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1	I N D E X	
2	WITNESS: EDWIN FRANKLIN CORKHILL	PAGE
3	DIRECT EXAMINATION CONTINUED	
	By Ms. Ronald	652
4	CROSS-EXAMINATION	
5	By Mr. Lewis	681
6	CROSS-EXAMINATION CONTINUED	
	By Mr. Lewis	753
7	REDIRECT EXAMINATION	
8	By Ms. Ronald	756
9	WITNESS: SANDRA FABRITZ-WHITNEY	
10	DIRECT EXAMINATION	
11	By Ms. Becker	761
12	WITNESS: DR. JANSEN	
13	EXAMINATION	
14	By Hearing Officer, Thomas Shedden	776
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
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P R O C E E D I N G S

HEARING OFFICER: Good morning. We are on the record again in the matter of the application for a permit to transport water out of state. Permit No. 33-96790, applicant, Wind River Resources, LLC, Docket No. 07A-TR001-DWR.

I'm Administrative Law Judge, Thomas Shedden.

I've been assigned by the Office of Administrative Hearings to preside over this matter. It is Sunday, March 4th, approximately 9:00 a.m. We are at the Beaver Dam High School in Beaver Dam, Arizona. Again, we want to thank them for allowing us to use their facilities today, particularly on a Sunday. Their staff has had to come down here for us, so we appreciate that.

Present today with me is Administrative Law Judge, Louis Cowell and Administrative Law Judge, Dianne Mihalsky. Present for the parties, representing the Department of Water Resources, Ms. Jan Ronald and Mr. Scott Deeny. For Wind River Resources, Mr. Byron Lewis and Ms. Maxine Becker. And they each have a number of witnesses or principals from their firm with them.

I want to thank the crowd for appearing again today. We've also got a number of our other interested

1 persons that are here. I will reiterate a couple of  
2 comments just in case some of you are here for the  
3 first time today and hadn't attended the other sessions  
4 we've had. One, this is an administrative hearing. It  
5 is conducted much like a trial. The public is welcome  
6 to attend, but not to participate in our proceedings in  
7 any way. I will ask you all to turn off your cell  
8 phones, pagers, and beepers, these kinds of devices,  
9 please. And I will point out for the public that's  
10 here, again, we received a substantial number of  
11 written comments, over 300. I have in deed read those  
12 and will consider those when I consider all the  
13 evidence that's been presented here.

14

15           With that, what I want to do, first thing,  
16 before we get too far into things, of course, those of  
17 you who were here last night, know Mr. Pearce on behalf  
18 of Great American Land, raised several issues. So I'm  
19 going to give the counsel for the two parties an  
20 opportunity to comment and or respond on those issues.  
21 And I'll turn to Mr. Lewis first.

22           MR. LEWIS: Your Honor, last night Mr. Pearce  
23 raised some issue of -- a couple of issues we'll be  
24 willing to stipulate to. And that is whether or not  
25 the -- I think he's had some CDs or videotapes or

1 something that show the -- record the two public  
2 hearings that were held up here. The first one, by the  
3 Arizona Department of Water Resources and the second  
4 one, by the Arizona Corporation Commission. We agree  
5 with Mr. Pearce that both of those documents should be  
6 part of the record since they really are a part on how  
7 we got here, this whole proceeding. So we would  
8 stipulate to the admission of those exhibits. He also  
9 raised constitutional due process issues. And it's the  
10 same constitutional of due process issues that we've  
11 raised all along. And that is whether not the  
12 statutory procedure that has been set up here with the  
13 interested party system as opposed to a actual  
14 protestant -- where actual protestants can join in the  
15 proceeding. We also believe, we will stipulate, that  
16 we believe that is procedurally unconstitutional. And,  
17 as you know, we've raised that issue and we will  
18 continue to raise that issue. It's just too late in  
19 this proceeding to do anything about it. It certainly  
20 that you had any control over, that we had any control  
21 over, or the Department of Water Resources had any  
22 control over. This was a system that was set up by the  
23 Arizona Legislature. It should have been set up in a  
24 system similar to what happens when you have an  
25 application to appropriate water.

1                   Parties who have interest in the water source  
2 can appear as protestants. They're parties to the  
3 proceeding. They have right to discovery. Everybody  
4 has rights to discover. They have a right to present  
5 expert witnesses. You have a right to present expert  
6 witnesses. Everybody has a right to cross-examine  
7 everybody's expert witnesses. That's what it takes to  
8 have a procedurally due process constitutional  
9 proceeding. And we don't think this is such a  
10 proceeding, so we join in their objections on the  
11 procedural of due process grounds.

12                   HEARING OFFICER: Anything else at this  
13 point?

14                   MR. LEWIS: Pardon?

15                   HEARING OFFICER: Anything else at this  
16 point?

17                   MR. LEWIS: No, Your Honor. That's all.

18                   HEARING OFFICER: Ms. Ronald.

19                   MS. RONALD: I believe that part of the --  
20 part of the comments that were made by Mr. Pearce last  
21 night addressed whether or not their motions to  
22 intervene should be reconsidered by this tribunal. And  
23 I believe during our prehearing conference on this  
24 matter, the department expressed it's view that it will  
25 not object to the motions to intervene that were filed

1 by these interested persons. That is still the  
2 department's position. We would not objecte to those  
3 motions being granted.

4 HEARING OFFICER: Okay. Anything else?

5 MR. LEWIS: Your Honor, I guess I didn't  
6 address that -- I think I did addressed that specific  
7 issue. But we do object to the motions to intervene,  
8 as we have all along. It's too late for them to  
9 intervene at this point. We would have to start all  
10 over again if they would intervene at this point. But  
11 we're still stuck with the same procedure, so that will  
12 not solve the constitutional due process problems.

13 HEARING OFFICER: Any view on the DVDs being  
14 admitted?

15 MS. RONALD: We have no objection to the DVDs  
16 coming in.

17 HEARING OFFICER: Let me tell you where we  
18 stand on these issues. And maybe before I do that, why  
19 don't I give Mr. Pearce one more opportunity, if you'd  
20 like, to make any comment on that, since it's in  
21 essence your motions.

22 MR. PEARCE: Thank you, Your Honor.  
23 Mike Pearce for Great American Land. Two comments.  
24 One, is that we not only offer the CDs, we also offer  
25 some petitions that were signed here in a local area

1 for evidence last night. And I had not heard those  
2 discussed. But we also we offer those for admission  
3 this morning. I have two copies -- I have one copy  
4 each of the CDs that I will leave with the hearing  
5 officer. And we can make copies available to the other  
6 parties, if necessary, if they are going to be admitted  
7 into the administrative record.

8           The second point I would like to make is that  
9 I do not agree with Mr. Lewis on the substance of his  
10 constitutional objections. He has portrayed this as an  
11 application to appropriate water, and ground water is  
12 not appropriable in Arizona. So we do not join him in  
13 his concerns over the way this procedure should be  
14 operated. Thank you.

15           HEARING OFFICER: Yeah, Mr. Wene has stood  
16 up. Why don't you come up. And I'm going to tell you  
17 I'm very concerned and I will be making ruling on this  
18 issue shortly. And once that ruling is in, I am going  
19 to address a couple of other issues. And I don't want  
20 to spend a lot of time on it. The interested persons  
21 have made various motions, but go ahead, Mr. Wene.

22           MR. WENE: For the record, Steve Wene for  
23 Biasi Water Company. Just one more point that I would  
24 like to make. The due process issue, I'd just like to  
25 point out that the applicant actually opposed our

1 motions to intervene. So I think it is very  
2 disingenuous --

3 HEARING OFFICER: I am going to stop you  
4 there. Because that's in the nature of argument and --

5 MR. WENE: Sure.

6 HEARING OFFICER: And I have the record of  
7 what happened up to this point. So I'm going to try to  
8 move forward.

9 If you have anything in particular about the  
10 issues that Mr. Pearce raised, that's fine. And  
11 otherwise, though -- let me tell everybody where we  
12 stand here and potentially help.

13 One, as to the DVDs, I do appreciate  
14 counsels' willingness to work together on that issue  
15 but, frankly, our hearing is constrained here. This is  
16 an administrative proceeding. Our record consists of  
17 the matters that occurred since the notice was issued  
18 and filings, these kinds of things, and I don't see the  
19 video as being relevant to that. I understand, as  
20 Mr. Lewis said that maybe that's sort of how some of  
21 this we got here, but there's plenty of information on  
22 the record that shows that those other proceedings did  
23 occur. But I don't find them relevant to my decision.  
24 Similarly, with respect to the petitions, if you will,  
25 I don't see those as relevant, and it's perhaps a poor

1 choice in this case on those. Again, though there's  
2 plenty of evidence on record; via the over 300 comments  
3 received in opposition to the application,  
4 Representative McLain's testimony, in opposition,  
5 representing her constituents in this area, some of  
6 those written comments we received were from other  
7 representative government and their officials. Also, I  
8 think some of testimony from Ms. Logan, particularly  
9 with respect to the ADWR Exhibit 11, tends to confirm.  
10 And so I don't see the petitions as really adding  
11 anything at this point of substance, so I'm not going  
12 to admit those either.

13           Finally, with respect to the renewed motion  
14 to intervene, that's going to be denied as well. The  
15 ruling I made initially stands in this regard. And  
16 the -- that's enough said on that.

17           Now, moving forward, what I want to make  
18 clear at this point is today we still have a  
19 substantial way to go, I believe. And I think everyone  
20 is in agreement with that. So from this point on, I'm  
21 going limit comments and information from the parties.  
22 Interested persons have had their opportunity to file  
23 prehearing briefs, to participate in the prehearing  
24 conference we had, to submit written testimony, and to  
25 supplemental that with their oral presentations last

1 night. I think I called them interested parties,  
2 they're interested persons. Pardon me, by statute.  
3 That's the first time I made that slip in a while. But  
4 we do have two parties, the rest are interested  
5 persons. Presumably, when the legislature made that  
6 designation, it was by design. And we have to move  
7 forward with our evidentiary hearing. So Mr. Reed, I  
8 would appreciate then if you would go ahead and yield  
9 to Mr. Deeny that chair.

