURT: Defendant's 64A and B, there are two of them.

MR. RUDOLPH: I'm going to--

MR. REKOFKE: What are they; I don't know.

MR. RUDOLPH: Oh, excuse me, these are Exhibits 64 and 64A.

THE COURT: What is each one?

MR. RUDOLPH: 64A is the Department's file entitled, "Robert J. Seagle, Ford", and 64B is entitled, "Robert J. Seagle, Ford, Chamokane Creek", and they're both files of the Department of the Department of Ecology.

THE COURT: Any objection to the admission?

MR. DUFFORD: No objection.

MR. CERUTTI: No objection, Your Honor.

THE COURT: Defendant's Exhibit 64A and B are each admitted.

(Whereupon, Defendant's Exhibits 64A and 64B were admitted into evidence.)

Q (By Mr. Rudolph) Handing you 64A, I believe in the front is the report of findings made on the examination by Fred D. Hahn, engineer, on January 25, 1951, and Mr. Hahn is an engineer with the Department, and he is still with the Department, is he not?

A That is correct.

Q I note on one of the statements that he makes, and this is pertaining to Mr. Seagle's application, it is noted that three wells are within a pervious, subsurface area and can affect the level of Chamokane Creek where surface water rights exist. In view of this, such well can be issued as recommended, but must, of necessity, be subject to existing rights claimed on that stream.

Would you agree, from that, that the position of the Department, pretty uniformly has been that Mr. Seagle's pumping does affect the flow of the stream?

A I would say that if there is flow in the stream, as established hydraulic--

Q Sir, that isn't the question.

A I can't answer the question as it is asked.

Q All right. Do you want it restated--

A Yes.
Q --or do you want it re-read?
A Restatement, please.
Q The question was, from Mr. Hahn, Mr. Hahn's findings, and from your previous statement to Mr. Germeraad and myself, would you agree that up until yesterday, the Department's position has uniformly been that Mr. Seagle's pumping does affect the flow of Chamokane Creek?
A When there is water in the creek, it could affect the flow in the creek.
Q Now, is there water in Chamokane Creek where Mr. Seagle is during the summer?
A I would have to rely on Mr. Woodward's data, and it would indicate that Chamokane Creek there is intermittent, so I would conclude there is no, at least no surface water in Chamokane Creek.
Q And the time of pumping proposed by Mr. Seagle was during the very time you're talking about their being no water in the stream?
A That is correct.
Q Now, would you refer to the Newhouse File? I believe that is Exhibit 87, is it, Barbara?
THE CLERK OF THE COURT: 86.
Q (By Mr. Rudolph) Now, I notice there were a number of

protests, not only from Mr. Biggs, the Director of the Department of Game, who was fearful over the effect of the Newhouse pumping on the springs, but from Mr. Schaffner as it is noted in the report of findings,--

A As it is noted in the report of findings, yes.

Q And Mr. Schaffner, now, he's there on the Reservation west of Chamokane, isn't he?

A That is correct.

Q Mr. Schaffner's objection is, "Applicant's withdrawal would lower the ground water table and would affect Chamokane Creek."

MR. CERUTTI: Object.

MR. TRACY: Your Honor, I'm going to object to this, that there is no showing, just because Mr. Schaffner made an objection, anybody can make an objection, and there is no showing that Mr. Schaffner has any reason to believe he's affected, other than by what he says. There is no showing his, he is an expert, or knows anything about ground water.

THE COURT: Counsel, wouldn't the only relative part of that be what the result of the protest was, not the actual protest itself? That might have been wiped out during the course of the administrative hearing.

MR. RUDOLPH: There wasn't a hearing, Your Honor,

there was just a granting of a permit.

THE COURT: No, no, there is administrative examinations of these things, I know that.

MR. RUDOLPH: Well, I agree, there is an examination, but not a hearing.

THE COURT: Well,--

MR. RUDOLPH: What I think this shows, Your Honor, is that the people in that area, who have lived and resided there, have observed it far longer than Dr. Maddox has, and taking a common-sense approach to it, felt that there is a possible effect, and they are fearful of it.

THE COURT: Well,--

MR. RUDOLPH: Now, that is what I think it shows.

THE COURT: I think we have to assume that, and the exhibit is in evidence, and I see no purpose in going into it with the witness.

MR. RUDOLPH: All right.

Q (By Mr. Rudolph) You were present during the argument yesterday morning concerning the State's admissions on the answers to the interrogatories?

A Yes, I was.

Q And, as a matter of fact, didn't you participate in the preparation of those answers?

A Yes, I did.

Q And in connection with your preparation, or participating in the preparation of those answers, you referred, did you not, to the allegations in the complaint, one of which was that Chamokane Creek, the entire Chamokane Basin, is part of the Chamokane Creek, and when the answer admitted that, you were aware of that, were you not?

MR. TORVE: I object, I don't think that's what the allegation says, Your Honor. The allegation merely says that there is this trough, it doesn't say that's the entire thing, or that's all-inclusive. There is further interrogatories here that go as to whether or not the Department of Ecology knew anything about the source of this, and they said they didn't.

MR. DUFFORD: Your Honor, I would like to join in that objection. It really gets to the same thing we were talking about yesterday, that, the generalized statement says that the ground water of the trough is part of the Creek, and by saying that, we agree that the ground water is part of the Creek, we certainly did not intend to admit that every drop of ground water in the Basin, but that ground water, in a general sense, there is a connection between the Creek and the ground water, not that we're, it never occurred to us that we were talking about a completely closed system, or that

the ground water comes out of the ground at any particular point.

Your Honor, I think simply, he is trying to read into it that we did something that we certainly never intended to do.

MR. RUDOLPH: Your Honor, I thought I had a right to ask the witness, who participated in this, and what he had in his mind.

THE COURT: Did he prepare this?

MR. GERMERAAD: He said he participated in it, and I think Mr. Rudolph can examine his participation in the preparation of this.

MR. TORVE: Well, our objection was to the form of the question, because it assumes things that are not true.

MR. RUDOLPH: Well, I take somewhat of an exception to that.

Q (By Mr. Rudolph) Would you mind reading the exact statement?

A I have read it.

MR. RUDOLPH: And would you read the question back, please? Well, no, don't bother.

Your Honor, I think I have been accused of falsifying a statement to the witness, and I don't think I did.

THE COURT: Are you reading from the deposition, er, the interrogatories, itself?

MR. RUDOLPH: I'm reading from the complaint, and the complaint admitted that allegation.

THE COURT: Well, I--

MR. RUDOLPH: Excuse me. --and the answer admitted that allegation.

THE COURT: Well, go ahead; I don't think we're proving very much one way or the other by it, but you can answer.

A Ask it.

Q (By Mr. Rudolph) The only question was, in participating, you were aware that there was an allegation that the ground water within the Chamokane trough are a part of the Chamokane Creek, you were aware of that allegation?

A I was aware that at least some of the water in the Chamokane trough were part of the Chamokane Creek; ground waters, that is, yes, I was aware of that.

Q And you also participated in the preparation of the answer to this question, "Does the Department of Ecology admit that existing ground water diversion by the individual defendants are reducing the surface water flow of Chamokane Creek?", and (b), "The ground water available in the Chamokane trough", and the answer given

to both of those were, "Yes."

A I don't really recall the specific interrogatories, but I remember the sequence of conversation I had with Mr. Dufford, who answered the interrogatories, and when you withdraw water from any creek or surface water, or ground water, from any body, you are taking water from that body, so there is no contest to the question.

Q No, the question was that, do existing ground water diversions reduce the surface flow of the Chamokane Creek?

A I would say--

Q --to which you say, "Yes."

A --that is true.

Q Now, what ground water diversions, in preparing your answer, what ground water diversions were you referring to; by whom?

A The ground water diversions that reduce the flow of the Chamokane Creek?

Q Yes.

A As I said, I think all of the ground water diversions reduce the flow of Chamokane Creek to some immeasurable amount. I don't know how much it is. Mr. Newhouse and Mr. Seagle both, by withdrawing water, to some extent influence the water that gets down into the part of Chamokane Creek that flows the year around. Now, what

the extent is, I don't know. I don't think it's measurable, but that is just an opinion.

Q When you said, "Yes," you were saying yes in a very slight degree, is that what you're trying to say?

A This would be, I believe, a true statement.

Q Would you consider that a very honest answer?

MR. REKOFKE: Your Honor, I object.

THE COURT: Sustained.

Q (By Mr. Rudolph) The only ground water diversions that exist at the time are the Seagle, the Newhouse pumping, and Peter, and the Peter Well, for .2 second feet, so these, we had to be talking primarily about the Seagle and Newhouse ground water diversions, didn't we?

A We didn't specify anyone; we spoke in general terms when we were preparing the answers, that anyone withdrawing water would affect the flow of the stream, and I said, yes, they would, in some amount.

Q Now, I understood you yesterday to indicate that, if Mr. Smithpeter pumped on a rising flow, that there would be no, and by reason of the fluctuation, there would be, he possibly would not even be affecting the flow of the stream?

A No, he would have to affect the flow of the stream. If he took water out of there, it would have to affect

the flow of the stream. I don't believe that's what I said, or at least, that wasn't the intent of what I said.

Q All right, you do agree that it definitely does affect the flow of the lower Chamokane?

A Yes, certainly.

Q And did you by any chance look at Mr. Woodward's charts, which show a very measurable five-day period in which there was a completely observable decline in the flow during the periods when Mr. Smithpeter pumped and had not previously been pumping?

MR. CAMPBELL: Object, Your Honor, I don't believe there has been any testimony tied to that exhibit showing when Mr. Smithpeter pumped. It could have been evapotranspiration.

Q (By Mr. Rudolph) The question was, well, let me simply ask, did you check any of Mr.Woodward's records to ascertain whether he had any such records as to the effect of the Smithpeter pumping?

A Specifically, I didn't check anything in his report. Mr. Woodward showed me some hydrographs in his office, which I imagine are incorporated someplace in the report. I didn't check them specifically for this point, though, no.

MR. RUDOLPH: That's all I have.

THE COURT: Does the government have any cross?

MR. GERMERAAD: Yes, Your Honor.

CROSS-EXAMINATION

BY MR. GERMERAAD:

Q During your qualifications, you testified, Dr. Maddox, I was left in a slight lurch as to the area of expertise which you are supposedly qualified to testify about. Could you fill me in; were you qualified to testify as a geologist?

A I don't believe that was clarified. I like to think of myself as both a geologist and an engineer. I'm a Registered Professional Engineer in both the States of New Mexico and Washington; hydraulic engineer in New Mexico, and civil engineer in Washington.

Q So, if you're a licensed civil engineer in the State of Washington, you hold the exact same license as do the Woodward brothers?

A That's correct.

Q So if you were to have a licensed private practice in the State of Washington, you would hold yourself out to be a civil engineer in the State of Washington, the way the Woodward brothers hold themselves out to be civil engineers?

A That is correct.

Q I take it from your answers to Mr. Rudolph's questions that you have personally found-- that you have personally not found, and that you do not know of any other exit of water in Chamokane Basin, other than the springs?

MR. CAMPBELL: Object, Your Honor, this is repetitive. The testimony is clear.

THE COURT: Counsel, I'm being a little liberal about this, we are trying to bring this case to a close, and unless there is some new material, why, I don't see any purpose--

MR. GERMERAAD: Your Honor, I'm laying the ground work for a new inquiry Mr. Rudolph didn't go into, and the defendants, at various times, have repeated various things on their Direct.

THE COURT: Well, the problem with this trial, we're trying to bring it to a close; proceed.

A I forgot the question, can you repeat it?

Q (By Mr. Germeraad) Yes, I can. I take it from all your previous answers that you personally know of no other exists for the ground water in the Basin, other than the springs, you know that exists, but you don't know of any others?

A That is correct.

Q I would now like to refer to Defendant's Exhibit 10,

the U.S.G.S. map. Uh, it's green.

Looking at Defendant's Exhibit 10, I want you to visually locate on that map the respective locations of the Seagle and Newhouse withdrawals.

A Do you want me to mark on the map?

Q Yes, if you could.

MR. GERMERAAD: And could I approach him, and just do it from there?

THE COURT: Yes.

MR. CAMPBELL: If Your Honor please, may I ask the Court to ask the witness if he will give us coordinates so we can locate it on a copy of the map?

THE COURT: Very well.

A The Newhouse Well would be in Section 9 of Township 28 North, Range 40, E.W.M., and I would place it approximately, and I'm going by my flow net, that's the closest thing I have here, as being in the Northwest quarter of the Northwest quarter of the Southwest quarter of Section 9.

Q Before you mark it--

THE COURT: Just a minute, before you mark it, have you all got that?

MR. CAMPBELL: Yes.

Q (By Mr. Germeraad) Before you mark it, isn't there a series of four wells that Mr. Seagle has?

A Mr. Seagle has four wells, yes.
Q And isn't that the one you're going to be marking on?
A No, the Newhouse--
Q Okay, you're marking the Newhouse?
A As I said, I'll roughly place this as being in the Northwest quarter of the Northwest quarter of the Southwest quarter of Section 9. That would be east of Chamokane Creek.
Q If you'll just place a dot there?
A I will put a dot about here.

MR. CAMPBELL: If Your Honor please, could I ask the witness if it is the Northwest of the Northwest of the Southwest, or the Southeast?

A I would say the Southwest of Section 9, and it's north of two drainages, intermittent drainages, one Rail (phonetic) Canyon, and I place it north, I don't know, physically, where it lies on the ground, but I'll just put it just north of the Rail Canyon drainage.
Q And could you just place an "N" on that?
A (Does so.)
Q Now, there are a series of four Seagle wells, are there not?
A As I understand it, that is correct, yes.
Q And, generally, they follow a north-south line, following the general trend of the valley, is that correct?

A I would describe it more nearly as being northeast-southwesterly.

