

SUPERIOR COURT OF CALIFORNIA

COUNTY OF RIVERSIDE

DIAMOND FARMING COMPANY, a California )  
corporation; and WM. BOLTHOUSE FARMS, )  
INC., a Michigan corporation, )

Plaintiffs, )

vs. )

CITY OF LANCASTER; ANTELOPE VALLEY )  
WATER COMPANY; PALMDALE WATER DISTRICT; )  
PALM RANCH IRRIGATION DISTRICT; QUARTZ )  
HILL WATER DISTRICT; ROSAMOND COMMUNITY )  
SERVICE DISTRICT; MOJAVE PUBLIC UTILITY )  
DISTRICT; DOES 1 through 200, Inclusive; )  
and All Persons Unknown, Claiming any )  
Legal or Equitable Right, Title, Estate, )  
Lien, or Interest in the Property )  
Described in the Complaint Adverse to )  
the Plaintiff's Title, or any Cloud Upon )  
Plaintiff's Title Thereto, )

Defendants. )

AND OTHER RELATED ACTIONS. )

Case No. 353840  
(c/w Case No. 344668  
and 353840)

Volume 3 of 3  
Pages 415 - 516

REPORTER'S TRANSCRIPT OF ORAL PROCEEDINGS

BEFORE THE HONORABLE JOAN F. ETTINGER, COMMISSIONER PRESIDING  
DEPARTMENT 10  
Friday, August 9, 2002

APPEARANCES:

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(Appearances continued to the following  
page.)

Reported by: TRINA N. FEHLMAN, CSR 10684  
Certified Shorthand Reporter  
Official Court Reporter  
Riverside County Superior Court

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(Appearances continued from the previous page.)

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DISTRICTS 37 AND 40:

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1 RIVERSIDE, CALIFORNIA - FRIDAY, AUGUST 9, 2002

2 (Discussion - Not Reported.)

3 THE COURT: Our witness has been sworn in. I think  
4 we've ruled on the motion in limine. We don't need any  
5 additional voir dire.

6 So Mr. Zimmer.

7 MR. ZIMMER: Thank you, your Honor.

8 MR. JOYCE: Thank you, your Honor.

9 DIRECT EXAMINATION (Resumed)

10 BY MR. ZIMMER:

11 Q. Mr. Sheahan, one of the things that we did not talk  
12 about yesterday is that you are licensed and status as an  
13 attorney; is that correct?

14 A. That's correct.

15 Q. It's my understanding you are not an acting, practicing  
16 attorney.

17 A. That's right. I don't practice law, have not.

18 Q. And it's my understanding that the report that you  
19 generated and the opinions that you intend to give in this case  
20 are from your expertise as a geophysicist, hydrogeologist,  
21 engineering geologist, registered geologist, and a Certified  
22 Professional Geologist, among other qualifications; is that  
23 correct?

24 A. Yes, that is correct.

25 Q. One of the things that you did in this case I'm not sure  
26 that we mentioned is that you generated a report which is 27  
27 pages of text, and including an Exhibit B, a large map; is that  
28 correct?

1 A. Yes.

2 MR. ZIMMER: Your Honor, I would offer to stipulate to  
3 allow the Court to have both the report prepared by  
4 Mr. Scalmanini and the report prepared by Mr. Sheahan for the  
5 Court's complete review.

6 MR. JOYCE: On behalf -- I'm sorry. On behalf --

7 MR. ZIMMER: To the extent I believe that would also  
8 help on this issue that we've been talking about in terms of the  
9 stipulation.

10 MR. JOYCE: And on behalf of my client, I would join in  
11 that stipulation.

12 THE COURT: Any objections?

13 MR. BUNN: Yes. We would object to that. We have no  
14 opposition -- or I don't have any opposition to having the map  
15 come in. But I don't think that the -- either report is  
16 admissible.

17 THE COURT: All right. Well, absent a stipulation, the  
18 reports are not admissible because they would be hearsay.  
19 Although you might just rethink that again. I'm not sure anyone  
20 would be prejudiced by the Court considering the reports. And  
21 we've heard all of the testimony.

22 MR. BUNN: Okay. Can we revisit that later?

23 THE COURT: You can revisit it.

24 Q. (BY MR. ZIMMER:) Yesterday, Mr. Sheahan, you advised us  
25 that your general opinion was that the area defined by  
26 Mr. Scalmanini in his report did not meet the requirements of  
27 Phase 1, the Phase 1 stipulation, because it did not include the  
28 areas depicted on Exhibit B which, in your opinion, needed to be

1 included for evaluation of the scientific significance of  
2 groundwater production during Phase 2; is that correct?

3 A. Yes, that is correct.

4 Q. Can you give us some examples of why generally examples  
5 of why Mr. Scalmanini's line does not include in the line  
6 appropriate areas for consideration in this lawsuit.

7 A. Yes. May I refer to Mr. Scalmanini's map?

8 THE COURT: You may.

9 MR. JOYCE: Your Honor, that would be Exhibit 126.

10 THE COURT: Yes.

11 Q. (BY MR. ZIMMER:) If we can tilt that slightly so I can  
12 see too.

13 Can the Court still see that?

14 THE COURT: Yes.

15 Q. (BY MR. ZIMMER:) That's good.

16 A. Well, your Honor, there are several areas. And as an  
17 example of areas of significance, let me first point to the area  
18 north of the line that is referred to here as both the Rosamond  
19 Fault and the Willow Springs Fault, Carlson 1998, which  
20 Mr. Scalmanini has used as the northern boundary of his area.

21 By -- by drawing this line and limiting his area to only  
22 that portion of the Antelope Valley to the south, he's  
23 eliminating a large area that overlies aquifer materials that are  
24 in hydraulic communication with the aquifer materials to the  
25 south. And so that's one example.

26 Q. Just -- let me interrupt you for a second.

27 Does hydraulic communication mean hydraulically  
28 connected?

1       A.    That's right.  Water can flow both ways between those  
2 two areas.  And Mr. Scalmanini testified, I believe, that he  
3 knows of at least one instance where water is flowing from the  
4 Fremont Valley area to the north southward into the area that  
5 he's designated, and the quantity, I think he mentioned, was up  
6 to 700-acre feet per year.

7               This is an area that -- that collects water from the  
8 drainage basin and collects of -- significant quantity of water  
9 which can be made available through pumping and through other  
10 means through the overall users in this area.

11              To ignore that area by selecting a boundary of a Phase 1  
12 area that doesn't include it would make it impossible for me as a  
13 hydrogeologist to adequately deal with those groundwater  
14 resources and other surface water resources in that area as part  
15 of Phase 2.

16              A secondary is an area that is south of Mr. Scalmanini's  
17 line and between this line that he's identified on this  
18 Exhibit 126 as the Unnamed Fault Associated with the San Andreas  
19 Fault Line.  I'll address that issue in a moment, but south of  
20 that line between there and the San Gabriel mountains is an area  
21 with no groundwater resources.  There are wells pumping in that  
22 area, there's groundwater down there.  And that's also an area  
23 that receives recharge from surface water and surface water  
24 infiltration.  And in dealing with the issues in this matter in  
25 Phase 2, it will be very important, as a hydrogeologist, for me  
26 to be able to -- to incorporate that area into an analysis of the  
27 overall water supply.

28              The third area is out to the east, east of Saddleback

1 Buttes, and this general area, which is to the east of the red  
2 line shown on Mr. Scalmanini's map. In fact, there are wells in  
3 that area, groundwater is being produced in that area, we have  
4 contours on water tables and so forth. And that's an area that  
5 also should be included because there are water resources there.  
6 It cannot be ignored.

7           And last but not necessarily least is this area further  
8 south of the south line of Mr. Scalmanini's boundary line that we  
9 refer to as the Leona Valley. Now, Leona Valley is  
10 hydrologically connected to the main area of the Antelope and  
11 Fremont Valleys both by surface water draining in and by  
12 groundwater draining in from fractured bedrock and alluvial  
13 deposits in that valley. So Mr. Scalmanini's line doesn't  
14 include those areas. All of those areas are going to be  
15 important for us in Phase 2. And that's why we need to include  
16 them.

17           Incidentally, the area that I have defined with the  
18 boundary line on what I'll refer to as Exhibit B because it's  
19 Exhibit B to my report, it does include those areas.

20           Q. Mr. Sheahan -- were you finished?

21           A. Yes.

22           Q. Mr. Sheahan, you had drawn a simple diagram for me that  
23 helped me understand in the context of this case for the  
24 stipulation we have or with the issues that are involved in this  
25 case why it's important to consider this -- this entire piece of  
26 ground.

27           Can you show us that.

28           A. Yes. If I can find a blank piece of paper here.

1 MR. JOYCE: If we're here long enough, you may not be  
2 able to.

3 Q. (BY MR. ZIMMER:) Do you have a marker up there?

4 A. I do.

5 There are several concerns that I have with defining a  
6 boundary for the Phase 1 purposes, if you will. What I've heard  
7 in court so far suggests that, for example, the defendants would  
8 like to draw a boundary line -- and I'll do it like this -- that  
9 would include the nonoverlying landowner pumpers and some of the  
10 landowners and overlying landowner pumpers. And that they would  
11 like to define this arrow -- area very narrowly. By picking an  
12 area where there's considerable amount of pumping now, the  
13 smaller the area, the easier it is to show in Phase 2 that there  
14 is excessive pumping in this area that may be construed as  
15 overdraft.

16 The second aspect, though, is -- and they have, I  
17 believe, mentioned that as part of the trial that they would be  
18 willing to -- to offer with regard to properties that are outside  
19 that area, that they would not assert claims of water rights  
20 against those properties.

21 What they failed to mention, though, that -- at least,  
22 that I did not hear -- is that in determining whether this  
23 pumping from the -- I don't know -- the black dot pumping. How  
24 should I refer to these?

25 Q. Defendants' pumping.

26 A. Appropriators. The effects of their pumping on this  
27 property will be an important issue in Phase 2. Trying to  
28 determine whether or not this pumping has affected this property.



1           If we draw a line around this and eliminate the  
2 possibility of looking at other pumping outside the area, it  
3 becomes fairly easy to say we're the only pumpers. There is an  
4 effect. We caused the effect.

5           In fact, these other properties are also pumpers. And  
6 if there are other properties out in this area that have the same  
7 overlying landowner characteristics and this property owner is  
8 not able to look at those to see whether their pumping has caused  
9 the effect instead of this pumping, then this property owner, I  
10 think, is seriously constrained. So one reason is that we need  
11 to include other areas so that we can see who, in fact, is  
12 causing the effects.

13           The other factor that I mentioned earlier, if we look at  
14 a small area where there is heavy pumping, perhaps it will look  
15 like there is overdraft. If we include a larger area where  
16 there's all contiguous aquifer systems, we may find that there  
17 are areas where groundwater levels are not going down, but  
18 they're going up.

19           In fact, there are some data shown in some of the  
20 Carlson reports that indicate that although the water level is  
21 going down in the central area, water levels are coming up  
22 elsewhere. And so in order to properly assess all of those  
23 things as well as to take into account all of the water resources  
24 in the area, it's necessary to have an area large enough to  
25 include all of those properties, all of those water resources.  
26 And that's what I've attempted to do with my Exhibit B.

27           THE COURT: All right. You used a term, "hydraulically  
28 connected." It's been used before.

1 Can you give me your definition of that term.

2 THE WITNESS: Yes, I can.

3 Even though there are some restrictions, perhaps, by  
4 postulated faults or other means between two different portions  
5 of an aquifer, there can be water flowing across those  
6 restrictions. So in that case, I would consider those to be  
7 hydraulically connected. Water can get from one to the other  
8 through some flow system.

9 For example, Mr. Scalmanini described that there was a  
10 flow across from the Fremont Valley area down into the  
11 Antelope Valley area. That's a hydraulic connection.  
12 Groundwater can flow from one area to another.

13 THE COURT: All right. Thank you.

14 MR. BUNN: Your Honor, I would move to strike the  
15 portions of the prior answer that dealt with the effects of  
16 defendants' pumping on the plaintiffs' property. That's not an  
17 issue in this case and never will be.

18 The issue will be whether defendants have acquired  
19 prescriptive rights by open and notorious and so forth production  
20 from a basin in 5 years of continuous overdraft. And the  
21 defendants' pump- -- the effects of defendants' pumping on  
22 plaintiffs' property has nothing to do with it.

23 THE COURT: Overruled.

24 MR. ZIMMER: Thank you, your Honor.

25 Q. (BY MR. ZIMMER:) Yesterday, Mr. Sheahan, Mr. Scalmanini  
26 drew a diagram that dealt with Cottonwood Creek.

27 You may recall that.

28 A. Yes.

1 Q. He had this little creek on top of the surface and a  
2 water table lower down.

3 Does anyone remember what number that was? It is 127.

4 Mr. Sheahan, you had some thoughts about this particular  
5 diagram and the concept of whether water in this kind of  
6 configuration described by Mr. Scalmanini, Number 1, is what we  
7 really are dealing with in the Antelope Valley, and Number 2,  
8 whether this is the only way it appears and whether it's a  
9 correct characterization of groundwater flow.

10 A. Yes.

11 Q. Could you give us your comments, sir.

12 A. Certainly. May I --

13 THE COURT: You may.

14 THE WITNESS: May I draw a diagram?

15 Your Honor, my concern with this diagram is that it  
16 showed one scenario but it did not show the scenarios that we see  
17 in other places. I'm sorry.

18 THE COURT: First we're going to mark yours, the one  
19 that you're drawing.

20 MR. TOOTLE: What about the previous one?

21 THE COURT: The previous one is --

22 MR. BUNN: 127.

23 THE COURT: -- 127. That was marked.

24 MR. ZIMMER: 127 was the defendants'.

25 THE COURT: Oh, the one he just drew. We need to mark  
26 the one he just drew. That one, let's mark 11.

27 MR. ZIMMER: We'll call this Exhibit 11?

28 Thank you, Mr. Tootle.

1 THE COURT: And then the next one you're going to draw,  
2 just write a 12 on the next page.

3 MR. JOYCE: For the purposes of the record, can we title  
4 11 as Sheahan's Illustration, 11?

5 THE COURT: That's fine.

6 MR. JOYCE: Thank you.

7 THE COURT: All right. Go ahead.

8 THE WITNESS: Yes. I was commenting that  
9 Mr. Scalmanini's diagram showed one situation but it did not show  
10 the kinds of situations that we do have existing in a number of  
11 areas in the desert environment that the Antelope Valley  
12 represents. And specifically, in the area that we are concerned  
13 about, I think, as part of Phase 1. If I may, let me draw a  
14 diagram, again, that includes some of the other facets to that.

15 MR. DUNN: Your Honor, could I ask that a proper  
16 foundation be laid inasmuch as the witness is now attempting to  
17 portray actual well scenarios within the Antelope Valley? In  
18 other words, I'd like to know how he knows this is true.

19 MR. ZIMMER: I think he's doing it representatively and  
20 not to scale. It's no different than Mr. Scalmanini's diagram  
21 that he drew.

22 MR. TOOTLE: Then I would move to strike his previous  
23 comment that this is the situation that we're talking about.

24 THE COURT: Well, why don't we get his explanation as he  
25 draws, and then if you think -- if you think there still needs to  
26 be a foundation before we move on, I'll let you make that  
27 objection.

28 Q. (BY MR. ZIMMER:) Go ahead, sir.

1 THE COURT: Go ahead.

2 MR. DUNN: For clarification, is this as to  
3 Cottonwood Creek specifically? Or is this as another portion in  
4 the Antelope Valley? That's the nature of my objection.

5 Mr. Scalmanini's diagram that he's attempting to  
6 criticize was specific as to the Cottonwood Creek cross section  
7 only.

8 THE COURT: All right.

9 MR. DUNN: So if he's trying to criticize that  
10 representation by Mr. Scalmanini, then his testimony needs to be  
11 limited to that Cottonwood Creek.

12 What I suspect he's trying to do is give us some area  
13 within the basin --

14 THE COURT: Let's find out.

15 What are you attempting to depict in your diagram?

16 THE WITNESS: Well, I believe Mr. Scalmanini's diagram  
17 is fine with regard to a specific focus, but I think it gives the  
18 Court the impression that's the way streams interact with  
19 groundwater everywhere in the area.

20 MR. DUNN: Objection. That calls for speculation on the  
21 part of this witness.

22 THE COURT: Well, I'll -- I'll disregard what he thinks  
23 the Court might be thinking. But I -- to the extent --

24 MR. DUNN: Well, let me --

25 THE COURT: Why don't you tell me, though, what is it  
26 your diagram is going to depict?

27 THE WITNESS: It's going to depict how surface water in  
28 a stream and groundwater interact in our area such that pumping

1 of groundwater does cause a change in the flow of surface water  
2 in the streams.

3 MR. DUNN: And how is that related to Mr. Scalmanini's  
4 cross section for Cottonwood Creek?

5 MR. ZIMMER: Your Honor, this is not cross-examination.

6 MR. DUNN: I'm sorry. May I voir dire this witness  
7 then?

8 THE COURT: I'm going to allow it just to the foundation  
9 part, so you may answer that.

10 MR. DUNN: What does this have to do with a  
11 cross-section illustration by Mr. Scalmanini for the specific  
12 area of Cottonwood Creek? Are you attempting to show us  
13 something different in Cottonwood Creek?

14 MR. ZIMMER: There are three different questions.

15 MR. DUNN: Okay. I'll break them up.

16 Are you trying to show by this illustration, Plaintiffs'  
17 Exhibit Number 12, something different in the Cottonwood Creek  
18 illustration or illustrated area that Mr. Scalmanini shows?

19 THE WITNESS: Not --

20 MR. DUNN: Yes or no?

21 THE WITNESS: No, with regard to Cottonwood Creek.

22 MR. DUNN: Okay.

23 THE COURT: All right.

24 MR. DUNN: Then, in fact, what you're attempting to  
25 testify is something that Mr. Scalmanini did not address; isn't  
26 that correct?

27 THE COURT: Well, at this point, I think we're past the  
28 point of foundation. I'm going to let him make the diagram and

1 then you can cross on it.