10 Yes, Mr. Crook. I'm sorry.

11 MR. CROOK: No argument, Your Honor. I just  
12 want to go on the record that we join Mr. Pierce's and  
13 Great American's motion. So it would be on the record.

14 HEARING OFFICER: Okay. Thank you. Then,  
15 the other issue I think that would be beneficial  
16 perhaps to consider with the parties at this point is  
17 the twofold, I think, in terms of where we go from  
18 here. We've got rebuttal concerns from the applicant's  
19 prospective, and then potentially from both parties.  
20 The potential, I guess, for filing some sort of  
21 post-hearing briefs. Any thoughts or comments on that  
22 at this point?

23 MR. LEWIS: Yes, Your Honor. You made it  
24 very clear that we will be able to present rebuttal  
25 evidence to rebut the material that was put on last

1 night by the interested persons. And we think that,  
2 obviously, we can't do at that today because he haven't  
3 had an opportunity to prepare the numerous, very  
4 lengthy expert witness reports. They have had the  
5 opportunity to present, both written and oral  
6 testimony. And it's going to take us some time in  
7 order to be able and sit down and go through all that  
8 in order to prepare for rebuttal. We would prefer to  
9 do that in writing, because I think it would make this  
10 proceeding go much faster than if we have to come back  
11 here again and do oral testimony. It's just going to  
12 continue this proceeding at infinitum because I  
13 personally cannot come back during the month of March.  
14 I have other matters scheduled in Supreme Court in  
15 Phoenix, where I cannot come back for another weekend.  
16 If we could continue the proceeding by oral testimony  
17 in Phoenix for rebuttal purposes at some point, that  
18 would be fine. But I think probably the best solution  
19 if we could do our rebuttal testimony by written  
20 rebuttal testimony. Then that what be probably the  
21 fastest and most preferable way to do it. On the  
22 post-hearing briefing, I think both us and at ADWR are  
23 in agreement that, yes, we both want to do post-hearing  
24 briefing before the record is close.

25 HEARING OFFICER: Ms. Ronald.

1                   MS. RONALD: I agree with Mr. Lewis. We will  
2 welcome the opportunity to file a post-hearing brief.  
3 With respect to Wind River's rebuttal testimony,  
4 submitting it in writing, we would not have an  
5 objection to that. However, if there is new  
6 information that is presented as rebuttal to  
7 information that's presented by the interested persons,  
8 the Department would like the opportunity to address  
9 any new information that Wind River might bring up in  
10 that process. And we would propose to do that in  
11 writing as well.

12                   HEARING OFFICER: Okay. And --

13                   MR. LEWIS: Your Honor, we wouldn't have any  
14 objection to that.

15                   HEARING OFFICER: Okay. Then would you  
16 expect an opportunity to respond again, if you will.  
17 My concerns becomes at some point where it was never  
18 going to end, written or otherwise.

19                   MR. LEWIS: I was wondering on the  
20 post-hearing briefing, how that would be handled.  
21 Would we file simultaneously opening briefs and  
22 response briefs or --

23                   HEARING OFFICER: Well, let's talk about that  
24 because it would seem clear that the timing has to be  
25 such that the response on the evidentiary portion comes

1 in before written closing argument can be submitted. I  
2 would tend to go toward just allowing you each to file  
3 one time simultaneously and make your points, and then  
4 I will review it, rather than any responses to those.  
5 And I do see some head shaking, so I'm assuming it's in  
6 agreement, that maybe that's the best way to go. But  
7 speak up now if you disagree with that.

8 MR. LEWIS: We would have no objection to  
9 that.

10 MS. RONALD: We agree with that approach,  
11 Your Honor.

12 HEARING OFFICER: Okay.

13 MR. LEWIS: The question that Ms. Becker had  
14 is: Can we get the transcript before rebuttal? Do we  
15 have any time sequential?

16 HEARING OFFICER: Let's talk about the timing  
17 now, in fact. One, we've improved our technology today  
18 and the court reporter has headphones, which is going  
19 to help a lot. And, again, it's been tough for our  
20 reporters because of our gymnasium and the echo effect  
21 and the technical nature of things, and I assume that's  
22 going to slow down getting a transcript. But we  
23 appreciate their efforts. With that in mind, my  
24 preference will be that we set -- and we sort of got an  
25 unknown in the sense that if the Department perceives

1 there's new information that's been presented, we've  
2 got to allow for a time to respond to that, if you  
3 will. My preference would be that we set good solid  
4 long timeframes. And I would prefer that they be very  
5 long and not grant any motions to continue or motions  
6 to extend. So even at the expense of far exceeding  
7 what you actually need as opposed to us just setting  
8 timing for everyone in effect, including at our office,  
9 of course, and then finding that we've got to  
10 reconfigure because, obviously, there's going to be a  
11 substantial amount of effort where I'm going to have to  
12 take time away from other matters or not book other  
13 matters, would be a better way to put it, so that I can  
14 give this the attention that it deserves. So my  
15 thinking, at this point, would be that if maybe on a  
16 break you two want to confer as to the timing for these  
17 things. And then after we come back from a given  
18 break, we'll have an estimate of how long it will be  
19 and, again, the key point from my prospective that we  
20 not continue, not extend. So be generous with  
21 yourself. That's not going to concern me at all.

22 MR. LEWIS: Your Honor, I think we can --  
23 Ms. Ronald and I can probably agree on a time sequence  
24 for that.

25 HEARING OFFICER: Okay. Then the other issue

1 with respect to our transcript and the concerns of our  
2 official record. Again, with the recording that we  
3 have, we hope the court reporters will be able to go  
4 back and provide a good solid transcript. That first  
5 day was particularly troubling for a number of reasons,  
6 but there may come a point when the parties get their  
7 copies of the transcript and I get a copy, that we're  
8 going to have to determine whether that can serve as  
9 the official record or we're going to have to go to our  
10 backup, being the tape. So I'm just going to ask you  
11 to keep that in mind as we go forward. Again, if  
12 there's anything else, preliminary issues today, let's  
13 go ahead and talk about those, if not we can get on  
14 with the testimony.

15 MR. LEWIS: We have nothing further, Your  
16 Honor.

17 MS. RONALD: Nothing further, Your Honor.

18 HEARING OFFICER: Picking up where we were,  
19 we have direct examination of Mr. Corkhill. I will  
20 just then just go ahead and allow Ms. Ronald to pick it  
21 up.

22 MS. RONALD: Thank you.

23 DIRECT EXAMINATION (Continued)

24 BY MS. RONALD:

25 Q. Yesterday you testified to a number of

1 assumptions that you felt were part of the application  
2 that Wind River has filed. And my question to you is:  
3 Did Wind River make any assumptions involving the  
4 concepts of recharge and perennial yield?

5 A. Yes.

6 Q. And what's your understanding of Wind River's  
7 position involving those concepts?

8 A. Basically, that because the perennial yield  
9 of the basin, as analyzed by Dixon and Katzer is  
10 comparatively large to the proposed volume of pumping  
11 and existing pumping in the basin, that this new  
12 Wind River pumping wouldn't be a problem.

13 Q. Do you agree with that position?

14 A. I do not.

15 MS. RONALD: Could we please have ADWR 36.  
16 The first three slides are slides that we've already  
17 seen, and we need to go to the fourth slide down.

18 HEARING OFFICER: Just for a complete record  
19 on today's recording. These are the slides that  
20 Mr. Corkhill prepared, correct?

21 MS. RONALD: Yes, they are.

22 We just went past where we need to be. Right  
23 there. Slide four.

24 BY MS. RONALD:

25 Q. As the Administrative Law Judge just pointed

1 out, you did prepare these slides, Mr. Corkhill?

2 A. Yes, I did.

3 Q. And Slide No. 4, why did you prepare this  
4 particular slide?

5 A. Well, I just wanted to go over what perennial  
6 yield is, at least originally defined to be, by Glancy  
7 and Van Denburgh. It's also more or less defined this  
8 way in a report called Water for Nevada, which was also  
9 provided to us. What we wanted to do is establish what  
10 the, at least, the original definition of perennial  
11 yield was.

12 Q. Could you just -- it's a short definition,  
13 the Glancy one, both of them are. Could you just read  
14 those please.

15 A. Sure. "The perennial yield of a ground water  
16 reservoir may be defined as the maximum amount of  
17 natural discharge that can be salvaged each year over  
18 the long term by pumping, without bringing about some  
19 undesired result." And from Dixon and Katzer: "To  
20 salvage or capture ground water discharge, generally  
21 requires reducing ET by lowering the water table by  
22 pumping --

23 Q. I'm going to interrupt you right there. What  
24 is ET?

25 A. Evapotranspiration.

1 Q. And that occurs from trees, plants?

2 A. Correct.

3 "Once the water table is lowered beyond the  
4 depth the phreatophytes can reach with their roots,  
5 then ground water is considered salvaged. It is not  
6 quite so simple in the lower Virgin River Basin."

7 Q. What is a phreatophyte?

8 A. A tree living off groundwater or a plant  
9 living off groundwater.

10 MS. RONALD: Could we go to the next slide,  
11 please.

12 BY MS. RONALD:

13 Q. Now, there's three more slides that are  
14 included in this particular exhibit. Did you prepare  
15 these?

16 A. I did.

17 Q. And what are intended to demonstrate? Why  
18 are there three slides here in the series?

19 A. Well, they're simply intended to show what  
20 that concept of perennial yield is in a very simplified  
21 manner, as at least, it has been originally proposed by  
22 Glancy and Van Denburgh.