Q But isn't that the general thing, they're strung along a certain area there?

A That is correct.

Q Could you mark the approximation on Exhibit 10 of those four wells for us, please?

A All right. I'm going to have to guess on these. I believe they're in Section 17 of Township 28 North, Range 40 E.W.M., and I'll put the most northerly well as being in the, it would be the Northeast quarter of the Northeast quarter of the Southeast quarter, and I'll mark it on this map as lying between Chamokane Creek and the highway, right near where Chamokane Creek makes sort of a U-shape jog with the open part of the U turning towards the northwest. Since I don't know where the other wells are, I will just continue to make four dots, each about a quarter of an inch apart, in between Chamokane Creek and the highway, in a southerly direction, so that the last dot, I don't know if this is correct or not, lies in the Southeast quarter of the Southeast quarter of the Southwest quarter of Section 17, Township 28 North, Range 40 E.W.M.

Q Could you just place an "S" near those four dots, please?

A Right.

Q Now, looking at those locations on this U.S.G.S. map; this U.S.G.S. map shows the topography, does it not?

A Yes, that is correct.

Q Now, if we are to go but a short ways to the east of either the Newhouse Well or the four Seagle wells, we start a rapid rise, do we not, in the topography?

A That is correct.

Q And would you term that rapid rise a rise into a mountainous area?

A Either hilly or mountainous, yes.

Q Now, do you know, Dr. Maddox, whether those hills or mountains to the east of Newhouse and Seagle are composed of granite?

A Only by hearsay. I have no direct information on it.

MR. GERMERAAD: Could I have Plaintiff's Exhibit 7, I believe it is--

(Inaudible discussion with the clerk.)

Q (By Mr. Germeraad) Dr. Maddox, I have placed on the board Plaintiff's Exhibit 6, Plate No. 3, General Geology and Well Locations. Would you come over towards the board, please.

(MR. CAMPBELL: If Your Honor please, may I ask, to refresh our memories, who prepared this?

MR. GERMERAAD: This is the Weaver map.

MR. CAMPBELL: Thank you.

Q (By Mr. Germeraad) Now, am I correct that if we were to place the Newhouse Well, it is approximately here, is that--

(Inaudible discussion at the board.)

Q (By Mr. Germeraad) So the Newhouse Well is approximately here?

A I would agree, generally, yes.

Q And then the Seagle wells are along the slant, right here, is that true?

A I would say yes.

Q Now, on these particular exhibits, these would be the mountains I was referring to, would they not?

A Those would be the mountains.

Q And on this map, anyway, MLG, which denotes those mountains, is called "Moon Lake Granite". Now, whether you want to say it's hearsay, or general knowledge of geology, does that comport with where you know the Moon Lake manolithic, monolithic, whatever, or Moon Lake granite, would be located?

A I couldn't say one way or the other. I would be willing to accept the map, though, on its face.

(Witness resumes witness stand.)

Q (By Mr. Germeraad) Dr. Maddox, granite is, in relative terms, certainly, with all the other materials we have

been talking to, is a rather impervious material, is it not?

A That is correct.

Q So you would certainly, in comparison, and that's all we're talking about right now, it would not have water passing through it like you would have in the glacial drift, as the Walker's Prairie ground water system?

A That is correct.

Q Now, I believe you have heard the testimony of Mr. Woodward, or you said you were here for most of it, anyway, and I believe you can recall talking about the falls. Now, are not the Chamokane Falls more or less going over-- That's over granite, too, is it not?

A I have no direct information on this.

Q Do you have anything that leads you to believe it's not granite?

A I don't know whether it's-- I could say that it's probably a very confident, what is called a very confident rock, like granite, and whether it's granite or something else, I don't know.

Q Okay, I'm now going to refer you--

MR. GERMERAAD: I think the best way, Your Honor, is just to point out the individual picture, and if I can show it to the witness?

THE COURT: Are the pictures numbered?

MR. GERMERAAD: No, they aren't, Your Honor, they're not numbered, but I can describe it into the record, perhaps.

Q (By Mr. Germeraad) This is Plaintiff's Exhibit 81, and I have opened it to the third sheet, as opposed to page, and on the back part of that sheet, in the upper right-hand corner, to me it looks like falls, and if you would please take a look at that picture, please.

A (Does so.)

Q Is that the picture of what-- Have you seen the falls?

A No, I haven't.

MR. CAMPBELL: If Your Honor please, if this will speed up things, if counsel is trying to establish that there is hard rock which would be in the nature of a dike, I think all of the defendants here will stipulate to that.

MR. CERUTTI: I'll certainly concede there is granite in this vicinity. I'm not prepared to concede that it's--

THE COURT: I'm not sure what he's trying to establish yet, but the witness says he hasn't seen the falls, so I think he can't tell by the picture.

MR. GERMERAAD: So I don't think I can ask the question, unfortunately. Thank you.

Q (By Mr. Germeraad) I'll then ask you a hypothetical

question. If we were to assume that the falls area were granite, a hard-type rock, and I believe you said earlier that perhaps there's been some erosion in this area, and if we have granite to the east of, and I think I can, though, refer to a broader picture in this album-- I'm now going to refer to Plaintiff's Exhibit 27, it is the eighth sheet, as opposed to page, pictures, and it's on the front of that sheet in the lower left-hand corner.

A Yes, I see that photograph.

Q Okay. Now I'm going to ask you to assume that is the falls, and the reason I think I can do this is Your Honor has gone out, and I think Your Honor has seen the falls and can recognize it, so on that basis, I'm going to ask you to assume that is the falls.

Now, don't we have-- The water falls down to more or less a deep gorge, it's a gorge, doesn't it look like, it falls into?

A It's a declivity, yes.

Q Okay. And we have assumed we do have a hard rock over which this falls. That hard rock slopes up on either side of the falls, does it not?

A I don't know if it slopes up. In the picture, it appears it goes into the bank on either side of the falls, yes.

Q Okay, I think that's all from that picture, thank you.

Now, if we have more or less assumed, or taken for established that we have a granite or other hard rock dike over which the falls plunge, and we have on either side of the bank that hard rock present, and looking at Plaintiff's Exhibit 6, we have that hard granite, the Moon Lake granite, directly to the east of the Newhouse and the Seagle, there really doesn't seem to be any other exit, does there, for the water to go if it were to go east, it would run up against the granite, would it not?

A On the scale in which the geology is mapped in that map, I would say yes, that is a true statement.

Q And that granite would generally stop any ground water flow, would it not?

A Unless there was some real good reason, yes, that would be a true statement.

Q I'm now changing my line of questions.

When you assumed the 100,000 coefficient of transmissivity, are you not assuming a rather homogeneous substance?

A That is correct, it's based on a coequivalent of homogeneous isotropic media.

Q And "isotropic" means that it has the same properties in all directions; is that correct?

A The same properties that transmit water in all directions, that is correct.

Q North, south, east and west, up and down; is that correct?

A That is right.

Q Although you might not have been here for all of Mr. Woodward's testimony, were you here for a portion of Mr. Woodward's testimony that related to whether or not the glacial drift in the Walker's Prairie area is a homogeneous substance?

A I don't remember Mr. Woodward's exact words, but his general statement was that there was a change in little of this rock-character type throughout the glacial drift.

Q You have not sampled that, have you?

A No, I have not.

Q So you have no data to disagree with that in any way?

A No, I have not.

Q But the coefficient considers this homogeneous?

MR. CAMPBELL: If Your Honor, please, I object to further testimony on this line of testimony, unless it deals with something new. We can't--

THE COURT: Counsel, of course, I have no way of knowing what you're leading up to.

MR. GERMERAAD: There is a long series of questions, Your Honor, that have not been gone into by Mr. Rudolph.

MR. CAMPBELL: May I request you make, then, a short series?

MR. GERMERAAD: I would make an effective series for him to handle.

THE COURT: Proceed, then.

Q (By Mr. Germeraad) Did you give-- You met, on the Saturday before trial, with the Woodward brothers, did you not?

A That is correct.

Q At that time, did you give the Woodward brothers a pamphlet which more or less described the use of a flow net?

A That is true, it's a pamphlet, it's a publication by the Water Resources Division of the United States Geological Survey.

Q What, would that be the ground water flow system in the Snake River between Idaho and idealized analysis?

A That is correct.

Q And that's Geological Survey Water-Supply Paper at 1536-D.

Now, I take it in this, it describes the function and the establishment of flow net, is that correct?

A That is correct.

MR. GERMERAAD: Mr. Court Reporter, at various

times, I'm going to be talking about authors, who are Skibitzke and Da Costa, and Skibitzke and is spelled S-K-I-B-I-T-Z-K-E, and Da Costa is small D-A, capital C-O-S-T-A. Now, there is a subtitle to this confurcation (phonetic), I believe, a theoretical analysis of ground water flow in a basalt aquifer, so this is not an empirical analysis, but a theoretical analysis?

A That is correct.

Q And this structure, this publication that describes flow net is based on a basalt aquifer, correct?

A It was applied to a basalt aquifer. The flow net analysis is a broadly used--

Q But that compilation that you gave is a-- Yes.

Now, Walker's Prairie is not a basalt aquifer, is it?

A That is correct.

Q I don't think we have ever established on the record exactly how you did construct your flow net, so the next series of questions is going to be directed to that.

From how many empirical data points did you construct your flow net?

A I believe there are 14 wells that Mr. Woodward had in his report, and there were about four surface water

stations that I used to evaluate the flow net.

Q I know we have these in Mr. Woodward's report, but how many specific data points did you use to construct your flow net?

A Fourteen wells.

Q Fourteen--

A Fourteen data points.

Q Fourteen data points. Could you, on your flow net, identify where those 14 are?

A I could identify it by township and range. Some of them, I could give Mr. Woodward's numbers. Mr. Woodward gave a set of unique numbers, so if I could identify all of them by township and range, and where I have Mr. Woodward's number, I will throw that in, to help identify it.

Q Okay. Well, I don't know that that will be necessary, but it could be done, but it's not on the flow net in and of itself right now?

A Yes,it is on the--

Q Well, I mean, it would be within the area of your flow net, but these are not designated on your flow net right now, is that correct?

A Yes, they're designated-- Well, at least the altitude of the water surface in those wells is designated. The well is plotted on the flow net.

MR. GERMERAAD: At this point, Your Honor, I believe we earlier established that there are certain points on the flow net that Dr. Maddox testified from that are not on the other flow net, which is in evidence, I believe.

Q (By Mr. Germeraad) Could I see-- Could you show me, on your copy?

THE COURT: Weren't they going to put the one with all the figures on it into evidence?

MR. GERMERAAD: I think, at some time, they were.

A These numbers are the altitude, like 1732, and the little round dots would indicate the wells, and here is a little round dot for 1732, and here is a round dot for 1743, and those round dots indicate the location of the well, so in order to give you the location of the well, I would have to just visually scan it out from the section and describe it by the landmark system, but each of those are on your flow net, too.

Q Okay. That's just a dot, it doesn't have any particular numbers, so this particular dot is not--

A --included in the flow net.

Q --included in the flow net?

A That is correct.

Q So you do have on this, where there is a small round dot, and figures given, those are the data points you

used?

A That is correct.

Q Okay.

MR. GERMERAAD: I think it would be advantageous, Your Honor, for this copy, or a Xerox of this, also to be introduced, because there are points on here that are not on the other.

THE COURT: I understood yesterday that was to be done.

MR. GERMERAAD: Do you have a Xerox copy of this?

MR. DUFFORD: Not at the moment, but we would be willing to.

MR. GERMERAAD: Could they mark this, then, and if they want to substitute, and just leave this one?

THE COURT: All right, just give it a number.

(Whereupon, Defendant's Exhibit 65 was marked for identification.)

MR. GERMERAAD: The new flow net with all the data points is now Defendant's Exhibit 65.

THE COURT: Defendant's Exhibit 65 will be admitted.

(Whereupon, Defendant's Exhibit 65 was admitted into evidence.)

Q (By Mr. Germeraad) Dr. Maddox, do you remember Friday, March 8th, describing to me how the flow net was

constructed?

A Generally, yes.

Q Now, I'm going to, for illustrative purposes, use this sketch pad, and I want you to tell me if I'm correct, if we have those four data points, and these have various elevations--

A Right.

Q I just think I should plan this out, but I have given these points four different elevations, 1786, 1790, 1804 and 1808. Now, once you have the data point, the first thing you do in establishing flow net, you draw in what you consider contours, is that correct?

A That is correct.

Q And these contour points are to establish certain elevations within your ground water system, is that correct?

A That is correct. The elevation of the water table along those contour lines should all be the same.

MR. CAMPBELL: If Your Honor please, I might interpose, in the interest of time, why don't we ask Dr. Maddox to draw how he did it, and it would save time.

MR. GERMERAAD: Well, I think I'm establishing by my questions, and I think I should be able to go ahead with my presentation. If he wants to have Dr.

Maddox do it all over again, that's fine, but I think this is most effective, his explanation, he explained it to me once, and I think I can bring out how he constructed it quite well.

THE COURT: Proceed.

MR. CERUTTI: Your Honor, I would appreciate an indication; are these elevations water or surface?

Q (By Mr. Germeraad) These would be water elevations, correct, Dr. Maddox?

A My analogy with the flow nets, they would be the altitude of the top of the water surface in a well under static conditions.

Q Now, if this were 1786, and this was 1790, at some point in between would likely be this 1788 position?

A That is correct.

Q And I'll make an "X" on the 1788.

Now, there is, between 1790 and 1808, there would also be, let's say, an intermediate point, let's say 1800 would certainly be in between there, correct?

A Yes.

Q Now, exactly the way you draw the contour lines between these points depends upon who draws the line, is that correct?

A That is correct.

Q So that geologist, hydrologist, or civil engineer might

draw it one way, and one might draw it slightly different? And some take a rather mathematical approach, do they not?

A That is correct.