2 MR. DUNN: Well, I would like to have a standing  
3 objection throughout Mr. Sheahan's testimony that it exceeds the  
4 designation that was done in the mutual exchange early on. And  
5 that specifically his testimony is to be to critique the  
6 testimony of Mr. Scalmanini. And now we're doing something  
7 beyond that.

8 THE COURT: I've already ruled on that motion in limine.

9 MR. DUNN: If I can have a standing objection to that.

10 THE COURT: I think the ruling on the motion in limine  
11 turns it into that, so --

12 MR. DUNN: All right. Thank you.

13 THE COURT: All right. Go ahead, sir.

14 THE WITNESS: Again, my concern was that the diagram  
15 showed one aspect and did not show other aspects of the surface  
16 water/groundwater interaction. And what I'd like to do is to  
17 present a diagram. It's not intended to be a scaled drawing, but  
18 a diagram that would explain how, in other instances that I  
19 believe are important, surface water and groundwater do interact.

20 So what I'd like to do is to start with a ground surface  
21 line, which I'll do in black. And a hill on the left, if you  
22 will. And ground surface may be further out in the valley, I've  
23 put in a V-notch in that to represent a stream or a creek. And  
24 similar to Mr. Scalmanini's drawing, I'll draw in a line under  
25 that that I believe he referred to as the bed of the creek.

26 Now, in our area, we have high ground or mountains on  
27 the sides of our valley. And so this mound to the left can be  
28 considered to represent the mountains, and I'm going to put a

1 vertical line at the top to represent the watershed boundary,  
2 just for clarity, and I'll mark that "WB," or watershed boundary.

3           What that means is that rainfall in this area that comes  
4 down to the right of my watershed boundary line would enter this  
5 area and would flow perhaps into the ground through the -- or  
6 into the creek, but would also infiltrate into the ground. And  
7 so surface water in this area is an important aspect of it.

8           MR. DUNN: Objection. Vague as to "creek." Move to  
9 strike.

10           Where are we talking about?

11           THE COURT: It's just a generality, is it not?

12           THE WITNESS: This is a diagram.

13           THE COURT: You're not showing any specific area.

14           THE WITNESS: That's correct.

15           MR. DUNN: Objection. Lack of foundation.

16           THE COURT: Overruled.

17           THE WITNESS: Again, just to -- to bring out all of the  
18 groundwater and surface water flow aspects, let me draw another  
19 line running more or less vertically downward to the left that  
20 would represent the contact between the bedrock areas and the --  
21 what we're calling the aquifer areas. It could be  
22 unconsolidated. It could be on kinds of aquifers. We'll call  
23 this the aquifer areas.

24           Now, in fact, the bedrock in this area is fractured.  
25 And there -- the rainfall that occurs in the mountains enters and  
26 forms a water table in the fractured bedrock. So there is water.  
27 And I should do this in a different color. There is water that  
28 fills up the fractures, fills up all these fractures. Fractures



1 are interconnected so, essentially, we have a water body in the  
2 mountains. That water flows into the aquifer material from these  
3 areas as well as surface water. So we have -- I'll use blue for  
4 this -- we have groundwater flowing into this area. And that  
5 groundwater can fill up the aquifer material in the -- in the  
6 area underlying the stream. And so I would draw a water table  
7 for diagrammatic purposes that looks like this.

8           In this situation, we have water in the stream that is  
9 at a level that is consistent with the water in the bed material.  
10 This is saturated with water, and this is saturated with water  
11 so, essentially, we have water in this general area.

12           Now, let me use black for -- for this example for  
13 arrows. I'm going to draw black arrows showing groundwater  
14 flowing into the area, black arrows for groundwater flowing  
15 through the area. In this instance, we have water in the stream  
16 and we have groundwater. The water in the stream is not draining  
17 out of the stream through the bed into the groundwater because  
18 the water table is at the level of the stream.

19           Now, if we put a well in -- I believe Mr. Scalmanini  
20 described the conditions of pumping at a well very well. If we  
21 put a well in and we extract groundwater, if we pull the water  
22 level down from this nonpumping level to a pumping level, and if  
23 we pull the water level down like this, now we've lowered the  
24 water level in the vicinity of the stream, and by pumping then  
25 we've created a situation where water from the bed wants to drain  
26 down to the water table and water from the stream wants to drain  
27 down into the bed.

28           So in this situation, this pumping not only can pull

1 water that is flowing from the bedrock and would otherwise flow  
2 through this zone, but it can also cause surface water to enter  
3 the groundwater body that would not have otherwise entered the  
4 groundwater.

5 MR. DUNN: Objection. Move to strike. Lack of  
6 foundation. It calls for speculation.

7 THE COURT: Overruled.

8 THE WITNESS: I believe that's --

9 Q. (BY MR. ZIMMER:) Now, just for example, even if we  
10 had -- or strike that.

11 What would be the effect if we had the water table level  
12 down here as Mr. Scalmanini had drawn it on any given creek or  
13 body of water?

14 A. I'm not sure I follow you.

15 Q. Let me ask you this --

16 MR. DUNN: I'm sorry, your Honor. Before another  
17 question is pending, may I voir dire this witness for  
18 foundational purposes? I would just like to know how it is he's  
19 able to stand here in court and testify about water flow analysis  
20 in this phase. I understand what he's testified. How on earth  
21 do we know whether this is true or not?

22 THE COURT: I'm not sure I'm following you.

23 MR. DUNN: I'd like to know what he has done to come  
24 into court and say this is the way it is. He won't tell us where  
25 it is specifically. He just says this is the way it's done. I  
26 would like for him to explain that.

27 THE COURT: I'll give you a few minutes on voir dire to  
28 go into that.

1 MR. DUNN: May I have that now?

2 THE COURT: Yeah.

3 VOIR DIRE EXAMINATION

4 BY MR. DUNN:

5 Q. Mr. Sheahan, I'll make this easy for you. You've  
6 stepped here into court and you've given us this water flow  
7 analysis, which supposedly is not even at issue in this case.  
8 But can you lay a foundation -- you're an attorney. Can you lay  
9 the proper foundation to explain to us how you can do it?

10 A. I believe so.

11 Q. Okay.

12 A. One example of this situation --

13 Q. No. No. No. Not the foundation. I want to know your  
14 study, your fieldwork, your testing. I want to know the  
15 monitoring you did of test wells and, you know, out in the field  
16 and the bore samples and the hydrology studies that you've done.

17 THE COURT: If you need that, versus whether this is  
18 just some generally accepted principle in hydrology --

19 MR. TOOTLE: Show us someplace else.

20 THE COURT: He's not saying that he's not giving any  
21 specifics in any certain area.

22 MR. DUNN: Let's make the record clear. He's saying  
23 this is occurring. He won't tell us where. He said it's  
24 occurring in the Antelope Valley.

25 THE COURT: I'm taking it that when you have these  
26 mountain areas with bedrocks and you have streams and you have  
27 the aquifer-type material, this is, in general, the way the water  
28 flows; is that what you're saying?

1 THE WITNESS: Yes, ma'am.

2 MR. DUNN: Are you saying that's also in the  
3 Antelope Valley?

4 THE WITNESS: Yes.

5 MR. DUNN: Okay. That's why I'm asking for the Court to  
6 require this witness to testify what he has done scientifically  
7 to come up with this conclusion. I have his opinion. I want to  
8 know why he has it.

9 MR. ZIMMER: Your Honor, first of all --

10 THE COURT: Have you done anything scientifically to  
11 support this in this case?

12 THE WITNESS: Yes, I have. I've -- I reviewed the  
13 geology and hydrogeology of the area. I have not specifically  
14 drilled wells, pumped them, and tested this, but as a  
15 hydrogeologist, I don't need to do that in order to understand  
16 the concept of what is happening in the groundwater.

17 Further, I've studied similar situations in the Mojave  
18 Desert very close to our area where this is happening today.

19 MR. DUNN: I'm not going to drop this issue.  
20 I need to know where in the Antelope Valley this  
21 happens.

22 MR. ZIMMER: Your Honor --

23 MR. DUNN: And I need to know why you know that's true,  
24 and then I'll sit down.

25 MR. ZIMMER: Can I be heard on this?

26 THE COURT: I'm going to at this point let you go into  
27 that on cross-examination.

28 MR. DUNN: Okay.

1 THE COURT: Because I think there's a sufficient  
2 foundational basis for him to give this opinion. I think your  
3 objection is better raised in cross-examination.

4 So Mr. Zimmer, your next question.

5 MR. ZIMMER: Thank you, your Honor.

6 DIRECT EXAMINATION (Resumed)

7 BY MR. ZIMMER:

8 Q. Mr. Sheahan, even in the diagram that Mr. Scalmanini  
9 drew with the water table low on his diagram --

10 A. Yes.

11 Q. -- way below the riverbed, even under those  
12 circumstances, that does not cut out groundwater flow at whatever  
13 the water table level is through the fully saturated fractured  
14 material in the mountains and across into the aquifer material.

15 MR. DUNN: Objection. Assumes facts not in evidence.  
16 The more he ties it into Mr. Scalmanini's specific area in the  
17 Antelope basin, the more this is objectionable.

18 MR. ABBOTT: And objection. Leading.

19 THE COURT: Just ask the question without referencing  
20 Mr. Scalmanini's in a nonleading fashion.

21 Q. (BY MR. ZIMMER:) Let's assume for the moment,  
22 Mr. Sheahan, that the water table level, instead of being here,  
23 was down here, at the bottom of your diagram.

24 A. All right.

25 Q. Would there still be groundwater flow from the fully  
26 saturated fractured bedrock into the water table?

27 A. Yes, there would.

28 Q. Sir, you mentioned that you believe there are

1 hydrogeologic structures in the Antelope Valley which are --  
2 strike that.

3           You indicated that the hydrogeologic structures in the  
4 Antelope Valley in terms of creeks and riverbeds, in your  
5 professional opinion, are not simply what was drawn by  
6 Mr. Scalmanini on his diagram.

7           A.    That's correct.

8           Q.    Can you give us some examples of other areas where there  
9 are, in fact, conditions that differ from that and are what  
10 you're indicating.

11           THE COURT: All right. And you -- unless you need to  
12 diagram some more, you can be seated.

13           THE WITNESS: I would just like to draw one other thing  
14 on the diagram as I explain.

15           THE COURT: You may.

16           THE WITNESS: The one that comes to mind is the  
17 Leona Valley. The Leona Valley is -- is underlain by alluvium in  
18 the center. And the aquifer in that area is a fractured bedrock  
19 aquifer. It's highly fractured. There are wells that are  
20 producing water from the fractured bedrock. So if I may on this  
21 diagram, just to -- just to distinguish it from what I was  
22 talking about before, let me put some vertical lines in the  
23 central portion of this and refer to that as still the aquifer,  
24 but it's not an unconsolidated rock aquifer, it's a fractured  
25 bedrock aquifer.

26           We have specifically in that area wells that penetrate  
27 the fractured bedrock. If those wells are not pumping, rainfall  
28 comes in, fills up the creek, which is Amaragosa Creek in this

1 instance, and that creek, if the groundwater body is full as a  
2 result of flows from the bedrock to the side, that creek enters  
3 on out into the Antelope Valley and would recharge that valley.

4           However, if we put in wells in the fractured bedrock and  
5 extract the water from those wells for other uses, we lower the  
6 water table. When we lower the water table, we cause the surface  
7 water that would otherwise go out through Amaragosa Creek to  
8 infiltrate down into that fractured rock to fill up the portion  
9 that has been dewatered. That reduces the amount of water that  
10 goes out into the main valley and affects the recharge in the  
11 main valley.

12           And, again, this is why that area is an important area  
13 to include within the area that we investigate in Phase 2. So  
14 this is a specific instance within the Antelope Valley of that  
15 occurring. The same kind of thing occurs in the Mojave River  
16 just to the east of our area and in other areas in the desert.

17           Q.   (BY MR. ZIMMER:) Okay. Thank you, sir. Go ahead and  
18 retake the stand.

19           A.   (The witness complied.)

20           Q.   So the bottom line is that whether or not this is a  
21 creek or a river that is at the level of -- of the water table,  
22 or it's the Leona Valley that's at the level of the water table,  
23 if you draw down that water table level, water that would  
24 otherwise be runoff is now infiltrating the ground and is not  
25 making its way into the Antelope Valley.

26           MR. DUNN: Objection.

27           MR. ABBOTT: Objection. Leading.

28           MR. DUNN: Objection. Assumes facts not in evidence.

1 THE COURT: Well, I'm going to sustain it on leading  
2 because I really don't like experts, when it comes to their  
3 opinions, to give -- to answer leading questions.

4 And I'll just have you rephrase it first.

5 Q. (BY MR. ZIMMER:) Would it be the case, sir, under this  
6 analysis hydrogeologically, that whether or not it's a creek or  
7 river wherein the water table is roughly equivalent to the bottom  
8 of that creek or whether it's a situation like in the  
9 Leona Valley where you have fractured bedrock and wells, if the  
10 water level is drained down sufficiently by pumping activity,  
11 that surface water which would otherwise make it into the  
12 Antelope Valley is diverted?

13 A. That is correct.

14 And if I may, just more specifically, the aquifer in the  
15 Leona Valley area is a fractured bedrock aquifer, which would  
16 normally have water levels at or above the bottom of the creek,  
17 which is the Amaragosa Creek.

18 If the aquifer is pumped, the fractured rock aquifer is  
19 pumped, and the water levels in that fractured aquifer are drawn  
20 down, then it allows the surface water from the creek to  
21 infiltrate into the ground instead of running out into the main  
22 part of the valley. That's the whole head of this diagram.

23 Q. Is there a concept in hydrogeology known as differential  
24 head?

25 A. Yes.

26 Q. Can you tell the Court what that is.

27 A. Differential head is the term that we use to refer to  
28 situations such as where we have a restricting layer separating



1 two portions of an otherwise contiguous groundwater body. If we  
2 have water levels on one side that are higher, we call that a  
3 higher head. Water levels on the other side that are lower, that  
4 would be a lower head. The difference in those two elevations is  
5 what we would refer to as a differential head.

6 Q. So in a state of nature without pumping, you could have  
7 differential head, for example, in the Leona Valley being higher  
8 than in the Antelope Valley.

9 A. Yes.

10 MR. BUNN: Objection. Leading -- I'm sorry. Objection.  
11 Leading.

12 THE COURT: Well, I'm going to allow it on this  
13 question, but I'm going to ask you to refrain from leading  
14 questions.

15 Q. (BY MR. ZIMMER:) Go ahead and answer and I'll try to  
16 remember that.

17 THE COURT: I think we got a "yes" answer, did we not?

18 THE WITNESS: Yes.

19 Q. (BY MR. ZIMMER:) If pumping in an area which is  
20 hydraulically connected to another area and in an area where  
21 there is generally higher differential head in the other area --  
22 in other words, an area other than the Antelope Valley -- and you  
23 draw down in that other area the head, is it also possible that  
24 by draining that down because the differential head is changed  
25 from being higher here to lower that water can actually flow out  
26 of your Antelope Valley into that other area?

27 A. Let me see if I can answer in this way: If we have a  
28 situation where we have a higher water level elevation and a

1 lower water level elevation, normally the tendency would be for  
2 groundwater to flow from the higher elevation to the lower  
3 elevation. If we pump the water where the water level is higher  
4 and cause that water level to go down and go down to below the  
5 level on the other side, then we can reverse that flow and cause  
6 water to flow the other direction.

7 Does that answer your question?

8 Q. Yes, sir.

9 And is that another reason why we need to include these  
10 hydraulically connected areas you've discussed into the Phase 1  
11 area?

12 A. Yes, it is.

13 Q. Let us talk, sir, about the L & S Memorandum, also known  
14 as the Luhdorff & Scalmanini Memorandum.

15 You did review that as a part of your work in this case  
16 and it is a part of your opinions in this case.

17 A. That is correct.

18 Q. Can you tell us what you did in terms of reviewing that  
19 and what your conclusions are.

20 A. Yes. May I -- may I put up some slides to assist in  
21 this?

22 Q. Sure.

23 THE COURT: You may.

24 THE WITNESS: May I have Slide 2?

25 Q. (BY MR. ZIMMER:) Now, do we have hard copies of this,  
26 also, so that we can provide -- I know that counsel has copies  
27 already. I think the Court got some also.

28 THE COURT: I have things that said slides. And we

1 probably need to mark them.

2 MR. JOYCE: Your Honor, I will be marking them for  
3 evidentiary purposes and I will provide them to the clerk.

4 THE COURT: Let's call Slide 2 Plaintiffs' 13.

5 THE WITNESS: Your Honor, can you see the screen?

6 THE COURT: I have a copy too.

7 THE WITNESS: I'd like to point to the screen as well,  
8 if I may.

9 THE COURT: You can do that.

10 THE WITNESS: What I'm showing here is a base map that I  
11 have created by combining several published U.S. Geological  
12 Survey topographic maps. The reason I'd like to talk about this  
13 momentarily is I use this base map as the base map for a number  
14 of other lines and figures. And I think it's important to  
15 understand what's shown on the base map, because it will be  
16 consistent throughout the presentation. And I think it helps to  
17 have a perspective of the ground surface and the area that we're  
18 looking at.

19 On this base map, this triangular area here is generally  
20 referred to as the Antelope/Fremont area. In some reports, it's  
21 the Antelope Valley/Kern area and so forth.

22 By way of orienting us, this vertical line through here  
23 is Highway 14. The city of Lancaster is this area that I'm  
24 referring to with the highlighter. Palmdale is just to the south  
25 of that area. The Leona Valley is just to the south of that, and  
26 I'll show that in a little greater detail.

27 The Fremont Valley is this upper lobe portion of the  
28 area. The San Gabriel mountains are to the south. The Tehachapi

1 mountains are to the west. And the Sierra Nevada and other named  
2 mountain ranges are to the northwest and so forth.

3 I mentioned the Mojave River. The Mojave River is  
4 within the area of my base map, and is more or less along this  
5 curved line to the east side.