23 Q. Could you go through and describe what those  
24 slides show.

25 A. Yes. This first slide is a predevelopment

1 groundwater-flow system. It is very conceptualized.  
2 What it shows, of course, is that there's in a  
3 ground-water system there's recharge along the mountain  
4 front and ephemeral streams, generally speaking. There  
5 may be underflow from adjacent ground-water basins.  
6 And this all the water that's recharged are under  
7 flowing from adjacent areas is flowing through the  
8 aquifer system to points of ground-water discharge. In  
9 this case, to an area where there's riparian vegetation  
10 and also where there's a stream. This flow in the  
11 stream in this area would be indicated as being a  
12 condition of base flow. There may be also another  
13 types of ground-water basins, such as in the Virgin  
14 River basin. Ground-water discharge to other areas.  
15 But for the purposes of this drawing, that's what we've  
16 shown. The main concept here is the ground-water  
17 recharge and ground-water discharge are in the  
18 long-term balance.

19 MS. RONALD: Could you go to the next slide,  
20 please.

21 BY MS. RONALD:

22 A. This slide's titled, Early Stage of  
23 Groundwater Development, Partial Salvage of Natural  
24 Discharge. This is to go back to the original  
25 definition, that the perennial yield is related to the

1 amount of water that can be salvaged by lowering the  
2 water table below the root zone of the plants. And to  
3 do that, at least conceptually, you have to put some  
4 kind of a well or a well field in the vicinity of the  
5 riparian area. And that would then allow you to reduce  
6 the water level in the general area of the plants --  
7 but of course, in doing that, you would also be  
8 reducing some ground-water discharge to the rivers.  
9 And also in this -- in this idealized diagram shows,  
10 you would be mining some groundwater as well.

11 Q. And your last slide.

12 A. This slide shows a later stage where you'd  
13 actually be able to totally salvage the natural  
14 discharge as Dixon and Katzer and both, Glancy and  
15 Van Denburgh indicated. This would be a situation  
16 where you would totally, by the use of the pumping  
17 wells in the vicinity of the riparian area in the  
18 stream, lower the water table to the point where you've  
19 captured the flow that was originally going to the  
20 points of ground-water discharge to the ET in the  
21 trees, and also the base flow would potentially be  
22 completely eliminated in the river. This is an extreme  
23 example, and of course, what the purpose of this  
24 shows -- these slides show is that there would be real  
25 problems with actually trying to implement a -- a

1 program of pumping, where you could try to capture the  
2 ground-water discharge in such a manner.  
3 Predominantly, in the Virgin River basin, you've got an  
4 area of the river where there's lots of aquatic life;  
5 trees, species, things like that. These would be  
6 problems to actually implement this type of a  
7 ground-water management or ground-water development  
8 scheme because of the impacts to the base flow and the  
9 riparian areas.

10 Q. So again, what does this tell you, with --  
11 these series of slides are showing a ground-water  
12 recharge component and then capture of -- capture is  
13 the wrong word. I'm sorry -- and whether or not that  
14 if there is a ground-water discharge to the flows in  
15 the river and the effects that that will have on the  
16 riparian habitat; is that correct?

17 A. Right. And I failed to mention. Of course,  
18 that the recharge would be, at least conceptually still  
19 what it was, from pre-development levels. The idea  
20 that we're trying to show is the idea what you can  
21 capture the discharge in the basin would be problematic  
22 because of the impacts to the riparian corridor and the  
23 stream flow.

24 So as a working model of how somebody could  
25 develop the ground-water basin, the perennial yield

1 concept doesn't seem to be very -- workable. At least,  
2 in the Virgin River basin.

3 MS. RONALD: Like to go to ADWR 7B. Page 19.  
4 And the page number for what I'm looking for is a  
5 figure and the page number is on the right-hand column.  
6 So if you could just kind scroll down for 13. That's  
7 it. It's coming up.

8 BY MS. RONALD:

9 Q. Mr. Corkhill, just briefly, what does this  
10 figure demonstrate or what is it depicting?

11 A. This is, again, groundwater-level map for the  
12 Virgin River basin. What it shows again is that the --  
13 it's a regional groundwater-flow system in the basin,  
14 that there's recharge along the periphery of the basin,  
15 along the mountain fronts, along the ephemeral streams.  
16 And the ground-water flow direction, in general, is to  
17 the south and towards the Virgin River, and then along  
18 the river corridor towards Lake Mead in the  
19 southwestern portion.

20 The point, of course, is that there's the  
21 volume of groundwater there's -- the groundwater is  
22 flowing through the entire aquifer system.

23 Q. And is there recharge also occurring  
24 throughout the system?

25 A. Yes. There's recharge again along all of the

1 mountain fronts and there is recharge along the  
2 ephemeral streams. And of course, there's underground  
3 water, underflow and carbonate aquifer.

4 Q. On that particular figure, where would the  
5 Mormon Well site be located?

6 A. It would be located right here (indicating).

7 Q. What do you think the feasibility is of a  
8 well located -- one or more wells located at the Mormon  
9 Well site of capturing the entire amount of recharge to  
10 the lower Virgin River basin?

11 A. It seems very unlikely. What I think would  
12 happen is that if somebody put a 14,000 acre foot per  
13 year well pumping center in this area, that it would  
14 create essentially a cone of depression that really  
15 wouldn't capture much of the recharge in the basin. It  
16 would be a situation where it would be predominantly a  
17 ground-water mining situation. There would be some  
18 recharge captured. But a well field in a 40 acre  
19 parcel, couldn't possibly capture a great deal of  
20 recharge. It would be mainly mining. Although, it  
21 could induce recharge from the overlying stream of  
22 Beaver Dam Wash.

23 Q. We have been talking about recharge to the  
24 basin. Is that something that you could actually  
25 measure?

1 A. No, it's not.

2 Q. And how do you go about estimating recharge?

3 A. Number of ways. In Nevada, they use the  
4 Maxey-Eakin Equation.

5 MS. RONALD: ADWR 1D please. Page 41.

6 BY MS. RONALD:

7 Q. Are there some limitations, while we're  
8 pulling this up, Mr. Corkhill, on how you go about  
9 estimating recharge?

10 A. Well, yes.

11 Q. And are we at page 41?

12 If you could please read the top of page, the  
13 first sentence.

14 A. Yes. "One of the difficulties in estimating  
15 recharge for the lower Virgin River basin is that it is  
16 nearly impossible to accurately estimate discharge from  
17 the basin."

18 MS. RONALD: And then again, in the same  
19 document, please, page 45. Thank you.

20 BY MS. RONALD:

21 Q. In the paragraph where it says, "Ground-water  
22 outflow," it's the last sentence there.

23 A. "There is no direct way of measuring these  
24 ground-water outflow components."

25 Q. What do those two statements -- what's the

1 significance of those two statements, Mr. Corkhill?

2 A. Simply put, it's very difficult and uncertain  
3 to estimate both ground-water recharge and discharge in  
4 the lower Virgin basin.

5 Q. So you are aware of some particular numbers  
6 that were relied on by Wind River using this recharge  
7 concept of having water available for capture by the  
8 proposed wells at Mormon Well site?

9 A. I am.

10 Q. So are you saying -- is your testimony that  
11 even if we were to use those numbers, that there might  
12 be some uncertainty built into what those numbers are?

13 A. I am.

14 Q. Let's move to a new topic.

15 HEARING OFFICER: I'm sorry. Before you go  
16 on and I apologize for interrupting you, but it hit me  
17 that I was asked to announce the representatives from  
18 the PTO will be here selling some sandwiches at lunch.  
19 And completely forgot at the beginning. And I  
20 apologize, but I saw the snacks in the back, and told  
21 them I would do that. So they will be here some time.  
22 And they are going through a lot of effort and trouble  
23 as well to try and help us out with our hearing. And I  
24 didn't want to short change them. So I do apologize,  
25 Ms. Ronald. Go ahead.

1 MS. RONALD: That's not a problem. It is a  
2 critical information. Thank you.

3 BY MS. RONALD:

4 Q. Regarding impact from the proposed wells on  
5 other wells, existing wells, did Wind River provide any  
6 information about or any analysis, any drawn down  
7 analysis that would attempt to assess what those  
8 impacts would be?

9 A. They did.

10 Q. What was the -- are you familiar with the  
11 drawn down analysis that they provided?

12 A. I am.

13 Q. Would you describe your understanding of that  
14 analysis.

15 A. Well, it was based on, as far as I understand  
16 it, the use of Theis Equation, using a transmissivity  
17 value of 15,000 feet squared per day, which was, at  
18 least, proposed to be used based on a pump test from  
19 the VVDW 31 well and a storativity value of .001. They  
20 did a draw down analysis that essentially indicated at  
21 a distance of 30,000 -- 30 or 35,000 feet that there  
22 would be a drawn down of approximately 61 feet.

23 Q. Do you think that draw down analysis is  
24 informative with the respect to the impacts that might  
25 occur from the Mormon Well site proposed pumping?

1           A.    I don't think so.

2           Q.    And why is that?

3           A.    Well, I think that the parameters that were  
4 chosen are obviously not derived from the site itself.  
5 They certainly are on the high end of parameters that  
6 are out there in the Virgin Valley, itself, as far as  
7 transmissivity values.  And they are not from the site.  
8 And you need parameters from the site to be able to  
9 make that kind of an analysis.

10          Q.    You mentioned the term "transmissivity  
11 value."  Could you please explain a little about what  
12 that is it and how it plays into a draw down analysis.

13          A.    It is a fundamental input to the Theis  
14 Equation.  It relates to the abilities of the aquifer  
15 to transmit water.  It is the product of the hydraulic  
16 conductivity and the saturated thickness.  It's a  
17 fundamental input to the Theis Equation.  So you have  
18 to put that into the equation to calculate the draw  
19 down.

20          Q.    And -- are you familiar with -- have you  
21 reviewed the information presented by Wind River  
22 concerning other wells in the area and what those  
23 T-values might be?

24          A.    I have.

25          Q.    And what's the range of values that you saw?

1           A.   Well, as a basin as a whole, looking at both  
2 unconfined alluvial aquifer down to and including Muddy  
3 Creek, it ranges anywhere from 35,000 feet squared day  
4 per day to roughly 1,000 to 2,000 foot squared per day.

