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-Third 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
9:15 a.m., Tuesday
May 13, 1986

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

MR. FACHER: Your question is reported as my question.

(Whereupon the jury entered the courtroom.)

THE COURT: Good morning, ladies and gentlemen of the jury.

All right. We'll proceed with the cross-examination of Dr. Pinder.

GEORGE PINDER, RESUMED

CONTINUED CROSS-EXAMINATION BY MR. FACHER

Q Dr. Pinder, yesterday --

THE COURT: Excuse me. The last two jurors can move in one. I've excused Mrs. Troutman because of her various problems that she's experiencing, so you can get in closer to the center and get a better view of the next model, exhibit, diagram, photograph, whatever.

All right.

Q Yesterday, Dr. Pinder, you were asked a question by his Honor about the present contribution that you thought the Beatrice and Grace sites were making to the well or well field. You remember that subject matter?

A I don't remember the questions, to be perfectly frank.

Q Okay. I'm going to show you Page 42 -- I wanted to wait for the transcript so that you would have the exact

Q And it draws from all of those areas, right?

A It draws from all those areas, yes, sir.

Q And only one of those areas -- and Riley is over on the west -- is only in one section as opposed to east, north and south that the well is drawing from, correct?

A Yes. The water that comes to the well from the west is coming basically from the Beatrice site. That's correct.

Q Now, the river is in that circle --

A Yes.

Q -- of radius that the well is drawing water from or the wells are drawing water from, right?

A Yes, sir. That's correct.

Q Now, getting back to my original subject, how long does it take for river water to reach the aquifer under conditions of pumping? You say it would never reach there on the non-pumping conditions?

A No, under non-pumping conditions it wouldn't reach there.

Q Now, pumping introduces what you call a stress to the environment?

A That's right.

Q How long will it take for the river to be a source of water to the aquifer under pumping conditions of G and H?

A Let me try and explain that, because it's not an easy concept.

Q No, I didn't ask you for the concept.

A I can't answer the question unless we define what we're talking about. I understand it's not easy for you to ask the question so I can give you the answer, but if you allow me to be expository --

Q I don't find it difficult. My question only calls for a time period. How long will it take before the river becomes a source of water to the aquifer in response to pumping conditions? That's all I want to know. How long?

A Well, I can't give the answer to that.

Q All right. I'll try and ask another question, then.

When the question was asked you on deposition, you were able to give an answer without any lengthy explanation, were you not, sir?

A I don't know.

Would you like to ask the question?

Q Volume 2 -- ignore these yellow markings which are not mine -- Volume 2, Page 152.

A Yes.

Q Talking about when the pumps began to pump.

A Yes.

Q Question: "Are you saying it would take a certain amount of time after the wells began to pump to get water out of the river and into the wells?"

Answer: "Yes."

That's still a correct answer, isn't it,

or do you want to change it?

A What I would -- what I would say is that --

Q First, do you want to change your answer that you gave at the deposition?

A No, I think this is all right.

Q All right. Then the next question is: "Discounting that period of time, approximately what period of time are you talking about there?"

Your answer was: "Based on our pump test results, it would seem that it was probably quite a long time."

Is that still a correct answer?

A Yes, sir.

Q You're talking about pump test results that had been completed or just the first four hours that you had used in your computation?

A I don't remember at that time what I was speaking to.

Q Let's see. This is January 8. You think you were relying on all the pump test data or just something maybe up to Christmas, something like that?

A I think I was using whatever was available to me at that time.

Q All right.

"Based on our pump test results, it would seem it was probably quite a long time."

Question: "How long?"

Answer: "All right. In terms of possibly tens to twenties of years."

A That's correct.

Q That's what the answer said. Now, the questioner presses you. Question: "It would take 10 to 20 years after Well G began to pump before any water from the Aberjona was first induced and pumped out of Well G?"

A Yes, that's also your question.