6 Just to get a little more perspective, could I have  
7 Slide 19.

8 Q. (BY MR. ZIMMER:) On all of these slides, north -- is  
9 north to the top of the diagram?

10 A. Yes, north is the top of the diagram.

11 Very briefly, this is a slide that shows an aerial  
12 photograph of the area.

13 What is of some interest here is that you can clearly  
14 see Rosamond dry lake, and these little squares represent areas  
15 that the color is not good but they're green in this photo and  
16 represent agricultural development in the area.

17 Q. Hold on one second, sir.

18 We're going to mark as Exhibit 14 Slide Number 19, the  
19 aerial photo vertical.

20 Was there anything else on this slide, Exhibit  
21 Number 14, sir, that you wanted to point out to us in addition to  
22 what you have shown us?

23 A. Yes. Just, again, a couple of things for correlation.  
24 This is the city of Lancaster, this area that's a more or less  
25 gray area. Palmdale is to the south. And you can see a trace of  
26 Leona Valley in here. This photograph doesn't cover as much of  
27 the area that the base map covers, but it's just to give you a  
28 picture.

1           And similarly, if I could have Slide 20, please.

2           Q.   Slide 20, we can mark as Exhibit 15.

3           THE COURT: Thank you.

4           THE WITNESS: I think this helps, also, to -- to put a  
5 perspective on what we are looking at in terms of the topography  
6 and the ground surface in the area. This is, we'll call it, a  
7 perspective view or an oblique view that is looking to the  
8 northwest. Again, we can see the Tehachapi mountains to the  
9 west, a portion of San Gabriel mountains to the southeast, and  
10 Leona Valley shows up here. We can see Rosamond dry lake, Rogers  
11 dry lake. We can see the sprawl of the city of Lancaster. And  
12 just off the bottom would be where Palmdale is.

13          Q.   (BY MR. ZIMMER:) Leona Valley, again, was where?

14          A.   Leona Valley is this area to the south. The line going  
15 diagonally upwards just at the edge of the mountains there.

16          MR. TOOTLE: Your Honor, I have an objection to the last  
17 two photographs. First off, I -- he's entering these as  
18 photographs, and I believe that they're digitally enhanced  
19 photographs.

20                I'd like to know where he got the photographs. I would  
21 like to know whether or not they have been digitally enhanced,  
22 and if they truly reflect what he's purporting them to.

23                I don't have a problem as to showing locations, but I do  
24 have a problem with actual -- showing anything else with regard  
25 to precipitation or anything like that in this area.

26          MR. DUNN: Objection. Lack --

27          THE COURT: Were they showing precipitation?

28          MR. TOOTLE: Well, colors. And purporting to what it

1 looked like a photograph, your Honor.

2 THE COURT: Why don't you state first, on Slide 19,  
3 where did this come from?

4 THE WITNESS: Well, Slide 19 is a photograph that I  
5 downloaded from a U.S. Geological Survey Web page. I believe my  
6 assistant can give me the -- exact Web site information. We have  
7 that. We have that somewhere.

8 What the Slide 19 figure shows at the bottom is Globe  
9 Explorer, Digital Globe. That's the logo, if you will, of the --  
10 of the group that manages this. But this is put on the Web page  
11 for general use.

12 I don't believe this is digitally enhanced. I believe  
13 this is the best quality that they were able to produce from a  
14 photographic plate into a digital photograph that can be  
15 transmitted by the Internet. So that's all this surface is.

16 MR. DUNN: I still have foundational objections. We  
17 don't know who took it or when.

18 THE COURT: All right. Well, at this time, we're just  
19 using it, I'll say, for illustrative purposes. When we get to  
20 needing to admit it into evidence, you might need to lay a  
21 different foundation if you wish to do that.

22 But let's just try to expedite this. Just tell us  
23 briefly on Number 20 where that came from.

24 THE WITNESS: Okay. Slide Number 20 is a photograph,  
25 again, that I downloaded. I believe the caption is on the  
26 document that you have. At the bottom, it shows the Web site  
27 location. It's -- specifically, it says  
28 [HTTP://PHOTOJOURNAL.JPL.NASA.GOV/TIFF/PIA02775.TIF](http://photojournal.jpl.nasa.gov/tiff/pia02775.tif).

1 THE COURT: All right. That's the Web site.

2 THE WITNESS: Yes. That's the Web site.

3 This is from JPL representing the Jet Propulsion  
4 Laboratory in Pasadena. NASA is the National Aeronautics and  
5 Space Administration, I believe. And so this is a photo that  
6 they had available for anyone to bring up.

7 Now, I would like to say I'm not sure that this is a  
8 photo. They present it as a photo. It may be digitally  
9 enhanced. I can't -- you know, I can't say on that. My only  
10 intent is to say that this helps us to understand what the area  
11 looks like.

12 THE COURT: All right. I'll allow you to go forward.

13 But we are now at a point where we need to break for the  
14 lunch recess.

15 MR. ZIMMER: Can I ask a question before I forget it?  
16 Two questions.

17 THE COURT: You may.

18 Q. (BY MR. ZIMMER:) Do these photographs that we just  
19 discussed generally depict the area in terms of what you're  
20 trying to describe in terms of geographically based on your  
21 observations being in the field in the area of Antelope Valley  
22 and based upon all of the other data that you have reviewed in  
23 preparation for this case or otherwise?

24 MR. DUNN: Objection. Vague as to the term "generally."

25 THE COURT: Overruled.

26 THE WITNESS: Generally speaking, yes. I -- from this  
27 photo, I can't determine whether the -- the elevations and the  
28 relative elevations are correct. But I can say from my own

1 personal observations in the area that this -- this diagram helps  
2 to understand the area that we're talking about.

3 MR. DUNN: Your Honor, move to strike all this witness's  
4 testimony about this particular exhibit shown as Slide 20, I  
5 believe it's Plaintiff's Exhibit 14, on the ground is -- the  
6 witness's testimony is he doesn't know. He believes it's  
7 probably digitally enhanced. He's not sure it shows the accurate  
8 levels.

9 THE COURT: Isn't his testimony -- is you can show the  
10 lake beds, it shows the city area, you can generally see the  
11 depiction of the area. It may have an admissibility later on.  
12 But as far as -- I'm going to deny the motion to strike. But you  
13 can raise it again if they ask it to be admitted into evidence.

14 Anything further on this, or is this a good breaking  
15 point?

16 MR. ZIMMER: It's good enough. We can bring it up  
17 later.

18 THE COURT: Let's start up at 1:30. We'll see everyone  
19 back then. Thank you.

20 (Lunch Recess.)

21 THE COURT: Good afternoon.

22 We are ready to continue.

23 MR. ZIMMER: Yes, your Honor.

24 THE COURT: Mr. Zimmer?

25 MR. ZIMMER: Yes, your Honor.

26 Q. (BY MR. ZIMMER:) Just before the break, Mr. Sheahan, we  
27 were discussing Exhibits 14 and 15, the slides.

28 Sir, did you digitally enhance any of those slides?



1 A. No. Not any of them.

2 Q. Are they accurate in terms of what you are using them  
3 for?

4 A. Yes. My intent was just to use them to show the general  
5 geography in the area and to identify some of the obvious  
6 elements on it and for no other purpose.

7 Q. In terms of our examination of the valley  
8 geographically, what's our next slide or portion to your  
9 evaluation?

10 A. I was in the process, I believe, of talking about my  
11 review of the Luhdorff Scalmanini Technical Memorandum.

12 Q. That's correct.

13 A. To continue that, what I'd like to do is show Slide 7.  
14 And on this slide, I've -- I'll wait till it comes up.

15 MR. ZIMMER: We'll mark this slide --

16 THE COURT: This is Number 7.

17 THE WITNESS: Slide Number 7.

18 MR. ZIMMER: Which would be Exhibit 16. Is that  
19 correct, Mr. Joyce?

20 MR. JOYCE: That, I believe, is correct.

21 THE COURT: 16 should be next in line.

22 MR. ZIMMER: So we're marking Slide 7 as Exhibit 16, for  
23 the record.

24 Q. (BY MR. ZIMMER:) And that is what, sir?

25 A. Slide 7 is my base map with a red line on it showing the  
26 line depicted by Mr. Scalmanini's map of what he refers to as the  
27 Bloyd 1967 boundary.

28 Q. Is -- now, that shows up on this slide on the screen

1 right now.

2 A. That's correct.

3 Q. Did you by any chance have an extra copy of that that we  
4 could highlight for the Court so the Court could have maybe two  
5 highlighted lines? Maybe we can highlight her copy.

6 THE COURT: That's -- well, I can just work off -- we  
7 need to highlight probably whatever's going to be the exhibit.

8 MR. ZIMMER: The exhibit.

9 MR. JOYCE: Here's Exhibit 7 that's been marked --  
10 excuse me -- Exhibit 16 as marked.

11 MR. ZIMMER: Maybe it shows up clearly enough.

12 THE WITNESS: Well, I believe it's clear. It's the red  
13 line that is shown on the --

14 THE COURT: I see that.

15 THE WITNESS: -- on the exhibit.

16 Q. (BY MR. ZIMMER:) And that shows it clearly on here.  
17 Okay.

18 Let's have you take a look at Exhibit 16, Mr. Sheahan,  
19 and have you discuss that with us.

20 A. Well, Exhibit 16, again, shows the red line that is  
21 shown on Mr. Scalmanini's map that he intended to represent the  
22 boundary that -- that he interpreted from the Bloyd 1967  
23 document.

24 First of all, just -- just to relate back, if I may  
25 point out something on the screen. The areas that I was talking  
26 about earlier as being important areas are outside of the line  
27 that he shows. There's the area to the south of the line,  
28 there's the area in Leona Valley. The entire Fremont Valley area

1 is excluded, and there's a large area to the east side. Those  
2 are the examples that I gave you earlier as areas that I believe  
3 are important to include and that are not included within that  
4 boundary.

5 Now, as I understand from reading Mr. Scalmanini's  
6 report and from listening to his 3 days' of deposition testimony  
7 and his testimony here, he constructed this line based on a  
8 description provided in the Bloyd 1967 report that he suggests  
9 describe this line as what Bloyd determined to be a groundwater  
10 basin.

11 If I may, I'd like to bring up Exhibit 113 on the board  
12 over here to -- to explain this.

13 Q. Tell me generally, sir, what that was.

14 THE COURT: Bloyd's map.

15 THE WITNESS: That's the Figure 10 of the Bloyd 1967  
16 document.

17 MR. JOYCE: Rich, it will be --

18 THE COURT: It's going to be --

19 THE WITNESS: It will be a big map.

20 Q. (BY MR. ZIMMER:) Figure 10, I think.

21 A. That looks like it right there, I believe. Figure 10  
22 would be in the upper right-hand corner. Is --

23 (Discussion - Not Reported.)

24 THE WITNESS: Okay. I thought we had a larger version  
25 of that. I have a larger version with me.

26 MR. JOYCE: Let's mark it.

27 THE COURT: Is that the larger version?

28 MR. ZIMMER: This might be the larger version here.

1 THE WITNESS: That's the larger version.  
2 MR. ZIMMER: Yes. This looks the same.  
3 THE WITNESS: That's it. That's it.  
4 MR. ZIMMER: The only difference is it does not have  
5 this pink line on there.  
6 THE COURT: Let's just mark the larger version  
7 Plaintiffs' 17.  
8 THE WITNESS: And then I can draw some lines on that if  
9 you'd like.  
10 MR. ZIMMER: We can do that.  
11 That's 117, your Honor?  
12 MR. JOYCE: No. 17.  
13 THE COURT: 17.  
14 MR. ZIMMER: I'm sorry.  
15 THE COURT: It's Bloyd's larger map.  
16 MR. ZIMMER: It's just a blowup of Figure 10 per Bloyd's  
17 record.  
18 MR. JOYCE: May I, for the record, suggest that it be  
19 entitled Larger Version of Defendants' Exhibit whatever that  
20 exhibit number would be?  
21 THE COURT: 113. That's fine.  
22 All right. Did you need to approach?  
23 THE WITNESS: Yes. May I?  
24 THE COURT: You may.  
25 THE WITNESS: Your Honor, if I may, let me go to this  
26 larger version and trace the line on here that represents the red  
27 line shown on my figure that represents the boundary line shown  
28 in the Plate 1 of Mr. Scalmanini's report. And so that --

1 THE COURT: You may.

2 THE WITNESS: -- will be, as best I can, the -- exact  
3 same line as shown on Exhibit 113.

4 THE COURT: All right.

5 THE WITNESS: Just so we have something to compare it.

6 THE COURT: And you're tracing it in the pink?

7 THE WITNESS: I'll trace this in pink.

8 MR. ZIMMER: Fluorescent pink.

9 (Pause in Proceedings.)

10 THE WITNESS: All right. I've done that.

11 And, again, the line I've traced in pink on Exhibit 17  
12 is the line that Mr. Scalmanini selected from what he read in  
13 Bloyd as -- and which he has called the groundwater basin  
14 described by Bloyd.

15 In fact, in Bloyd's report on page 20, he describes what  
16 he calls the Antelope Valley basin to a number of subunits and  
17 subareas partly which is -- part of which are included in this  
18 line and part of which are not.

19 What Bloyd actually describes as the "Antelope Valley  
20 basin" -- and if I could use those three words in quotes for  
21 right now --

22 THE COURT: You may.

23 THE WITNESS: -- includes an area called the  
24 Rosamond-Bissell area and the -- let me outline these in -- which  
25 is this area. It includes what's called the Hi Vista area. And  
26 I'm going to outline the outer boundary of that area as shown in  
27 Bloyd. And it includes the Foothill area. And I'm going to  
28 attempt to outline that area in -- I'll do it just generally

1 instead of following each of the little catches down here. And  
2 so there are three additional areas that Bloyd refers to when he  
3 describes what he calls the Antelope Valley basin.

4           And you may recall, I believe, Mr. Scalmanini was asked  
5 to explain what Bloyd referred to as basin as opposed to  
6 groundwater basin. This is -- what? -- on page 20 of the Bloyd  
7 1967 report, this outer boundary, including the green, is what he  
8 described as the Antelope Valley basin.

9           Now, even more important, earlier in his report on the  
10 previous page, on page 19, Bloyd actually defines what he  
11 considers to be both the Antelope Valley groundwater basin -- and  
12 I'll accent the groundwater part -- and the Fremont Valley  
13 groundwater basins. And so what I'd like to do is to show you  
14 Figure 2 of his report, which he refers to when he says there are  
15 two major groundwater basins in the AVEK area, Antelope Valley  
16 and Fremont Valley basins, Figure 2.

17           And I believe I need to have our version of Figure 2 to  
18 put up here. I don't know that we have a copy of Figure 2.

19           THE COURT: We've had Figure 2 up there.

20           MR. JOYCE: Figure 2 is Exhibit --

21           MR. BUNN: Exhibit 10.

22           THE COURT: Okay. That's Exhibit 10. I think it's up  
23 there somewhere.

24           MR. JOYCE: Actually, your Honor, the -- the Exhibit 10  
25 that I marked is exactly the same scale as pulled from Bloyd's  
26 report which is roughly 8-by-11. And it's a one-page small --

27           THE COURT: Right.

28           MR. JOYCE: -- smaller document.

1 THE COURT: So you have a big one.

2 MR. JOYCE: I think he has an enlargement of it.

3 THE COURT: All right. So we will mark as  
4 Plaintiffs' 18 the bigger version of Exhibit 10?

5 MR. ZIMMER: We're making sure we have a copy first.

6 Q. (BY MR. ZIMMER:) Mr. Sheahan, while she's looking for  
7 that, what you have outlined in pink and green, is that what  
8 Mr. Bloyd described as the basin including the subbasins?

9 A. Yes. That's -- that's the specific definition that he  
10 described using the subunits. He doesn't refer to these as  
11 subbasins, but he calls them "subunits" and "areas." And his  
12 definition of the basin includes both subunits and areas. And  
13 when he refers to the Antelope Valley basin, he's referring to  
14 this area outlined by the green and pink boundaries. So it's a  
15 larger area.

16 Q. In terms of the way the report reads, does the report  
17 start out by Bloyd with a description of the groundwater basin?

18 A. Yes.

19 Q. In other words, start out generally?

20 A. On the previous page is where the text that I read a  
21 moment ago shows. So the introduction to his section called  
22 delineation of groundwater basins states that there are two  
23 basins, and he refers to Figure 2 to demonstrate what the two  
24 basins are. And on that figure, I'll be able to show what he was  
25 referring to as the two groundwater basins, the Antelope Valley  
26 and the Fremont Valley.

27 THE COURT: And let me ask our witness, as you're using  
28 these terms, is there a -- what is your definition of a

1 groundwater basin versus the basin?

2 THE WITNESS: Your Honor, the definition of a  
3 groundwater basin is a very difficult question to answer.  
4 Groundwater basin is not a term of art in the field of  
5 hydrogeology. It's a term that's applied to various study areas  
6 dealing with groundwater. And the areas depicted and the  
7 definitions of those areas varies significantly and varies  
8 depending on the purpose of the person defining the basin. And  
9 that's specifically the point that I'm going to be presenting.

10 What -- what Mr. Bloyd described as a basin was an area  
11 that he wanted to focus on for the remainder of his study. In  
12 other figures in his report, he refers to the area as a study  
13 area. The only place that I've found in his report that he  
14 refers to a groundwater basin is the boundaries shown on  
15 Figure 2. Everywhere else, he uses "basin" without saying  
16 groundwater basin in quotes, and he refers to study area.

17 So it's clear to me from reading his report that for the  
18 Antelope Valley vicinity, he focused on a certain group of  
19 subunits and areas for his study. He didn't -- he didn't choose  
20 to study other subunits that are up in the Fremont Valley area.  
21 He didn't choose to study other areas outside this. He chose to  
22 study an area that he defined as these units and these areas.

23 THE COURT: Thank you.

24 THE WITNESS: And there's no place in Bloyd that I have  
25 seen where the pink line that's shown here is highlighted as  
26 being a groundwater basin. It's an interpretation of -- that is  
27 made from the text in Bloyd by including the subunits and  
28 excluding the areas that he describes as part of his basin.