5           Q.   Specifically, did you look at the information  
6 that was provided regarding Palm's Well No. 2?

7           A.   I did.

8           Q.   Do you recall, offhand what, that T value  
9 was?

10          A.   It is in the vicinity of 2,000 feet squared  
11 per day.

12          Q.   How far away from the proposed site is that  
13 well?

14          A.   Palm's No. 2, I'm thinking it is in the order  
15 of 8 miles or so. I'm estimating that.

16          Q.   I'm not going to ask you to describe each one  
17 of these various T values, because I really want you to  
18 comment on whether any of those T values are helpful  
19 for determining what's going to happen from the Mormon  
20 Well site?

21          A.   I don't think so.

22          Q.   So is it your position that we need some --  
23 we need some site-specific information?

24          A.   Yes.

25               HEARING OFFICER: Before you move off that.

1 You said that the Palm's Well No. 2, T-value was about  
2 2,000 feet squared per day?

3 THE WITNESS: I believe so. There was a  
4 couple estimates. One, was provided by Mr. Janson's  
5 work and that was actually another pump test. And  
6 well, the analysis is the same data by previous  
7 researchers. I'm in the ballpark on that, I believe.

8 HEARING OFFICER: Thank you.

9 MS. RONALD: Just for the record, Your Honor,  
10 the Palm's Well No. 2 is included in Wind River Exhibit  
11 No. 73. And the exact number is found in that exhibit.  
12 There -- did you also -- in terms of helping the  
13 Administrative Law Judge locate some of these numbers,  
14 did you also look at the well log information and the  
15 EnerConnect wells that were testified to, I believe, by  
16 Mr. Janson?

17 THE WITNESS: I did.

18 BY MS. RONALD:

19 Q. There are T-values associated with those  
20 wells also?

21 A. Yes. Mm-hmm.

22 Q. What were those T-values on the order of, do  
23 you recall?

24 A. I'm believing that it was down around  
25 2,000 feet squared feet per day. I recall his numbers,

1 I think, were in gallons per day per foot. And so if I  
2 got that wrong, I can be corrected --

3 Q. I didn't really want to spend the time this  
4 morning --

5 HEARING OFFICER: I'm sorry. I just didn't  
6 hear. I thought I heard him say 2,000, but I want to  
7 make sure that I heard what I thought I heard.

8 MS. RONALD: I'll just quickly add that  
9 EnerConnect well information is in Wind River Exhibits  
10 105, 106, and 107. And they are expressed in -- they  
11 are not expressed in feet squared per day. So how  
12 would you convert the number that's in there, the feet  
13 squared --

14 THE WITNESS: Divide by 7.48.

15 MS. RONALD: Thank you.

16 BY MS. RONALD:

17 Q. Is there also some transmissivity information  
18 in the Glancy Report?

19 A. Yes.

20 Q. And in the Holmes Report?

21 A. Yes.

22 Q. The Glancy Report for the record, is AWDR 1A  
23 and the Holmes Report for the record is AWDR 1B. But  
24 again, are these particularly informative with respect  
25 to what will happen at the well, the Mormon Well site?

1           A.    I -- no.

2           Q.    What was Wind River's position regarding  
3 possible subsidence at the Mormon Well site?

4           A.    Wind River's position was that it wouldn't be  
5 a problem.

6           Q.    It would be a problem or not a problem?

7           A.    Would not be a problem.

8           Q.    That was the initial position in the  
9 materials that were submitted to the Department of  
10 Water Resources?

11          A.    Yes.

12          Q.    Did you hear any testimony yesterday or the  
13 day before, regarding concerns about subsidence?

14          A.    Yes.  Mr. Johnson discussed the fact that  
15 they're involved with an INSAR Program to monitor  
16 subsidence in the basin, and that they are concerned  
17 about subsidence.

18                   MS. RONALD:  I believe we are already in ADWR  
19 1D.  And I would like to go to Page 93.  That's good.  
20 Thank you.

21 BY MS. RONALD:

22          Q.    The section that's entitled, "Water Resource  
23 Development Impacts," there's information there, I  
24 believe, that relates to subsidence.  If you could  
25 please read the first two sentences?

1           A.    "Extensive ground-water pumping from the  
2 Muddy Creek Formation in any of the target areas will  
3 cause ground-water levels to decline in the vicinity of  
4 pumping wells."

5           Q.    The next sentence.

6           A.    "Depending on the density and placement of  
7 wells, recovery generally could be rapid."

8           Q.    Keep going, please?

9           A.    "However, depending on the amount of  
10 ground-water withdrawals, there could be a general  
11 lowering of the entire ground-water table in the  
12 vicinity of the greatest density of wells.  If this  
13 occurs it will probably be accompanied by some degree  
14 of land subsidence."

15                    May I just -- based on the work of Bell in  
16 Las Vegas Valley, a general rule is 1 foot of land  
17 subsidence for every 20 feet ground-water level  
18 decline.

19           Q.    Did you look at the reference there,  
20 Bell 1981?

21           A.    I did.

22                    MS. RONALD:  ADWR Exhibit 28, please.  
23 Page 8.  The left-hand column.  It is the paragraph  
24 that begins with, "Five major zones of subsidence  
25 problem."

1 BY MS. RONALD:

2 Q. Now if you could please put this in context,  
3 what does this report address?

4 A. Well, this report discusses the history of  
5 land subsidence in the Las Vegas valley, discusses  
6 the -- it provides information on historic water  
7 levels, historic ground-water pumping, and documents  
8 the different -- the amount of subsidence measured from  
9 leveling data, and also documents -- shows photographs  
10 of subsidence damage to wells and other structures, and  
11 also earth fissuring.

12 Q. Why is subsidence a concern?

13 A. Well, because when you pump groundwater, in a  
14 predominantly fine grained aquifer, you can have  
15 subsidence and it could cause a lot of damage.

16 Q. So going to the paragraph, again, that  
17 starts, "Five major zones of subsidence," if you could  
18 just read the first sentence and the second sentence.

19 A. "Most of these zones -- is that one?"

20 Q. That's fine, you can start there.

21 A. Okay.

22 "Most of these zones had severe differential  
23 movement and there are numerous reports of cracking of  
24 buildings, streets, sidewalks, curbs, differential  
25 settlement of structures, rail road tracks, and

1 rupturing of utility lines."

2 Q. That's good. What is differential movement?

3 A. Well, that would be mean that one area moved  
4 more or less than another area.

5 Q. You mentioned earlier in your testimony that  
6 there were some photographs in this report.

7 MS. RONALD: If we could please move to  
8 Page 58?

9 THE WITNESS: Actually -- probably. Well,  
10 yeah, that would be good.

11 MS. RONALD: 55, is that where you with like  
12 to go first?

13 THE WITNESS: The one is just a map showing  
14 the general level of subsidence.

15 MS. RONALD: Which I think that is 55. We'll  
16 go there first.

17 BY MS. RONALD:

18 Q. Is that the map.?

19 A. Yeah. Yes.

20 Q. What does this show?

21 A. Well, it it's entitled, "Land Subsidence in  
22 Las Vegas Valley," between '63 and '80 due to artisan  
23 head decline. And it's essentially contours of equal  
24 subsidence showing -- I will do some pointing.

25 Q. That's not the right figure?

1 A. No.

2 MS. RONALD: I think you need to go down. I  
3 think you are in front of where that should be. You  
4 are on Page 53, the next should be 54. And the figure  
5 looks like this (indicating). Yes. That's the one, I  
6 believe.

7 BY MS. RONALD:

8 Q. Is that correct?

9 A. No, one more.

10 Q. One more.

11 A. That will work right there.

12 Q. All right. Would you proceed with your  
13 comments.

14 A. Yes. The main thing that this map shows is  
15 these are contours of equal subsidence measured between  
16 1963 and 1980, leveling data from '63 and '80 were  
17 compiled and the difference in the elevation, land  
18 surface is shown as the amount of subsidence here. The  
19 point being that there was over 2 feet of subsidence in  
20 a large part of the Las Vegas area, during that period  
21 of time, that was of course, accompanied or caused by a  
22 great deal of ground-water withdrawal in the basin.  
23 And might also note there seems to be some centered  
24 areas and, of course, these will be around well fields.

25 MS. RONALD: Page 58, please. I'm not sure

1 whether they are going to be colored or black and white  
2 photographs.

3 THE WITNESS: They are all black and white.

4 Q. They are all black and white?

5 A. Yeah. That's good.

6 BY MS. RONALD:

7 Q. What comments do you have of these pictures?

8 A. Well, this is just one paragraph of the Las  
9 Vegas Valley, this is actually Las Vegas Valley Water  
10 District Well No. 5. It shows -- this is -- the upper  
11 picture was taken in 1962, showing about a half of  
12 meter of well head protrusion. The lower photograph  
13 was taken -- well, and by the way, it mentions that  
14 pumping stopped in 1971. But the lower photograph was  
15 taken by Dr. John Bell on 1978. And by that time, the  
16 protrusion had gotten to 1.25 meters. And protrusion  
17 is just the -- in other words, the well casing and  
18 everything, because it's -- and drilled and completed  
19 into a more competent layer, has remained at its  
20 original level. But the land is subsided all around  
21 it.

22 Q. Page 59, without much of a description, I  
23 think also has some photographs of the effects of  
24 subsidence; is correct?

25 A. That's correct. And we could probably just

1 skip to 71, if you'd like.

2 Q. So the last photograph that you wanted to  
3 share is on Page 71, please.

4 A. As you're panning by those, there are some  
5 interesting earth fissures there.

6

7 Q. You are a geologist, right, Mr. Corkhill?

8 A. Yes. There is a nice one. That's good.

9 Q. And what does this last photograph show?

10 A. Well, it shows an earth fissure that just  
11 happened to intersect a home, crack the wall. Very  
12 unlucky person.