Q "That is not an unreasonable statement based on what we know from the pumping test."

A And I'll stand by that statement.

Q So your estimate, then, was 10 to 20 years?

A Based on the information I had, that was my best estimate.

Q Are you now changing the estimate?

A No. I still believe that's reasonable.

Q So for the river, which was within a hundred feet or so of the well, it would take 10 to 20 years for river water to serve the well, if I may say that and use it in that fashion, but it would only take three months for water from 600 or 700 feet away to serve the well?

A That's correct, sir.

Q Okay.

A That's because the permeability is very different.

Q Is the 10 to 20 years -- I note there, sir, you didn't say within 20 years. Did you observe that form of expression? You didn't say within 20 years. You said 10 to 20.

A That's correct, sir.

Q When you want to put a minimum on the way you use time, you usually give parameters?

A Maybe I did say "within." I can't remember. But let's assume I didn't, for the sake of going on.

Q So we can take the 10 if we want to take the low side; and in 1974, then, the river water is supplying the well?

A Supplying -- according to that estimate, some river water would be supplying the well.

Q At 10 years.

Did you do calculations on that, or is that just a ballpark figure that you estimated?

A Well, we did do calculations, and the estimates that I gave you are, in my opinion, consistent with what we observed.

Q And that's based on -- mostly based on peat being there, that little layer of peat?

A Well, it's based on the idea of something relatively impermeable being on the base of the river and that, in turn, is what I've been able to establish using everything that I know about the system, not one particular piece of information, but looking at the information as a whole.

Q And if it wasn't peat, but just ordinary sand and

gravel or mud, that figure would be way, way smaller, wouldn't it?

A You mean the time of travel would be smaller?

Q Yes. Let's say it's sand and gravel.

A If it were all sand and gravel, then, A, that number would be smaller, and, B, we wouldn't see what we see in the field.

Q Well, before we talk about what we see in the field, if it's all sand and gravel, the river water would be serving the well almost immediately, would it not?

A Not really.

Q Within a year?

A Perhaps, but not necessarily.

Q Within two years?

A Well, --

Q Probably not?

A If it were all sand and gravel and the permeabilities and the vertical direction was the same as the permeabilities and the horizontal direction, and if the well were fully penetrated, then I would say we're looking at times of travel that are no longer than two years for some of the water to get into the wells.

Q Well, you said in your opinion you gave, you didn't take into account the river, did not take the river into account in the opinion that you rendered; is that right?

A I don't remember saying that, sir.

Q Do you recall whether you took the river into account, before I find the --

A I did take the river into account because it forms an important part of the system, and, therefore, forms part of the information that I brought to bear in trying to draw my conclusions.

Q What did you take into account about the river?

A I took into account its existence in the sense that it represents to me part of the hydrologic system; and in our analysis of the groundwater flow and the transport on a regional scale, we also accommodated the river. And it therefore constitutes an important part of our overall observations.

Q That answer, what you just said was in response to "Did you take the river into account?" Your answer sums up, "I took the river into account." That's all you just said, wasn't it?

A I tried to explain to you how I took it into account.

Q What numbers did you take into account about the river?

A Numbers in the sense of its properties, sir?

Q Yes.

A Well, we took its position into account, we took the estimated thickness of the peat into account.

Q Estimated what?

A Thickness of the peat.

We took into account as many of the physical aspects of that river as we could.

Q Did you just go out and check to see if there was peat there in a river that may be three feet deep when you're walking through it? Did you just do that --

A No, sir.

Q --so you'd be able to testify from personal knowledge about this, quote, impermeable layer that you've been talking about?

A I did not personally go into the river myself.

Q Did you send one of your graduate students into the river?

A Well, I didn't send him into the river exactly, but he ended up --

Q He fell in? Trying to take a well measurement?

All right, sir.

Now, how much water was pumped out of the river during the pumping test of Wells G and H?

A I think very little if any at all.

