UNITED STATES DISTRICT COURT

DISTRICT OF MASSACHUSETTS

Civil Action
No. 82-1672-S

SKINNER, D.J.
and a jury

ANNE ANDERSON, ET AL

V.

W. R. GRACE & CO., ET AL

Forty-Forth Day of Trial

APPEARANCES:

Schlichtmann, Conway & Crowley (by Jan Richard Schlichtmann, Esq., Kevin P. Conway, Esq., and William J. Crowley, III, Esq.) on behalf of the Plaintiffs.

Charles R. Nesson, Esquire, on behalf of the Plaintiffs.

Herlihy & O'Brien (by Thomas M. Kiley, Esq.) on behalf of the Plaintiffs.

Hale & Dorr (by Jerome P. Facher, Esq., Neil Jacobs, Esq., Donald R. Frederico, Esq., and Deborah P. Fawcett, Esq.) on behalf of Beatrice Foods.

Foley, Hoag & Eliot (by Michael B. Keating, Esq., Sandra Lynch, Esq., William Cheeseman, Esq., and Marc K. Temin, Esq.) on behalf of W. R. Grace & Co.

Courtroom No. 6
Federal Building
Boston, MA 02109
9:00 a.m., Wednesday
May 14, 1986

Marie L. Cloonan
Court Reporter
1690 U.S.P.O. & Courthouse
Boston, MA 02109

Q Do I have to go back and read them to you?

A No. I agree with what you just said.

Q So the water does no longer continue to go into the river from the aquifer under pumping conditions?

A Well, in some stretches of the river, water will continue to go in --

Q Wait.

A Do you mind if I finish my answer?

Q Sure.

A The water will continue to go into the aquifer at a lower rate. It may not stop completely. But everywhere where you have any kind of drawdown there will be a decrease in the flow to the river and in some areas it will, in fact, stop.

Q We are talking about between Olympia and Salem?

A Yes, sir.

Q Stay with that, will you, please?

A That is what I'm talking about, sir, precisely that stretch of the river.

Q Between Olympia and Salem, you say when the pumping starts the signal goes out -- I think I better find the reference. I know you would like to get the precise language.

You said, "What's happened is the water -- what happened is the water would normally go into the river is not going into the river any more. It doesn't mean it's leaving the river, it just means it's not going in."

A That's correct. That was in the sense of the area where the gradient was steep enough to do that.

Q I didn't hear that last qualification.

A I'm saying to you, in the context of that question, that there is going to be a signal going to the water molecule that says stop, don't go into the river, think about going back to the well. And that was the spirit in which I answered that. In other parts it just says slow down.

Q Well, the spirit in which you answered it is what you just said, the words which you answered it with is, "Water that would normally go into the river is not going into the river any more."

A I think that is what I meant, yes.

Q "It doesn't mean it is leaving the river; it just means it is not going in." Could anything be clearer than that?

A No.

Q You don't have to explain that, do you?

A I want to make sure you understand I'm talking about areas where the gradient is sufficient to stop it completely, when I say that. There are other areas along the river where it will simply slow down. The rate of discharge to the river will be still there but much smaller. I'm trying to say to you it doesn't necessarily have to come out of the river just because it is not going in.

Q "What happened is the water that would normally go into the river is not going into the river any more."

Is that plain English?

A Yes, in the context of what I said, that is what I meant to say.

Q Forget about the context of what you said. Is that what you mean to say?

A If we are not going to talk about context, the answer will make no sense.

Q I was asking you -- the context was I pointed out to you 600 gallons per minute had left the river, which you were then -- said you had been thinking about for a long time and were about to explain it, and this was the explanation. That was the context, wasn't it?

A Yes, I think in that sense it was.

Q When I left here yesterday I said, "We're going to read that answer to you." Do you remember that?

A No, I don't remember that, but it seems like something you might logically do.