13 Q. What's the age of those cars sitting outside  
14 of the house?

15 A. These are old photographs, looks like from  
16 1961.

17 Q. I believe this is our last exhibit.

18 MS. RONALD: If you could please turn to  
19 Exhibit 7N, which is the Nerby Report. N, as in Nancy.

20 BY MS. RONALD:

21 Q. Now, while we're pulling that up, have you  
22 heard some testimony from the Wind River witnesses  
23 about --

24 HEARING OFFICER: I'm sorry. You said seven  
25 Nancy?

1 MS. RONALD: Yes. Is that not the Burby  
2 Report.

3 HEARING OFFICER: I believe we got seven  
4 up -- 7F is up. So I want to --

5 MS. RONALD: It's N. Sorry, I wasn't  
6 watching sorry. Yes. N. Thank you.

7 BY MS. RONALD:

8 Q. Mr. Corkhill, was there some testimony by the  
9 Wind River witnesses concerning the existence of a  
10 Littlefield Formation in the Beaver Dam Wash area,  
11 Virgin River area?

12 A. There was.

13 Q. What was is their position -- how does the  
14 existence of the Littlefield Formation tie into whether  
15 or not there's a possibility of subsidence in that  
16 area?

17 A. Um --

18 Q. What is Wind River's position on that?

19 A. Wind River's position is that because the  
20 Littlefield Formation -- Wind River's position is  
21 because the Littlefield Formation is -- contains  
22 consolidated units and it's somewhat rigid, that it  
23 would be not prone to subsidence.

24 MS. RONALD: Is this 7N? If we could please  
25 go to -- actually, it's right on the first page, I

1 believe. Yes.

2 BY MS. RONALD:

3 Q. This is the abstract for this report. Where  
4 it starts with, "The purpose of," could you please read  
5 that.

6 A. Yes. "The purpose of this investigation was  
7 to quantify and characterize three dimensional surface  
8 deformation and strain associated with cyclic pumping  
9 and to evaluate aquifer properties on the bases of  
10 these data. Results indicate that both horizontal --  
11 and in parens -- less than 8 millimeter total  
12 displacement with .2 millimeter precision and vertical  
13 deformation less than 12 millimeter total displacement  
14 with 2 millimeter precision were measured within the  
15 first 22 days of pumping, with a slowly migrating  
16 outward wave of compression strain, in spite of the  
17 fact that 83 meter brittle unsaturated zone resided  
18 over the dynamically active aquifer."

19 Q. What does that mean?

20 A. Well, that sounds a lot -- well, what it  
21 means is that they had a brittle unsaturated zone, that  
22 to me, sounds a lot like, at least, in geologic  
23 character what the Littlefield Formation would be like  
24 if subsided in this particular test.

25 Q. They don't use the word subsidence, but they

1 use words like of vertical deformation and  
2 horizontal -- where is the other one? Displacement, I  
3 believe?

4 A. Yes.

5 Q. And is that what you mean by subsidence? Are  
6 those the terms that lead you to believe --

7 A. Yes.

8 Q. -- that there is subsidence underneath?

9 A. That's correct. To really sum it up, what my  
10 belief on this is that pumping in the Muddy Creek  
11 Formation, as analyzed by any of the tests that we --  
12 the well-impact analysis that we saw presented last  
13 night, and even with Wind River's own analysis, which I  
14 don't believe is correct, those all show significant  
15 draw down at a great distance from the Mormon Wells'  
16 area. Which by that ratio that was in the Bell Report  
17 of about 1 foot of subsidence per 20 feet of  
18 water-level decline, would be causing major subsidence  
19 in the Muddy Creek Formation. Even though the  
20 Littlefield Formation may be quite competent and have  
21 some rigidity, it would just move down as the Muddy  
22 Creek Formation subsided.

23 Q. At the beginning of your testimony,  
24 you character -- you described six basic assumptions --  
25 six categories of assumptions there you've been talking

1 about for the last two days that Wind River -- that are  
2 inherent in your estimation to Wind River's position  
3 regarding the impacts of pumping from the Mormon Well  
4 site. And I would just like for you to go through each  
5 one of these and give us your final thoughts on whether  
6 these assumptions have --

7 MR. LEWIS: Your Honor, at this point the  
8 testimony is just becoming repetitive. We went through  
9 this yesterday.

10 HEARING OFFICER: Well, I'm going to allow  
11 the witness to go ahead and kind of sum up his  
12 conclusions briefly, so we have them all in one little  
13 bundle, if you will.

14 MS. RONALD: I'm not intending to go to any  
15 great detail here.

16 HEARING OFFICER: Again, the keyword I heard  
17 was recap or is what I wrote for what you said recap or  
18 summary, but just kind of going through again in a  
19 brief fashion, I would think.

20 BY MS. RONALD:

21 Q. So simply stated Mr. Corkhill, there's -- do  
22 you believe that the information submitted by  
23 Wind River establishes a confining layer between the  
24 upper alluvial channel-fill aquifer and the lower Muddy  
25 Creek Formation?

1           A.    I do not.

2           Q.    Do you think that additional information  
3 would be necessary in order to establish the existence  
4 of that layer?

5           A.    I do.

6           Q.    With respect to the availability of good  
7 quality water at the Muddy Creek -- I'm sorry.  At the  
8 Mormon Well site has, in your estimation, Wind River  
9 provided information that indicates that the proposed  
10 depth of the production wells at the Mormon Wells' site  
11 will encounter good quality water?

12          A.    It doesn't.  The information provided does  
13 not indicate that to me.

14          Q.    Regarding the amount of water that will be  
15 produced at the Mormon Well site, has Wind River  
16 indicated in it's information, in your opinion, that  
17 there will be sufficient quantities of water available  
18 at -- that can be withdrawn from that particular site?

19          A.    No.

20          Q.    Regarding concepts of recharge and perennial  
21 yield, do you agree with Wind River's position that the  
22 proposed wells at the Mormon Well site will be able to  
23 capture recharge that's available in the -- throughout  
24 the basin so that -- I'll stop right there.

25          A.    I do not.

1 Q. And do you believe that Wind River has  
2 provided enough information for -- to determine whether  
3 there will be ground -- impacts the groundwater from  
4 the proposed -- pumping on other existing wells?

5 A. I -- no.

6 Q. And finally, do you believe that Wind River  
7 has provided enough information to establish that  
8 subsidence is not a problem or will not be a problem at  
9 that site?

10 A. No.

11 Q. Now, do you believe that additional  
12 information is necessary in order to address these  
13 areas of concern?

14 A. I do.

15 Q. And it's your testimony that has not yet been  
16 provided?

17 A. Correct.

18 Q. Do you have anything further to add,  
19 Mr. Corkhill?

20 A. No, I don't.

21 MS.RONALD: That concludes our testimony,  
22 Your Honor.

23 HEARING OFFICER: Why don't we go to  
24 cross-examination then.

25 MR. LEWIS: Thank you, Your Honor.

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CROSS-EXAMINATION

BY MR. LEWIS:

Q. Mr. Corkhill, anybody who practices geology or hydrology in the State of Arizona has to understand the difference between the two categories of water, percolating groundwater and surface water, you would agree with that wouldn't you?

A. Not necessarily. I don't agree with that.

Q. What is percolating groundwater?

A. I don't know the answer to that.

MS. RONALD: Your Honor, I'm going to object here. The terms percolating groundwater and sub flow are legal terms of art that require the witness to make -- express a legal opinion. I don't think they are appropriate.

HEARING OFFICER: Any response, Mr. Lewis?

MR. LEWIS: Your Honor, in order to determine whether or not this water is subject to ground-water laws opposed to surface-water law, a determination has to be made as to whether it's percolating groundwater or whether it's surface water or sub flow of the stream. I'm amazed that they bring a person in here from the Department of Water Resources who supposedly is a hydrologist and geologist and can't make distinction between percolating groundwater and surface water.

1                   MS. RONALD: Your Honor, I think that's a  
2 total mischaracterization of what Mr. Corkhill just  
3 said. He was being asked to express a legal opinion.  
4 Those are legal terms of art. We have just heard  
5 testimony from Mr. Corkhill, spending about four hours,  
6 I think, regarding his analysis of the hydrogeology of  
7 this area. He's very knowledgeable. He is -- the  
8 report's that were submitted by Wind River were  
9 thoroughly reviewed by Mr. Corkhill. I can't believe  
10 there would be any dispute about that. And he's a  
11 registered geologist, he is a hydrologist, and he's  
12 expressed an incredible amount of scientific knowledge  
13 and expertise regarding the matters that were raised by  
14 the Wind River application. The Wind River application  
15 never questioned -- never brought up this concept of  
16 percolating groundwater. What we're trying to figure  
17 out is what the hydraulic parameters are at the Mormon  
18 Well site. And what this case is about is whether or  
19 not Wind River has provided that information. It's our  
20 testimony that they have not. And I believe that we're  
21 really shifting ground over to an area that has nothing  
22 to do with whether or not adequate data has been  
23 provided.

24                   HEARING OFFICER: Well, let me ask you a  
25 question then. Is it the Department's position that,

1 for purposes of this proceeding, whether or not this  
2 water is groundwater or surface water is irrelevant?

3 MS.RONALD: No. It is not our position, Your  
4 Honor. But I believe that that -- this is, as  
5 Mr. Lewis knows, we both practice in the adjudication  
6 court. This is a very complicated issue that has  
7 factual and legal components. What Mr. Corkhill has  
8 testified to is the hydrogeologic information that is  
9 available in the Virgin River basin. How that  
10 information is then tied into legal concepts of  
11 percolating groundwater and surface water, is a very  
12 complicated matter and it has been complicated in the  
13 adjudication process. And I certainly want to insert  
14 that level of complication into this process --

15 HEARING OFFICER: Well, let me --

16 MS. RONALD: I'm sorry. If I could just say  
17 one more thing.

18 HEARING OFFICER: Sure.

19 MS.RONALD: If it were -- if it did -- I  
20 think Lisa Logan talked about the fact that she  
21 processes surface water applications. And if, in fact,  
22 they were pumping surface water that was hydraulically  
23 connected to the alluvial aquifer, then they would need  
24 a surface water permit. That's our position. And if  
25 this evidence -- our position, though, is we don't know

1 that right now, because not enough information has been  
2 provided. So I don't see how going into this line of  
3 questioning is going to be particularly helpful.