Q --since there is a distance in between--

A That is correct.

Q --and they will try and connect the points. Other people, in doing this, use more judgment, and not necessarily mathematically?

A That is correct.

Q And you would consider you're in that last category?

A That is correct.

Q If we were to draw that 1788 contour, that is the 1800 contour, we would then have perhaps an 1804 here, and 1808 here, and have rather a straight system. But if we were to, say, look at the distance between 1790 and 1804, we would put it close to here, but we could also have 1800 here and have the flow lines curved. I'm doing this just for illustrative purposes.

In other words, whether we have straight lines or the amount of curve depends on who draws the lines in. All you would have to do is be true, more or less, to the data points in some way and account for any anomalies?

A That is correct.

Q So you could have two people come up with slightly different lines that would go, at first glance might not look too much alike, is that correct?
A Uh,--
Q Well, they certainly would be different?
A They would be different, I'd agree with that.
Q Now, after we have established certain contour lines, the next thing we do is establish stream lines, or those lines that are generally perpendicular, is that right?
A That is correct.
Q And these perpendicular lines to your contours establish the direction of the water flow?
A That is correct.
Q Now, if we were to be perpendicular at this point,and you have the water flow there, and yet to be perpendicular here, we would have to have the water curve to be perpendicular there, so your flow lines, then, in being generally perpendicular to your contour lines, might change if your contour lines change, and that's a matter of judgment, correct?
A That is correct.
Q With the processes that I have gone to, showing the first data points, the establishment of contours, and then the flow lines being perpendicular to the contours,

the method you used to establish your flow net?

A Generally, yes, I did have some guide on where I put my flow lines, but, generally, yes.

Q Right, the guide, depending on your data points?

A On the flow lines I worked with unit areas, between two sets of contours.

Q Right. But without going into the unit areas, these first two establish--

A That's right.

Q --the principles that were involved in your, in establishing your flow net?

A That's right.

Q Okay, thank you. Mr. Skibitzke and Mr. da Costa, in this pamphlet that you gave to the Woodwards, describing the establishment of a flow net, feel that there are certain limitations on the use of a flow net, isn't that correct?

A That is correct.

Q When you constructed your flow net, what geological picture did you assume, or did you take as true?

A That there was a homogeneous isotropic medium, and by this I mean that there was no big granite knob right in the middle of the basin that would stop water from moving through.

Q Going to Plaintiff's Exhibit 6, if we are to go beyond

the Newhouse and Seagle wells, though, we do have these large pieces of granite, and also camas basalt before we get to the granite. Could not these stop the flow-- You have already said these could stop the flow in that direction, didn't you?

A The granite could, but--

Q But not necessarily the basalt. So, when you were assuming your geology, you, of course, did not make reference to the Weaver or the Griggs map, isn't that correct?

A I had a copy of it that Mr. Woodward gave me, and I just generally looked at it.

Q But you really did not consider it?

A I didn't incorporate it on the area that I drew my flow lines, that is correct.

Q This paper, I believe, concludes, in almost the very last paragraph, that without the geology being incorporated, the hydrologic data, which is involved, could be almost meaningless, is that correct?

A I would agree with that statement.

Q So if the geology you assumed was not, in fact, what did exist, the hydrologic data, or any testimony about the hydrologic data, could be almost meaningless?

A If the geology was not what I had assumed existed, yes, this is true.

Q I believe one of the first things, according to Mr. Skibitzke and Mr. da Costa, in setting up the flow net, is to establish the boundaries of the basin?
A That is--
Q I take it, since you went only to the Chamokane Creek, you could not do that?
A I established one boundary, which would be the watershed boundary to the west. I have no recent boundary, my information ran out before I got to the boundary.
Q So if we were to look at Plaintiff's Exhibit 10, basically the red line here, then, is the one boundary that you assumed?
A Yes, that is correct.
Q And you did not assume any north, south or east boundaries?
A I had no information to take for true the boundaries as shown there on the map.
Q I believe, according to this book which you gave the Woodwards, the authors felt that unless you could establish as one of the parameters the external boundaries of your basin, and do this, and be able to express it mathematically, you certainly have an incomplete picture, would you not?
A I would agree.
Q And the effectiveness in what you could say about that

would certainly have a lot less reliability than if you did establish the boundaries, isn't that correct?

A I would agree.

Q One of the other parameters which is discussed, to know where the input is and where the output is; where the inflow and the outflow are. Did you establish where your inflow is on your net?

A Only to the extent of the 1840 line, which was my farthest, er, my highest altitude line, indicates a direction of flow from where the input came.

Q So, if we are to say that the 1840, referring to Plaintiff's Exhibit 10, if we are to say that the 1840 line just cut across here, for instance, then the only thing that your flow net says that, is that there is input someplace here, it does not say there is or is not input anyplace else in the basin, is that correct?

A That is correct.

Q Now, according to Mr. Skibitzke, we also have to know where the outflow goes.

A That is correct.

Q Now, did you assume that there was outflow, or did you locate a certain outflow?

A I didn't assume any to begin with, and I began working with only my data, and the data began to show that the springs, the spring area, the area of perennial flow,

and Chamokane Creek was at least one area of outflow, and then to the north and east, it was inconclusive, and just indicated flow to the southeast.

Q Well, I get the impression, when Mr. Skibitzke and Mr. da Costa have a constructed flow net, they first describe mathematically the boundaries of the basin, and then they establish, I guess this is empirically, before they even begin to sketch anything in, where the input comes and where the output goes.

And now, certainly, if you located, empirically, where the input comes in and where the output goes out, this would certainly influence you in the way you first set up your contour lines, would it not, and your flow line?

A Under some conditions, it could, yes, if you made that assumption, for instance, a series of gigantic springs. This might help you in an otherwise flat water table, this might help you in your contours.

Q Right. I would like to put two, sketching on the pad, two rectangles. Now, if in the A Basin, we have the inflow here and the outflow all the way along the bottom line, we establish that these are, and just see what happens; generally, our flow net is going to be a series of rectangles, is that correct?

A That is correct, and the homogeneous isotropic medium

was, you know, was uniformly recharged.

Q And we are to, indeed, have the area along the top, just the top being our area where the water is coming in, and having one place where the water exits, which I have labeled and circled, "B-1", then, likely, we are going to have a different flow net, correct?

A That is correct.

Q But before you began, you did not establish the total area of where the water was coming in, or where the water was going out? All you know is that the springs was one such source, but you don't know whether there is any other exit, correct?

A That is correct.

Q Now, if there was an exit at B-2, you would have some of the water going here?

A That is correct.

Q But if there was no exit at B-2, only at B-1, there would be no curve to this direction, but it would curve into the other direction?

A That is correct.

THE COURT: Counsel, I think this would be a good time to take the mid-morning break.

MR. GERMERAAD: Okay.

THE COURT: It may be a little longer than our usual 10 minutes, but we'll let you know.

(The morning recess taken at this time.)
(Extended recess due to bomb threat and evacuation of building.)

THE COURT: Well, I guess we can proceed.

MR. GERMERAAD: Thank you, Your Honor.

Q (By Mr. Germeraad) Before our untimely interruption, I believe we were, or we had covered, some of the parameters which Mr. Skibitzke and da Costa mentioned, but which you did not consider in constructing your flow net. Does the flow net which you have constructed assume any recharge?

A It has nothing to do with recharge. It assumes nothing like that, no.

Q Did, you did assume, did you not, that there was a constant thickness of the zone of saturation?

A No, I didn't assume that, I only mapped the surface of the water table and said nothing of the thickness.

Q Isn't the Skibitzke-da Costa approach that that is one of the assumptions they made in constructing their flow net, that we had a constant thickness in the zone of saturation?

A I don't recall that. That is possible. They could

have made that assumption.

Q In any case, if we did go to the Shannon & Wilson report, and as that is graphically shown on Plaintiff's Exhibits 8 and 9, we could determine that, empirically, anyway, there is no constant thickness of this strata, could we not?

A I would agree there is no constant thickness to it, yes.

Q If we were to study a ground water system, fluctuations in the ground water are very important, are they not?

A In the level of the ground water?

Q Yes, fluctuations during the period of time.

A That is right.

Q I'm going to have handed to you Plaintiff's Exhibit 18.

Plaintiff's Exhibit 18 shows the fluctuations in the Hill Well for 1971, at some point in time, up until February 1st, 1974, does it not?

A Yes, it does.

Q Now, and it shows the number of feet of recharge during the winter and spring floods that evidence themselves in the Hill Well, does it not?

A It shows the number of feet of water table rise in the spring of the year.

Q Well, do you agree or disagree that that comes from a

recharge of the floods spreading over Walker's Prairie and sinking into the ground water system?

A I would agree that the rise in the water level occurs from the recharge. Where the recharge comes from, I really don't-- The graph doesn't show that.

Q No, the graph doesn't show that, but that is not what my question was prefaced on, but in fact, would you not agree with the statement that the recharge to the ground water system, in large measure, comes from flooding of the Walker's Prairie area in the winter and spring floods, and do not the winter and spring floods, in time, correspond with the rise shown on the Hill Well, as shown on Exhibit 18?

A I would agree that the winter and spring floods correspond, in time, with the rise of the water in the wells, and I would agree that the winter and spring floods are the recharging mechanism. I couldn't comment on where the recharge takes place. I don't really know.

Q If we were to have a similar hydrograph for each of many wells in the Walker's Prairie area, by looking at such hydrographs, could we not empirically decide how much water was taken into the ground water system?

A We could calculate a volume for that particular area, yes.

Q Yesterday in response to a question by Mr. Rudolph, you

mentioned the date of November 3 and November 4, 1971, as the date of the data, or the elevation in the Hill Well. Am I correct that that is the date of the data which is that point of your flow net in the Hill Well?

A I believe it is so. I used one-- one water level, one bit of water-level information that was not November 3 and 4, it was sometime later in November of 1971, but I have forgot which well that was for, there was one well that was not measured on the 3rd and 4th of November, so I couldn't say if that was or was not the Hill Well.

Q So except for one of the data points, all the other data points were all on November 3 and 4, the readings?

A That is correct.

Q And you got these from the table you found in Mr. Woodward's report?

A That is correct.

Q Why did you use three different dates if we have 14 points given simply for November 4, 1971; why combine any two dates, if we can have 14 points just on one date? If you only have 14 points, and I believe you will find there are 14 points given for November 4, 1971, and an additional nine points for November 3, now that gives you 23 different points, and if you had 23 different points plus one day other in November, you probably

have 24 different points, and yet you only used 14. Why did you throw out 10 points and not use them to establish your flow chart?

A I would have to see which 10 points. There were other points I did plot, but they were outside of the drainage basin, and therefore I didn't use them, and if these are the 10 points, that is the reason I threw them out. I tried to use all the data points I had inside the drainage basin.

Q Would it not give you a truer picture, if you are going to construct your flow net, if you took all the data points on one day rather than three different dates, to construct that flow net?

A That is correct.

Q Yet you did use three dates, November 3, November 4 and some other November date?

A That is correct.

Q Now, I believe yesterday you said that the rock medium itself is a passive unit and you have other forces playing on that rock unit, right?

A That is correct.

Q The rock, in and of itself, does nothing, it just stays there?

A That is correct.

Q Before Mr. Skibitzke and da Costa even began to

construct a flow net, they looked at various parameters, did they not, over a period of time, not just one, single date, but a period of time, as affecting that basin?

A I don't recall that specifically, but I would assume that they did, yes.

Q In another approach, they did first look at what the precipitation was, they looked at the evapotranspiration, that might occur, the surface runoff, and then from those, they could probably decide how much went into the soil zone, or aquifer?

A I would assume this is true, yes.

Q And they would also look at the ground water discharge and the water levels in the aquifer?

A I would assume this is true, yes.

Q And they also would look at man's effect, such as pumpage, and the resulting change in the water level, and change in the discharge?

A I would assume this, too, is true.

Q Right. Thank you.

MR. GERMERAAD: For the Court's information, that material is graphically displayed in Figure 12 on page 50 of that report.

Q (By Mr. Germeraad) When you constructed your flow net, the 14 data points that you considered on those three

dates were the water levels in the aquifer, and you did not consider those other parameters, is that right?

A That is correct.

MR. GERMERAAD: Before we go on, Your Honor, I wonder if we can, first of all, go back to the top sheet here, and this was the sheet yesterday which Dr. Maddox did his computations on, these were all Dr. Maddox's work; if we could have this marked as an exhibit.

(Whereupon, Plaintiff's Exhibit 90 was marked for identification.)

MR. GERMERAAD: So we have marked this Plaintiff's Exhibit 90, Dr. Maddox's computations, and I wonder if we could give this to Dr. Maddox, and have him write across the top with that pen, "Maddox Computation", and then yesterday's date was what?

THE CLERK OF THE COURT: March 20.

MR. GERMERAAD: "Maddox Computations of March 20". And to further identify it, could we--

Q (By Mr. Germeraad) This is, correct me if I'm wrong, Dr. Maddox, having to do with precipitation, runoff, these figures?

A I think they were, yes.

Q So could you also write, "Precipitation runoff", on that exhibit?

A (Does so.)

MR. GERMERAAD: I would move the admission of Plaintiff's Exhibit 90, Dr. Maddox's computations.

MR. CERUITTI: Your Honor, I would have no objection, but I would observe, for the record, if nothing else, that the computations are using figures that were supplied by the plaintiff.

THE COURT: I think the record will show that.

MR. GERMERAAD: I think the record will show that, and it will help us to better understand the record.

THE COURT: Plaintiff's Exhibit 90 is admitted.

(Whereupon, Plaintiff's Exhibit 90 was admitted into evidence.)

MR. GERMERAAD: These other illustrations which I constructed and which I cross-examined Dr. Maddox on, I would like marked as Plaintiff's Exhibit 91A, B and C.

(Whereupon, Plaintiff's Exhibits 91A, 91B and 91C were marked for identification.)