Q Did you check the figures of the U. S. Geological Service with respect to what I just asked you?

A I understand that they observed a significant decrease in the flow of the river, but I have not personally read that.

Q They observed a significant decrease in the flow of

the river. That means the river level dropped?

A That's exactly right, sir.

Q Right?

A Yes, sir.

Q Just like you're telling the jury that well levels drop under pumping conditions?

A I'm saying that I also personally observed that the water level in the river dropped about the same time or a little later than the pumping started.

Q And the U. S. Geological Service and you, I assume, are able to compute from the drop in the river level what volume of water has been pumped out of the river as a result of the pumping of Wells G and H?

A No, sir. Your statement is not correct.

Q How much water was pumped out of the river when the pump test was taking place?

A Very little, sir.

Q How much did the river drop?

A I would say it dropped a good two inches, sir.

Q Was it not discharging approximately 600 gallons a minute as a result of the pump tests?

A The wells, sir?

Q No. The river. The river was giving up water in the quantity of 600 gallons a minute?

A No, sir, you're wrong about that. And I was puzzled

by it until I started thinking carefully about what had happened and I realized --

Q Before you explain a question I haven't asked yet --

A I'm just so anxious to try and inform you.

Q You're anxious to help me?

A I am, very much, sir.

Q And I'm anxious to help you.

Before you explain that, you apparently saw some phenomenon which the untrained eye might interpret as 600 gallons a minute being pumped out of the river?

A That's right. I observed that, and I concur with your observation.

Q Right. To the untrained eye of the U. S. Geological Service, that was a 600-gallon-per-minute discharge?

A I don't know how they calculated the discharge. I just observed that the river level dropped and that the untrained eye would, therefore, assume that somehow it was going into the aquifer.

Q But the trained eye which has been hired to give an opinion in this case had a ready explanation for that, right?

A Not then, but I do now.

Q Ah. So for a long period of time you thought that the well had taken 600 gallons, approximately 600 gallons a minute from the river?

A No, sir. I knew it hadn't done that, but I couldn't

figure out why it appeared as you've stated it has appeared.

Q And as trial time got closer you began to work on the problem, right?

A Well, I didn't -- I wasn't actually working on the problem when I came up with a solution. It was more like the sort of thing you think about in the shower.

Q Okay.

Now, before we talk about the shower thoughts, I'd like to come back to the question I asked you, which is this: Did the river play any part in your opinion?

A Yes, sir, it played a part in my opinion.

Q Played a big part?

A Well, I think it was a big issue, and, therefore, it's a part of the opinion.

Q And we're talking about during pumping now?

A Yes, sir. During pumping.

Q Because during non-pumping the part the river plays is to receive the water and carry the contaminants away?

A Well, I think it receives in part the water from the surrounding land, and those contaminants that would be in there would be either volatilized or carried along.

Q And the river acts as a kind of natural divide between the two directions of the groundwater flow?

A Yes, sir, I think that's a fair assessment of the situation.

Q Good.

Now, bearing in mind that you just told us that the river, when the wells were pumping, played a part in your opinion, I want to call your attention to Page 78 of your deposition, Line 19.

Question: "Does the existence of that river play any part in your opinion? Does that river, its flow or what happens to the river when wells are pumped, play a part in the opinion you've just given?"

What was your answer back in December when I asked you that question?

A May I read the context of the question just to be sure that I understand what you're asking me?

Q Well, first I'd like you to tell the jury what your answer was when we asked you, does that river play any part in the opinion you've just given. You answered no, didn't you?

A Yes, sir, I answered no to that question.

Q Now read the context or anything else you wish.

A Thank you.

(Pause.)

A Okay. Now, the context in which I was answering --

Q Wait a minute. I haven't asked you a question yet.

A But I can't explain the context of my answer?

Q Certainly I'm going to give you a chance.

I asked you today if it played a part; you said yes. We asked you in December did it play a part; you said no.