1           The other point that I'd like to make once I'm -- and I  
2 apologize for getting to this figure slowly --

3           Q.   (BY MR. ZIMMER:) Let me get you this, Mr. Sheahan. At  
4 least we can get back on track here. We've marked Exhibit 18  
5 what I believe is a copy of Figure 2 from Mr. Bloyd's report.  
6 You might want to highlight on that copy what Mr. Bloyd's  
7 groundwater basin line was for purposes of his study.

8           A.   This is a figure I believe you heard testimony about  
9 yesterday.

10          Q.   Mr. Sheahan, if you can make a line, I thought I'd put  
11 it up on the ELMO for the Court to look at.

12          A.   You want me to do it here and show it there?

13          Q.   That's correct.

14          A.   I'm going to use a blue highlighter on this.

15                What is shown on this figure -- the only boundary line  
16 shown on the figure -- boundary lines are the AVEK boundary which  
17 is, if you will, a political boundary, and the drainage boundary.

18                The drainage boundary is what I'm going to highlight --  
19 is blue. And I'm also going to highlight in blue the words  
20 "Antelope Valley" and the words "Fremont Valley." So it's clear  
21 in looking at this figure and reading the text that Mr. Bloyd  
22 provides --

23          Q.   Let me put that up there, Mr. Sheahan, so the Judge can  
24 see it.

25          A.   I'm sorry.

26          Q.   And she'll know what you're referring to.

27          A.   Now, the blue highlighting is not showing up very well.

28          Q.   Not very well.

1 THE COURT: It's there.

2 MR. ZIMMER: We can see it, I think.

3 THE WITNESS: To the extent I -- the line that I'm  
4 showing in the legend that I'm pointing to --  
5 (Discussion - Not Reported.)

6 THE COURT: It might help if you indicate with a laser  
7 pointer perhaps.

8 THE WITNESS: Certainly.

9 The line that I outlined, would you like me to indicate  
10 that?

11 THE COURT: Please.

12 THE WITNESS: I outlined starting in the lower  
13 right-hand corner this boundary line that goes up to the top on  
14 the west side and generally across the top, stops at that point.  
15 And another line that's also the drainage basin boundary that  
16 goes generally through the center and upper portion.

17 And the point, your Honor, this is the map that Bloyd is  
18 referring to when he describes groundwater basins. He describes  
19 two groundwater basins as being shown on this figure: The  
20 Antelope Valley groundwater basin and the Fremont Valley  
21 groundwater basin.

22 So what he has done is to define groundwater basins  
23 using drainage basin boundaries. This is not an uncommon  
24 practice in some of the information that you've been provided by  
25 Mr. Scalmanini. Use of drainage basin boundaries is totally  
26 appropriate for defining groundwater basins if it meets your  
27 purpose. It is one of the terms commonly used for this purpose.

28 And, in fact, this is not the only time that agencies

1 such as the United States Geological Survey that Bloyd worked for  
2 or other state agencies have used drainage basin boundaries to  
3 design groundwater basins.

4 I'd like to show you the figure -- I believe it's  
5 Exhibit 109. And I believe I have a larger copy of it.

6 THE COURT: That's Bulletin 118?

7 THE WITNESS: Yes. I have a small copy of that, but I  
8 believe I have a blowup of a Bulletin 118 figure that shows that  
9 the Department of Water Resources, as early as 1975, as shown by  
10 Exhibit 109, was using the same drainage basin boundary for the  
11 separation between the Fremont Valley and the Antelope Valley  
12 groundwater basins as they define groundwater basins.

13 THE COURT: All right. We'll mark as  
14 Plaintiffs' 19 -- this is the larger version of 109? Is that  
15 what it is?

16 THE WITNESS: No.

17 THE COURT: Well, Exhibit 109, being Bulletin 118, the  
18 map from 1975.

19 MR. JOYCE: Is this the update?

20 THE WITNESS: This is the update. The update I have is  
21 dated 2000.

22 THE COURT: This is Bulletin 118-2000.

23 THE WITNESS: Yes.

24 There are no significant differences in area shown by  
25 the groundwater basin in the Bulletin 118-2000 version that I'm  
26 showing you and the bulletin on 118-1975 version that is  
27 Exhibit 109.

28 With regard to the point that I'm making concerning the

1 upper boundary, there are no differences at all, so --

2 MR. JOYCE: Your Honor, for the purposes of the record,  
3 I am placing the exhibit sticker on the back of the exhibit so it  
4 will be --

5 THE COURT: That's fine.

6 MR. BUNN: Your Honor, may we review that exhibit,  
7 please?

8 THE COURT: You may. Why don't we give them about two  
9 seconds to do that.

10 (Pause in Proceedings.)

11 MR. ZIMMER: Your Honor, the other exhibit that came up  
12 there, we took the hard copy up to the clerk.

13 THE COURT: All right.

14 Q. (BY MR. ZIMMER:) Mr. Sheahan, we are showing you what  
15 has been marked as Exhibit 19 for identification.

16 Do you recognize this document, sir?

17 A. Yes.

18 Q. Can you tell the Court what that document is.

19 A. This is a document that I downloaded, again, off of the  
20 Internet from the Department of Water Resource's Web site.  
21 Currently, the Department of Water Resources is continuing to  
22 update its Bulletin 118. But in that process at various times,  
23 it issues the maps and maps of a specific date.

24 This map was compiled and prepared as of August 22nd,  
25 2000. The map has actually been updated again on the Web site,  
26 but this one remains as the one published on the Web site as of  
27 August 22, 2000.

28 Q. Why don't you go ahead and put it up on the board so we

1 can see what it depicts.

2 A. (The witness complied.)

3 I hope this stays on the board.

4 Q. Let me ask you this before we get started: Is this --  
5 can you show us the line that it depicts and then tell us whether  
6 that's the same line that's on the 1975 study.

7 A. Yes. I can highlight the line in pink on this exhibit.  
8 I've forgotten the number.

9 THE COURT: You may.

10 THE WITNESS: The portion of the line that is shown  
11 on -- on here is the line that I'm highlighting in pink. Let me  
12 say it's the portions of the line, because it has segments.

13 What I'd like to point out that I think is important is  
14 that in defining a groundwater basin, the Department of Water  
15 Resources has used its own set of criteria for its own purposes.  
16 One of their criteria has been the aerial extent of  
17 unconsolidated materials, and that's the area generally shown in  
18 blue. But in those areas where the unconsolidated deposits or  
19 aquifer materials go beyond one area into another area, they have  
20 selected other boundaries for convenience and for the purpose of  
21 defining groundwater basin. This map shows the Fremont Valley --  
22 and I'll show that with an "FV" in pink -- and the  
23 Antelope Valley -- and I'll show that with an "AV" in pink. That  
24 shows continuous water deposits in the Antelope Valley and  
25 Fremont Valley.

26 For their convenience and appropriately to divide this  
27 into separate groundwater basins for groundwater basin management  
28 purposes, Department of Water Resources has chosen to utilize the

1 drainage basin boundary, watershed boundary, if you will, that  
2 separates the Fremont Valley and the -- the Antelope Valley as a  
3 line of demarkation between their two identified groundwater  
4 basins.

5           Since 1975 -- perhaps before that, but certainly since  
6 1975, the map that you see on Exhibit 109, they have designated  
7 the Antelope Valley groundwater basin by a number, 6-44, which  
8 I'll highlight in pink, and the Fremont Valley groundwater basin  
9 by a number, 6-46, which I will highlight in pink.

10           This general designation of groundwater basins has been  
11 essentially the same from 1975 to date. In fact, the most recent  
12 map published on the Internet as of May of 2002 shows the same  
13 designation and shows the same drainage basin boundary separating  
14 the two so-called groundwater basins.

15           In response to your earlier question, DWR has defined  
16 their groundwater basin based on their purposes based on their  
17 criteria. And they've defined a considerably larger groundwater  
18 basin that they call the Antelope Valley groundwater basin, than  
19 has been defined by the pink line on Exhibit 17.

20           In fact --

21           Q. (BY MR. ZIMMER:) Just for record identification  
22 purposes, Mr. Scalmanini's line.

23           A. Yes. I'm sorry. Scalmanini's line.

24           The Department of Water Resource's information indicates  
25 that the Antelope Valley groundwater basin that they have defined  
26 is approximately 1,730 square miles. I believe you heard earlier  
27 that the -- the Scalmanini boundary line is approximately 920  
28 square miles. I think it's slightly larger than that, but I

1 believe it's less than a thousand square miles. That's a  
2 considerable difference.

3           This is a relatively small area shown by Mr. Scalmanini  
4 compared to the groundwater basin that the Department of Water  
5 Resources has used. And it's -- Department of Water Resource's  
6 groundwater basin is probably 70 percent larger. They have  
7 chosen to include in their groundwater basin those example areas  
8 or many of the example areas that I mentioned earlier. They've  
9 included portions above the Rosamond Fault. They've included the  
10 area south of the south line of Mr. Scalmanini's area. They've  
11 included the Leona Valley. And they've included all of the land  
12 out east of Saddleback Buttes.

13           Q. Mr. Sheahan --

14           A. I think I'm done with that.

15           Q. Okay. Mr. Sheahan, the DWR line, for its purposes, is  
16 still somewhat less inclusive than where you -- what properties  
17 you think should be included for the purposes of Phase 1 in this  
18 case; correct?

19           A. That's correct. Let me explain why.

20           As I mentioned earlier, the Antelope Valley aquifer  
21 system doesn't stop at the watershed boundary to the north. The  
22 watershed boundary goes across a relatively high spot in the flat  
23 ground out there. And the aquifer system continues on up into  
24 the Fremont Valley.

25           Q. Can you show us what you're talking about.

26           A. I can do this with a highlighter. Would that be  
27 sufficient?

28           Q. Sure.

1       A.    The area I'm talking about, the blue area on exhibit --  
2 help me out? Is that 17, or 18?

3       Q.    That is 18.

4       A.    Thank you.

5       Q.    19.

6           MR. JOYCE: That's Exhibit 19.

7           THE WITNESS: The blue area is the area designated by  
8 the Department of Water Resources as aquifer material. And they  
9 show that it's a continuous aquifer system running from up in the  
10 Fremont Valley all the way down through the Antelope Valley and  
11 out past the Saddleback Buttes area.

12           And so my assessment of this included both the  
13 Fremont Valley and the Antelope Valley. My boundary includes  
14 both of those because there's hydraulic continuity across that  
15 line, certainly. Groundwater can easily flow under that drainage  
16 divide. Pumping in the Fremont Valley in the area that I'm  
17 showing here above that line can have an hydraulic effect on  
18 water levels south of that line and vice versa.

19           So in my assessment, I found it not appropriate to limit  
20 the area for the Phase 1 boundary to just a groundwater basin,  
21 and certainly not just this groundwater basin, but to take in an  
22 area that included all of the aquifer system that was important  
23 for Phase 2 analysis.

24       Q.    In terms of gross amounts --

25           THE COURT: Can you hold on one second?

26           While we're on this subject, I'm looking at the smaller  
27 map, which was 109-A.

28           THE WITNESS: Yes.



1 THE COURT: You're saying Fremont Valley and  
2 Antelope Valley are hydraulically connected. I don't think I've  
3 ever seen that word right. But then we look -- you can't see the  
4 numbers, but when we're going to the right, is it 43 and then 42?  
5 THE WITNESS: Yes.  
6 THE COURT: Do you see those, which I take are other  
7 basins somewhere?  
8 THE WITNESS: That's correct. 6-43 is the El Mirage  
9 basin and 6-42 is the Alto basin.  
10 THE COURT: You're not including those?  
11 THE WITNESS: Well, DWR did not include those in their  
12 boundary basin, and I have not included those specifically in the  
13 area that I've shown in my Exhibit B. And I can explain why.  
14 THE COURT: I want to know why the Fremont Valley would  
15 be hydraulically connected but this one -- at least, this one,  
16 43, whichever basin that is, is not. Because in looking --  
17 THE WITNESS: I'm sorry. I didn't mean to imply that.  
18 That basin is hydraulically connected.  
19 THE COURT: All right.  
20 THE WITNESS: I have another reason why I did not  
21 include that.  
22 THE COURT: Then explain that reason.  
23 THE WITNESS: It definitely is hydraulically connected.  
24 THE COURT: It would look, in looking at this map, 109,  
25 that there's a whole lot of basins hydraulically connected.  
26 THE WITNESS: That's correct.  
27 THE COURT: All right.  
28 THE WITNESS: There are a lot of basins hydraulically

1 connected.

2 THE COURT: So have you made the decision to include the  
3 Fremont Valley basin and not this -- these other ones?

4 THE WITNESS: Give me just a moment. I may have a slide  
5 that will demonstrate that.

6 Give me Slide 5, please.

7 THE COURT: Slide 5, we'll mark as 20.

8 THE WITNESS: I'll use the highlighter to show you. It  
9 may be difficult to see there, but there are two boundary lines,  
10 if you will, drawn on the base map on Slide 5. The black line is  
11 the watershed boundary for -- actually, for several watersheds.  
12 I have shown the watershed boundary for the Fremont Valley, the  
13 watershed boundary for the Antelope Valley.

14 Now, these are the drainage basin boundaries, the  
15 watershed boundaries. And I've shown a small watershed boundary  
16 down to the east portion of the Leona Valley.

17 If we were to select watershed boundaries and consider  
18 that we were interested in looking at all the water within those  
19 boundaries, which is sometimes appropriate in defining a study  
20 area for groundwater studies because the watershed includes all  
21 the surface water and all the groundwater within that area, we  
22 might have chosen that entire area.

23 There is hydraulic communication across the watershed  
24 boundary to the east, as you indicated, your Honor, through the  
25 groundwater system. That hydraulic communication is important.  
26 However, there's another aspect that's important as well. And  
27 that's the fact that the area to the east generally of the  
28 San Bernardino County line and this watershed boundary has

1 already been addressed in court, if you will. And by that, I  
2 mean just generally adjudicated. And so that's an area where, as  
3 I understand it, water rights have already been determined.

4           It's -- in my review of the Phase 1 stipulation and my  
5 understanding of what's required in this case, is to adjudicate  
6 water rights, it seems inappropriate for this Court to address  
7 properties located east of the line that represents the west line  
8 of the Mojave basin area adjudication. So I've chosen on my map  
9 that I'm referring to as Exhibit B -- I don't know if we have a  
10 figure number for it or a -- or a true exhibit number for it.

11           Q.   (BY MR. ZIMMER:) We've not marked this one yet;  
12 correct?

13           A.   I don't think so, no.

14           MR. DUNN: Objection. Move to strike the witness's  
15 testimony as to what is legally appropriate with regards to  
16 what's been adjudicated in the Mojave adjudication on the grounds  
17 that it's a legal opinion.

18           THE COURT: His testimony just goes to his opinion as to  
19 why he did not include it, not whether or not it is legally or  
20 not legally appropriate. So to that extent, I'll allow it.

21           MR. ZIMMER: And as we said, your Honor, we have no  
22 objection to considering groundwater flows in and out of the  
23 area.

24           Q.   (BY MR. ZIMMER:) Did you want to mark this?

25           A.   Yes, I would like to.

26           THE COURT: We'll make that 21.

27           What should we call it for our clerk?

28           THE WITNESS: I refer to it as Exhibit B to my report.

1 But perhaps Phase Area 1 boundary, which is its title, might be  
2 better.

3 Q. (BY MR. ZIMMER:) Mr. Sheahan, we're showing you what's  
4 been marked as Exhibit 21 for identification.

5 Can you tell us what that is, sir.

6 A. Yes. This is the map that I produced as a result of my  
7 studies on this -- in this matter. It's Exhibit B of my report  
8 dated June 16th. On this, I've shown three lines. Again, the  
9 solid black line is the set of watershed boundaries that I  
10 described earlier, the boundary of the Fremont Valley, the  
11 boundary of the Antelope Valley, and these are drainage basin  
12 boundaries, and the boundary of what I'll call the western  
13 portion of the Leona Valley.

14 I've also shown a dashed line that is generally north  
15 and south in this area, and that represents the county line.  
16 It's essentially the western boundary of San Bernardino County.

17 In my review of the judgment in that case and the maps  
18 that are shown to represent the western boundary of the  
19 adjudicated area, from the point marked F on my map to the point  
20 marked G, the red line that I have drawn represents the boundary  
21 of the area that I have proposed. And that's the western  
22 boundary of the adjudicated area. And I've chosen that on my map  
23 because I believe, in my opinion, it is inappropriate for me to  
24 have included an area that has been previously adjudicated in  
25 this matter concerning water rights..

26 Q. Is the line that you indicated on your map the same line  
27 as described in the Mojave adjudication?

28 A. Yes, it is.

1 Q. Okay. And that would be the line that follows the  
2 county line on the southeastern portion?

3 A. Yes.

4 Q. And then picks up the watershed on the northern portion.

5 A. That's right. The upper portion is generally watershed,  
6 although there are two places where it stops being watershed and  
7 becomes county line there and there. And then the lower portion,  
8 it goes beyond the watershed and actually includes part of what  
9 Exhibit 109 shows as groundwater basin 6-43. So it includes part  
10 of that groundwater basin. And I have included that within my  
11 total watershed boundary.

12 THE COURT: Let me just ask counsel: I take it that  
13 other adjudication is a nonpublished decision?

14 MR. TOOTLE: Supreme Court decision.

15 THE COURT: Which one is that?

16 MR. ABBOTT: Barstow versus Mojave Water Agency.

17 THE COURT: Thank you.

18 Q. (BY MR. ZIMMER:) Is there anything more at this time  
19 that you wanted to comment upon, Mr. Sheahan, regarding this  
20 particular diagram or the previous one?

21 A. Well, the previous one I was talking about was just to  
22 make the comparison that in -- and in response to your Honor's  
23 question about groundwater basin definition. DWR has chosen to  
24 define a groundwater basin in a particular way. They have done  
25 it consistently since 1975 in terms of using a drainage basin  
26 boundary for that purpose.