Q When you said, "The water is not going into the river," did you mean the water is not going into the river, or did you have some private qualification that you weren't telling us about, or private exception that you weren't expressing?

A No. I think what I was trying to get across to you, without being overly specific, was the general idea of water

not getting to the river, decreasing its flow, was an important thing to consider, It is not all-encompassing. It doesn't mean water can't get out into the river, but before water can get out, what is going in has to stop. I wanted to present that in what I thought was a level of understanding that you would comprehend.

Q Could there be anything more specific than a statement, "It doesn't mean it is leaving the river, it just means it is not going in"? That is as specific as you've gotten in your whole testimony, isn't it, Doctor?

A As I said, as a principle, what I said is correct.

THE COURT: Let's get going. Just flow.

MR. FACHER: All right, your Honor. I'll move along.

Q The water is not getting into the river, under what I just read you, when the wells are pumping. It is also your opinion, is it, that no water is leaving the river and going into the aquifer to satisfy the demands that are being made on the system by the pumping of Wells G and H?

A No, sir, I didn't say that. I don't believe I said that.

Q Well, I thought you told us yesterday that no river water was going into serving Wells G and H.

A No, sir.

Q When they were pumping.

A If I said that, I either misspoke or you misunderstood.

Q Do you remember my asking you if Wells G and H took river water when they were pumping, and you said they didn't?

A That's correct.

You must realize that when you say that, I interpret it to mean that a molecule of river water has reached the well. If that's not the idea behind your question, again, it is a matter of me trying to answer so it is clearest to you.

Q I think it is clearer to me if you think in terms of molecules.

A Okay. Let's talk about molecules.

Q Instead of talking about these concepts it is the river water serving the well.

A That's fine. If you want to talk about molecules, let's talk about molecules.

Q I don't want to talk about molecules.

A I thought you said you did.

Q I want to talk about your testimony yesterday in which you gave as an opinion that the Wells G and H did not induce river water into the wells or into the aquifer as a result of pumping. You said that the river played no part in your opinion.

A I'm sorry, sir, the things that you are saying are awfully difficult for me to come to grips with because in many ways they're contradictory.

Q All right. What I say is contradictory. Is that what you just said?

A When you were asking a question like that, that is in its formulation something that's not physically consistent and I just don't know how to handle it.

Q I thought you gave an opinion. I guess I'll have to start over again. I thought you gave an opinion that the river played no part in your opinion with respect to groundwater flow from the Beatrice site allegedly under the river and to Wells G and H. That's where this all began. Do you remember that, sir?

A I do have some problems recalling the details of that. I know we had lots of discussions along those lines.

Q Well, Dr. Pinder, your entire opinion is centered on the fact that you say groundwater flowed from somewhere on the Beatrice site, which you haven't yet told us about, and instead of going in the river went under the river and then into Wells G and H. And then I began questioning you about the effect of the river, and the fact that the river itself had lost 360,000 gallons a minute, and I suggested to you that the river -- that the river was serving Wells G and H, and that there wasn't any water coming from the site of Beatrice.

So then you said, "I've been thinking about this for a long time, and I think I've come up with the solution." And we had a coffee break, and more questions, and finally

you explained to us it wasn't that water was leaving, it was just that water wasn't getting in.

Now, doesn't that accurately describe what took place yesterday?

A I'm sorry.

Q Pardon me?

A I don't understand. Your summary is not totally consistent with my recollection. I'm willing to say in general we had a discussion of that kind, that we talked about how much of the water that flowed in the river might be due to groundwater discharge, how much might be due to water leaving the river. I made the express statement that I felt that an important part in the decrease of the flow of the river was due to the fact that the groundwater was not discharging in some areas of the river, and that was as important as the water coming out of the river, and I think that was more or less where we left it.

Q Well, you were responding to the Judge's question.