A The context was quite different.

Q The context. All right. In December, did you understand the question?

A In the context of the way you were asking the preceding questions, I did. May I repeat your preceding question?

Q Yes.

A "The Aberjona River appears to roughly separate the Riley and Beatrice properties, is that correct?

"Yes."

Q You better read it slowly if you want the jury to hear.

A The preceding question refers to -- Well, I'll read it to you.

Q Read it.

A "The Aberjona River appears to roughly separate the Riley and Beatrice property, is that correct?

"Yes.

"Does the existence of the river" -- et cetera - "is that important to your opinion?"

And in the context that I was understanding your question, which is in the unstressed state because that's what you're talking about when you say it divides two flow fields, it did not play a part in my opinion.

Q "Does that river" -- this is a question I'm reading -- "its flow or whatever happens to the river when wells are pumped play a part in the opinion?"

A I think the answer I gave you --

MR. SCHLICHTMANN: "In the opinion you have just given us."

MR. FACHER: Yes, "In the opinion you have just given us." "When wells are pumped." So I was talking about conditions of pumping. That was the context we were talking about.

A What I'm answering here is that what happens to the river, its flow, et cetera, was not important in the establishment of my opinion as I had stated at that time.

Q What happens to the river under pumping conditions was important to your opinion?

A No. What happens to the river, sir, that is not the point. What happens to the river is not important to me. What happens to the groundwater system is important to me. And the existence of the river will influence that. But what happens to the river itself is not of importance to me.

Q Well, if the river is connected with the groundwater, as you said it was when I first started talking to you --

A That's correct.

Q -- and if the river replenishes the groundwater within 10 years, as you gave that opinion, then isn't it a fair

interpretation that the river plays some part in your opinion when wells are pumping?

A I think that the way I see the system at this point in time, the effect of the river as it contributes or doesn't contribute to the cone of depression is not a substantial part of my opinion.

Q I thought when I was asking you questions before I showed you a deposition that you just told the jury that the river did play an important part in your opinion.

A Well --

Q Or did I mishear you?

A What I meant by that was that it was an issue that I think people were concerned about.

Q You just wanted to clear up anybody's mental concern, but it wasn't a part of your opinion? Is that what you're saying?

A I think I'll have to ask you to ask me a more specific question. I can't answer that one.

Q You were concerned about the river playing a part, were you not?

A I was concerned about the fact that the river was there in a form of hydrologic, possible hydrologic impediment. In that sense, I was concerned.

What was going on in the river was not a concern to me.

Q Well, you knew the river was in fact a hydrologic concern to the groundwater at that time?

A No, sir, I didn't know that at that time.

Q Your big problem was getting groundwater from one side far to the west under the river. That was your big problem, wasn't it?

A It's not my problem. We had calculated that's what would happen but I was very happy to see the pump test come along to corroborate it.

Q That's what you wanted to prove when you started out being engaged as an expert in this case.

A No. I don't think I was engaged to present anything, sir. I was just engaged to say what I knew.

Q Well, tell us now, does the river play an important part in your opinion or not?

A The river, in my opinion, does not affect -- the river being there is obviously of concern to everyone and it turns out that my opinion is not influenced significantly by the river because its behavior is just as I would have expected it to be.

Q And this turned out recently from preparation for trial, right?

A No. I've known that ever since the pump test started.

Q Well now, is it still your opinion that it would take river water ten years to replenish the aquifer; that is, fill up the aquifer in response to pumping conditions of G and H? Is that still your opinion or have you changed that?

A No. My opinion was 10 to 20 years; and I don't feel uncomfortable with that at this point.

Q So the replenishment would have started even on your

opinion during the period the wells were pumping between '64 and '79?

A I think small amounts of water would be expected to come from the river, sir.

MR. FACHER: Does your Honor want to take the recess at this time?

THE COURT: All right.

Did you want to take up this transcript matter with me?