27 The Figure 2 of the Bloyd report presents the  
28 groundwater basin as described by Bloyd, which is different than

1 the groundwater basin so-called that Mr. Scalmanini has presented  
2 as the red line that I showed earlier. And that's the  
3 information that I wanted to present to you with regard to that  
4 issue.

5 THE COURT: Is it your opinion that Mr. Scalmanini's  
6 basin is essentially a subbasin of the Bloyd report?

7 THE WITNESS: Your Honor, I have the same problem with  
8 the term "subbasin" as we do with the term "groundwater basin."  
9 A "subbasin" is not a term of art. We can use that as long as we  
10 all agree to what the meaning is.

11 The problem that I have with that is that it has been  
12 attributed to Bloyd that he has used the term "subbasin" to  
13 designate certain areas. And, in fact, he did not. He used the  
14 term "subunit." I have no idea why, but he chose the term  
15 "subunit" and area to represent divisions within the overall two  
16 groundwater basins that he defined.

17 If we would like to agree that there's some specific  
18 definition of what a subbasin is -- and hydrogeologists do this  
19 all the time -- then it's fine to apply that term. But I think  
20 at this point in this case, to use the term "subbasin," it just  
21 continues to be confusing.

22 I would prefer to go back to Bloyd's use of the term  
23 "subunit" to define the areas that Bloyd identified, which  
24 Mr. Scalmanini has presented on his map, and refer to those as  
25 subunits. I realize that's not an answer to your question.

26 THE COURT: You would agree that what Mr. Scalmanini has  
27 depicted is simply a subunit of what you believe is the Bloyd  
28 basin.

1 THE WITNESS: If I may.

2 THE COURT: You may.

3 THE WITNESS: What he has done is to select 8 subunits  
4 of the 14 subunits that Bloyd presented. And based on his  
5 interpretation of what Bloyd said on page 20 of his report,  
6 Mr. Scalmanini has chosen to make the outer boundary of those  
7 contiguous subunits equivalent to groundwater basin.

8 THE COURT: All right. And when you say 8 of the 14,  
9 you've outlined three general areas.

10 THE WITNESS: That's correct.

11 THE COURT: So could you be more specific and on some  
12 map show me where you believe the missing six, seven units are.

13 THE WITNESS: Yes. I'd be happy to. I need Figure 113,  
14 which is the -- I'm sorry -- Exhibit 113, which is Figure 10 of  
15 the Bloyd report.

16 Let me use a green highlighter, if I may.

17 THE COURT: Is that green, or that orange?

18 THE WITNESS: I'm sorry?

19 THE COURT: It looks orange. Thank you.

20 THE WITNESS: It's definitely orange. Thank you.

21 Rather than the boundary lines, let me use orange to  
22 highlight the names of the subunits and we'll count them as I go.

23 The eight that are included within Mr. Scalmanini's line  
24 are the Finger Buttes, the West Antelope, the Neenach, the  
25 Lancaster, the Pearland subunit, the Buttes subunit, and the  
26 North Muroc subunit, and the Peerless subunit. That should be  
27 one, two, three, four, five, six, seven, eight.

28 The other subunits that are shown on here are the

1 Willow Springs, the Gloster subunit, the Chaffee subunit, the  
2 Oak Creek subunit, the Koehn subunit, and the California City  
3 subunit. So that's 9, 10, 11, 12, 13, 14 -- a total of 14  
4 subunits.

5 THE COURT: All right. And then those other two areas  
6 to the south and to the east that you've shown in the green  
7 outline were not part of Bloyd's study area, however you want to  
8 call it?

9 THE WITNESS: They are included in what Bloyd describes  
10 as his Antelope Valley basin. They're not included as subunits.  
11 They're a different thing. But he did include those in what he  
12 described as the basin.

13 Now, in fact, the drainage basin boundary is not shown  
14 on here. But if it were -- and we can do an overlay that shows  
15 that -- several of these subunits that are not within the pink  
16 line that represents the Scalmanini groundwater basin are within  
17 what Bloyd describes as the Antelope Valley groundwater basin.  
18 Particularly, Willow Springs, which is just north of his line of  
19 part of the Gloster subunit, part of the Oak Creek subunit.

20 MR. ZIMMER: Would it be helpful, your Honor, to have  
21 one more color on there to show the groundwater basin as  
22 described by Mr. Bloyd?

23 THE COURT: If we can maybe take a black marker and you  
24 do the outermost limit in black? Can you do that?

25 THE WITNESS: I would have to only -- I would have to  
26 estimate it because the drainage basin boundary used by Bloyd as  
27 the boundary of the Antelope Valley and Fremont groundwater basin  
28 is not shown on this figure.



1           This is a figure that -- that presents the units, the  
2 groundwater units, and these other areas that Bloyd discusses.  
3 In separating them, Bloyd has chosen to describe the area that I  
4 have indicated that's the eight subunits and the three areas.  
5 He's chosen to call that his Antelope Valley basin for his  
6 purposes, and further discussing the area in his report.

7           He also talks about the other subunits. But the choice  
8 of which subunits and areas he has used has been totally  
9 Mr. Bloyd's. He did not pick all of the subunits within what he  
10 calls the Antelope Valley groundwater basin. He picked a few of  
11 them for his purposes.

12           Mr. Scalmanini has taken the subunits but not the areas  
13 and has called that a groundwater basin for his purposes. So I'm  
14 still responding to your question concerning what is a  
15 groundwater basin and a subbasin. For a specific purpose,  
16 hydrogeologists, unfortunately, use the term "groundwater basin,"  
17 but generally they define what that is for that purpose. There  
18 is no such thing as the groundwater basin.

19           I could very comfortably include several more of these  
20 units and draw a line around it and say for my purposes this is a  
21 groundwater basin and this is what I will refer to henceforth as  
22 a groundwater basin.

23           As I mentioned earlier, my concern with limiting the  
24 number of subunits that are selected for our groundwater basin  
25 tends to exclude areas that have groundwater in them wherein  
26 pumping can cause effects across those boundaries and tends to  
27 create a very difficult situation in doing a Phase 2 assessment  
28 of the significance of pumping in this area.

1 THE COURT: All right. And can anyone -- I'm not sure  
2 if this expert can -- point out to me right now on this map where  
3 we have all these things where plaintiffs' land lies?  
4 MR. JOYCE: Well, your Honor, I can --  
5 THE WITNESS: I cannot.  
6 THE COURT: All right.  
7 MR. JOYCE: I can point out where the two pieces I have  
8 are.  
9 THE COURT: If you would just do that. I won't take it  
10 as evidence, but just as a general.  
11 MR. JOYCE: As a general proposition, your Honor.  
12 Your Honor, this will not be the least bit  
13 geographical --  
14 THE COURT: Let's not even mark it. I just want an  
15 idea.  
16 MR. JOYCE: One of the pieces of property that is before  
17 the Court through Diamond Farming is in the Neenach subunit, and  
18 another is in the Lancaster subunit.  
19 THE COURT: All right. Those are --  
20 MR. JOYCE: So we have two -- two internally distinct  
21 subunits.  
22 THE COURT: All right. So that's all of yours.  
23 MR. JOYCE: That's exactly.  
24 THE COURT: All right. Mr. Zimmer?  
25 MR. ZIMMER: Your Honor, our properties are in the  
26 Antelope subunit to the east of Lancaster and some other areas  
27 out in the Buttes area.  
28 THE WITNESS: I think the other side --

1 MR. ZIMMER: I'm sorry. Over in this area, in the  
2 Buttes area, near the county line.

3 THE COURT: And that's all of yours.

4 MR. ZIMMER: Yes.

5 THE COURT: All right.

6 MR. ABBOTT: Your Honor, I brought my maps to all of the  
7 hearings. And this one shows where the Diamond Farming  
8 properties are in green.

9 THE COURT: I don't see any green. Is that the grayish?  
10 Oh, okay.

11 MR. ABBOTT: Here and here (indicating).

12 THE COURT: You know what we need is, like, one master  
13 overlay with everybody's boundaries on it.

14 MR. BUNN: Our technology isn't quite there yet.

15 MR. ZIMMER: I'm sure Mr. Sheahan can probably do it.  
16 Eventually in Phase 2 we'll be doing that.

17 THE COURT: That would be really helpful.

18 THE WITNESS: I have one showing all of the lines on  
19 Mr. Scalmanini's map and all the lines on my map together.

20 THE COURT: Plaintiffs' property and --

21 THE WITNESS: It doesn't show the properties.

22 MR. ABBOTT: And then this depicts the Bolthouse  
23 properties in pink -- rough areas. These are not exactly  
24 engineering-specific. It was, you know, rough -- section,  
25 quarter-section numbers, and they just tried to estimate it from  
26 the section lines. It's not absolutely accurate.

27 MR. JOYCE: Okay.

28 MR. ABBOTT: General vicinities.

1 MR. JOYCE: I just didn't want us to get evidence out  
2 of -- and more importantly, I wasn't sure what that was  
3 representing. That looks generally -- reasonably accurate as far  
4 as generalization.

5 THE COURT: For some reason, I was thinking Mr. Zimmer  
6 had land north of the Scalmanini line, but you don't.

7 MR. ZIMMER: No.

8 THE COURT: It's to the east.

9 MR. ZIMMER: Yes.

10 MR. TOOTLE: And the pink on this map is the Bloyd area.

11 MR. ABBOTT: This is the Carlson Phillips.

12 MR. TOOTLE: This said Bloyd's.

13 THE COURT: Doesn't he reference Bloyd probably?

14 MR. TOOTLE: Yeah.

15 MR. JOYCE: Your Honor, it may be helpful if the  
16 defendants can now tell us where their wells are.

17 THE COURT: That may take a lot longer.

18 MR. ZIMMER: Let's move.

19 MR. JOYCE: I meant that facetiously.

20 (Discussion - Not Reported.)

21 Q. (BY MR. ZIMMER:) Mr. Sheahan, the Court has asked a  
22 question where the properties are, for the Court generally.  
23 There was discussion by Mr. Joyce about some of the Diamond  
24 Farming's property being up near the Neenach and some by the --  
25 in the Lancaster area, as well as some properties of Bolthouse  
26 near the Lancaster area along with some area -- some Bolthouse  
27 properties over in the Buttes area.

28 Is it your opinion as a hydrogeologist, or do you have

1 an opinion as a hydrogeologist whether, given the generalization  
2 of those properties, you would want to include the areas you've  
3 described in your area for evaluation?

4 A. Yes. In my opinion as a hydrogeologist, it's necessary  
5 to include the areas north of what we're talking -- calling the  
6 Neenach subunit because there is hydraulic communication across  
7 that boundary. Mr. Scalmanini has indicated one area where  
8 there's hydraulic communication. Actually, Mr. Bloyd's maps  
9 indicate that there is greater amount of hydraulic communication  
10 and actual flow from north to south across that.

11 Therefore, in order to assess in Phase 2 effects of  
12 pumping, of groundwater pumping, I have to look further north  
13 than just the northern boundary of Mr. Scalmanini's line. I need  
14 to look into the subunit above that and consider the groundwater  
15 conditions and groundwater pumping that may or may not be  
16 occurring out there in order to make that assessment.

17 To truncate the area of interest for Phase 2 using the  
18 northern line of Mr. Scalmanini's map, essentially based on my  
19 understanding of, I think, what he clearly says in the Phase 1  
20 stipulation, that we will not consider pumping above that point  
21 and exclude those properties, it makes it nearly impossible as a  
22 hydrogeologist to make a proper assessment in Phase 2. That's  
23 why we need to include an area larger than that.

24 Q. And why is that? Because the entire water table in this  
25 area is affected by inflow and outflow?

26 A. Yes. Absolutely. If there is some flow coming across  
27 from north/south across that line -- and just as a -- as an  
28 example, I think Mr. Scalmanini testified that there may be up to

1 700-acre feet coming through one small section. If someone north  
2 of that line starts pumping groundwater or has been pumping  
3 groundwater and reduces that 700-acre feet to 600-acre feet, then  
4 there's 100-acre feet less down in the Antelope Valley portion,  
5 which would affect water level in that area.

6 THE COURT: And I understand what you're saying, but I'm  
7 going to interrupt with a question, because this is where I'm  
8 having a little trouble.

9 And I go back to that little area. I guess it's 6-43  
10 that we didn't include because it's been adjudicated.

11 THE WITNESS: Yes.

12 THE COURT: Does not the pumping over there have the  
13 same effect on this basin -- or whatever -- the area, whatever we  
14 want to call it -- as the pumping in the area you want to  
15 include?

16 THE WITNESS: It could have an effect. But we have one  
17 other factor in that area that we haven't discussed yet -- at  
18 least, I haven't discussed that --

19 THE COURT: What is that?

20 THE WITNESS: -- that becomes important.

21 There has been documented in that area a groundwater  
22 divide. And let me explain what that means.

23 Where we have areas of large groundwater recharge such  
24 as a stream coming down from the mountains carrying large  
25 quantities of water that infiltrates into the ground, as it  
26 infiltrates into the ground and gets into the water table, it  
27 builds up a mound in the water table.

28 Along the crest of that mound on either side of that

1 crest, groundwater flows in two different directions. I  
2 believe -- you may recall some testimony concerning groundwater  
3 divides as being one means of defining a groundwater basin.  
4 Although the groundwater divide may move some as a result of  
5 pumping, it still provides, to a great extent, an acceptable way  
6 to separate two groundwater units. So we do have the advantage  
7 down in that area of having a groundwater divide.

8 In Phase 2, though, it would be necessary to consider  
9 pumping from one side, let's say, the east side of that boundary,  
10 and its effects on pumping within our Phase 1 area boundary. We  
11 need to consider that, but we would not need to consider it with  
12 regard to water rights issues. We'd only have to consider it in  
13 terms of what I'd call a water balance. How much water is coming  
14 in and how much is going out. You could take care of that --

15 THE COURT: But assuming -- and I have not made any  
16 predecisions on this, but say I adopt a smaller area than what  
17 you have outlined. Could we not do the same things? I was  
18 trying to explain before when I was talking to counsel, request  
19 the area not in terms of the rates, but in terms of the effect  
20 the pumping would have?

21 THE WITNESS: Yes, we could.

22 THE COURT: All right. And explain to me why, in your  
23 opinion, to the north, and then I guess to the -- what is  
24 that? -- the southwest, those areas that would not work.

25 THE WITNESS: To the north -- well, I'm sorry, your  
26 Honor. If I understand your question, why we need to go outside  
27 of Mr. Scalmanini's line?

28 THE COURT: Right. Because you said this area in

1 Subsection 43 would not be considered to the extent of rights,  
2 but you'd still consider the effect of the pumping on that area.  
3 I thought that's what you said.

4 THE WITNESS: We'd consider the inflow or outflow of  
5 groundwater in that area --

6 THE COURT: All right.

7 THE WITNESS: -- as part of balancing out our water  
8 system.

9 THE COURT: All right. So if I adopt a smaller area  
10 than what you are proposing, why would not just considering the  
11 inflow and outflow of the -- the larger areas not be adequate?

12 MR. JOYCE: Your Honor, I think --

13 THE WITNESS: I'm not following you.

14 MR. DUNN: Let's let the witness answer.

15 THE COURT: I want an answer. Just -- if you have an  
16 objection, just state your legal basis.

17 MR. JOYCE: I'm sorry. It's not intended an objection,  
18 your Honor. The issue really is --

19 THE COURT: Then I'm going to ask just for the legal  
20 basis.

21 MR. JOYCE: Fine. Then I withdraw. Proceed.

22 THE COURT: And then you can certainly argue that I'm  
23 misplaced in the wrong area.

24 MR. JOYCE: No.

25 THE COURT: I'm trying to get my way through this as  
26 good as I can.

27 MR. JOYCE: I understand.

28 THE WITNESS: I'm sorry. Just to clarify your question,



1 the larger area that I'm referring to is the eastern side of the  
2 6-43 area, for example?

3 THE COURT: Well, that. But the area to the north and  
4 the area to the southwest that you've also included in your area.

5 THE WITNESS: I believe you mean the southeast.

6 THE COURT: I have south on that, the green? Isn't that  
7 part of yours?

8 THE WITNESS: This here. I'm sorry. Southwest.

9 THE COURT: And the north.

10 THE WITNESS: Yes.

11 THE COURT: In other words, if I have a smaller area  
12 than what you've outlined but we're still considering the inflow  
13 and outflow, why would that not be adequate to adjudicate the  
14 plaintiffs' rights?

15 THE WITNESS: Okay. I understand your question.

16 And one reason is that the Willow Springs subunit and  
17 the Gloster, if I believe I'm pronouncing that right, subunits  
18 that are north of that area would not be within the -- what Bloyd  
19 defined as the Antelope Valley basin. But they are adjacent to  
20 and hydraulically connected to the subunits that are included  
21 within Mr. Scalmanini's red line.

22 Those are areas where we would need to consider  
23 specifically pumping because plaintiffs, as I -- I'm sorry --  
24 defendants, as I understand it, have wells in that area and there  
25 are other properties that have wells in that area.

26 In considering the impact of specific pumping on water  
27 levels and considering the effects of groundwater production, we  
28 would need to take those areas into account. Not just general

1 inflow and outflow, but the specifics of what is happening in  
2 terms of groundwater production in those areas.

3 THE COURT: Are you saying in that area that we call --  
4 whatever -- 43, there's no wells?

5 THE WITNESS: No, I'm not saying that. There may be  
6 wells in that area, but the parties that own those wells are on  
7 the other side of the line that -- that represents the Mojave  
8 basin area adjudication. So I chose -- for convenience as a  
9 method of keeping our area as small as possible, I chose that  
10 boundary just to separate the area that we would be concerned  
11 about. And I believe without any question, we could -- as a  
12 hydrogeologist, I can easily say I will not consider the effects  
13 of specific groundwater pumping on that side. I don't need to  
14 consider that. And I could meet the Phase 1 stipulation by  
15 saying that's a line along which groundwater pumping on the east  
16 side of it would have no effect for the purpose of this matter on  
17 the west side because of the adjudication boundary.