Q (By Mr. Germeraad) Referring again to 91A, Dr. Maddox, I believe this is the exhibit we used when we were talking about the establishment of contour lines from data points?

A That is correct.

MR. GERMERAAD: I think I will label it that.

I would move for the admission of 91A for illustrative purposes only.

THE COURT: 91A will be admitted for illustration purposes only.

(Whereupon, Plaintiff's Exhibit 91A was admitted into evidence.)

Q (By Mr. Germeraad) The next one we call 91B, Dr. Maddox, which was the establishment of flow lines perpendicular to the contour lines, was it not?

A That is correct.

MR. GERMERAAD: I will label it "Contour and Flow Lines".

Q (By Mr. Germeraad) Does that conform with your memory?

A It does.

MR. GERMERAAD: I would move for the admission of Exhibit 91B for illustrative purposes only.

MR. DUFFORD: No objection.

THE COURT: It's admitted.

(Whereupon, Plaintiff's Exhibit 91B was admitted into evidence.)

Q (By Mr. Germeraad) Now referring to Plaintiff's Exhibit 91C, I believe we have A and B representing two different stations, and the lines at the top are the inflow points, and the lines at the bottom are the outflow.

MR. GERMERAAD: I'll just label "Inflow and Outflow"

on A.

Q (By Mr. Germeraad) Does that conform with your memory?

A It does.

Q And on B--

MR. GERMERAAD: On B, I will also label "Inflow and Outflow",--

Q (By Mr. Germeraad) --and we were primarily talking about B-1. Does that conform with your recollection?

A Yes, it does.

Q Would you say it would be fair to title this comparison of the flow nets with a broad outflow and a point outflow?

A I would describe it as flow net A, being a flow into a line sink, and flow net B, into a point discharge, a well or a spring or something.

Q Okay. A, you said, would be--

A A line sink discharge, which might be a stream.

Q And B is a point discharge?

A Point discharge, yes.

MR. GERMERAAD: I would move the admission of Plaintiff's Exhibit 91C for illustrative purposes only.

MR. CERUTTI: No objection.

THE COURT: It will be admitted.

(Whereupon, Plaintiff's Exhibit 91C was admitted into evidence.)

Q (By Mr. Germeraad) Dr. Maddox, I hope you will indulge me for a little more art work.

Now, if we were to look from the top into this basin, would that be called a plane view?

A At the upper part?

Q If we were to look down on this, is that a plane view?

A Yes, plane view, yes.

Q Is that spelled plane?

A P-L-A-N-E, yes.

Q If the red line I have drawn on the top of this--

MR. GERMERAAD: Could we have this marked for identification as Plaintiff's Exhibit No. 92?

(Whereupon, Plaintiff's Exhibit 92 was marked for identification.)

Q (By Mr. Germeraad) Now, in reference to Plaintiff's Exhibit 92, the top half I have labeled, "Plane View", and I have a red line, kind of a curved red line, and I'm going to ask you to assume this is Chamokane Creek, and I will label it, "Ch. Cr."

A All right.

Q Now, the 14 data points that you did use were on the west side of Chamokane Creek, is that correct?

A Most were on the west side. I believe there were one, at least one point, possibly two, on the east side, though. I would have to look at my map in detail to

locate those. Generally, they were west of Chamokane Creek.

Q Could you be more specific as to which two points might be on the east side of Chamokane Creek?

A There is a well-- It's actually on the south side of Chamokane Creek, that is in Section 19, Township 28 North, Range 40 E.W.M. Lies on the, oh, I would say, approximately in the Southwest quarter of the Northwest quarter of the Southwest quarter of Section 19. I believe that's Woodward's No. 104. It's a well 230 feet deep.

Q Is that near the Massive Springs area in any way?

A It would be south and a little east of the Massive Springs area, about a half a mile south, and generally about three-quarters of a mile east of the center of the Massive Springs area, or what I guess would be the center.

Q On Exhibit 92, I have drawn an oblong, not an oblong, but an elongated circle-- Dr. Maddox, I'm directing your attention to Plaintiff's Exhibit No. 92. This is the Massive Springs area.

A All right.

Q And that's generally in that crook?

A Yes, it is.

Q And the one point would be here?

A Generally located in there, I would say, yes.
Q And are there any other points that are on the far side of the creek?
A I don't see it-- Well, I don't see any right now. Oh, yes, there is. It wasn't included in the flow net itself, but I had that point in for control, and it would lie a great deal south of the spring area, it would be in the-- About the northwest-- It would be in Section 26 of Township 28 North, Range 40 E.W.M., and it would be about in the Northwest quarter of the Northeast quarter of the Southeast quarter of Section 26.
Q How does that compare to the location of Chamokane Falls?
A It would be north of Chamokane Falls, and approximately a mile and a-half south, and about a quarter of a mile west of the center of the Massive Springs area.
Q Here?
A I would say approximately, a little close to the stream, I believe.
Q About here?
A About there, right. I would guess that one.
Q And the falls would be up here?
A I believe the falls are farther below. I'm not quite certain where the falls are, myself.
Q Okay. Your other points would be on this side?

A That is correct.

Q Although this is not going to be an exact representation, it's for illustrative purposes only, I'm going to put 12 points, then, over here. Okay, now, if we were to take, if the creek were straightened out and we would go down to the lower half of this exhibit, this is what you might term a "cross-section", would it not?

A It could be, yes.

Q And we would have two wells on that side, correct, fairly close to the stream?

A That is correct.

Q And you would have 12 on this side, is that correct?

A That is right.

Q Now, although we have three different dates that you used data from, and 12 of these points are here, and two are very near the creek, now, if your flow net has any relevance whatsoever, it would be as to that one point in time, correct; this is what the flow net is portraying, that November-- November 3--

A That is correct.

Q Okay. I will label this "November 3, 1971". Now I'm going to ask a hypothetical question. Looking at the cross-section, over to the right, and these are the, I'm going to label it "Mts.", for mountains, whether

you describe them as mountains or hills, off to the side of Newhouse and Seagle.

Oh, first of all, before we go into that, of these 14 data points, could you tell me how many were pumping on that particular day?

A Hopefully, none of them were. Mr. Woodward's table didn't indicate, but I selected November as being a time of minimum pumping; in other words, after irrigation season and prior to recharge, so we have a fairly steady pace.

Q But, in fact, you don't know whether there was pumping in any of these points or not?

A That is correct; I don't know that.

Q If we were having any rain at anytime, say, in the mountains over here to the east, we could expect some runoff, could we not?

A That is correct.

Q And if we had runoff, it would be coming out of the mountains and into this Walker's Prairie area, would it not?

A I would assume so, yes.

Q We will label this "Area Runoff". We only have these two data points right here. Now, if, from your flow net, we have flow going both towards the spring area, and on your flow net, going, some smaller portion going

towards Mr. Newhouse, and if you were to look at a plane view, giving some cognizance to the-- this would be a cross-section, we would show that here, at one of these points, which might be near Newhouse, it would be lower than over here, is that correct, we would have water running, to some extent, east, and if these were the elevations, this would indicate some movement of ground water towards the Newhouse Well, correct, and that would be some extent of what your flow net shows; is that right?

A It would depend on which orientation your cross-section has.

Q If your cross-section was an east-to-west cross-section at the point of Newhouse, you would have some movement there, isn't that what your flow map shows?

A To a degree it does, yes, but it would not portray the true picture. A better cross-section at the Newhouse Well would portray--

Q Okay, but just answer that one particular question.

A It would, that's true.

Q And this would be east, and this would be west, and you also, on your flow net, or the vast majority of it, going, heading south towards the Massive Springs area?

A That's correct.

Q If we were to label this "South to Massive Springs", and

we really don't have very much data on the east of Chamokane Creek, is that correct?

A That is correct.

Q If we were to have runoff out of the mountains and into the basin, might not the runoff head for the creek?

A It is topographically the lowest place, and I think we could assume that, yes.

Q And as it was sinking in, it would continue, if there is any surface, it would continue to run towards the creek?

A That, I think we could assume, yes.

Q And if we were to assume some of it does get down, we might have-- I'll put in a dotted line-- water coming in, all along, and heading towards the creek, even in the ground water, might not that occur, if we were having precipitation in the mountains and the water pouring in?

A It might occur under special circumstances, yes.

Q It might occur. If we were to assume, hypothetically, that this did occur, you only have one picture here, but they might have rain over on this side, too, but we might have water coming in on an angle this way. Now, if these two flows of water were to intersect and we were to apply the vectors, or direction to that, using a principle of physics, might not the direction

of runoff, then, be turned south?

A Yes, I would agree.

Q And southwesterly, down through the gorge we have here, the valley narrowing towards the falls?

A It might move down southwesterly. I don't know if there's a valley. I would agree it would turn southwesterly, or could turn southwesterly.

Q So one possibility, if this were to occur on the one date in time that you selected for your flow net, you might have water coming in here, water coming in here from the other side, to balance this off, and have a resultant flow to the Massive Springs. That could occur, could it not?

A I don't believe that it would flow to the Massive Springs, but I would agree that it would flow down the valley.

Q It would flow down the valley?

A That would be true.

Q You spent much of your time during your Direct Examination talking about the cone of influence. The cone of influence is not the only thing that affects water level, is it? I mean, if we have an open system, where the water does keep flowing on forever and comes in forever and flows, then the cone of influence may be, at that point, the most significant effect on

neighboring wells and springs, which would be the area of least pressure and discharge, is that correct?

A I don't know if I can answer that question as asked. I don't think I understand your question.

Q I will rephrase it. I will-- I would like you to assume that we do have an east border and a west border of the space, but I'm not asking you to assume a north or south--

A All right.

Q --but that it continually flows. Now, at that point in time, the cone-of-influence principle which you have described in one well could affect another well, but if there is a constant recharge, that might be the most significant effect it could have on neighboring discharge points, be they wells or springs, is that correct?

A It would be correct, yes.

Q If we were to change our hypothetical, and we have a border on the south part of that basin and one point of discharge, rather than a line of discharge always continuing at the south; in other words, I'm closing in the basin, rather than having an open basin; in addition to the effect of the cone of influence, are you not also taking, and assuming for a period of time, no additional recharge by pumping or withdrawing at one

well, are you not taking a quantity of water out of the ground water system that would otherwise go through your one point of discharge?

A If all of the water had, prior to pumping, gone through that one point of discharge, that would be true.

Q So, in addition to the draw-down effect of a cone of influence on points of discharge, you also have a quantity effect, if you have a closed system and there is only one general area of discharge, you have a quantity that is taken out that otherwise would go through that point of discharge?

A If there is only one point of discharge, yes, that would be correct.

Q I'm going to change the line of questioning.

THE COURT: Counsel, before you start, let's make an inquiry about our time. It's now 12:20, and I thought we'd run to 12:30, if we could finish the Cross. If not, I think we'd just as well--

MR. GERMERAAD: Well, I think I could finish, Your Honor.

THE COURT: Well, let's go to 12:30 and finish the Cross, then.

Q (By Mr. Germeraad) I'm going to ask you to recall March 8th of this year in the clerk's office across the hall, and do you remember pointing out the four

Seagle wells, drawing me a picture; do you remember that?

A I remember illustrating them, yes,right.

Q And we have done this on some of the exhibits. Now, focusing your mind on the well farthest down the valley.

A Closest to the springs?

Q Closest to the springs, right.

A Correct.

Q Can you remember telling me that you thought this had an effect on the springs?

MR. CERUTTI: Your Honor, I'm going to object to this line of questioning. We have been through it a half a dozen times.

MR. GERMERAAD: No.

MR. CERUTTI: Purely repetitive.

THE COURT: I'm not sure--

MR. GERMERAAD: I don't think it would, because we're talking specifically--

THE COURT: Yes, I think this is--

MR. GERMERAAD: Mr. Rudolph talked generally about that conversation, but not specifically.

THE COURT: Proceed.

Q (By Mr. Germeraad) Do you remember telling me that that one well affected the springs?

A I don't remember the exact conversation, but I may have

said something to the effect that if any of these wells affected the springs, that that well would have the greatest effect, and if all of the water were taken from that well, it would have a general effect on the springs.

Q Okay. There is something that you said, generally, that gave me the impression that that one bottom well could affect the springs.

A I believe it was something that I related to you, although I don't, the specific words.

Q Okay. I'm not going to ask you; if you can't remember the specific words, you tell me about that. After you got done talking about that bottom well, do you remember going to the wells above that and saying that bottom well also affects the well directly above?

A Yes, I will agree with that statement.

Q And you set up a chain, then, of the bottom well affecting the third, and the third affecting the second, and the second affecting the first?

A Yes, I remember that. That is true, I believe.

Q Okay. Now that we have all of these wells affecting each other, and the bottom well affecting the springs, let's assume, then, can you remember back as to giving the impression that all four, being interconnected, and the bottom one affecting the wells, all of these have

an accumulative effect, you didn't say precisely what, but all of these, then, would affect the springs?

A I believe I did say something like that, and I believe they do, to a certain extent, affect the springs.

Q Thank you. You mentioned in your Direction Examination that the Smithpeter permit has low-flow limitations. I believe that low-flow limitation was 20 CFS, correct?

A I believe it is, yes.

Q Now, whose responsibility is it to see that Mr. Smithpeter abides by that low flow?

A Most directly, it's mine.

Q And to determine whether he did comply, did the State set up any monitoring station, or weir right below the diversion?

A No, we did not.

Q I now ask you to go to the Smithpeter File, which is Plaintiff's Exhibit--

THE CLERK OF THE COURT: 87.

Q (By Mr. Germeraad) --87, and I would like you to go through that and see if you can find an April 24, 1970, memorandum in that file, please.

A I have the memorandum.

Q Is it a long memorandum?

A No, it's three short paragraphs.

Q Okay. Glance over that, and then I'm going to ask you

a question on it.