MR. FACHER: Yes. It will only take a moment, your Honor.

CONFERENCE AT THE BENCH AS FOLLOWS:

THE COURT: This is the --

MR. JACOBS: Your Honor, if I may, could I have the recess and I'll give you a written list of any of the observations that I have about inaccuracies in the transcript. I was actually paying attention to Mr. Facher's cross-examination and assisting him in the morning rather than reading the transcript.

THE COURT: Oh, I see. I thought you had already --

MR. JACOBS: I just skimmed through it and I saw problems with the attributions.

THE COURT: On the one I had, it was

Q Now, let's get back to the river, sir.

A Yes, sir.

Q Were you able to locate the U. S. Geological Service data with respect to the drop in the river during the pump test?

A I did not look for it, sir. I did not find it.

Q You know that there was a measuring device at Olympia Avenue. You knew that?

A I observed that there were two metering devices that are usually used for that purpose.

Q That meters the flow in what? Cubic feet, or gallons per minute, or what?

A Frankly, that is not my expertise, and I can't tell you very much about that.

Q Okay. But it was something to measure the drop in the river?

A I think it was there to measure the velocity of the river, but I imagine it was also a device for measuring the level. I didn't personally see that.

Q All right.

Well, that was at Olympia Avenue. I don't want to take the time to drag out a chart. Olympia Avenue is in the northern part of the site.

A Then I misspoke, because I was thinking of the bridge at the southern part.

expressed in the courtroom?

A Well, I've been thinking about it for a long time, and I think I actually came to the conclusion that it couldn't be leaving the river some time ago, but I didn't quite understand why until just the last few days.

Q Now, have you seen the U.S.G.S. data?

A I've seen the sheets. I haven't gone through it as you have.

Q And the data that you used to reach this conclusion is no different than all this water level data that we've had in this courtroom for weeks, right? No new information?

A No. I think the only thing that's new is the realization and the analysis that brought it all together for me.

Q The fact that we're on trial is a new factor, isn't it?

A In what sense, sir?

Q In the sense that you were preparing this opinion for trial in anticipation of being asked?

A I wasn't consciously thinking of it that way, but I guess if I had thought about it, I would have concluded that you might ask such a thing. But, quite frankly, I didn't know about the U.S.G.S. information until fairly recently.

Q Your view, then, as I understand it, is that the river is not losing any water?

A I'm saying that --

Q It's just not getting any from the usual sources; is

Q Well, there's a bridge up there, too.

A The one I'm thinking about is at the southern site.

Q You're thinking of Salem Street?

A Yes. I didn't realize we had two. That's why I misspoke.

Q They had one upstream on Olympia Avenue measuring -- that's above G and H?

A Yes, sir.

Q So the stream, the river is going by that one?

A Yes, sir.

Q Then they have one on Salem Street?

A Yes.

Q Right?

A Yes, sir.

Q And they had somebody there that was taking measurements and recording the data as to the velocity and the other features that were happening to the river under the pumping conditions?

A Is that a question, sir?

Q Yes, it is. I'm sorry.

A I think it's perfectly reasonable to assume that. I didn't physically see them at the upper bridge.

Q So somebody was monitoring the effect on the river of the pumping of Wells G and H?

A I would think that that was their intention, sir.

Q And did you come to learn that it was the U. S. Geological Service or the Department of the Interior?

A I feel comfortable it was the U. S. Geological Service that was doing the measurements on Salem Street.

Q That's because you saw them or you saw their equipment?

A I saw their equipment, sir.

Q Okay. And then you received a printout of stream data, did you not?

A Yes, sir, I certainly did.

Q And that indicated, when computed into gallons per minute, that the river had lost approximately 600 gallons per minute; do you recall that?

A Relative to its normal flow, that's correct, sir.

Q Relative to its normal flow?

A Yes, sir, that's correct.

Q So 600 gallons of water per minute, which is 36,000, I guess -- No --

THE COURT: What are you looking for?