18 THE COURT: Okay. But the effect is -- the no effect,  
19 in your opinion, is more because it's been adjudicated than  
20 because of inflow and outflow?

21 THE WITNESS: Yes.

22 THE COURT: All right.

23 MR. JOYCE: Your Honor --

24 THE WITNESS: That's correct.

25 MR. JOYCE: -- at this point, I think it would be of  
26 some aid to the Court to understand that in the process, as  
27 lawyers, we made it clear to him that what we understood the case  
28 to be is that that line of legal significance and that whatever

1 he chose to do as a hydrologist, that in light of the Phase 1  
2 stipulation, the use of the term "adverse," that none of us could  
3 do anything with.

4 MR. DUNN: Objection. I will not agree to that, your  
5 Honor. That's a --

6 THE COURT: Wait. Wait. Wait. The court reporter  
7 can't take you all down at one time.

8 MR. JOYCE: That is the legal opinion I expressed.  
9 Whether I'm right or wrong, maybe I don't know. But I was of the  
10 opinion that the -- that line created a line that we couldn't  
11 cross anyway.

12 MR. BUNN: Your Honor, if I may.

13 THE COURT: You may.

14 MR. BUNN: I want to take issue with Mr. Joyce's  
15 representation because Mr. Sheahan did testify in deposition that  
16 his use of that line did not come from the attorneys at all, but  
17 came from his own evaluation of the Mojave basin area of  
18 judgment. So to the extent that Mr. Joyce is representing that  
19 he told Mr. Sheahan something, that's contradicted by  
20 Mr. Sheahan's own testimony.

21 THE COURT: I'm not sure it really matters whether  
22 Mr. Sheahan's coming to this conclusion because of something  
23 Mr. Joyce said or something he said. I mean, he's basically made  
24 a determination he's not going to consider this area.

25 MR. BUNN: Yeah. I understand that.

26 THE COURT: I don't think it makes a difference.

27 MR. BUNN: I don't quarrel with that. I just have a  
28 problem with --

1 THE COURT: I'm just curious as to why -- I suppose it's  
2 that Barstow case -- why they stopped it there.

3 MR. BUNN: It's the Mojave River adjudication --

4 THE COURT: All right.

5 MR. BUNN: -- is what it is.

6 THE COURT: There's nothing -- I take it, there's  
7 nothing in their decision that deals with their basin  
8 determination that helps us, is there?

9 MR. DUNN: There is indeed.

10 MR. JOYCE: Actually -- I'm sorry -- actually, your  
11 Honor, it's the portion of the Supreme Court opinion I was  
12 proffering to the Court the other day with Mr. Sheahan. It  
13 describes the hydrologic condition existent in the immediately  
14 adjoining Mojave basin to the east. And it describes very  
15 similar hydrologic conditions as to what's present here. And  
16 what the Court will find in reading that opinion is that they  
17 used, in essence, the drainage basin as the basin boundaries  
18 except, your Honor, as what we've been trying to explain for over  
19 a week, is that a groundwater basin is not a scientifically fixed  
20 animal.

21 THE COURT: I think that's really evident from what I'm  
22 hearing and seeing.

23 MR. JOYCE: And that's the reality. And the reality is  
24 that for political reasons, they cut off the -- the, quote,  
25 unquote, "basin boundary" using the county line because that  
26 happened to be co-extensive with the jurisdictional boundaries of  
27 one of the water agency's parties in the litigation. It's a  
28 political boundary. But now it's a judicially established basin

1 boundary. That is the problem. And that's why the science and  
2 the law aren't always matching up.

3 MR. ABBOTT: Mr. Joyce is making all sorts of  
4 representations about what went on in the Mojave case. I was one  
5 of the attorneys in that case and sat through that whole trial --  
6 I think 28 days. Something for your Honor to look forward to.

7 THE COURT: What we need to get --

8 MR. ABBOTT: And the judgment in that case defines an  
9 adjudicated area which was proposed by the parties who stipulated  
10 to a physical solution.

11 THE COURT: Mm-hmm. And?

12 MR. ABBOTT: And the published decision just describes  
13 the general hydrology of the reason. It does not discuss the  
14 specific boundaries at the outer edges or within the basin  
15 itself. And how they were arrived is just silent on that.

16 MR. BUNN: What Mr. Joyce further omits to say is that  
17 adjudicated area was further divided into groundwater basins --

18 MR. DUNN: And let me put it another way --

19 MR. BUNN: -- plural.

20 MR. DUNN: -- based on this witness's testimony that his  
21 entire opinion is based on hydroconnectivity and that his  
22 testimony is that there's hydrology connectively between his area  
23 and Mojave basin, Mojave basin is now at issue in this case, and  
24 all of that involves. So we'll all consider that over the  
25 weekend.

26 MR. JOYCE: Your Honor --

27 MR. ZIMMER: Your Honor, we're going off on the  
28 arguments and --

1 MR. DUNN: That's what it means.

2 MR. JOYCE: Your Honor, I would just --

3 THE COURT: I'm not sure that's what it means.

4 It almost sounds like the courts, to some extent, draw

5 arbitrary lines as do the scientists. That's what it seems like.

6 MR. JOYCE: Thank you, your Honor.

7 THE COURT: Doesn't it?

8 MR. ZIMMER: That's correct.

9 MR. BUNN: No.

10 THE COURT: Didn't I just hear that they drew a

11 political line because of jurisdictional reasons?

12 MR. ABBOTT: The issue that was tried in Mojave was do

13 we have a river? Do we have a series of interconnected

14 groundwater basins? And, in particular, there were claims of

15 riparian rights and appropriate licensed rights under the State

16 Water Resources Control Board. Judge Kaiser found against those

17 when making those contentions and, you know, applied the law of

18 groundwater rights as he understood it.

19 MR. BUNN: And --

20 THE COURT: I'm looking at this map. I mean, if you

21 kind of look at all what's outlined here, we're pretty much all

22 connected. Probably someone could make the argument that they're

23 all hydraulically connected somehow to each other.

24 We certainly can't adjudicate four counties worth of

25 basins. I don't know how many counties are in that area.

26 MR. JOYCE: Your Honor, we only have two jurisdictional

27 counties concerned.

28 THE COURT: We only have two here. But it just seems

1 you have to get it to a -- a size that makes sense based upon the  
2 facts of the case and what specific rights you're trying to  
3 adjudicate.

4 MR. BUNN: Exactly.

5 THE COURT: The question is where in this case do we  
6 draw the line? I don't know.

7 MR. ZIMMER: That's why we came up with the concept of  
8 the area rather than groundwater basins.

9 MR. BUNN: We think we can make that clear with further  
10 testimony.

11 THE COURT: Let's keep -- actually, why don't we take  
12 our recess now. This is probably a good time. 15 minutes.

13 MR. JOYCE: Thank you, your Honor.

14 THE COURT: And then we'll start up again.

15 (Recess.)

16 Q. (BY MR. ZIMMER:) Mr. Sheahan, could you possibly show  
17 us in overlay format the Scalmanini line, the line you've drawn,  
18 and the DWR line?

19 A. Yes, I believe I can.

20 I have a -- an overlay of Mr. Scalmanini's map -- at  
21 least, this is the map from his report. It's not exactly the  
22 same as Exhibit 126, but it's -- the only change to that is the  
23 one that you've testified to. And --

24 MR. JOYCE: Your Honor, that overlay would be what  
25 number, please?

26 THE COURT: Well, your next in order is 22.

27 MR. BUNN: And, your Honor, what's the exhibit number  
28 that he's overlaying it onto?

1 THE COURT: That's a good question.  
2 MR. ZIMMER: He's now overlaying Exhibit 22 onto Exhibit  
3 Number 21.  
4 MR. BUNN: Okay.  
5 MR. TOOTLE: Your Honor, can we have the question read  
6 back as to all the different lines you see on this map?  
7 THE COURT: I'm sorry. You want the question?  
8 MR. TOOTLE: Yeah. I think Rich asked --  
9 MR. ZIMMER: I think the question involved the  
10 Scalmanini line, the DWR line, and Mr. Sheahan's line.  
11 MR. BUNN: Okay.  
12 (Pause in Proceedings.)  
13 MR. JOYCE: Your Honor, Exhibit 23 is the DWR  
14 Bulletin 118-2000 overlay.  
15 THE COURT: We'll so mark it.  
16 (Discussion - Not Reported.)  
17 THE COURT: What's 22?  
18 MR. ZIMMER: 22 is the Scalmanini overlay.  
19 MR. JOYCE: It's a vellum overlay.  
20 THE COURT: It is an overlay. All right.  
21 MR. JOYCE: Depicting Mr. Scalmanini's line.  
22 THE COURT: And so 23 is just another overlay.  
23 MR. JOYCE: Correct, your Honor.  
24 THE COURT: That's what I thought. Okay.  
25 MR. BUNN: A suroverlay (sic).  
26 THE COURT: And they're all overlaying 21.  
27 We'd better watch it. It is too late in the day and  
28 week for this.



1 MR. BUNN: Sorry.

2 (Pause in Proceedings.)

3 THE WITNESS: I believe we're ready.

4 THE COURT: I think we need a question. We might have  
5 had one, but let's get it again.

6 Q. (BY MR. ZIMMER:) Mr. Sheahan, have you now put up for  
7 us on the board the overlays which will show us the Scalmanini  
8 line, the DWR line, and your line?

9 A. Well, yes. What I'm showing now is my line in the  
10 background on the solid board and an overlay that shows  
11 Mr. Scalmanini's line. Actually, the overlay shows all of the  
12 lines, but I believe he testified that he would select the red  
13 line as his boundary line.

14 Q. Is there any way to write on the overlay so we can take  
15 it off later if we want to?

16 A. Yes.

17 Q. Or leave it, as the case may be? Just so we can make  
18 three different lines in different colors?

19 A. I believe so. If I test this, I believe this will erase  
20 off if we want it to.

21 Is that what you're asking?

22 Q. All I'm saying is it's probably hard for the Court to  
23 see what -- from distance what lines we're looking at. Maybe it  
24 won't help. Do it how you think will work with the overlays,  
25 but --

26 A. I can do as I did before, use a pink highlighter. And I  
27 believe the highlighter will work. It will. I can highlight  
28 Mr. Scalmanini's line if that would help.

1 THE COURT: Why don't you do that.

2 MR. JOYCE: I would suggest the pink's not going to help  
3 because you can't see it.

4 MR. BUNN: Do you have anything darker?

5 THE WITNESS: May I have the purple one back so we're  
6 using something different. Let's see if this one works better.  
7 Yes. This one works better. I'll highlight it in purple.

8 THE COURT: Thank you.

9 THE WITNESS: And I believe, though, this erases, so  
10 it's not necessarily a permanent line.

11 All right. Just for the record, I'm highlighting the  
12 red line on Mr. Scalmanini's map that represents the outline of  
13 the boundary that he testified that he would select as the  
14 boundary from the lines that he showed on his Plate 1, which I  
15 believe is Exhibit 126.

16 And the portion that I've highlighted now is that  
17 portion that his report indicates he took from Bloyd.

18 MR. ZIMMER: You need to keep your voice up,  
19 Mr. Sheahan. I don't know if it's just back here, but that thing  
20 is making noise.

21 THE WITNESS: Thank you. What I was saying is the  
22 portion that I've highlighted is the portion that Mr. Scalmanini  
23 indicated he obtained from the Bloyd 1967 study.

24 If you'll notice that there's an open end in the  
25 southeast corner. We can talk about that later. But essentially  
26 that's that line.

27 Q. (BY MR. ZIMMER:) This is the Figure 2 line, Figure 2  
28 from Bloyd, Figure 2.

1 MR. JOYCE: No. Bloyd, Figure 10.

2 MR. ABBOTT: Objection. Misstates the testimony.

3 Q. (BY MR. ZIMMER:) Figure 10.

4 MR. TOOTLE: Figure 10.

5 THE WITNESS: It's not that either. It's the group of  
6 subunits that Mr. Scalmanini collected from Figure 10 that  
7 include 14 subunits. This outlines the 8 subunits that he  
8 collected and the boundary of those 8 subunits that represents  
9 what he's referring to as the groundwater basin.

10 The black line that's on this -- this figure underneath  
11 is the watershed boundary. And the red line that is on the  
12 figure underneath is the boundary that I have selected, if you  
13 will, as the Phase 1 area boundary.

14 THE COURT: All right.

15 THE WITNESS: I note that I have not explained the  
16 basis.

17 THE COURT: I don't think I can see the difference  
18 between what you said is the watershed line and the line that you  
19 have depicted.

20 THE WITNESS: My line and the watershed boundary -- or  
21 drainage basin boundary are coexistent everywhere except along  
22 the county line.

23 THE COURT: Oh.

24 THE WITNESS: So this red and black line here is  
25 coexistent with watershed boundary all along the south, all along  
26 the west, all along the north, and for a portion of the northeast  
27 until it becomes that portion of the Mojave basin area  
28 adjudication boundary.

1 THE COURT: All right. Thank you.

2 THE WITNESS: The black line going across generally the  
3 center -- upper center of the figure is the watershed or drainage  
4 basin divide between the Antelope Valley and the -- I'm sorry --  
5 the Antelope Valley to the south and the Fremont Valley to the  
6 north. This line coexists with the line used by DWR to separate  
7 the Antelope Valley groundwater basin from the Fremont Valley  
8 groundwater basin. And I'd like to show that by pulling this  
9 other overlay down.

10 THE COURT: You may.

11 THE WITNESS: And you'll see that the lines are not  
12 exactly the same, but they are -- and that's because my overlay  
13 of the DWR groundwater basin map is blown up from a smaller map.  
14 But essentially, you'll see -- and I'll use another color to  
15 highlight this, if I may. I'll use an orange color.

16 MR. DUNN: And, for the record, this is Exhibit  
17 Number 23?

18 THE WITNESS: Yes, it is.

19 MR. DUNN: Thank you.

20 THE WITNESS: Those portions of the -- this may not be  
21 showing as well as I had hoped, but those portions of the DWR  
22 groundwater basin boundaries which are drainage basins are the  
23 portions that I am highlighting now.

24 The other portions of their drainage basins -- I'm  
25 sorry. That highlight is not -- not very clear. I think you can  
26 see that the black drainage basin boundary that I've shown and  
27 the orange groundwater basin boundary that DWR has chosen to  
28 separate the Fremont Valley groundwater basin from the

1 Antelope Valley groundwater basin are essentially coexistent.

2 Q. (BY MR. ZIMMER:) So going back -- pull the slide up  
3 there for a minute. Pull the vellum for a minute. The top one.

4 So we have essentially Mr. Scalmanini's line inside the  
5 purple; is that correct?

6 A. That's correct.

7 Q. And then we have the DWR line being essentially this  
8 line.

9 A. Something like that. Not exactly, but yes.

10 Q. But close.

11 And then we have your line being all of the DWR line  
12 plus, essentially, the Fremont Valley.

13 A. That's correct.

14 THE COURT: Are the Fremont basin and the  
15 Antelope Valley basin separated by what you referred to before as  
16 a -- is it a groundwater divide?

17 THE WITNESS: No, your Honor, they're not. They are  
18 hydraulically connected. And while there are some groundwater  
19 divides in some of the subunits, there's no such groundwater  
20 divide that separates the two valleys.

21 THE COURT: Thank you.

22 Go ahead.

23 Q. (BY MR. ZIMMER:) Mr. Sheahan, I'd like to figure out  
24 how you got to the point of making your line. And it's my  
25 understanding that derived from examining Mr. Scalmanini's line  
26 and figuring out what portions were not included that should have  
27 been included.

28 A. That's correct.

1 Q. And can you take us through that.

2 A. Yes. If I may, it's important in explaining that to  
3 explain the process that I used. And the process that I used  
4 began with my review as a hydrogeologist of the Phase 1  
5 stipulation.

6 May I take my seat?

7 Q. Sure.

8 THE COURT: You may.

9 THE WITNESS: I was asked to review the Phase 1  
10 stipulation, again, as a hydrogeologist looking at this case to  
11 see what the requirements of the Phase 1 stipulation were in  
12 terms of my perspective as a hydrogeologist to see what a Phase 1  
13 boundary line would require. And I looked at that in -- in  
14 detail.

15 The first sentence of the Phase 1 stipulation states,  
16 "Phase 1 will determine the area within which claims of  
17 groundwater rights will be adjudicated in this lawsuit and will  
18 include or exclude overlying properties from the lawsuit."

19 As a hydrogeologist, I understood that to clearly say  
20 that we were looking to adjudicate groundwater matters concerning  
21 some properties and to exclude properties from that.

22 Based on that, I considered the fact that the western  
23 boundary that I've shown on my map is a previously adjudicated  
24 area. And, again, as a hydrogeologist, it seemed appropriate to  
25 me to exclude that area from the Phase 1 area boundary that I  
26 would define. So I selected the eastern boundary as -- the  
27 eastern boundary of what I'll call the Phase 1 area as the  
28 western boundary of the previously adjudicated Mojave basin area

1 adjudication.

2           The second portion of the Phase 1 stipulation states:  
3 "The parties agree and based on such agreement the Court finds  
4 that groundwater production from outside this area does not have  
5 and has not had any legally adverse effect on groundwater  
6 production inside the area and vice versa."

7           That tells me that the Phase 1 requirements concern  
8 themselves with physical conditions. Groundwater production is a  
9 physical aspect that, as a hydrogeologist, I can deal with. The  
10 effects of groundwater production, I can also deal with. I do  
11 not have to address whether the effects are legally adverse or  
12 not. I can deal with whether or not there are effects.

13           Groundwater production causes a lowering of the  
14 groundwater level. And that's the key effect, in my opinion,  
15 that -- that impacts either beneficially or adversely groundwater  
16 production elsewhere.

17           THE COURT: All right. And the term "groundwater  
18 production," how are you defining that as far as your  
19 understanding of the stipulation?