THE COURT: I'll tell you what I think we ought to do at this point. We're approaching hopeless confusion, maybe immediate confusion. I'm going to call the morning recess and suggest very strongly to Dr. Pinder that he take the transcript of his testimony yesterday and read it, and then perhaps we can start again on this discussion.

We'll take the morning recess.

(Recess.)

Q Dr. Pinder, between Olympia Avenue and Salem Street, north and south, if we assume no water was getting into the river because of this stop sign, that the pumps -- that the pumping started; and if we assume that no water was leaving the river because of the peat level that you talked about; then the flow measurements at Olympia and the flow measurements at Salem should be the same, because no water was coming in and no water was going out. You should have roughly the same flow at both spots; isn't that correct?

A Except for an evaporation, that would be correct.

Q Except for evaporation. So in the example I gave you, they measure 100 at Olympia?

A Yes.

Q When the wells are pumping, 150 at Salem, then you conclude 50 has been added by virtue of the aquifer?

A If we assume it was 150 coming out of the bottom and 100 from the top, then I say at least 50 was added by the aquifer.

Q Indeed, when the pumps were turned on, the situation changes, and I ask you again to assume nothing is coming in, that 50 is not coming in because of the stop sign, and you say the peat prevents anything from going out, therefore those two numbers you should get a hundred on both ends at Olympia, and at Salem. That's what you just agreed?

A No. You said you assumed something. Now, if I assume

nothing goes out and nothing comes in, the values would be the same on each end except for the evaporation. But I didn't say that nothing would come out.

Q Well, I'm not going to review your testimony about whether you said that no more water was flowing to the river. If you assume that no water was flowing to the river, and you assume that you correctly testified that the water wasn't getting to the wells because of the peat level, nothing was coming in and nothing was going out, then those two measurements should be the same. The river isn't gaining and the river isn't losing, correct?

A You make all the assumptions that you just made, I think that your statement isn't at all consistent. The assumption is not what I said.

Q When the U.S.G.S. measured the flow under pumping conditions, you know that they measured a flow at Olympia Street of a given number, which I'm happy to have you recite if you know it, and they measured a flow at Salem Street of a given number, and they discovered that the flow at Salem Street was less than the flow at Olympia Street; isn't that correct?

A The U.S.G.S. made a number of measurements during the duration of the pump test. At the beginning of the pumping period the reverse was true. I'm trying to explain what you just said.

Q Go ahead. I'm listening.

A The river was actually gaining as you might expect at the beginning of the pumping test. After about 20 days of the pumping test, the balance was changed so that the amount of water that came in the top was more than what was going out the bottom. So approximately at that point in time, the river is actually losing water, be it from the top to the bottom. And prior to that time, it's essentially either gaining water or is more or less in balance as far as I can see. The phenomenon I'm talking about and the context I was talking about yesterday is an attempt to explain what I observed in the field as a sudden response of the river to pumping. My explanation was, and is still, the reason that I saw the change in the river so quickly was not because you suddenly started to drain a lot of water out of the river, which I had difficulty with because of the low permeability of the materials; but the message had come out from the well to decrease the flow to the river.

The flow of the river was descreased. In some places it stopped completely, and saw the response of the river. As time goes on, slowly the water begins to move across from the river into the peat layer and starts this long journey to the well, in which I said then and still feel comfortable now, is 10- to 20-year time frame. That is the concept that I was trying to express yesterday, and am trying

to express today.

Q Am I correct, sir, that the measurement at Salem Street that the U.S.G.S. made after the pumping test, or at the conclusion of the test, showed that there were 600 to 700 gallons per second less flowing by Salem Street than there had been by Olympia? Am I correct?

THE COURT: You mean per minute?

MR. FACHER: Per minute. I'm sorry.

Q Am I correct or not, sir?

A As far as I'm able to determine looking at the values, your numbers are not out of line at all.

Q I'm not out of line?

A No. I think that's quite reasonable. The wells are pumping a thousand gallons a minute.

Q All right. All right.