4 HEARING OFFICER: Let me turn back to Mr.  
5 Lewis. And I will observe, Mr. Lewis, it's my  
6 understanding that the issue as to what is or isn't sub  
7 flow has been being hashed out since at least 1987, and  
8 there are two Arizona Supreme Court decisions on that.  
9 So there is obviously a large legal component to that.  
10 But go ahead and --

11 MR. LEWIS: Your Honor, it makes a big  
12 difference. They put on a hydrologist, geologist who  
13 is subject to cross-examination on all aspects of his  
14 testimony. Now, the big issue here is water in the  
15 Muddy Creek aquifer, percolating groundwater as opposed  
16 to sub flow of the stream. If it's percolating  
17 groundwater, it's subject to the general Arizona  
18 Ground-water Law. Our position is that it is  
19 percolating groundwater, that it's a confined aquifer,  
20 and that it's separated from the surface flow of both  
21 Beaver Dam Wash and Virgin River. The way I understand  
22 Mr. Corkhill's testimony, he's testifying that it is  
23 not separated from the water in the upper alluvial  
24 aquifer. Therefore, if you are taking water from the  
25 Muddy Creek aquifer, you would be taking surface water,

1 you'd need a prior appropriative right. We got 212  
2 wells out here, pumping water from both the upper  
3 alluvial aquifer and the Muddy Creek aquifer, without  
4 having prior appropriative rights. And that is a very  
5 significant issue in this case. I think we should be  
6 allowed to explore that, because if it is percolating  
7 groundwater, there is no restriction on pumping that  
8 percolating groundwater under this -- the Arizona law  
9 that controls percolating groundwater in this part of  
10 the State of Arizona. We are outside of an AMA.  
11 They're going to put on a witness who is going to talk  
12 about the different regulations between AMAs  
13 requirements for adequacy water supplies. We have  
14 pending applications by the water companies up here for  
15 additional certificates of assured water supply.  
16 They're going to have to prove the legal category of  
17 the water that's involved here. And I think it's a  
18 wide open question, and it's a legitimate area of  
19 cross-examination.

20 HEARING OFFICER: Briefly, please.

21 MS. RONALD: Yes. Your Honor, I have  
22 absolutely no problem with Mr. Lewis cross-examining  
23 Mr. Corkhill about his testimony and his analysis of  
24 the geohydrologic information that he reviewed in the  
25 Virgin River basin. The majority of which was provided

1 by the applicant. If Mr. Lewis wants to draw some sort  
2 of legal conclusion regarding that information, we  
3 don't need to do it through the witness. That is  
4 something that Mr. Lewis can do based on the facts.  
5 And if he wants to talk to him about what he testified  
6 to, that's fine. But I don't think it's particularly  
7 relevant that this particular witness is not versed in  
8 the legal nuances that are going on in the Gila Four  
9 decision, which is now pending before the Arizona  
10 Supreme Court, yet once again. I don't have a problem  
11 with the cross-examination. But I do take exception to  
12 characterizing Mr. Corkhill's witness -- I'm sorry.  
13 Mr. Corkhill as a witness as not suitable, simply  
14 because he is not versed in those legal issues.

15           Mr. Lewis can make his legal arguments in his  
16 post-hearing brief.

17           HEARING OFFICER: All right. What I'm going  
18 to do is --

19           MR. LEWIS: I'm not questioning  
20 Mr. Corkhill's suitability as a witness. I'm not  
21 questioning his competence. But I am entitled to  
22 cross-examine on this category of whether or not we're  
23 talking about percolating groundwater or surface water.

24           HEARING OFFICER: All right. We have 10:15  
25 right now. Rather than wait till 10:30 for our break,

1 why don't we take 15 minutes right now, and I will  
2 consider this at this point. When we come back from  
3 our break, we will be prepared to, move, forward.

4 MR. LEWIS: Thank you, Your Honor.

5 (Whereupon, a short break was taken.)

6 HEARING OFFICER: Okay. We're back. We're  
7 back on the record. Couple of things; one, in terms of  
8 the specific objection, I'm going to overrule that  
9 objection and allow Mr. Lewis a chance to ask some  
10 questions and ascertain the state of this witness'  
11 knowledge on the subject. And pending where that goes,  
12 we'll -- obviously, you're always free to renew your  
13 objection, and we will just get some basic information  
14 and then move forward.

15 MS. RONALD: Thank you.

16 BY MR. LEWIS:

17 Q. Mr. Corkhill, is it your testimony that you  
18 do not know the difference between percolating  
19 groundwater and surface water in Arizona?

20 A. That's correct.

21 Q. You had never worked -- none of the work  
22 you've done with the Department of Water Resources has  
23 ever dealt with distinguishing between the categories  
24 of percolating groundwater and surface water?

25 A. That's correct.

1 Q. Therefore, you could not rebut the testimony  
2 of Dr. Janson that he has testified that the water in  
3 question in the Muddy Creek aquifer is percolating  
4 groundwater as opposed to sub flow, right?

5 A. That is correct.

6 Q. Thank you. Has ADWR ever estimated the  
7 recharge, discharge, and perennial yield of the lower  
8 Virgin River basin?

9 A. Would you repeat the question, please?

10 Q. Yes. Has ADWR ever estimated -- let me pull  
11 this in here -- has ADWR ever estimated the recharge,  
12 discharge, and perennial yield of the lower Virgin  
13 River basin?

14 A. We have not.

15 Q. Does ADWR propose to compute estimates for  
16 the lower river, Virgin River basin?

17 A. Not that I'm aware of.

18 Q. Now, you said something that kind of  
19 surprised me. Maybe I misunderstood. Did you say you  
20 cannot measure recharge?

21 A. In the sense of mountain front recharge as  
22 it's, of course, being done by Maxey using a basin wide  
23 estimate for mountain front recharge using the  
24 Maxine-Eakin Equation. People use that because you  
25 can't measure it as such. There's techniques, of

1 course, for looking at recharge measurements,  
2 stream-flow measurements in the loss, of course as it  
3 weighed in for recharge, those sorts of things. But  
4 that's not what's typically done for a big groundwater  
5 basin like this.

6 Q. So you don't believe that USGS Reports that  
7 are in evidence, where they estimate the recharge at  
8 40,000 acre feet per annum, that can't be done or how  
9 do you do --

10 A. Well --

11 Q. -- do you disagree with them?

12 A. I say that I don't know what the recharge is.  
13 But I also know that the estimates have changed a lot  
14 over the years. I've read the Dixon and Katzer Report.  
15 I've read how the they're using a new precipitation map  
16 in Nevada. And -- well, actually I've read that they  
17 used an estimate based on an altitude precipitation  
18 relationship. But I've also seen the prism data that  
19 was presented in the UNLV letter. So I know that  
20 there's things that are changing in terms of  
21 information.

22 Q. As a matter of fact, in the active management  
23 areas in Arizona, you do measure recharge, don't you?

24 A. Recharge is estimated in some cases, measured  
25 in others depending on what the particular component

1 is.

2 Q. And isn't that really the basis for  
3 determining whether an area is going to be designated  
4 as an active management area as to whether the pumping  
5 exceeds the recharge?

6 A. That's a part of act active management goal.

7 Q. So do have to make estimates of recharge?

8 A. That's correct.

9 MR. LEWIS: Does a -- going back to your  
10 Exhibit ADWR 36B. If we could have that, please.

11 HEARING OFFICER: What exhibit again,  
12 Mr. Lewis?

13 MR. LEWIS: 36B.

14 HEARING OFFICER: I'm seeing a 36 on our  
15 menu, but not an E, just one number on that.

16 MR. LEWIS: B. 36B. Yeah. There it is.

17 BY MR. LEWIS:

18 Q. I think on your direct testimony, you said  
19 that a phreatophyte only lives off of groundwater?

20 A. Well, that may have been a generalization,  
21 yes. It could live off water in the vadose zone too.

22 Q. The phreatophytes usually put their roots  
23 down into the groundwater -- the upper ground-water  
24 table; is that correct?

25 A. Yes.

1 Q. Does the illustration used in ADWR 36B  
2 identify the water table aquifer that is associated  
3 with Beaver Dam Wash aquifer?  
4 A. No. This is just a very conceptualized  
5 drawing. This is not meant to show Beaver Dam Wash at  
6 all.  
7 Q. So this is not intended to illustrate Beaver  
8 Dam Wash at all?  
9 A. No, sir.  
10 Q. Has nothing to do with the Muddy Creek  
11 aquifer, right?  
12 A. This is a general diagram to show the concept  
13 of perennial yield and how it is a concept related to  
14 capturing discharge.  
15 Q. I just wanted to make it clear that this does  
16 not purport to be the Beaver Dam Wash or the Muddy  
17 Creek aquifer or the upper alluvial aquifer.  
18 A. No, sir.  
19 Q. What parameters for transmissivity would you  
20 estimate for the Muddy Creek aquifer?  
21 A. Where?  
22 Q. In the Mormon Wells area?  
23 A. I have no idea.  
24 Q. How about down by the Littlefield gage?  
25 A. I don't know.

1 Q. How about by the Virgin River or the Virgin  
2 Valley Water District wells, Mr. Johnson's wells?

3 A. Well, the wells, if they are wells, the  
4 tested values.

5 Q. Would you -- apparently, you don't disagree  
6 with the measurements that Mr. Johnson made, that you  
7 would have no basis for disagreeing with that?

8 A. I have not evaluated the data, but I'm not  
9 questioning what he's done.

10 Q. Thank you. Do you believe that Muddy Creek  
11 aquifer is a confined aquifer?

12 A. I believe it is a confined to semi-confined  
13 aquifer in different locations. It's very  
14 heterogenous. I don't think that it can be  
15 characterized as one way or another.