A Yes, I have finished reading it.

Q Thank you. Now, towards the end of that memorandum, I think it probably was the last paragraph, it gave me the impression, I'll give you my impression and see if you agree with me, that the Department of Ecology was going to take the U.S.G.S. gaging station readings and then interpolate, or make a curve, to determine exactly what the flow was below the Smithpeter's.

A This is another memorandum, this is not in the April 24th memorandum that I read.

MR. GERMERAAD: Could I approach the witness, Your Honor?

THE COURT: Yes, you may.

Q (By Mr. Germeraad) Here's the April 24th, well, this is the April 24th.

A All right.

Q There were two documents with an April 24th memorandum, now, if you could read that April 24th memorandum.

A Yes.

Q You've finished reading it? Okay, now, the latter part of that memorandum which you now have in front of you, and could you identify it for the record, at the top, what it says, who it's directed to, things like that.

A Memorandum date was dated April 24, 1970, to Eugene F.

Wallace, Supervising Hydrologist; Kris G. Kauffman, Engineer, Division of Water Management. From Glen H. Fiedler, Assistant Director, Division of Water Management. Subject, Surface Water Permit No. 15894, Chamokane Creek.

Q And that's the Smithpeter diversion they're talking about, in the Smithpeter File, is that correct?

A Yes.

Q Now, the latter part of that, I'll ask you my question again, it gave me the impression that the Department of Ecology was simply going to take the U.S.G.S. gaging station reading below the falls and interpolate, or come up with a "curve", I think is the word that it uses, to approximate what the flow was at Smithpeter, is that correct?

A I would interpret it being broadly that they were going to correlate the flow at Smithpeter's with the U.S.G.S. gauge, yes.

Q And so that seems to have been the method that the Department of Ecology settled on to determine whether Mr. Smithpeter complied or did not comply?

A That is correct.

Q You were asked a question by Mr. Torve, he asked you, specifically he cited the 1931 to 1970 precipitation records and asked whether you could predict a flow in

the Chamokane Creek for the 1930's, and your answer was that, looking at the 1971 to 1973 records, you could predict a flow of 20 to 25 CFS. I didn't consider that responsive, and I can understand why Mr. Torve didn't go into it.

MR. TORVE: Oh, I ask that comment be stricken.

MR. GERMERAAD: I'll have it stricken.

THE COURT: It will be stricken.

Q (By Mr. Germeraad) I didn't consider that responsive directly to the question.

Now, what I'd like to know, is, you do accept, then, that you could predict, from your answer, I'm asking you, do you accept that you can predict a certain stream flow for the Chamokane, the lower part of the Chamokane Creek?

A That I can?

Q Yes.

A No, only in a relative way, if the precipitation is high, I would expect the discharge at the springs, and the flow, with the low flow of the Chamokane Creek, would be high, and if the precipitation were low, I would expect a decrease, so I couldn't tell you quantitatively what the flow would be.

Q So that when you said you really, you really didn't mean that you could then look and predict that it was

between 20 and 25?

A No, I couldn't say a quantative amount, no.

Q I just wanted to clear that up in the record. To Mr. Tracy, you said that ground water and surface water were independent, but then, to one of his later questions, that you might have the ground water flowing under the surface of Chamokane Creek towards Newhouse, and later I believe you said that the surface runoff did recharge the ground water basin.

I may be mistaken, but I look at these as two contrary principles, that the surface runoff recharges the ground water, but yet that the ground water and the surface water are not interconnected.

Now, could you set me straight on that?

A In the reach which Mr. Woodward has indicated on Chamokane Creek, where it's intermittent, that is, where it's not continuous water flow in it, I would presume there is some degree of recharge due to the underflow, let's say there is no water running in the creek, there is underflow in the creek, but recharge gradually percolates down to the water table, and in that sense, it does recharge the water table, whereas down due south of the springs area--

Q South of the springs area?

A Yes, right, and north of Chamokane Creek, or at Chamokane

Creek, south to the Big Springs area.

Q But that's not where Newhouse is.

A No, I was by comparison, to answer your question, giving you a comparison. At that point, although my flow net is incomplete from the information Mr. Woodward had in his report, the water surface, the ground water table and the stream are coincident, they are practically one and the same.

Q I must not have asked my question properly, because I don't think you understood it, so I'll try it again.

I'm going to refer you to Plaintiff's Exhibit 10. Now, the place where we get the summer runoff recharge at Camas Valley, as denoted there, is right below the north line of the Reservation, and I believe Mr. Woodward testified that within a mile and a-half of that, that summer flow sank into the ground and was no longer seen.

A As I remember, he testified that, yes.

Q So, from that point, the number of miles down to Newhouse Well during the summer, the creek bed there, that's dry, is that correct?

A That's correct, as I understand it, yes.

Q Well, if all the water disappeared up here, seemingly on its way down into the ground water system, do you still believe that at that creek bed, which is dry,

that water is higher right below there than it is in the ground water on either side, even though miles up here, that stream could disappear?

A I don't believe it's higher there. At least the data don't indicate that it's higher there. I believe the water that has disappeared a mile and a-half south of the north gauge of Mr. Woodward moves in two directions, there are probably several directions, but two principal directions, and one is down the trend of the stream, and the other is to percolate down by gravity until it joins the ground water table.

Q And we're not talking about a big flood there during the summer, we're talking about a small quantity of water?

A Just the percolation, the underflow percolation.

Q Well, then, this is why I'm a little confused, or didn't quite understand your answer to Mr. Tracy, that at the Newhouse Well, at, in the summertime, how there could be any flow underneath the stream, because the stream is dry and there is no water there, you don't have ground water and surface water differential, because there is no surface water at that point, isn't that correct?

A That is correct, as far as there being no surface water but there is water moving directly under the channel of

the creek, and parallel to the channel of the creek, and this is separate from the regional ground water table, if I could use that term.

Q Do you remember the testimony of Mr. Woodward as to the width of the stream, and I believe he talked about the width of the stream in the Walker's Prairie area, he said this is two miles wide, at the same water level-- Are we having distinct channels, like through a limestone aquifer, or is it at least homogeneous enough that all the water is moving, even though they may be spreading out in different directions, that is, that it's one body of water that is moving, isn't that correct?

A I would say, in general, there are two bodies of water, one is the regional water table, which is moving in a particular area towards Mr. Newhouse's well; the regional water table, or the basin water table, is moving to the south and east. I believe as this water is flowing, it's underflow along Chamokane Creek, the general trend of it is generally northeast-to-southwest, and this is not what I would call regional-- This is not what my flow net is based on.

Q Now, I thought we had established that this small amount had gotten down to the water table, that there was no difference, there was no surface stream, there was

nothing different than the total ground water table.

A No, I didn't-- If I said that, or if I implied that, I'm certain I didn't say that, but if I implied that, I'm sorry. What there is, as this water moves down the course of the stream, it's percolating down under gravity, and part of it joins the basin water table, and this amount, I believe I told Mr. Tracy, was possibly incorporated, or probably incorporated, in the withdrawal of Mr. Newhouse.

Q Okay.

MR. GERMERAAD: I think I only have two more questions, Your Honor.

Q (By Mr. Germeraad) Pointing to Plaintiff's Exhibit 6, we have the Newhouse and Seagle Wells, and your flow net indicates an easterly direction?

A Southeasterly direction.

Q Southeasterly direction, and we have the granite, and you said it's not likely that is going to go through the granite; where does this water go?

A I don't know. The data are incomplete, I can't tell.

Q Could I look at the first flow net on which certain drawings were made? This is Plaintiff's Exhibit 63. Directing your attention to the blue box which you have designated as the "Schaffner Withdrawal"--

A Yes.

Q If we were to take the two lines, two flow lines on either side of that box and follow it in its course, it goes straight to the Massive Springs area, does it not?

A I would-- Well, it would go to the eastern extremity of the Massive Springs area, that is correct.

Q But it does go to the Massive Springs area?

A That is correct.

MR. GERMERAAD: That's all the questions I have, Your Honor.

THE COURT: Gentlemen, before we take our noon recess, I think we better see where we are on time. Can we anticipate, even if we run late this afternoon, can we finish taking testimony in this case? Does anybody have an opinion?

MR. : Let's ask the plaintiffs what they have further to go.

MR. GERMERAAD: We're done with the cross-examination of this witness, and if you have nothing more--

THE COURT: I'm talking about rebuttal on the main case.

MR. CAMPBELL: That can be very time-consuming.

MR. GERMERAAD: As far as I know, the only rebuttal we might have is one question, two questions,

just two small questions of Mr. Woodward, and that's absolutely all.

MR. CAMPBELL: Two apiece, or two between you?

MR. GERMERAAD: Two between us,so it would be no more than about two and a-half minutes.

THE COURT: I would presume we could finish this today, even if we have to run a little later than normal, but I think everybody needs to know about this.

And then we have the second problem, after the completion of the testimony, there is a matter of whether subsequent exhibits need to be prepared, and if so, and the, because of the fact we have had parties who are not here but they're non-default parties, I think the trial would have to continue to a date certain, to keep the record clear.

This is going to be a little bit of a problem, we have to do a little negotiating, everybody's got their own scheduling problems, but frankly, if we do that, the first day I can find, unless something settles, where I get opened up, I'm looking at June 11th. Now, it seems like a long ways away, but I'm not sure but that that isn't a good thing. It seems to me counsel has quite a job ahead of them, putting together this information that has developed in the last nine days in preparing for summations, so I just throw that out,

you can kick it around among yourselves, and maybe somebody can come up with a better approach after we finish--

Mr. Dufford, you look inquisitive.

MR. RUDOLPH: Your Honor, were you thinking of oral argument on that date?

THE COURT: I think, that would give you plenty of time, I think, that we could put in any last-minute exhibits that may perhaps develop, you can have oral argument--

MR. CAMPBELL: Your Honor, there is one colloquy, or discussion, of Mr. Kauffman being called for testimony. At what time did we figure that testimony would come in? And I ask that because I have been contemplating asking the Court's permission to call Mr. Don Ernest (phonetic) after I get a chance to talk to him. He's the one that wrote the letter, or report, to Mr. Biggs. He is in Mexico, he is retired from the Department.

THE COURT: Well, if we go this route, I would think some testimony could come in on the 11th. I think we can do them both. That won't change the whole picture enough that you can't plan your attack.

MR. TRACY: Your Honor, I might inform the Court, I have a problem today, as far as testimony from Mr.

Newhouse is concerned, he called this morning and says he's ill and couldn't make it.

Now, I talked to Mr. Dellwo about this yesterday, and I don't know if Mr. Rudolph and Mr. Germeraad have been advised of the potential of just putting in a stipulated fact about a few things Mr. Newhouse is doing, they would not need oral testimony; but anyway, at this time, there is no way we can present any oral testimony today, although we were planning on doing it, if we cannot get the stipulated facts.

THE COURT: Well, I don't think that's a major problem. If you can't get the stipulated facts, you can bring him in on the date of continuance. It couldn't be very much.

MR. TRACY: It would not take more than a half an hour.

THE COURT: It couldn't be very much.

MR. RUDOLPH: As far as the map which is being prepared, it is my understanding, that is the breakdown of the land, it is my understanding that would be ready in not more than two weeks.

THE COURT: I see no reason why that couldn't be filed. I think everybody understands what that map is.

MR. DUFFORD: Your Honor, the reason I was looking quizzical, I don't have a real recollection of what my

calendar is.

THE COURT: Well, I recognize that.

MR. DUFFORD: I don't know, if we're settling on a date, I would like to check, I think I have an argument in the Supreme Court.

THE COURT: Well, I think the important thing is, on the record, that I continue this to a date certain, because of absent parties. We may have to continue that, or, if we run into problems, but I don't want the record just left open.

Mr. Rekofke?

MR. REKOFKE: I was wondering about any briefs, if the Court would want those?

THE COURT: I would have to leave that up to how much time you gentlemen think you need. Of course, I think we all recognize that it is an important case, I'm not going to shoot off the top of my head, I want all the help I can get, so I'm going to leave it to you fellows what time you're going to ask for to get in the memorandums.

MR. REKOFKE: If plaintiff wishes to submit some additional memorandums, that they have at least 10 days.

THE COURT: Well, I, frankly, was thinking of longer than that. I don't think this is that simple of a case.

MR. REKOFKE: Some time we can review it and--

THE COURT: We can work out a time schedule on that.

Well, for the time being, let's recess until 2:00 p.m.

(Noon recess taken at this time.)

Hon. Marshall A. Neill, Judge
Spokane, Washington
Thursday
March 21, 1974
2:00 P.M.

MR. GERMERAAD: Before Redirect starts, I would like to move for the admission of Exhibit 92, which is on the board.

THE COURT: Any objection?

MR. REKOFKE: No objection.

MR. TORVE: No objection.

THE COURT: Plaintiff's 92 will be admitted.

(Whereupon, Plaintiff's Exhibit 92 was admitted into evidence.)

MR. TORVE: Over the lunch recess, I discovered I would like to ask one additional question, if I could.

REDIRECT EXAMINATION

BY MR. TORVE:

Q In constructing your flow net, Dr. Maddox, did you have a data point to the Newhouse Well?

A No, I did not.

MR. TORVE: If I could approach the witness--

Q (By Mr. Torve) This, I believe, is your, is Plaintiff's, excuse me, Defendant's 65. Is this round

circle with the dot in it the Newhouse Well?

A As best I can locate it, yes.

Q Is that touching a point that is your 1780 contour?

A I would say that it is, now, yes.

Q Didn't you, in answer to previous questions, say that you assumed that the Hill Well and the Newhouse Well would be relatively the same elevations?

A I believe my testimony was that the Hill Well, I knew the altitude being 1791, and that the Newhouse Well was down gradient, but looking at my map, I would assume it to be about 1785, or something like that, so it was a bit lower, but in the same range as the Hill Well, I think that is what I said, yes.