Would you come over here, then, and demonstrate that for the jury, please? Do you have your figures with you at the beginning of the -- or do you have them in your head? Do you want to do it with the pumping on or with the pumps off?

A I was going to draw a picture. Do you want me to draw a picture?

Q Yes, draw a picture of Olympia Street. Let me draw it.

(Indicating)

Now, you'll have to assume this squiggly line

is the river. Give me the figure that the U.S.G.S. recorded at Olympia Street on December 4th, whatever the date was, when the pumps were turned on.

A I'll have to go and get some documents.

Q Why don't you go get it.

(Pause.)

A So I assume I'm responding to a question as to how I feel the water has changed going from Olympia to Salem.

Q No, I didn't ask you that at all. Put a number there that represents the cubic feet per second that was measured at Olympia Street when the wells were turned on, which I take it is the 4th of December, 13.7 correct?

A I beg your pardon. It is not correct. That's a down-stream number. The upstream number is 11.6.

Q That's before pumping?

A Yes, just before the pump is put on.

Q That wasn't my question, but it's all right.

A Okay.

Q Okay. "CFS" means cubic feet per second?

A Yes.

Q So I'm putting on this chart "Before pumping."

A Yes.

Q So before pumping, 11.6 cubic feet per second at Olympia, 13.7 cubic feet per second at Salem, and that translates into a net gain for the river of 1.7, correct, cubic feet per second?

A (Writes 2.1.)

Q 2.1. Sorry. I got it backwards. You take 2.1 cubic feet per second, and you multiply it by some factor, and that will give you gallonage; is that correct?

A Yes, sir.

Q And that factor is 148.8?

A Approximately.

Q So we've got 950 gallons per minute?

A Yes.

Q Right?

A Yes, sir.

(Writes 950.)

So we agree that the net gain under this hypothesis is 950 gallons per minute.

Q These two squiggles mean --

A "Approximately."

Q "Approximately." That demonstrates your view, most geologists' view, that the aquifer contributes to the river; is that right?

A Yes, sir, it does.

Q That's before pumping?

A Yes, sir.

Q. So that's with the faucet turned on, you have the bathtub there and you have 950 more gallons coming into the bathtub from the faucet being turned on, right?

A. Yes.

Q. Now, this is after pumping.

A. (Drawing.)

Q. All right, let's put, "After pumping, Olympia, and Salem" (marking on pad).

Now, give us the figure on December 4th or whenever it was -- January 3, I beg your pardon, January 3 when the pumps were turned off or when the pumping test ceased.

A. (Marking on pad.)

Q. So the record can listen to what you have written, at Olympia 4.63 cubit feet, at Salem 3.47 cubic feet per second or a net loss to the river of 1.16, which, I guess, is the figure you mentioned before when I was thinking of it. 1.16 is the difference between -- This is under pumping conditions, what the flow was at Olympia and what the flow was at Salem, and that is going to come out to about something in the order of 500-some-odd gallons per minute.

A. (Marking on the pad.)

Q. And this is where you are down here on Salem Street looking at the measuring devise.

A. (Witness nods head.)

Q. So at the close of the pumping, you observed a net loss in the flow of the Aberjona River -- not you observe -- these figures show, of 1.16, correct?

A. Yes, sir.

Q. And if no water is coming in and no water is leaving, according to your hypothesis, under pumping conditions, you said you would expect to see those two figures the same.

It is now obvious, is it not, that water is leaving?

A. There is no question about that.

Q. And it is leaving -- It's not just not gaining, water is leaving, isn't that right?

A. Yes, sir. But that was not your question yesterday.

Q. Wait a minute.

Yesterday you said it was not that water is leaving the aquifer, it is just that it is not gaining. Today you agree, do you not, that there is a net loss and water is leaving?

A. No, sir. Your question yesterday was, stated to me that the discharge changed by 600. You did not say that the river lost 600. I asked you to please repeat the question, so it was very clear to me, and you said, once again, you were talking about a change in discharge.