20           THE WITNESS: Groundwater production, in my profession,  
21 generally means obtaining groundwater from its natural resource,  
22 if you will, or natural reservoir, the aquifer, and producing it  
23 for use. Pumping from -- groundwater from wells, essentially.  
24 Groundwater production can also occur by draining of groundwater  
25 through springs or horizontal wells or other means. But  
26 principally, in this area, what it means is pumping groundwater  
27 from wells.

28           THE COURT: Thank you.

1 THE WITNESS: So groundwater production, pumping  
2 groundwater from wells, causes the water level to go down. When  
3 the water level goes down, it takes more energy to pull  
4 groundwater out for additional production. That's an effect of  
5 groundwater production.

6 So I understood very clearly that the one requirement of  
7 the Phase 1 stipulation was to define an area such that along the  
8 boundary of that area groundwater production on the outside would  
9 not have an effect on groundwater production on the inside  
10 because the stipulation indicates that the Court is going to  
11 agree and the Court will find that that will be the case. So as  
12 a hydrogeologist, I looked for means to define a line where that  
13 would be essentially true in all cases.

14 I believe you've heard testimony from Mr. Scalmanini  
15 that, essentially, a watershed boundary is a line along which  
16 groundwater production from the outside does not have, at least,  
17 a significant effect. I think he used, but does not have an  
18 effect on the inside. I think that's generally understood and I  
19 think we agree on that. So a watershed boundary would be one  
20 such line.

21 Another important element of defining such a line and to  
22 define such an area is to have a line that can be surveyed, a  
23 line that is not a variable. We discussed groundwater mounds  
24 because pumping can cause the crest of a groundwater mound to  
25 move. It's not a finite line that one can determine today and  
26 have it be the same forever.

27 Similarly, a postulated fault is not a finite line that  
28 one can survey and field. A watershed boundary or a drainage



1 boundary, however, is a line that can be surveyed. Two surveyors  
2 can go out on two different days and look at the same area and  
3 define exactly the same line that represents the drainage basin  
4 boundary or the water. So that makes a drainage basin or  
5 watershed boundary line, let's say, an enhanced line for  
6 selection as one of the possible lines that we might select. So  
7 I considered the surveyability of the line.

8           The third thing is that the watershed boundary line,  
9 turns out, encompasses all of the recharge to all of the  
10 groundwater aquifers within that area. At least, all of the  
11 surface recharge.

12           The watershed boundary is the line within which all  
13 precipitation goes into those groundwater systems and outside of  
14 which all precipitation -- or none of the precipitation goes into  
15 those areas. So it gives us a finite boundary containing all of  
16 the water that, as a hydrogeologist in Phase 2, I would need to  
17 look at in order to make assessments concerning the water  
18 resources and groundwater conditions.

19           Then the other aspect that I considered was the  
20 materials underlying the watershed boundary. Notwithstanding the  
21 fact that we might agree that on either side of a watershed  
22 boundary, we won't consider that groundwater production has an  
23 effect. Certainly in some places, that's not exactly true. For  
24 example, the -- I'll use the highlighter. If I can remember what  
25 I did with it.

26           Q.     (BY MR. ZIMMER:) Laser?

27           A.     I'm going to point at the map that's up on the board,  
28 but specifically to Exhibit 21, which is my Phase 1 area boundary

1 map underneath, and point to the drainage basin or watershed  
2 boundary that separates the Fremont Valley from the  
3 Antelope Valley.

4           That happens to be a surface water divide. A very faint  
5 surface water divide, but it is a surface water divide. The  
6 aquifers on the north side and south side are hydraulically  
7 connected. And groundwater production on one side can easily  
8 have an effect on water levels on the other side. So that's --  
9 that's a watershed boundary that I found not to be acceptable as  
10 a Phase 1 area boundary because it did not -- it specifically did  
11 not meet the requirements of the Phase 1 stipulation that  
12 groundwater production from outside this area does not and has  
13 not had any legally adverse effect on groundwater production  
14 inside the area. So I was not able to select that drainage basin  
15 boundary.

16           And if I may, let me back up. The reason that I have  
17 selected the other portions of the drainage basin boundary has to  
18 do with the geologic materials under them. The drainage basin  
19 boundary generally along the south side overlies bedrock.  
20 Bedrock with either a low hydraulic conductivity or a low  
21 transmissivity -- and I'll explain those in a moment -- which  
22 means that there is little chance that groundwater flow will  
23 occur across that boundary. Further, it means that there's  
24 little chance that there will even be groundwater production in  
25 those vicinities.

26           Hydraulic conductivity, I can -- I have a chart that  
27 would explain what I mean -- I'd be happy to, but just in  
28 general, that's the ability of a material to transmit water. If

1 you can imagine a clay material that's very fine grain, it might  
2 get wet, but water won't go through it very easily. That's a low  
3 conductivity material. Solid and fractured bedrock is low  
4 conductivity. A coarse gravel deposit with a lot of void space,  
5 interconnected void space, is a material that has high  
6 conductivity. Water will go through it very easily.

7           Transmissivity -- and, by the way, Bloyd's report refers  
8 to it as transmissibility, an older term meaning the same thing.  
9 Transmissivity is simply the value for hydraulic conductivity  
10 multiplied times the thickness of an aquifer unit. So an aquifer  
11 with a high hydraulic conductivity such as a gravel but which is  
12 very thin would have a low transmissivity.

13           There are some areas in the mountains where there are  
14 some small streams and there's some gravel deposits that are  
15 relatively thin. Those materials have high hydraulic  
16 conductivity but very low transmissivity, little or no water will  
17 go through them because of that.

18           So I selected as a criteria for defining which of the  
19 watershed boundary line segments would be appropriate by choosing  
20 those segments which are underlain by geologic materials that  
21 contain either low hydraulic conductivity material, such as  
22 bedrock that is not highly fractured, or materials that have a  
23 low transmissivity such as gravel deposits that are buried in.

24           And I was able to trace around using the geologic maps  
25 that are available for this area and determine that the watershed  
26 boundary that I defined on the -- we'll start with the south  
27 side -- that entire boundary meets those requirements. So,  
28 again, that's a boundary line that is surveyable that contains

1 all of the water within it that overlies geologic material with  
2 relatively low hydraulic conductivity and/or relatively low  
3 transmissivity. And I found that to be an acceptable boundary to  
4 meet the Phase 1 requirement of the boundary lines of an area  
5 such that groundwater production on one side would not have an  
6 effect on the other side.

7 I continued that process throughout the whole area  
8 starting with the south line and around the west side and around  
9 the north side. And those criteria are fully met, in my opinion,  
10 by the watershed boundary going from the point that I have marked  
11 "G" in the southeast corner all the way around to the west and  
12 north and back around to the point that I have marked "F."

13 Those criteria, by the way, were not met by the  
14 watershed boundary that goes between the Fremont Valley and the  
15 Antelope Valley. So I was not able to choose that watershed line  
16 as part of my Phase 1 area boundary.

17 And I've already explained that the western boundary  
18 from Point F to Point G, I show as the Mojave area -- I'm  
19 sorry -- the Mojave basin area adjudication western boundary. So  
20 just so you understand, that's how I've selected my boundary.

21 And that includes, then, all of the aquifer systems  
22 within it that are hydraulically connected and all of the surface  
23 water that is available to a greater/lesser extent as recharge to  
24 those systems. And they'll allow me, as a hydrogeologist, to  
25 properly assess the impacts of groundwater production in Phase 2.

26 Sorry for such a long answer, your Honor.

27 THE COURT: That's all right.

28 Q. (BY MR. ZIMMER:) Mr. Sheahan, why didn't you select the

1 line between Fremont Valley and Antelope Valley?

2 A. Well, that line, again, represents a drainage basin  
3 boundary. If you can imagine a piece of paper that is just  
4 slightly bent upwards in the middle and a drop of water falling  
5 on one side of it, it would drain one way; falling on the other  
6 side, it would drain the other way. All that line represents in  
7 the physical characteristics is that pressed or that high point  
8 of a very slight bend in a piece of paper. It is a drainage  
9 basin boundary. Surface water goes both ways from that line.

10 The reason I didn't select it, though, is beneath that  
11 line in the groundwater system, we have contiguous aquifers.  
12 Groundwater flows across those lines very easily. That line is a  
13 surface topography line. Has nothing to do with groundwater flow  
14 in that area. It's not a boundary for groundwater flow. Its  
15 presence or absence has no effect, if you will, on --  
16 essentially, no effect at all on groundwater flow.

17 So it -- and that drainage basin boundary, then,  
18 overlies materials with high hydraulic conductivity and high  
19 transmissivity such that groundwater can easily flow through it.  
20 So it didn't meet my criteria, and so I did not select it for  
21 those reasons.

22 Q. Do you happen to have, by any chance, a cross-sectional  
23 representation of what, generally speaking, is included from,  
24 let's say, the south line to the north line?

25 A. Yes. I've made a sketch that shows that. I think I can  
26 put that up.

27 THE COURT: That would be 24.

28 MR. BUNN: Did you say that was a cross section?

1 MR. ZIMMER: Did you guys want a copy of that?

2 MR. TOOTLE: Yeah, I do want a copy.

3 Q. (BY MR. ZIMMER:) Mr. Sheahan, can you show us the  
4 general location of the cross section that you have graphically  
5 depicted.

6 A. Yes. I've prepared a diagrammatic cross section, your  
7 Honor. It's not exactly to scale, but it's done for the purpose  
8 of explaining the groundwater and other conditions in an area.  
9 And I've started generally in the area near Leona Valley on the  
10 south. Actually, just at or below the watershed boundary on the  
11 south. And I've carried it up across the lines that  
12 Mr. Scalmanini has chosen and on up into the Fremont Valley and  
13 all the way to the watershed boundary to the north.

14 And what I want to do is to show the line -- the cross  
15 section that represents the subsurface conditions generally in  
16 that area to explain some of the characteristics of it.

17 Now, on this -- in this sketch -- and it's just a  
18 hand-drawn sketch -- the left side represents the San Gabriel  
19 mountains, the line going up from the top of the mountains --  
20 which I'll highlight in blue now. It says "watershed boundary."

21 Q. Just for reference, is this south down here?

22 A. South would be on the left side, yes.

23 Q. Why don't you put an "S" down there.

24 A. I'll put an "S" in blue on that side, and an "N" for  
25 north on the right-hand side.

26 Okay. And what I've shown as the top line is,  
27 essentially, the groundwater surface so we have a reference.

28 I'm sorry. Let me correct that. The ground surface,

1 not the groundwater surface. So the top line is the ground  
2 surface.

3           The high point here represents the watershed boundary  
4 overlying bedrock. Somewhat fractured, contains groundwater, but  
5 it's not high, high hydraulic conductivity or high  
6 transmissivity. Groundwater will move through it, but  
7 groundwater production on one side would not have, essentially,  
8 an effect on the other side.

9           That line then goes down through the Leona Valley. And  
10 I've shown in -- with vertical hatches the area in the  
11 Leona Valley that we have not yet discussed, but it represents  
12 the location of the San Andreas Fault. San Andreas Fault zone is  
13 a zone up to about a mile wide through the Leona Valley where the  
14 bedrock has been fractured. And because it is so highly  
15 fractured, it acts as a bedrock aquifer, or a fractured rock  
16 aquifer.

17           The next high point represents the high ground or  
18 bedrock separating the Leona Valley from the main portion of the  
19 Antelope Valley. It can't be shown in the cross-section view,  
20 but there is direct hydraulic connection between the fractured  
21 bedrock aquifer in the Leona Valley, which is the San Andreas  
22 Fault zone with the unconsolidated aquifers out in the  
23 Antelope Valley.

24           Q. Since we're talking about that, could you show us on a  
25 slide -- do you have a slide that shows that?

26           A. I -- yes, I do. If you'd like, I think I can do that.  
27           Let me have Slide 10, please.

28           THE COURT: That would be marked as 25.

1 MR. ZIMMER: Thank you, your Honor. Slide 10 marked as  
2 Exhibit 25.

3 Q. (BY MR. ZIMMER:) And Mr. Sheahan, what is that?

4 A. Slide 10 is a blowup of my base map. And if I may, I'll  
5 use the highlighter. It's a blowup of my base map, the green and  
6 the topography and the roads and so forth are from the base map.  
7 It shows the south line of the boundary that Mr. Scalmanini has  
8 drawn. And that is shown on here as San Andreas Fault zone  
9 because that's what Mr. Scalmanini's original map showed on that  
10 line. In fact, that is incorrect. The San Andreas Fault zone  
11 runs through the area that I'm now showing that you can  
12 essentially see as a low portion of the topography, which is  
13 known as Leona Valley.

14 This is -- this area in Leona Valley is a fractured rock  
15 zone that is connected in the outlet of Amaragosa Creek to the  
16 main portion of the Antelope Valley. So this is a hydraulic  
17 connection between this aquifer and these aquifers out here.

18 Q. When you say "highly fractured," there's difference in  
19 fracturing?

20 A. Yes. When we have faulting as we do in this area and we  
21 have significant faulting such as the San Andreas Fault zone, the  
22 Garlock Fault zone that marks the northwestern portion of the  
23 Antelope/fremont Valley area, the movement of rocks along those  
24 faults, the movement of the plates causes the rocks adjacent to  
25 the point of movement to break up a great deal, highly fracturing  
26 those rocks. But even out from that area, those stresses cause  
27 the otherwise brittle rocks to break and fracture.

28 There may not be movement along those fractures, and,



1 therefore, they may not be faults, but they still are fractures  
2 and they open up an opening in the rock. And those openings can  
3 contain water.

4           And the openings caused by fractures in the rock that  
5 are interconnected, the fractures being interconnected, form a  
6 permeable material that can transmit water. If it's highly  
7 fractured, it can transmit enough water to be used as an aquifer  
8 such as in the Leona Valley. So that's the -- that's the area  
9 and that's the hydraulic connection that I was referring to.

10           Q. Mr. Sheahan, is it correct to state that the only  
11 hydraulic conductivity is through the outlet, or is there  
12 hydraulic conductivity across this area as well?

13           A. The latter is more correct. And I can explain that, I  
14 think, more easily on the diagram. That's one of the points that  
15 I wanted to show on this diagram, if I may.

16           I'll finish discussing the rest of the top line in a  
17 moment, but let me highlight for a moment what I've shown on this  
18 diagram to be the upper -- upper level of the saturated material  
19 below ground, what we call the saturated aquifers or saturated  
20 fractured bedrock.

21           I'm highlighting the blue, a line that's marked on here  
22 to designate the water table. And I'm going to take that all the  
23 way on across while I'm in the process.

24           Now, in answer to your question, Mr. Zimmer, between the  
25 Leona Valley shown here under the words "San Andreas Fault zone,"  
26 between that and the main portion of the Antelope and Fremont  
27 Valleys is bedrock. That bedrock is fractured. But below the  
28 water table, the fractured bedrock is saturated with water.

1           Rainfall occurs in the mountains, builds up a higher  
2 head in that area than the head of water in the valley. And I  
3 mentioned differential head earlier. There's a differential head  
4 between the water level and the fractured bedrock between  
5 Leona Valley and the main valley portion. And that differential  
6 head causes groundwater to flow through the fractured bedrock out  
7 into the unconsolidated deposits in answer to your question.

8           Q.    Okay. So you haven't colored in blue, but everything  
9 below this blue line would be described as fully saturated  
10 conditions.

11          A.    I would -- yes. I would characterize that. I don't --  
12 I haven't gone through the full depth, but just everything within  
13 the blue block that I've drawn would be considered saturated  
14 materials.

15                The other point I wanted to bring out concerning what we  
16 were discussing a moment ago, the drainage between the  
17 Fremont Valley and the Antelope Valley I tried to depict in this  
18 upper line. There is a surface water drainage basin boundary  
19 that I've listed on here as watershed boundary also.

20                Again, water falling on the surface on the right side  
21 of -- in a line to -- tend to move to the right. Water falling  
22 on the surface of the left would tend to move to the left. There  
23 may be a groundwater mound in some areas, but there may not be.  
24 But the groundwater beneath that can move in either direction.

25                The groundwater body beneath it is hydraulically  
26 connected all the way from the Fremont Valley all the way down  
27 through the Antelope Valley. And, in fact, all the way up to at  
28 least the watershed boundary on the left side and all the way up

1 to the upper watershed boundary north of the Fremont Valley.

2           So the point I was attempting to make to begin with is  
3 the surface water boundary can be used to define a groundwater  
4 basin. For my purposes in defining a line, I found this line to  
5 be unacceptable for purposes of Phase 1 because it did not mark  
6 the boundary of an area where groundwater pumping on one side  
7 would not have an effect on the other side.

8           THE COURT: All right. And you're showing the water  
9 flowing through the San Andreas Fault zone; correct?

10          THE WITNESS: Yes. Groundwater --

11          THE COURT: And I think I'd heard before that a fault  
12 acts as a barrier?

13          MR. ZIMMER: You heard that from Mr. Scalmanini.

14          THE COURT: Right. So why do you not believe that the  
15 fault zone acts as a barrier? Is that -- is a zone different  
16 than what you've depicted as the postulated fault and the  
17 Rosamond Fault in the sense of how it acts with water?

18          THE WITNESS: Yes.

19          THE COURT: Can you explain that.

20          THE WITNESS: Yes. It's different in several regards.  
21 The fault zone produces a wide area of highly fractured bedrock.  
22 It's different than the specific definition that I gave you of a  
23 fault where it's a fracture along which there's movement. It's a  
24 zone where there has been movement of the -- I'll call it the  
25 bedrock mass to the south side or left on this diagram versus the  
26 entire mass to the right side. And that whole zone is broken-up,  
27 fractured bedrock that has large voids in it that are capable of  
28 collecting, storing, and transmitting water and producing water

1 to wells in economic quantities. In fact, there are wells in the  
2 Leona Valley, as I understand it, that produce water from the  
3 fractured bedrock.

4 Now, that's a fault zone. The fault that we talked  
5 about before is represented on Exhibit 24 by two lines. In fact,  
6 I've shown two faults. One, the deposited postulated fault that  
7 represents the south line of Mr. Scalmanini's map. And I can  
8 show that on Slide 10 with the highlighter. He has now referred  
9 to as a -- an unnamed fault, a pattern that he shows with dots is  
10 the postulated fault. So the southernmost or left-hand most  
11 fault I've shown here, which I'll discuss in just a moment, is --  
12 it represents that fault.