Q Well, but haven't you just pointed out that the Newhouse Well, in fact, touches, the way you have drawn it, the 1780 contour?

A Yes, by the graphic representation of the Newhouse Well,that is correct.

Q So, although I believe your earlier testimony would be that they would be roughly the same, in fact, you show an 11-foot difference between those two wells?

A I wouldn't-- Just by the location of the well, I wouldn't say 11 feet.

Q You could get that, though, interpretation, by looking at your flow net, couldn't you?

A No, I couldn't. The most I could get would probably be nine or 10 feet.

Q Okay. If we were to assume that the Newhouse Well was the same as the Hill Well, at 1791, then your 1780 contour, in fact, would be lowered down towards Section 16, rather than in Section 9, is that correct?

A I would probably have drawn it down there, that is correct.

Q And if, in fact, that contour was drawn at that point, you don't have quite the swing to the east of that flow do you; it's farther south and perhaps coming around the southwest end?

A It would be farther to the south and west-- Farther to the south, at least.

MR. TORVE: No further questions, Your Honor.

THE COURT: Redirect?

REDIRECT EXAMINATION

BY MR. DUFFORD:

Q Dr. Maddox, in your undergraduate education, did you take courses that dealt with ground water?

A Not in any undergraduate courses, no, I did not.

Q And what about at the graduate level?

A At the graduate level, I took several courses that dealt with both ground water and surface water and its

interrelationship between the two.

Q Was that with respect to pursuing both the Master's and Ph.D. degrees?

A That is correct.

Q Would it be accurate to say that your postgraduate studies concentrated on ground water?

A Yes, I could say that.

MR. DUFFORD: Okay, I would like to now ask if Exhibit, I think it's 41, it's the memorandum of Mr. Kauffman, be given to the witness.

Q (By Mr. Dufford) Dr. Maddox, do you know the author of that document?

A Yes, I do.

Q Have you worked with him in the course of your employment at any time?

A Yes, I have.

Q And to your knowledge, is he an expert on ground water?

A No, I don't believe I would classify Mr. Kauffman as an expert on ground water.

MR. RUDOLPH: Well, Your Honor, I don't think this is quite proper, for one, for the witness to be in the same department, doing that, when we have the file showing that at least he purported to be an expert on ground water. I think this is a boot strap operation.

THE COURT: How can one expert witness test the

expertness of another witness, counsel?

MR. DUFFORD: Well, I'll withdraw the question.

Q (By Mr. Dufford) Now,Dr. Maddox, is it fair to say that in your experience, in your field, that you have seen comprehensive reports relating to ground water aquifers other than the report of Mr. Woodward?

A That is correct.

Q Does that memorandum you have before you purport to be such a document?

A It does not purport to be, no.

Q Is there any data in that document to support any of the conclusions that might have been reached?

MR. RUDOLPH: This is repetitive, Your Honor.

THE COURT: I don't know yet. Is this the document from which a number of excerpts were read during Cross-examination?

MR. REKOFKE: Yes.

THE COURT: I'll let him answer. We'll see.

A There is one bit of information that might be considered to be data, and that is a reference on page 6, under Paragraph H, "Statement of the current position of this Department and alternate courses of action: 1. Current position:", and there is reference therein to, "the low flow is 20 second feet and the indicated firm flows range from 25 to 32 second feet in the lower

Chamokane."

Q Is there anything to indicate where that information came from?

A There is not.

Q Okay. I would like to direct your attention now to the flow net analysis that you did, and just ask you a couple of questions that were raised on Cross about it, or about a couple of matters that were raised.

Does the flow net analysis that you conducted have anything to do with transmissivity?

A Not directly. Only reflects transmissivity, but I didn't need transmissivity to construct the analysis.

Q Okay. Does the land surface elevation anywhere in the drainage have any effect; is it reflected in your flow net at any location?

A It is not.

Q Does the fact that the ground water table may at some point intersect the land surface have any significance to the flow net?

A Yes, to the extent that that would be a spring or a seep area, and would be indicated as a point of discharge, or a point of orientation of flow lines.

Q Does that intersection have any significance with respect to the question of which way the ground water is flowing?

A Only to the result that the ground water is flowing towards the point of discharge.

Q Is the fact that a point of discharge has been identified, you know, does that have any significance with respect to the direction of flow of the ground water?

A Well, it is reflected in the net, or flow when I drew the net, I ignored the points of discharge and drew the net on the data, and the data confirmed what we knew, in fact, a point of discharge, being the springs, at least one point indicated by the net.

Q Is it true that in some cases a flow net, if you knew there was a single point of discharge, that a flow net might be used to show how water in the ground water aquifer gets to that single point of discharge?

A If you had no other information, you could theorize it, or--

Q If you had the information there was a single point of discharge.

A And no other information at all?

Q If you had that information, might you use a flow net to show how the ground water gets to that point?

A Yes, the flow net would show that.

Q Is it also reasonable and technically valid to have the flow net to determine the direction of flow to help find out where points of discharge might be occurring?

A That is correct.
Q Is it then necessary for a flow net analysis to have pre-identified all the points of discharge?
A No, it is not necessary.
Q With respect to your testimony about transmissivity, was that related to a discussion of what the cone of influence of any particular well might be?
A That's correct.
Q And what is the significance of knowing what the cone of influence might be with respect to the question of the discharge at the springs?
A If the cone of influence had intercepted, or expanded to the distance where it would intercept the flow lines leading to the spring, then I could conclude that the flow line would be reflected to bring water in to fill the cone of depression created by the pumping.
Q But what was your conclusion with respect to the extent of the cone of influence with either the Seagle or Newhouse well?
A That the cone of depression, on the assumptions I had, that is, 100,000 gallons per day per foot, and the storage coefficient of 12 percent, and pumping for a period of 180 days, at a rate of 1500 gallons a minute, would not influence the flow of the spring from either of those points of discharge.

Q I believe you testified on Cross-examination that you had no information which would allow you to say with certainty that the Chamokane drainage is not a closed system. Based on what you know from Mr. Woodward's report and the testimony you have heard, do you have enough information to be able to absolutely state that we are dealing with a closed system?

A No, I couldn't make such a statement.

MR. DUFFORD: I have no further questions.

THE COURT: Mr. Torve?

MR. TORVE: I have no questions, Your Honor.

THE COURT: Mr. Campbell?

REDIRECT EXAMINATION

BY MR. CAMPBELL:

Q Dr. Maddox, you stated that you didn't know where the water might be going from the Newhouse Well, for a certainty, didn't you?

A That is correct.

Q What is your theory as to where it is going?

A My theory would be that it's moving, at the site of the Newhouse Well, the water is moving to the south and east, and I have no other idea, beyond that point, that's the last data control I have.

Q The testimony in the case is that the drainage basin

is underlain by granite batholith?

A As I understand it, yes.

Q And you testified that the mountains to the east were basalt?

A I believe my testimony was that the mountains to the east are granite, but I testified in relation to the geological map, the exhibit number of which I don't remember.

Q Can you see anything, could you tell us what the formations are to the east by this Exhibit No. 6?

A Six?

Q What I'm getting at, somewhere in the testimony was testimony of a contact to the east of this drainage area?

A That is correct. It was in regard to a question asked me--

Q Would you stay over there, please. --in regard to a question asked you, what?

A With regard to what would happen, a theoretical question of what would happen at a contact between a basalt and a granite, and I forget who, I forget exactly who asked the question.

Q What was your answer to that?

A My answer was, what would happen to this as the basalt was deposited on the granite, the basalt being a hard

rock, you would have a baking or frittering of the granite, and you would have a physical breakdown of the granite into a coarse sand, and this would create a zone of weakness between the two, and I believe I further elaborated later in the question by saying that this could serve as a point of escape for the water.

Q In other words, the water that you're speaking of in the Newhouse Well could escape in that fashion?

A That is correct.

Q Let's go over here now to your flow chart. I have seen the chart that you drew, but how about if you would sketch here for me how you constructed that flow chart, and in just general terms demonstrate, and can you come over to this side?

A Well, again, just to repeat what was shown earlier, this is Chamokane Creek, and this, and I believe this was shown to be the large spring area, and we had a well here, I believe, and another down here, with 12 wells scattered at random back out, well, there were none down here, in this method. There was a basic boundary I'll attempt to show.

Q And would you keep telling us what you're drawing?

A Yes, this would be the basin boundary, and that would be the west boundary of the basin, in the vicinity of

Sections 2, 11, 14, of Township 28 North, Range 39 E.W.M.

Q Which on your chart, you have marked in red boundaries?

A Boundary. I assume this would be a ground water boundary, as well as the surface water boundary. I have no other information to go on. And then, using the data points indicated at the wells, and these would be the altitude of the water surface in the well, what I hope to be a steady seepage condition, which was November 3 and 4, 1971, and one date later in November. The reason I selected these dates, I thought it was after the pumping season and before the recharge season, so the flow would appear normal, appear more as it would under natural conditions, unstressed conditions.

Q Could I ask you at this time if there would be much change in the water level between November 3rd and 4th and the later date, at this time of year?

A No, I seriously doubt if there would be. I happened to use the one at the later date because I knew there was another data point. I would have preferred to use another one on the same date, but--

Q But there wasn't information on November 3rd or 4th for that data point?

A That's correct.

Q Continue with your explanation of your flow chart.
A Using these altitudes, and against nothing else, except the boundaries, I began to construct contours, and I can't remember exactly how the contours went.
Q Do you have your notes, or are those the ones that we are going to make a copy of?
A Yes.
Q Would you get those so you can--
A (Does so.) I won't go through the entire process that I used. A lot of it was trial and error until I got my data points, but I generally had a contour which might look something like that.
Q Is that your 1840 contour level?
A That is correct.
Q Why did you choose that?
A That was in regard to the data points that I had shown in my matrix, that is the altitude of the well.
Q Does this really kind of give you a control line to start with?
A That is correct, although I think I started with my 1800 line as a control line.
Q You have marked your 1840 line with the numeral 1840, have you not?
A Right. Again, this drawing that I'm putting on the illustration is only for purposes of illustration, it's

not to scale.

Q What are you drawing now?

A I'll draw this as the 1800 line, and between--

Q Put another zero on it, will you?

A --and I'll draw this as the 1820 line.

Now, of course, when I drew the contour map, I drew it at a 10-foot-contour interval, and I was only kidding myself, because I don't have that much accuracy, as far as control, so I went to a 20-foot-contour level, to give you a more overview of what is going on.

Q What data led you to draw the lines as you placed them on the illustrative chart?

A The control points in my well, the water surface in my well.

Q What is it about those control points that you seek?

A Well, the numbers that they represent, the altitude that they represent.

Q From-- Of the top of the water in the well?

A That is correct.

Q Okay, proceed.

A I have then a 1780 contour, I'll have to put it like this; then a 1760, and again, this is not to scale.

Q But it does illustrate your process?

A Yes, it does.

And, finally, 1740. This, then, was where my contour lines, based on my data points, and then I wanted to show flow line; in other words, what happened at my flow, and according to my theory--

Q What is a flow line?

A The flow is the direction of the water moving.

Q How would you determine a flow line on a flow chart?

A A flow line always moves perpendicular to a contour line.

Q All right; proceed, then.

A Flow lines, at a boundary, always follow a boundary, and although I haven't drawn this to scale, I drew my contour lines so they would be perpendicular to the boundary, so that each one is perpendicular to the boundary. This implies impermeability at the boundary. This is an assumption on my part, the boundary may not be impermeable, but I want to start at one place, from one assumption, and work out from there.

If that is the case, and this isn't an impermeable boundary, we can say there is a flow line, a series of flow lines that fall right along the boundary.

Then, in order to find out where to draw my first flow line in helping the analysis of the flow net, I measured the distance along two flow lines, or two contour lines, and then measured the distance beginning

at this known point here, down--

Q You're pointing to the western boundary?

A Yes, I am, between Contour Line 1840 and 1820, and measured that distance, and kept looking for another distance for a flow line between those two contour lines. Seldom the total of the distances of the flow lines, and divided by the total of the distances of the contour lines, I arrived at unity, or 1.00, and this was just for purposes of helping to illustrate and to analyze the flow net, so the result at this first point, I arrived, eventually, after trial and error, to another line here, so I drew a line perpendicular to the 1840 line, and perpendicular to the 1820 line, and measured the distance of the two perpendicular flow lines, and divided by the distance between the two contour lines between the two flow lines, and I arrived at a number of unity, or one, and then I simply extended this flow line out perpendicular to all my contour lines, and this would, then, indicate a flow path with a particle of water, or a stream of water, and I repeated this process for a series of points, all unities, each of these were unities across my flow chart.

This, then, showed me the direction of flow at each place, and, again, the flow chart I'm drawing in the illustration deviates somewhat from that I have

in the illustration, but the key thing is, although my artistry isn't the best, is to keep the flow lines perpendicular to the contour lines, and to make no sudden changes in either one.

Ground water is not like the surface water in that, er, surface topography-- generally speaking, there are no cliffs or sudden cliffs. If you find a sudden change in contour interval, this is usually due to a ground water cascade, a change in transmissivity, a fall, you have to interpret that away, there is no way to get away from it.

Again, I'll not be drawing this, but it showed something to this effect, going out in this direction.

Q Now, you're getting to the easterly part of your flow chart area, are you not?

A That is right. I began to get flow lines that were moving away from the spring. Now this, I have the Massive Springs shown wrong here, I'll draw, redraw them down here, and write "Springs".

Q Also at this time, would you mark "Ch." and "Cr." for Chamokane Creek, at both ends.