16 Q. Let me go back to -- last night, one of the  
17 expert witnesses testified that it was ridiculous for  
18 Virgin river -- or Wind River to object to spending a  
19 million and a half to \$2 million to go out and do a  
20 site-specific test because apparently he says they do  
21 it all the time in Arizona. But there's a big  
22 distinction here, isn't there? When you do this in the  
23 active management areas down around the Phoenix area,  
24 you do your water study and you come up with a water  
25 right, you come up with a right to appropriate that

1 water, correct? Or pump that water --

2 MS. RONALD: Excuse me, Your Honor. Is  
3 counsel asking the witness to express an opinion  
4 regarding last night's testimony or to defend last  
5 night's testimony?

6 MR. LEWIS: No. I'm not.

7 MS. RONALD: Could you please rephrase that  
8 question.

9 HEARING OFFICER: Would you please to see  
10 where we stand.

11 BY MR. LEWIS:

12 Q. If the Wind River Resources spend a million  
13 and a half to \$2 million to do a site-specific study  
14 prior to getting a permit and they demonstrate that  
15 there is no adverse impact on the aquifer that the  
16 impact is negligible, that doesn't mean that they're  
17 going to get a permit, does it, to transport water to  
18 Nevada?

19 A. I believe the statute has several other  
20 requirements.

21 Q. Pardon?

22 A. I believe the statute has several other  
23 requirements.

24 Q. Exactly. So just showing that there is no  
25 hydrologic impact, does not guarantee them that they

1 are going to get the permit, right?

2 A. I think all the requirements of the statute  
3 would have to be evaluated.

4 Q. Wouldn't you be reluctant to spend up  
5 \$2 million to do what they're doing, if you didn't have  
6 some assurance that if you showed no hydrologic impact,  
7 you would be able to get your permit?

8 A. I can't speak for how I feel in Wind River's  
9 position. I'm not in it.

10 Q. I'm asking you if you, if you were in that  
11 position, personally, would you be willing to do that?

12 MS. RONALD: Objection, Your Honor. This is  
13 not relevant.

14 MR. LEWIS: Well, I think it a legit  
15 question.

16 HEARING OFFICER: I'll go ahead and let the  
17 witness answer.

18 THE WITNESS: Honestly, I don't have an  
19 answer to that because I've never been there.

20 MR. LEWIS: Thank you.

21 BY MR. LEWIS:

22 Q. Subsidence, if I understand it correctly, is  
23 related to over drafting of the groundwater?

24 A. Yes, sir.

25 Q. Is the lower Virgin River basin overly --

1 currently over drafted?

2 A. I don't know if there's any groundwater  
3 mining going on or not. We have never seen any data  
4 indicating what may be going on in the Virgin Valley  
5 Water District wells. Generally speaking, the water  
6 table seems to be stable. But I haven't seen any  
7 hydrographs of wells where the real pumpings going on.

8 Q. You gave some fairly extensive testimony on  
9 the subsidence in the Las Vegas Valley. Do you know if  
10 the soils in the Beaver Dam Wash area are  
11 geotechnically similar to the Las Vegas basin?

12 A. Well, the Muddy Creek Formation as described  
13 by John Bell as being both in Vegas and, of course, up  
14 here.

15 Q. Do you have any expertise in the area of soil  
16 mechanics or subsidence that would allow you to make  
17 such a determination.

18 A. Well, I read what Dr. Bell -- excuse me.  
19 He's not a doctor, as far as I know -- Mr. Bell has  
20 said and I also read what Dixon and Katzer said that  
21 there's -- the potential for subsidence in the Muddy  
22 Creek Formation is substantial if there's groundwater  
23 withdrawal and decline.

24 Q. Do you have technical data on the mechanical  
25 properties of the subsurface in the Beaver Dam Wash

1 area that would allow you to make a determination of  
2 potential for subsidence due to pumping from the Mormon  
3 Well site?

4 A. I do not.

5 Q. Do you know the perennial yield of the  
6 Las Vegas Valley?

7 A. I do not.

8 Q. Do you know if the Las Vegas Valley is  
9 currently over drafted?

10 A. I do not. I can only tell you that the  
11 history -- that certainly historically had been. I  
12 don't know what's going on now.

13 Q. I guess the answer to the next question, do  
14 you know of any studies that indicate that rebound  
15 could occur with reduced pumping?

16 A. Yes.

17 Q. That is the -- that does happen, correct?

18 A. Yes. And I've seen a recent USGS article or  
19 something that indicating that there was rebound in the  
20 Las Vegas area.

21 Q. And is there a potential for groundwater  
22 pumping in Arizona to induce subsidence in Nevada?

23 A. I would guess so.

24 Q. Is the Littlefield Formation mapped in Nevada  
25 as illustrated in Plate 1 of ADWR 1D? You want to see

1 that?

2 A. Well, as far as I could see the Littlefield  
3 Formation more or less ended at the state line.

4 Q. Could you state that again?

5 A. The Littlefield Formation more or less  
6 extended about to the Nevada line. My memory of the  
7 geology maps I've seen.

8 Q. Thank you. From -- could we have --

9 HEARING OFFICER: I apologize. Let me make  
10 sure I have that clear. So it's not mapped in Nevada  
11 because it doesn't extend into Nevada?

12 THE WITNESS: Yes, sir. That's my memory of  
13 the geology map.

14 HEARING OFFICER: Thank you. Go ahead, sir.

15 MR. LEWIS: We'd like to have ADWR  
16 Exhibit 53.

17 BY MR. LEWIS:

18 Q. And from that exhibit, Mr. Corkhill, could  
19 you point out the extent of the map unit designated as  
20 the Littlefield Formation?

21 A. Sure. When it comes up.

22 HEARING OFFICER: Do you have a page number  
23 that may help on that?

24 MR. LEWIS: Do you know what the page number  
25 is on that?

1 THE WITNESS: I'm sorry, I don't.

2 MS. RONALD: Do you have a copy, Mr. Corkhill?

3 THE WITNESS: I do have a copy. So hang on.

4 We're looking for geologic map. It might be about page

5 right in the beginning maybe. I'm not sure. Maybe

6 page -- well, after you get through the table of

7 contents, maybe the third page. I think -- if that's

8 the one you're talking about. I think you're too far

9 into it.

10 MR. LEWIS: It's Page 3.

11 THE WITNESS: Yeah. I think that's it.

12 HEARING OFFICER: Well, let me ask. It looks

13 like Wind River has their paper copy of this out. I

14 believe the witness does as well. Although maybe we

15 are going to need it on the screen to get a complete

16 answer. Does ADWR's attorneys have theirs out?

17 MS. RONALD: Yes, we do.

18 MR. LEWIS: Your Honor, I think I can

19 rephrase it this way.

20 BY MR. LEWIS:

21 Q. Mr. Corkhill, on ADWR Exhibit 53, Page 3, is

22 the extent of the mapped unit designated as the

23 Littlefield Formation in the green area on that page?

24 A. I'm sorry. I couldn't hear.

25 Q. Is the Little -- the extent of the

1 Littlefield Formation shown on the green area on the  
2 map on that page?

3 A. You know, I don't have a color copy. I'm  
4 sorry.

5 MR. LEWIS: Could I approach the witness,  
6 Your Honor, maybe we can get this done?

7 HEARING OFFICER: Yes.

8 THE WITNESS: Yes. Yes, sir.

9 HEARING OFFICER: So in case the -- well, the  
10 crowd probably didn't hear that. It looked like the  
11 court reporter may have.

12 Mr. Lewis has shown the witness a copy of  
13 Page 3, and the answer was: "Yes." The Littlefield  
14 Formation is shown in green," correct?

15 THE WITNESS: Yes. But it is hard to tell.

16 BY MR. LEWIS:

17 Q. Mr. Corkhill, I want to go back to some of  
18 your testimony from yesterday on the resistivity work  
19 done by Zohdy.

20 A. Yes, sir.

21 Q. Yesterday, you offered opinions on the  
22 resistivity work conducted by Zohdy. Are you an expert  
23 on electrical resistivity?

24 A. I am not.

25 Q. Do you have any experience in geophysical

1 data acquisition?

2 A. Yes, I do.

3 Q. Can you described what that entailed.

4 A. Geophysical well logging, doing geophysical  
5 logging of oil and gas and water wells, mining wells.  
6 Did that for about three a half years. Using  
7 principals of electrical resistivity measurement, that  
8 the principals are for logging are similar, at least,  
9 electrical theory, although, obviously doing it on the  
10 surface using resistivity soundings as a physically  
11 different thing.

12 Q. Did that include -- this word is going to  
13 kill me and the court reporter, both -- Spismic,  
14 S-p-i-s-m-i-c, reflection acquisition and processing?

15 A. Spismic? Seismic.

16 Q. I got it wrong. S-e-i-s-m-i-c.

17 A. I have done seismic data processing. Not  
18 acquisition.

19 Q. Do you include directing or interpreting  
20 surface electrical read -- do you include directing or  
21 interpreting surface electrical resistivity surveys?

22 A. Do I do what?

23 Q. As far of your expertise?

24 A. Do I call that part of my expertise?

25 Q. Yes.

1           A.    Not expertise, but I obviously have seen the  
2 information from time to time, so I can read what's  
3 said about it.

4           MR. LEWIS:    Could we have AWDR Exhibit 1C,  
5 Page 84.

6 BY MR. LEWIS:

7           Q.    Yesterday, if I remember correctly, the Judge  
8 asked you to explain the white gap below Sounding 10 on  
9 Profile 4-5. Do you remember that?

10          A.    Yes, sir.

11          Q.    I think your answer was that you could offer  
12 no further explanation than what you read on Page 12.2,  
13 the second paragraph of that same report; isn't that  
14 correct?

15          A.    Yes.    That's correct.

16          Q.    What does the concept of maximum probing  
17 depth relative to the depth of the last infinitely  
18 thick layer mean to you as used on Page 12.2, second  
19 paragraph?