As you can easily see from the example you have shown, the change in discharge as quoted to me was

completely accommodated by the first hypothesis.

Q. You don't think my questions were directed to the fact whether the river lost water to the well, wasn't that as you would say the spirit of my questioning?

A. Not at all. I had not seen the data. I wanted to make sure you were asking me what I thought you were asking me. That is why I asked you to repeat it to make sure.

Q. Well, sir, the Well G, which is over here, right around there let's say, and Well H right around there (marking on pad) was only pumping at about 500 gallons per minute?

A. I beg your pardon?

Q. A second I mean. Well G, what was it pumping?

A. Slightly in excess of 600 gallons per minute.

Q. That is what I thought I said.

And the net loss that you just described is 522 gallons per minute, isn't that right?

A. Yes, that's what it says.

Q. So enough water was coming out of the river to satisfy the demands of Well G if 522 gallons were leaving the river and Well G was only demanding, if you will, 600 gallons and getting it from an entire radius, isn't that right?

A. The water that is coming out of the river is going in the direction of the wells, but it will take about 10 to 20 years to get there.

Q. Well -- This is where we came in yesterday. The Judge said to you, "Where did the 864,000 gallons go?"

A. Yes.

Q. And that is when we started this examination. And you say they didn't go anywhere, there was no such gallonage.

A. The 600 gallons per minute that you spoke to me about in your question, you said was a change in discharge, not a net difference between the upper and lower stages. And as you can see from the calculations that we just did, you can accommodate around 500 gallons a minute of that change by the elimination of discharge to the river.

Q. The Judge's question didn't ask you about net discharge. You say I asked you---

A. Well---

Q. Wait a minute. ---I asked you about net discharge and not about what the river lost?

A. Yes.

Q. Question---

A. Well---

Q. Just a minute.

Question, Page 42-108 by Mr. Facher, referring to the computations. "And that indicated, that is, the measurements, when computed into gallons per minute, that the river had lost" -- I underline that -- "the river had lost approximately 600 gallons per minute, do you recall

that?"

Your answer was, "Relative to its normal flow, that's correct, sir."

A. Relative to its normal flow, that is correct, sir.

Q. You are quibbling whether I use the word "discharge" or "lost".

A. That is different.

Q. You understood, did you not, I was trying to suggest to you that the river was providing the water that Well G was demanding, you understood that was the thrust of my suggestion, didn't you?

A. I would think that was a line of questioning I thought you were going to pursue, but I had not seen the G.S. information at that point.

Q. I let you see it overnight?

A. Yes.

Q. You explained yesterday that no water -- I will read it to you again. "No water was getting into the river," and you say no water was getting out, so these figures would be the same?

A. No, sir, I do not say that nor does my transcript say that.

Q. All right, would you resume your seat then, sir.

A. (The witness complied.)

(Loud bang)

MR. FACHER: That is referring to weight

of the evidence.

The record will be obscure as to that remark. I am referring to the easel toppling over, your Honor.

Q. Do you agree, sir -- Do you still say the acquifer gets a message on pumping to stop supplying water to the river?

A. May I finish that sentence by saying at least in part. That was the sense of what I was referring to.

Q. Well, when you read your testimony over, you didn't see anything in there about at least in part?

A. Yes, sir, it was. The last sentence or two of the paragraphs which essentially answer the same question twice.

Q. I am looking at your answer that says, you say, "It senses the drawdown, wants it to stop discharging to the river, so it does at least in part.

"Then what happens to the downstreet side?

"What's happened is the water that would normally go into the river is not going into the river any more.

So does the river continue to receive groundwater during periods when G and H are pumping or not?

A. In some regions it does and in some it doesn't.

Q. I'm not talking about some regions.

A. Within the area we are talking about, we are going to have some areas where the drawdown is not enough to overwhelm