13 The solid line that I've shown just to the right of that  
14 represents the Rosamond Fault or otherwise known as Cottonwood or  
15 Willow Springs Fault. But that represents the northern boundary  
16 of the area that Mr. Scalmanini's red line encompasses.

17 So, essentially, I'll show in brackets the portion of  
18 this diagram which is -- is the portion that he has included as  
19 the groundwater basin is only this portion. And I'll put an "S,"  
20 if you will, for Scalmanini. That is the width that he has  
21 included as part of what he's defined as groundwater basin. In  
22 fact, there's groundwater running from watershed boundary to  
23 watershed boundary. And it is hydraulically connected across.

24 Q. (BY MR. ZIMMER:) Did he have a diagram -- with the "S"  
25 there, he had a rather simplistic diagram with a little --

26 A. Yes, he did.

27 Q. He tried to make it look like a bucket kind of?

28 (Pause in Proceedings.)

1 MR. TOOTLE: Your Honor, can we have the question read  
2 back, please.

3 (The Record Was Read.)

4 THE COURT: Why don't we have a new question.

5 MR. JOYCE: Let's see. Let the record reflect it's  
6 about ten to 4:00.

7 Q. (BY MR. ZIMMER:) Maybe the other diagram would be  
8 correct, the other diagram there?

9 A. Perhaps. I would prefer to start with this one, if I  
10 might.

11 THE COURT: Let's just go through this. We're going to  
12 have to wrap it up so we can talk about the legal procedures  
13 we're going to go through. So let's try to just get through some  
14 questions on this.

15 Q. (BY MR. ZIMMER:) Go ahead, sir.

16 A. If I may, the reason that I'd like to present this is  
17 just to compare and contrast.

18 On Mr. Scalmanini's diagrams, on all three of them, he  
19 fails to indicate that there is any fracturing or any bedrock  
20 water -- groundwater in the bedrock on either side. And,  
21 therefore, he doesn't show a water table in that area. That is  
22 not the case. There is water in the fractured bedrock that comes  
23 from rainfall within the watershed infiltrating down through the  
24 fractures and then from the fractured bedrock out into the  
25 aquifer materials.

26 Q. That's this area over here in your diagram.

27 A. That's right. In my diagram, I'm showing that by  
28 this -- this blue portion.

1 He also doesn't show faults in this. He shows a -- a  
2 water table that is level. In fact, the water table is not  
3 level. There's a slope to the water table in most tables because  
4 water is draining and it's following a slope downward.

5 I think that's enough. I think the important thing is  
6 that even though my diagram is simple, 24, I believe it is, there  
7 is a lot more detail that's important to be considered when  
8 you're looking at the simplistic diagrams.

9 Q. Let me show you this diagram, because we were talking  
10 about the faults there. And Mr. Scalmanini has drawn a diagram  
11 of a fault and, at least, in his opinion, the effect that it has.

12 Now, in your diagram over here, you have water going  
13 across the fault, or moving across the fault. And Mr. Scalmanini  
14 is basically saying it's an impermeable barrier for all intents  
15 and purposes.

16 Can you discuss this concept and diagrams?

17 MR. DUNN: Which exhibit are you referring to?

18 MR. ZIMMER: This is -- I'm not sure -- Defense  
19 Exhibit 112.

20 THE COURT: Groundwater basin boundaries is what I -- is  
21 that what that says?

22 MR. ZIMMER: That says "Groundwater basin boundaries.  
23 No appreciable underflowing."

24 THE COURT: All right. What's our question?

25 Q. (BY MR. ZIMMER:) The question was can you --  
26 Mr. Scalmanini has essentially said that there is no appreciable  
27 underflow. It acts as a dam. That was his analogy. That the  
28 water doesn't go across there.

1           You, by contrast, have indicated that there is migration  
2 of water across there that should be considered.

3           I'd like you to tell us why.

4           A. Let me point out a couple of things on Mr. Scalmanini's  
5 diagram, also, that I think are really important to take into  
6 account.

7           Again, the bedrock areas are portrayed as being solid,  
8 impermeable rock. They are not. They are permeable, they're  
9 fractured, and they contain water. And water from the bedrock  
10 feeds into the -- even more permeable aquifer materials.

11           Secondly, he shows a differential head. He shows a  
12 water table that he described and a water table on each side of  
13 the fault. He shows a differential head between those two, and,  
14 I believe, testified that that differential head indicated that  
15 there is no flow of water across the fault.

16           In fact, that is not the case. On the south side -- and  
17 I'm going to point to my figure for a moment -- the boundary that  
18 he has used, the postulated fault boundary, based on the  
19 information from Bloyd's Figure 10, there is groundwater on the  
20 south side that is approximately 50 feet higher than groundwater  
21 on the north side. And the contours in that area indicate,  
22 clearly, that there is groundwater flow from south to north  
23 across that barrier.

24           Similarly -- and I can show you this in more specifics,  
25 but because of the time, I'm trying to do this really fairly  
26 quickly. Similarly, the 300-or-so-foot differential head that he  
27 referred to along the Rosamond Fault, the contours on Bloyd's  
28 Figure 10 indicate clearly that there's a component of

1 groundwater flow that goes across that fault also. The fact of a  
2 fault or the presence of a fault does not mean a barrier to  
3 groundwater. If that fault is such that it includes impermeable  
4 clays or causes something to happen other than just faulting that  
5 might act as an impermeable barrier, then perhaps it would be.

6           In most cases, the fault simply displaces material from  
7 one side to the other and makes it more difficult for groundwater  
8 to flow through the fault. We call that retarding fault. And  
9 that happens frequently. When that happens, it causes the  
10 groundwater to need more energy to get through that material  
11 because the hydraulic conductivity at the fault may be lower.  
12 That requires a greater differential head.

13           So the groundwater levels due to recharge will build up  
14 to a higher level on the one side to increase the head. And once  
15 the head gets increased to an appropriate differential head, then  
16 the groundwater essentially has enough energy to go through that  
17 lower material. And that's exactly what we have happening not  
18 only along the Rosamond Fault, which is the northern boundary  
19 that Mr. Scalmanini has selected, but also along the southern  
20 boundary, along the postulated fault. There's differential heads  
21 on both sides. There's -- the contours in the area indicate the  
22 groundwater is flowing towards those faults and not stopping at  
23 the faults, otherwise it would just fill up and be flat. It  
24 continues to be flowing in that direction. The outflow of that  
25 zone has to be -- can only be across that fault. And, in fact,  
26 in the modeling study done by Durbin, he quantifies the  
27 groundwater underflow going across those zones.

28           So, again, one of the reasons that I disagree with



1 selecting those boundaries for our area is there's considerable  
2 groundwater inflow going across those zones and, therefore,  
3 groundwater production on one side could have an effect on  
4 groundwater production on the other side. I don't know the  
5 significance of that production, but for Phase 1 purposes, it's  
6 not appropriate to determine the significance.

7           It's only appropriate as I -- you know, as I indicated,  
8 the requirements of Phase 1 are to select the boundary line where  
9 we don't have that happening. So I'm not able to accept a  
10 boundary that allows that to happen. I must go to a boundary  
11 where groundwater production on one side doesn't have that  
12 effect. And that's one of the reasons I've selected the boundary  
13 that I have.

14           THE COURT: Thank you.

15           Let's stop here. I'm going to have you take your seat.

16           And we have a motion by Mr. Bunn, I believe, to vacate  
17 the stipulation.

18           MR. BUNN: Yes, your Honor.

19           THE COURT: All right. We're not even going to get into  
20 the grounds at this point, because I'm going to make you file it  
21 in writing.

22           I keep thinking the problem we're having here is based  
23 upon the wording of the stipulation, the "legally adverse  
24 effect," because it is requiring, I believe, plaintiffs to  
25 include a greater area.

26           Is not, really, what we're supposed to be doing in  
27 determining the area is simply determining that area where we can  
28 adjudicate plaintiffs' overlying rights? Correct?

1 MR. JOYCE: Your Honor --

2 THE COURT: And doesn't it just simply connect to the  
3 aquifer, connected underneath, i.e., that basin? And isn't that  
4 what we should be looking at? Because I think then you can still  
5 consider pumping outside the basin and flow in and out of the  
6 basin without actually adjudicating a larger basin than we need  
7 to.

8 MR. ZIMMER: Your Honor, I --

9 THE COURT: I've not -- you know, I've got to sort of  
10 read through all of this, but that's sort of what my mind thought  
11 is. I want to see how the cases explain it.

12 MR. JOYCE: Your Honor, if the only issue was do  
13 plaintiffs have overlying rights, the answer to your question  
14 would be yes because then the area is the legal description of  
15 the property. There it is. We have overlying rights. That's an  
16 incident of the deed, an incident of the title. The importance  
17 of the area is the end product of the defendants' answer and  
18 claiming of prescriptive rights.

19 The problem and the issue is this: In Phase 2, at some  
20 point, hydrologically, there's going to have to be an analysis of  
21 the, quote, unquote, "water supply," where that's the water  
22 supply based upon the entire watershed, both surface and  
23 subsurface flow. What is the water supply based upon?  
24 Cross-flows from outside of an area, from another area? And then  
25 once you've done that, then you've got to go to the next  
26 hydrologic interconnected issue, and that is, is there pumping?  
27 And is one pump affecting another pump, or is Pump A the one  
28 that's having an affect on Pump B, or might it be Pump C?

1           So when you start pulling an area down, down, down, and  
2 down, then they can say, as Mr. Sheahan pointed out earlier,  
3 "There's your well. There's our well. Your water table is going  
4 down. It must be us. We must be adverse. We must have  
5 prescribed. You win; we lose."

6           THE COURT: But the flip side of that is if you make it  
7 bigger, bigger, bigger, bigger, you -- the mathematical  
8 calculations are going to take into account the -- I don't know.  
9 Is it volume of the land?

10          MR. JOYCE: That -- the dynamics of the system.

11          THE COURT: I mean, what I think I have to do in  
12 determining the boundaries is have a size that is fair to both  
13 sides, but also what the law requires. But I don't think any of  
14 the cases that I've seen so far give me a formula in how I do it.  
15 They talk about it. They talk about basins. They talk about  
16 watersheds. But where do they explain how they -- how that Court  
17 sat down and calculated the boundaries --

18          MR. TOOTLE: Your Honor --

19          THE COURT: -- in some detail that I can take that  
20 formula and apply it here? I see little smiles. No one --

21          MR. ABBOTT: I see case law that says follow Steps A, B,  
22 C, and D. What it talks about the common supply, the safe field,  
23 kind of storage unit in which this water is. There is a  
24 fundamental disagreement between plaintiffs and defendants as to  
25 what we have to show to prove the adversity element of  
26 prescription. We understand the case law to be that if we were  
27 pumping water from the basin, while it was in an overdraft  
28 condition, that is, by law, adverse to their rights. We do not

1 have to show direct well interference, just pumping during the  
2 overdraft to establish the adversity element. So we've got that  
3 disconnect between plaintiff and defendants.

4 MR. JOYCE: That's --

5 MR. ABBOTT: The overdraft is focused on the storage  
6 unit in which all this groundwater is located.

7 MR. ZIMMER: May I be heard somewhere in here?

8 MR. JOYCE: I'm sorry. Go ahead, Rich.

9 THE COURT: You may.

10 MR. ZIMMER: I think the problem is the Court has read  
11 some of these cases which discuss groundwater basins. And a lot  
12 of those cases are dealing with cases where there were  
13 injunctions. The one party was trying to stop another party from  
14 pumping and, therefore, the extent of or the reach of the right  
15 of the party seeking the injunction was in issue.

16 In this case, we have brought suit to quiet title to  
17 these properties. And the defendants have claimed that they have  
18 prescriptive claims to water on those properties based on the  
19 elements that they need to prove on our prescriptive rights --  
20 make of prescriptive rights claim.

21 So that's why I keep coming back to the point that the  
22 Court needs to focus on the area of inquiry to allow us an area  
23 of study so that we can look at that area hydraulically and  
24 determine whether pumping in one area is, in fact, affecting  
25 pumping in another area.

26 There is no case that you will find that says that as a  
27 prerequisite element to this kind of a claim that you have to  
28 prove what the basin is or that you have to prove what -- a

1 certain groundwater basin exists. Groundwater basin has simply  
2 been used along with other terms, "subdivisions."

3 "Subdivisions," as a way of describing --

4 THE COURT: I understand.

5 It seems like the problem, though, is perhaps maybe in  
6 the Antelope Valley basin that some of the other areas could be  
7 included. I'm not sure. I'd need to hear all the testimony.

8 But it's that jump that you want me to make to  
9 include -- is it the Fremont Valley basin? And I'm having a hard  
10 time understanding why that should be included if, in fact,  
11 there's no overlying land there. And it seems to be something  
12 separate.

13 Now, there's some connection, yet there's a lot of  
14 connection between all kinds of different basins. You know, what  
15 is it about that to include what is really a big piece of land?

16 MR. JOYCE: One of the defendants --

17 MR. TOOTLE: Your Honor, I think what's important is not  
18 only the cases, but also the studies that have been performed in  
19 this area by USGS over a number of years. And what areas they  
20 have chosen to do these studies and to do these models. And I  
21 think you need to take that into account when you look at what --  
22 forming your basins to be consistent with what they have done.

23 MR. ABBOTT: And if I can make one point, your Honor.  
24 Although, you know, we don't have a Step A, B, or C, I don't know  
25 how you define a basin. If you go back -- and I don't know how  
26 far you've gone back in your reading -- the initial case Katz  
27 versus Walkenshah (phonetic), the Supreme Court explained the  
28 hydrologic conditions in Southern California that prompted them

1 to depart from the English common law rule that whoever can pull  
2 the water out of the ground can do whatever they want with it and  
3 replace it with the correlative rights system where people who  
4 overlie the basin have a right in common with each other to pump  
5 water. And the surplus can be appropriated. If there's pumping  
6 that isn't a surplus, that's adverse to those correlative rights,  
7 owners' rights.

8           If you read that case, I think you can get a pretty good  
9 flavor of what the Supreme Court was looking at and having in  
10 mind for the common supply that they were referring to in that  
11 case.

12           THE COURT: Well, let's do this. Because I am really  
13 leaning towards the continued trial starting up September 16th.  
14 With that in mind, how much time does everyone want to brief  
15 this? I can have you come in Tuesday, but I think the feeling  
16 I'm getting from everyone is you don't think that's going to give  
17 you enough time to really sit down and think about it.

18           So if we get the actual motion to vacate the  
19 stipulation -- filing it more as a motion in limine versus a  
20 noticed motion with the Court. So file it directly in this  
21 department so we can handle it.

22           If we get that done -- do you need more than a week? Or  
23 can you get it done --

24           MR. BUNN: A week is fine, your Honor.

25           THE COURT: All right. So today being the 9th. That  
26 gets filed by the 16th.

27           Opposition --

28           MR. JOYCE: No.

1 MR. ZIMMER: Opposition -- yes. There will be  
2 opposition.

3 THE COURT: Well, I heard a no. I was kind of excited  
4 here for a second.

5 MR. JOYCE: I said "well." I said seven and seven would  
6 seem fair minimally.

7 THE COURT: So we'll give you till the 23rd. Reply on  
8 the 20 -- I'd say by the 29th. With the motion September 4th,  
9 something around the 4th, 5th, or 6th.

10 You know what? I'm going to have you file it as a  
11 noticed motion. I think it will work better. If you end up  
12 filing in this department, it's going to end up confusing things.  
13 So I take that back.

14 What day the week of September 3rd -- avoiding the 3rd  
15 because Monday's a Labor Day holiday -- do you want it heard?

16 MR. JOYCE: Your Honor, I can't -- I was trying to see  
17 if I can see the calendar. Would it be possible to hear it that  
18 Friday, on the 6th?

19 MR. DUNN: That would work best for me, your Honor  
20 because I'll be in a case that's dark that day.

21 MR. JOYCE: And I'm in a trial --

22 THE COURT: All right. Let's put it on Friday the 6th.

23 (Discussion - Not Reported.)

24 MR. JOYCE: Your Honor, just as a discussion, and it may  
25 or may not be of any help to the Court, if the Court were to read  
26 the Mojave decision and read, more importantly, background  
27 introduction, it's a fairly explicit and detailed hydrogeographic  
28 description of the area in controversy. It may be of some help

1 to you.

2 THE COURT: All right. This is what I want everyone to  
3 do. This will cure what I was trying to do the last time. But  
4 we're going to file it as a noticed motion. When you file it  
5 with the clerk, have a courtesy copy delivered up here. That  
6 way, I will make sure I get it ahead of time rather than our  
7 usual day before.

8 MR. JOYCE: And we'll do the same with the opposition.

9 THE COURT: All right. So -- and on the reply. And  
10 that'll give me a chance -- because I've started to read through  
11 some of the cases. They're all so long, I can't say that I've  
12 read through a complete case. And I want to do that. So that  
13 will give me a chance well before the hearing to have everything  
14 and not have any surprises. So let's do that.

15 MR. JOYCE: Thank you, your Honor.

16 (Proceedings Adjourned.)

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REPORTER'S CERTIFICATE

STATE OF CALIFORNIA     )  
                                  ) ss.  
COUNTY OF RIVERSIDE    )

I, Trina N. Fehlman, Certified Shorthand Reporter,  
Number 10684, hereby certify:

That on August 6, 2002; August 7, 2002; and August 9,  
2002, I took in shorthand a true and correct report of the  
proceedings had in the Diamond Farming, et al., versus City of  
Lancaster, et al., matter, pages 163 - 516, inclusive, which is a  
true and accurate transcription of my shorthand notes, taken as  
aforesaid, and is my oral proceedings transcript.

DATED: Riverside, California, August 29, 2002.



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Trina N. Fehlman, CSR 10684  
Official Court Reporter  
Riverside Superior Courts