MR. FACHER: I'm looking for his computer.

THE COURT: What do you want to know? How many per hour? How many per day?

MR. FACHER: Well, it's 36,000 an hour, I think. And it's probably 750-odd thousand per day.

THE COURT: 864,000.

MR. FACHER: Good. All right.

Q That is 864,000 a day based on a 24-hour day, gallons of water that's going somewhere, leaving the aquifer?

A No, sir. That's where you're wrong.

Q That's where I'm wrong?

A Yes.

Q That's what everybody assumed up to the time you appeared on the scene, right?

A I have not talked to anybody and found out what they assumed, but that's where you're wrong.

THE COURT: Where did it go?

THE WITNESS: That's the question.

MR. FACHER: That's not your line; that's my line.

THE COURT: Sorry about that. I've been waiting for an hour.

MR. FACHER: I had to have my coffee break, your Honor.

Q All right, sir. Tell his Honor, tell the jury, tell us all where the 864,000 gallons went.

A I'd be very pleased to do that.

Q Please do that.

A All right. I have to teach you a little tiny bit of hydrology to understand this.

Q Would you like a pointer?

A No, I'll do this with words.

We have a certain amount of water coming in on the northern boundary of the site that is associated with the upstream measuring device. You mentioned the name of the street.

Q Olympia Avenue.

A Olympia Avenue.

Q Go ahead, sir.

A You have a certain amount coming out at the bottom of the site. What comes out the bottom is what comes in the top plus what comes from the aquifer.

Q That's it?

A Now, the distribution -- No, that's not it.

Q Oh. Sorry.

A Now, we have to say to ourselves that this whole system is in equilibrium: what comes in at the top, in the middle it loses a little, it gains a little, and there's a certain amount going out below. Now we turn on the pumps. And the water that was normally feeding the river gets the message that it should stop because the message goes very quickly because it's a pressure message. It senses that the drawdown wants it to stop discharging to the river, so it does, at least in part.

So then what happens to the downstream side? Well, what's happened is the water that 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. And that will give you a net loss at the downstream end.

So in simple terms, you've got so much coming in the top, a certain amount of activity is going on in between, a certain amount leaves the other end. You put the wells in place, the cone of depression spreads out, and the pressure gradient reverses, and it wants to no longer have water going into the river, so it stops.

Now, the water would like to come out of the river but it really can't do that because the permeability is too low. The actual water molecules can't come back into the aquifer very quickly. But it's very easy to turn off the ones already going in. So there's a net loss to the river as soon as that happens. And that's what I say happened in your situation. Not that the water came out of the river, but the normal flow simply didn't go into the river.

Q So it's not really -- what the U.S.G.S. recorded as a drop in the river wasn't really a drop in the river?

A Yes, it was a drop in the river. Sure, it was a drop in the river. But what happened was that the water that normally was discharging to the river wasn't discharging any more, at least part of it.

Q Have you now completed your explanation?

A If you understood it, I've completed it.

Q I understood it, all right.

A All right. Then I've completed it.

Q And when did you first formulate that view that you just

that the --

A That, in essence, is what I'm trying to express.

Q I simplified it down to one sentence.

A I think that you --

Q Caught on right away. Okay.

So the usual sources have been turned off. And so it's not that you're losing money; it's just that you haven't got paid this week so you don't have any money coming in?

A Yes, sir, that's the idea.

Q I see.

And that's just based on cerebration, your thinking about it, trying to explain it, and this is the way you rationalize what's happened, right?

A I don't know if I'd use "rationalize," but it's the conclusion that I came to.

Q I'll change the word. This is how you applied your expertise, judgment, experience and knowledge to the problem, right?

A I think that's a fair statement.

Q That's fair enough?

A Yes, sir.

Q Well, now, sir, is there anything else you want to add to that now? This is going to be memorialized, and I'm going to be looking at it tonight.