A (Does so.) All right, and again, I'll draw another-- Some of these, I could not carry anymore than about two spaces, and I ran out of data points, and I stopped after two spaces. I'll have to continue this on out to

the 1820, but I would draw a flow line something like this, which would indicate a movement away again, as was illustrated on the flow chart, which is a better situation, because it's drawn somewhat to scale, but this indicates a general northwest-to-southeast, and turned around and flowing towards the springs in the western part of the area covered by the flow net, and the eastern part of the flow net movement is northwest-to-southeast, as far as I can trace it, and then to the extreme eastern part, the movement was almost north-south for at least two contour lines, and then I don't know what happened to it beyond that.

Then I looked at the, well, after, of course, all of these between the first two flow lines were unity, and the reason I took those two, not flow lines, but contour lines were unity, and the reason I took the 1840 and the 1820, those contour lines, to begin constructing my flow net, is that they were the ones that were most nearly parallel throughout their length over my control area on flow net.

Having unity, the squares between the 1820 and the 1840 contour lines, I then measured, totaling the length of the flow line to each square, and dividing that by the length of the contour line for each square, I came up with a number that might deviate

from the unity, one would go below and the other would go above, and in interpreting flow net, with a number left below unity, for instance, I see one with a 0.85, and this would be less than unity. This would indicate to me, by looking at this number, that the distance between the contour lines had increased from what it was directly upflow, the theory being that equal volumes of water are moving between the flow lines, and if the contour lines are farther apart, then any one of several things can happen to interpret this, that is, water can be lost from the system, go out in a surface discharge, the system can thicken, there can be a change in transmissivity, there may be, for instance, flowing through sand normally, there may be a gravel bed there, something that flattens out the ground water gradient.

MR. RUDOLPH: Excuse me, Your Honor, do we have a question that he's answering? I mean, this all should have been on Direct. I can't see it as Redirect, unless it's aimed at specific questions and answers, for us to start qualifying the exhibit all over again, and we have listened for quite a while, and I was just wondering how long it does go on.

THE COURT: Well, I assumed that he was going to come to some conclusion as to any difference between

his method of constructing the flow chart and the one counsel drew for him on cross-examination, that's the only relevancy I can see, but I assume, counsel, that you're going to come to some--

MR. CAMPBELL: Your Honor,-- You know, I didn't understand this exhibit that he had in his hand. I'm, beginning to see a little of it now, it's been of that much help.

Q (By Mr. Campbell) Would you mark the north end of Chamokane Creek, "Ch. Cr.", please.

MR. RUDOLPH: Again, I hope we do stay with proper Redirect, and not start all over again.

Q (By Mr. Campbell) At the lower left, would you put, "Maddox".

MR. CAMPBELL: And Miss Severance, can you give us a number for a defendant's exhibit?

THE CLERK OF THE COURT: 66.

THE COURT: Defendant's what?

MR. CAMPBELL: 66.

(Whereupon, Defendant's Exhibit 66 was marked for identification.)

Q (By Mr. Campbell) Can you tell me what other conclusions you drew from this?

A Generally, the conclusion I drew, the only conclusion I drew from the flow net is that ground water in the

western part of the area of the flow net boundary, the water moves toward the springs, and in the eastern part of the area, it moves to the south and east, to some unknown point. I couldn't trace it any farther than my data went.

Q Read me that number again.

A Exhibit No. 66.

MR. CAMPBELL: If Your Honor please, I offer Exhibit No. 66 at this time, for illustrative purposes.

MR. GERMERAAD: No objection.

THE COURT: It will be admitted.

MR. CAMPBELL: No further questions.

(Whereupon, Defendant's Exhibit 66 was admitted into evidence.)

THE COURT: Mr. Tracy?

REDIRECT EXAMINATION

BY MR. TRACY:

Q Dr. Maddox, to continue with the diagram that you have just drawn, Exhibit 66, I just wanted to ask one further question. Now, you stated earlier, in response to Cross-examination, that you had a reading on a well but you didn't know which well, and that was on the Seagle property, is that correct?

A That is correct.

Q Have you found out now, with the help of Mr. Woodward, which well that was?
A Yes, that was the Seagle No. 1 well, and that is the northernmost Seagle well.
Q Have you charted that in your flow net?
A I haven't shown it on the note that the Court has, but I noted the number and put in on another copy, which I don't now have.
Q Is it on Exhibit 66?
A No, it isn't.
Q Would you put that on Exhibit 66, please?
A I think it would lie, relatively speaking, at about this point.
Q And can you chart in your flow?
A (Does so.)
Q Would you show the Court how that helps in your characterization, in which direction the flow is directed, of the ground water?
A Well, it would help to this extent, that when I found out which well it was, and went to Mr. Woodward's table and took the altitude from it, it fell between, in proper perspective, between my two contour lines, which would indicate the validity of the contour map I drew without that point of control, and I'm marking on Exhibit 66 now to indicate the validity of direction

of flow at that particular point, in accordance with the limitation of my .

Q Now, I would like to ask--

MR. TRACY: May I have Exhibit 18, please.

THE CLERK OF THE COURT: It's on the witness chair.

Q (By Mr. Tracy) Now, Exhibit 18, does that show, you sufficiently identified that before, but there were a couple of further questions that I wanted to ask you that counsel did not, on Cross-examination, that did not show the effect of irrigation, does it?

A I can't tell if it does or not.

Q Well, can you ready any-- It just shows that the ground water level goes down?

A Correct.

Q And you can't tell whether or not that would be due to a decline due to irrigation, or a decline due to lack of precipitation, can you?

MR. RUDOLPH: Your Honor, this is Cross-examination.

MR. GERMERAAD: I don't believe I asked any questions relating to 18 that go to the point that Mr. Tracy is going into. All I asked is, could he see recharge in the wells, and those are the only questions I asked relating to Exhibit 18, so I think this is

outside the scope of Cross-examination.

MR. TRACY: Well, I don't think it is, Your Honor. All I'm asking-- Apparently, they attributed some significance to that, at least I felt Mr. Woodward did, in saying that irrigation affected, that that exhibit showed that irrigation affected the ground water, and I don't think you can tell it from that, and that's all I wanted--

THE COURT: Mr. Woodward said that. I don't believe this witness did. If I'm in error, you're entitled to ask it, but I don't recall that this witness was asked about it. Maybe the witness can correct me.

A I don't recall it, either, Your Honor.

THE COURT: I'll sustain the objection.

Q (By Mr. Tracy) There was one other area of questioning now.

In response to some questions by Mr. Rudolph, and I think also by Mr. Germeraad, I had a question on the discharge point. Do you think that the flow of the springs accounts for all of the natural ground water discharge in the area?

A I really don't know.

Q Why don't you know?

A Well, the flow net is inconclusive. The flow net would

indicate there is some other point of discharge, other than the springs, but I don't know what that point of discharge is.

Q What would you need to find out where this point of discharge is, what other facts would you need?

A More information on the water level east of the Chamokane Creek.

Q Now, your flow net shows the water flow in the month of November, is that correct?

A That is correct.

Q Do you have an opinion as to whether or not there would be any change in the summer?

A Yes, I do have an opinion.

Q Would you state your opinion, please?

A Probably in the summer, when there is pumping going on, and perhaps there is very little rainfall, the evapotranspiration rates are higher, that the ground water level might be fine, this is shown on Mr. Woodward's map, the hydrograph of the Hill Well, Exhibit 18, which shows the decline of the water level during the summer; however, I don't believe that there is a change in the general flow of direction due to the rise and fall of the water table in the summer and winter and the influence of pumping.

Q Then it would be your opinion that the flow of the

ground water would still be in a southeasterly direction?

A In the northern, northeasterly part of my area, covering my flow net, yes, I think the flow would continue in that direction.

Q Now, one final question. In response to this question regarding the surface and ground water as being independent, do you recall Mr. Rudolph's questions about that?

A Yes, generally, as I understood them.

Q I think there was some discussion that there might be an amount of water in the Newhouse area that might filter down into the ground water table?

A Amount of surface water, or water immediately below the surface?

Q Right.

A Yes, that's as I understood the question.

Q Would this be a measurable or immeasurable amount?

A I don't think you could measure it at any one point. You would have to take a very large area; in other words, a block of two square miles, and if you had a sensitive enough instrument, you might be able to measure it; but as a practical matter, you couldn't measure it.

MR. TRACY: That's all I have.

THE COURT: Mr. Cerutti?

REDIRECT EXAMINATION

BY MR. CERUTTI:

Q Dr. Maddox, I have trouble with this word, "transmissivity". Am I close, anyway?

A Yes, that's right.

Q I would like to go back to your assumptions on the coefficient of transmissivity and storage, and I believe you said you assumed 100,000 as a figure on transmissivity?

A One hundred thousand gallons per day per foot.

Q And what was the assumption on storage again?

A That's 12 percent.

Q I would like you to assume, just hypothetically, for demonstrative purposes, suppose you were just drastically incorrect in those two assumptions; suppose your margin of error was, say, double or triple, what you assume it would be; what effect, if any, would that have on the flow map that you have drawn up here as Exhibit 66?

A On the flow net, it would have essentially no effect.

Q No matter how great the error, whether it was two or three times off?

A No, I had in mind the gross assumption for the flow net, so if I were two or three times off, the gross assumption

would be two or three times off, and the flow net would remain unchanged.

Q In your opinion, the water would still be running the same way?

A That is correct.

Q Do I understanding, given my same hypothetical, that you're grossly incorrect in your assumption, that there will be some effect on the cone of depression?

A That is correct.

Q If the cone of depression gets substantially larger from the Newhouse and Seagle Wells than what you have assumed it to be, would there ultimately come some point at which those did have a substantial effect on the Massive Springs?

A Yes, that would be true.

Q And am I to understand that if the coefficient of transmissivity is substantially larger than what you assumed it to be, the size of this cone will correspondingly begin to increase?

A You might generally make that as a statement, yes, assuming, of course, that storage doesn't change drastically.

Q Doctor, I wonder if you could tell us, in general, how much larger would this coefficient have to be, or, put it another way, how wrong would you have to have been

before this cone of depression is going to get big enough to do that?

A I would estimate at the present time, if storage remained 12 percent, the transmissivity would have to be somewhere around a million, or greater, in order for the cone of depression to reach the springs, at a pumping rate of 1500 gallons a minute, for an irrigation period of 180 days.

Q You say a million?

A Yes.

Q And your estimate was 100,000?

A That is correct.

Q Assuming that your 100,000 isn't right on the nose, it isn't just exactly what you picked it, can you give us some range as to where it likely falls?

A I would say--

MR. RUDOLPH: Now, Your Honor, now we're going to have an assumption on an assumption?

THE COURT: It's a hypothetical.

A Using the information that is given on the log for the Newhouse Well, which was introduced as an exhibit, I have forgotten the exhibit number, which gives the number of gallons per minute and the number of feet of draw-down in that well, I arrived at a number known as "specific capacity", that is the gallons per minute

that will put a draw-down, and the general rule of thumb is to multiply this by 2,000, in, say, a sand-and-gravel aquifer.

When I did this, I have forgotten the exact numbers, but I came out with about 235 or 40,000 gallons per day per foot, which, of course, would be about twice, over twice as large as the number I assumed. I had no limit for the lower end, although in my experience, an aquifer that will yield 10 to 15 gallons a minute to a well with, say, a five-foot draw-down, which might be reasonable in a small, domestic well, would have to be somewhere in the vicinity of 15 to 25,000 . I didn't know what the draw-down was in the so-called "public health well", what its yield was, so I just assumed the draw-down, so I would say my lower limit might be 15 to 25 gallons a day per foot for the tighter rocks, and 235,000 gallons per day per foot for the upper rocks.

I think the transmissivity may lie somewhere in between there, and that's why I accepted the 100,000.

Q Do I understand that if it falls below your 100,000, then there is even less chance of impact on the springs?

A That is correct, assuming that storage remains at 12 percent.

Q I wonder what kind of effect we have in these calculations

if we turn to the coefficient of storage; what probable range is there, above and below 12 percent, and what effect changes have, in terms of percentage needed to get the impact over to the springs?

A Again, it would be more difficult to tell the coefficient of storage. I think a lower limit for coefficient of storage would be something about eight or 10 percent.

Now, one thing to point out is that on storage, they say that clean gravel, that is, with no sand or silt, would have a lower coefficient of storage than would, say, a sand and gravel, and if the sand and gravel had more silt and clay, the coefficient of storage would go up; this is the amount of water that is held in the rock, and has to drain out, so therefore, I would guess that the range for the particular logs shown by Mr. Woodward's report would be a similar case to, maybe, 15, to, uh, oh, I doubt if we'd get to 20 percent, let's say 15 to 18 percent, and so if we decreased the coefficient of storage slightly, that would mean-- and held transmissivity at a constant, say 100,000, that the cone of depression would have to reach out slightly farther. If we increased the coefficient of storage to, say, 15 percent and allowed the transmissivity to remain at 100,000,

the cone of depression wouldn't reach out quite as far, in that it could get enough water out of storage.

Q I wonder, are there professionally-acceptable and -recognized methods of determining the direction of flow of ground water, other than the construction of a flow net in the fashion that you used up here at the board?

MR. GERMERAAD: Your Honor, I have difficulty finding how this question is related to any part of the Cross-examination.

MR. CERUTTI: Your Honor, counsel spent 45 minutes drawing flow nets on the board. I guess the assumption was there was some question that, whether or not they were valid.

THE COURT: You may answer.

A Generally, the entire field of hydraulics is based on flow net. Now, some of the more sophisticated flow nets are drawn by computer models, who give you a third dimension, that is, what happens in depth with flow. I may, uh, well, one hydrologist talks to another, many times they don't bother putting in the flow lines, because when they look at a set of contours, they, in their mind, put in the flow lines to see what they are, but I believe, in this context, they are a generally-accepted method for analyzing ground water movement.

Q (By Mr. Cerutti) Is it the best way, in your opinion?
A I believe it's the only way.
Q I understand you had some discussion with Mr. Woodward prior to this litigation?
A That is correct.
Q You have been through his material, have you not?
A Yes, I have.
Q To your knowledge, did Mr. Woodward prepare a flow net?
A No, I don't believe he did.
Q Did you discuss that with him at any time?
A Yes, we discussed it, I think, twice.
Q Did you provide him with a book that described a flow net analysis?
A At our last meeting, yes, I did.
Q Did he at any time make any indication to you as to whether or not he was planning to attempt such a thing, and if not, what his reason would be?
A Mr. Woodward indicated he didn't think a ground water contour map would serve in this particular basin, due to its unique features of having the bedrock, I believe this was based on the geophysical survey, so he thought that ground water contours would not, probably not appear on the map, which he wouldn't have sufficient data to draw the contours, and as I interpret what he told me, I think that is what he said, why.

Q Now, there has been a reference to data points; is it my understanding that data points are the surface elevation in the wells?

A Yes.

Q --elevation of the water?

A Yes, that is correct.

Q Where did you obtain the information from those data points?

A From Mr. Woodward's report.

Q Why didn't you extend your flow net east of Chamokane Creek and east of the Seagle property?

A There were no more data points in Mr. Woodward's report.

Q Did you utilize all the available data points from his reports, then?

A Yes, I did.

THE COURT: He's already answered this line of inquiry.

Q (By Mr. Cerutti) I'd like to direct your attention, Dr. Maddox, to the exhibits that have been previously referred to as the Weaver and the Griggs reports or maps. One of them is on the board right now.

A Yes.

Q I gather you have no knowledge as to who Mr. Weaver and Mr. Griggs were?

MR. RUDOLPH: He asked the same questions

yesterday, Your Honor.

THE COURT: I think that's right.

MR. CERUTTI: I thought I asked it of Mr. Woodward.

MR. RUDOLPH: You asked it of this witness, too.

MR. CERUTTI: I will withdraw the question.

Q (By Mr. Cerutti) What I was laying the groundwork for is this, Dr. Maddox, do you have any knowledge as to how such maps are generally constructed in your profession, what they purport to depict, and how they are made?

A Yes, I have such knowledge.

Q Directing your attention, then, specifically to Plaintiff's Exhibit 6, which is on the board, what does it purport to tell us, or show us?

A I believe that map is the reconnaissance map, and I have forgotten the name of the person who drew the reconnaissance map.

MR. GERMERAAD: Your Honor, I think Mr. Cerutti asked the same question yesterday, and other counsel asked the same question on Direct of the witness.

THE COURT: Does the witness recall; were you asked this?

A I don't recall.

THE COURT: You may proceed.

MR. CERUTTI: Thank you, Your Honor.

Q (By Mr. Cerutti) What, generally, does that depict again, Dr. Maddox?

A I believe that particular map is a reconnaissance map, or the geology in the Chamokane Creek area.

Q Assume that I wanted to know what the geology, or geological characteristics were, at any specific point on that map, would this chart be of assistance to me?

A In a broad sense, that you would know what units were out there, and you could go to the specific point you were interested in and begin checking the accuracy of the map, and if the map doesn't purport to be accurate at each and every point, only on a reconnaissance basis, that is showing the general outline of the geology there.

Q Is that true of the other geological map as well?

A I couldn't make that statement to that degree. I would have to look at it for a minute.

Q What's the number of the other--

A Either 7 or 5.

THE COURT: It's either 5 or 7.

Q (By Mr. Cerutti) Dr. Maddox, directing your attention to Exhibit No. 7, does that also purport to be a generalized, as opposed to specific, reference?

A Could I approach the exhibit and look at it?

Q Certainly.

A No, that's a more detailed map than the prior map.

Q And how is a map such as that constructed?

A With many more traverses. What is done, when one of these maps is constructed, is, that if a person will take a traverse of an area, you take a number, traverse number, and just start walking along a contact, which is a point at which two rock bodies come together, and he'll cut it in one or two places on his traverse, and he will note these and carry the contact between, in a more detailed study. You take many more traverses and spend much more time in mapping other rock units that might lay between, in much more detail.

MR. GERMERAAD: Your Honor, I hoped he would get finished with that answer. I would make an objection to this line of questioning. I checked with Mr. Rudolph, and neither one of us can remember referring to this exhibit in our Cross-examination, so I do not believe it's within the scope.

MR. CERUTTI: I will withdraw the question, Your Honor. I thought the two exhibits interrelated to each other a little bit.

THE COURT: All right.

Q (By Mr. Cerutti) Dr. Maddox, I guess I have just one final question, and it is my most important, at least to Mr. Seagle. On the basis of all the legal data

information, and assuming that Mr. Seagle pumps 528 gallons a minute during the irrigation season, a total of 1400 acre feet a year, what is your best opinion as to the probability that there is any significant effect from that pumping in the flow of the Massive Springs or the Chamokane Creek?

A If all the water were taken from this western, south-westernmost well, there would be one effect, it would probably be immeasurably small. If water were taken from each of his four wells, the effect on the flow of the springs would be a great deal less, and again, the measurement would be small and I don't believe the effect would be felt by the springs, unless there was some very peculiar set of circumstances for that pumping season.

Q I'm not sure I understood. You say "immeasurably small" if just from the one well?

A Right.

Q And even less than immeasurably small if it were rotated between the four?

A That is correct.

MR. CERUTTI: Thank you, Doctor.

THE COURT: Mr. Rekofke.

MR. REKOFKE: I have no question, Your Honor, of this witness.

THE COURT: All right.

MR. McGREGOR: Your Honor, I have a question.

THE COURT: Excuse me, I missed you, you're sitting back there. Proceed, Mr. McGregor.

REDIRECT EXAMINATION

BY MR. McGREGOR:

Q On Cross-examination, Dr. Maddox, I believe the answer to a question indicated that at some time Thomas Creek flowed directly into Chamokane Creek. Is that a fact?

A I don't know that that is a fact. I couldn't comment one way or the other.

Q You cannot state that Thomas Creek, in fact, never flows directly into Chamokane Creek?

A No, I couldn't make that statement.

Q On Cross-examination, you were asked what effect the Seagle wells and the Newhouse Well and Schaffner diversion would have on the, what is referred to as the "Massive Springs area", and your answer indicated that, of those three, that the Schaffner diversion would have a greater effect.

Just to clear a point up, at the rate of 0.24 cubic feet per second, from the Schaffner diversion, which water, previous testimony indicated, was taken from an earth-filled dam that is previously filled by

Thomas Creek; would that have any measurable effect on Chamokane Creek itself?

A I don't believe it would.

MR. McGREGOR: That's all.

THE COURT: Recross?

RECROSS-EXAMINATION

BY MR. GERMERAAD:

Q I take it from your answers on Redirect Examination, about the, what might be termed the "non-limitations of the use of the flow net", has very few limitations; I take it, then, that you would disagree with Skibitzke and da Costa on the limitations of the flow net, is that correct, then?

A No, I don't disagree with it.

Q You don't disagree; okay. You were asked which contour line you started with, and first, the question was asked by Mr. Campbell as to 1840, then you said you started with 1800. In fact, you could start with any particular line and then just conform all the other lines to that, isn't that correct?

A That is correct.

Q You have taken on-- Well, look back a second to Plaintiff's Exhibit 92, if we had runoff from these mountains, we could also have runoff from the mountains

on this side, is that correct?

A That is correct.

Q Now, looking at Defendant's 66, we had runoff from those mountains on the west, and actually this, along here, might be a source of water, correct?

A If there were a runoff and recharge from the line, the contour lines would swing parallel with my boundary there.

Q You mean like this?

A That's right.

Q If that were the case, then, this would not be the point where you could conform all the rest of your flow net to it, you would not have a straight line here, is that right?

A That is right.

Q So this would, without going into it, would have changed the flow net?

A It would have changed it at either boundary, but not in a, not in the matrix that contributed towards the spring, no.

Q One last question. Look again at Defendant's Exhibit 65, I believe it's defendant's exhibit; it's your flow net with your notations on it.

A Yes, that's correct, 65.

Q I asked you, you know, about the 1780 contour line being

close to Newhouse, and 1791 being the Hill Well--

A Yes.

Q What if you were to find that in fact the Newhouse Well was two feet higher than the Hill Well, 112, where you have the 1791 contour; you would not then have the swing out to the east, would you, it would again be swinging the other direction, it would change the direction of that flow net, would it not?

A That is correct; I would probably bring it out just north of the Seagle Well and begin to swing it to the south and east at that point. The 1780 well would begin to swing at about the Northwest corner of Section 16, down to the--

Q Well, in any event, it would change it, wouldn't it?

A That is correct.

Q So instead of going this way, it would not quite go that way, but it would come this way instead?

A That is correct.

MR. GERMERAAD: No further questions. Do you have any questions, Mr. Rudolph?

MR. RUDOLPH: Yes.

RECROSS-EXAMINATION

BY MR. RUDOLPH:

Q Dr. Maddox, just going on just a little farther beyond

what was just asked, if in fact you would change the flow net, then many of the answers you have given this Court concerning direction of flow, you would retract?

A If the data were there to change the flow net, that is correct.

Q And did you make any measurements of the water surface level in the Newhouse Well on November 3, 4, or this other date in November?

A No, I did not make them, nor were they made, I presume; they're not in Mr. Woodward's report.

Q Did you make any inquiry of Mr. Woodward as to whether he had, within just a few days of that date, a measurement of the water surface in the Newhouse Well?

A No, I did not.

MR. RUDOLPH: I think that's all I have.

THE COURT: You may step down. Thank you, Dr. Maddox.

I'm not certain who is coming up next.

MR. TORVE: I guess I'm next.

Your Honor, for the record, this would be the case for the Defendant State of Washington, Department of Natural Resources, and we would call Mr. Howard Isaacson to the stand.

HOWARD ISAACSON, called as a witness on behalf of the defendant State of Washington, Department of Natural Resources, having been duly sworn, testified as follows:

THE CLERK OF THE COURT: Would you please state your full name for the Court, spelling your last name.

THE WITNESS: My name is Howard Isaacson, last name I-S-A-A-C-S-O-N.

DIRECT EXAMINATION

BY MR. TORVE:

Q Who are you employed by, Mr. Isaacson?

A The Department of Natural Resources, Washington State.

Q Could you tell me how long you have been in their employ?

A Approximately five years.

Q What is the nature of your duties with that organization?

A I am a land manager, I do various economic studies on development of natural resource properties, check them for further development, er, or for development information, I do water, I'm responsible for the water

registration and all water rights.

Q What type of development or natural resource lands are you referring to?

A We are changing dryland grazing, in the areas where the lands are susceptible to irrigation, to irrigated farming, and this includes irrigated row crops, irrigated pastures, orchards, and vineyards.

Q Can you give the Court a little indication of your educational background?

A Beyond high school, I take it?

Q Yes.

A I attended Central Washington State College of Education for three years, went to Oregon State College for another year, and received my Bachelor of Science in Agriculture, I worked one year towards Master's with a major in Soils and a minor in Field Crops.

Q What has been the nature of your experience prior to the time you became an employee of the Department of Natural Resources?

A I farmed for myself for a period of five years, and was also a custom farmer. I then became a field man for a civil engineering chemical outfit, organization, and ended up being the branch plant manager of the same organization.

Q Have you, as a part of your duties with the Department

of Natural Resources, been involved in water adjudications in various watersheds?

A This is correct.

Q And have you handled the jobs and duties of obtaining land ownership owned by the Department of Natural Resources, investigating that land and observing it for the purpose of water adjudication?

A I have; and further, that included estimates of water needs.

Q I'm going to ask you, on Exhibit 23, did you prepare a map which showed the ownership of the State of Washington in the Chamokane watershed?

A Yes, I prepared, actually this map was prepared by the Department of Ecology, I believe. That is a secondary copy; however, I have checked it. This is the one I personally did, and this one is a duplicate of my work copy.

Q Has there been placed upon there, in coloring, the various tracts owned by the Department of Natural Resources within the Chamokane watershed?

A Yes.

Q Let me ask you this, the map that you refer to, prepared by the Department of Ecology, can you tell me what that map shows, generally, other than the coloring?

A The map purports to show the exterior boundaries of the

Chamokane Basin, or the Chamokane watershed.

Q Now, have you had an opportunity to compare that outline of the watershed to Exhibit 10 as introduced by the plaintiff in this case and determine whether or not they're accurate, for the purpose of showing the ownership of the State?

A They appear to be reasonably close. Neither one of them has enough detail to be able to give a very finite description of the other.

Q However, was it adequate for the purpose of showing the State ownership within the watershed?

A Yes, very much so.

MR. TORVE: I will ask that that Exhibit 23 be admitted in evidence. This is one of the prefiled exhibits.

THE COURT: Any objections?

(No response.)

THE COURT: Defendant's 23 is admitted.

(Whereupon, Defendant's Exhibit 23 was admitted into evidence.)

MR. TORVE: I wonder if you could place that exhibit on the board, please.

MR. RUDOLPH: Could I ask-- Just a moment-- That's the same one that's been on file all the time?

MR. TORVE: Yes.

Q (By Mr. Torve) Mr. Isaacson, how have you shown the ownership of the State of Washington, Department of Natural Resources, on this particular map?

A The Natural Resources managed, owned and managed lands, are shown in the reddish color.

Q Can you just generally tell us what type of lands those are, as far as their derivation of ownership is concerned?

A The Sections 16 and 36 are school trusts which we acquired because of the provision of the Enabling Act at statehood. There are some other original statehood grants, and there are some little lands that were selected from base lands.

Q Now, directing your attention to Exhibit 24, did you prepare a sheet which lists all of these lands in relation to their legal description, in relation to the amount of acreage in them, in relation to the amount of acres in the, lying in the watershed, in relation to the stock or grazing capability, capabilities of those lands, and the water that might be necessary for the type of grazing, the land that is suitable for it?

A I did prepare Exhibit 24.

Q Yes. And that is Exhibit 24 which you were referring to, is that correct?