20          A.    Okay.    What that tells me is that what I  
21 interpret this whole thing to mean is that at that  
22 site, for whatever reason, the probing depth for these  
23 resistivity surveys is increased by moving the current  
24 electrodes out from the initial setting of the  
25 potential electrodes.    And as you increased the spacing

1 of the current electrodes, you get a deeper depth of  
2 penetration and probing depth. What I interpret that  
3 to mean is that for some reason at that site, he  
4 couldn't move his current electrodes out far enough  
5 away to get a deeper reading. And what that tells me,  
6 from these words, is that it's indicating that there's  
7 deeper aquifer there, material there. However, because  
8 he couldn't get a deep -- a larger current -- electrode  
9 separation, he wasn't able to know what was actually in  
10 that location.

11 Q. I think you just answered by next question.  
12 And that was: The factors that control the probing  
13 depth of a resistivity sounding is the spacing between  
14 the electrodes, correct?

15 A. Spacing between the current electrodes, yes.

16 Q. Right. What electric -- electrode array was  
17 used for the Zohdy Survey?

18 A. The Schlumberger.

19 Q. Pardon?

20 A. The Schlumberger.

21 Q. And that is spelled S-c-h-l-u-m-b-e-r-g-e-r,  
22 correct?

23 A. Yes, sir.

24 Q. Do you know what parameter is used to  
25 describe the array length for a Schlumberger sounding?

1           A.    The relationship between resistivity and the  
2 voltage current and resistivity relative to the AM and  
3 AB spacings.

4           Q.    And that is called AB/2?

5           A.    Yes.

6           Q.    Do you know what AB/2 refers to?

7           A.    That's the half spacing between the two  
8 current electrodes.

9           Q.    What is the largest AB/2 value used for  
10 Sounding 10 on Profile 4-5?

11          A.    I would have to look.

12          Q.    Page 38, at the table at the bottom.

13          A.    The largest AB spacing would be 426 meters.

14          Q.    Would that be also 1400 feet?

15          A.    Roughly.

16          Q.    Do you know the largest AB/2 values used for  
17 the adjacent soundings to Sounding 10, soundings being  
18 1 and 9?

19          A.    I'd have to look.  What were the numbers?

20          Q.    That was the Sounding 10, being between  
21 Soundings 1 and 9.

22          A.    Let me -- hang on.

23          Q.    I just want to have you confirm that was  
24 6,000 feet and 7,500 feet.

25          A.    I don't have it in front of me so, I mean, if

1 you say so. I'm not going to necessarily argue with  
2 you. I have to look. It's just a matter of me  
3 verifying what you're saying.

4 Q. If you don't know --

5 A. We can do that, if you'd like.

6 Q. No. I don't care. If you don't know, you  
7 don't need to look at it.

8 What effect would the shorter AB/2 Spacing  
9 for Sounding 10 have on it's maximum probing depth?

10 A. You'll have to hang on. You know, I'll just  
11 say I'm not able to answer some of these questions.  
12 What I did do was read this report. If you really want  
13 to get to the heart of this. I read this report. I  
14 read the Holmes Report. And I read the interpretation  
15 of electrical sounding where by Zohdy in his geophysics  
16 report of 1974.

17 It's clear to me from what I've read in those  
18 reports that there's -- if we go back to that one  
19 profile, if you really want -- I don't know if this may  
20 not be what you want to do. Do you want to talk about  
21 the profile?

22 Q. No, no. I guess my point is that it would  
23 take somebody that's skilled in the art of electrical  
24 resistivity surveys to answer the answer the question  
25 that the Judge posed yesterday?

1           A.    Certainly, it takes somebody with knowledge  
2 of this to -- more knowledge perhaps than I do -- to do  
3 detailed analysis.  However, what I did do was read the  
4 reports, look at what was under -- what was shown on  
5 those cross sections, looked at the descriptions of  
6 material types and groundwater conditions, as far as  
7 salinity, and made my interpretations from that  
8 information.

9           Q.    Then you wouldn't disagree that the answer to  
10 the Judge's question is that the space occurred because  
11 the depth was less than the adjacent soundings because  
12 the line was shorter, so there was a blank space at the  
13 bottom of Sounding 10, does that sounds logical?

14          A.    I'm going to have to hear you one more time.

15          Q.    The probing depth was less than the adjacent  
16 soundings because the line was shorter, so there was a  
17 blank space at the bottom of Sounding 10?

18          A.    Yes, that's right.

19          Q.    And --

20                HEARING OFFICER:  Let me make sure I  
21 understand.  I think when we entered this line of  
22 questioning, that pretty well was what you answered the  
23 first question, right?

24                THE WITNESS:  Yes.

25                HEARING OFFICER:  You couldn't get the

1 electrodes far enough apart?

2 THE WITNESS: Right.

3 HEARING OFFICER: Saying those are equivalent  
4 terms.

5 THE WITNESS: Yes.

6 HEARING OFFICER: What Mr. Lewis just stated  
7 and what you said at the beginning are equivalent, in  
8 your view?

9 THE WITNESS: I think so.

10 HEARING OFFICER: Okay. Thank you.

11 BY MR. LEWIS:

12 Q. Yesterday you mentioned that resistivity  
13 soundings can be impacted by power lines; is that  
14 correct?

15 A. That's stated in the Zohdy Report.

16 Q. Would you be able to recognize a sounding  
17 curve that's impacted by a power line?

18 A. Would I be able to?

19 Q. Yes.

20 A. I don't know.

21 Q. Would you look at Pages 29 through 75 of the  
22 Zohdy Report, present what? What is presented in the  
23 Pages 29 through 75 of the Zohdy Report?

24 HEARING OFFICER: That is Exhibit 1C,  
25 correct?

1           MR. LEWIS:  Yes.

2           THE WITNESS:  29 through 75 would be the

3 sounding curves.

4 BY MR. LEWIS:

5       Q.  That's the resistivity sounding plots for the

6 Zohdy Survey?

7       A.  Yes, sir.

8       Q.  Can you point to any soundings that you would

9 characterize as impacted by power lines.

10      A.  Well, I can go and find -- I know he's

11 mentioned some.

12      Q.  But you haven't picked out any --

13      A.  I haven't picked out any.

14      Q.  Can you point out any features of Sounding 10

15 on Page 38 that would indicate power line interference?

16      A.  No.

17      Q.  And does Zohdy discuss any orientation to a

18 power line that is most likely to cause interference?

19      A.  I believe parallel.

20      Q.  That would be Page 10, the first paragraph,

21 last line, if you could read that for the record.

22      A.  First paragraph?  "On the other hand, sixty

23 hertz interference from a power line is strongest when

24 the sounding line is expanded perpendicular to the

25 power line."

1 Q. No. I'm talking about the Page 10, the first  
2 paragraph, the last line.

3 A. First para -- that's what I read.

4 Q. Okay, that's fine. You got the right one.  
5 Do you know the direction which the  
6 resistivity soundings on Profile 4-5 are expanded  
7 relative to the power line?

8 A. Yes. That's shown on the figure, the  
9 location map.

10 Q. It was parallel, right?

11 A. No. That's not correct.

12 Q. Wasn't parallel?

13 A. No.

14 Q. Is it dislikely to cause problems based on  
15 Zohdy's description?

16 A. Probably not.

17 Q. And does Zohdy mention any soundings done  
18 along Profile 4-5 that were impacted by the power line?

19 A. He may have. I noted that he mentioned some  
20 soundings that seemed to have some problem with that.  
21 I'd have to look. I can't. If you want me --

22 Q. Look at Page 10, the third paragraph, and see  
23 what he said there.

24 A. Sounding 20? The one about Sounding 29?

25 Q. Right. Did he say anything there about

1 soundings along the Profile 4-5, being impacted by the  
2 power line?

3 A. I don't see that.

4 Q. Staying with the Zohdy Report, AWRD  
5 Exhibit 1C, I want to ask you some questions about the  
6 water quality and range size from the resistivity data.  
7 Yesterday you discussed the correlation between  
8 resistivity grain size of a formation and the TDS  
9 levels of the formation fluid, do you recall that?

10 A. Yes.

11 Q. Do you have expertise in interpreting  
12 resistivity surveys and fine grained formations that  
13 allows you to form independent opinions on formation  
14 water quality from resistivity values, beyond what you  
15 read in Zohdy or Holmes?

16 A. I do not.

17 Q. And on Page 22 in Zohdy's Report, please read  
18 .1 of the summary on the conclusion section.

19 A. Page 22 was that?

20 Q. It's page 22 --

21 A. Okay.

22 Q. .1 --

23 A. .1?

24 Q. Of the summary and conclusions section.

25 A. Yes. Low-to medium resistivity, that?

1 Q. Right. Could you read that for the record.

2 A. Sure. "Low-to medium-low resistivity

3 materials, 7 to 15 ohmmeters, generally represent

4 clay-rich sediments or may represent sand and gravel

5 layers saturated with brackish to saline water."

6 Q. Now, does that mean that all units between 7

7 and 15 ohmmeters must produce brackish water?

8 A. Doesn't necessarily mean it.

9 Q. Says it does not?

10 A. I believe he says uses the word "may".

11 Q. Please read .2 on the same page.

12 A. "Medium-low resistivity materials, 15 to

13 30 ohmmeters, probably represent silty sand layers with

14 a significant amount of clay, 50 percent -- or

15 50 percent, question mark -- "Such materials are

16 generally not very good aquifers, because of the

17 possibility of high clay content."

18 Q. So it would be true, then, that this section

19 correlates 15 to 30 ohmmeters materials to a

20 significant clay content?

21 A. Yes, sir.

22 Q. Now, based on your knowledge of the

23 hydrogeology, how much water will a dense un-fractured

24 clay unit yield to a well?

25 A. Very little.

1 Q. Based on what you said read what resistivity  
2 range would you expect for a saturated dense clay  
3 layer?

4 A. Something below 20 ohmmeters.

5 Q. So it would be 10 to 30 ohmmeters would be a  
6 good range, right?

7 A. I don't know about 30. Certainly, there's  
8 statements that 20 ohmmeters and below is fine grain  
9 material saturated with brackish water.

10 Q. So you wouldn't disagree that 20 to 30 ohms  
11 would be a good range?

12 A. Okay.

13 Q. If you were provided with information that a  
14 zone of subsurface of a resistivity with 10 to  
15 20 ohmmeters was producing large quantities of low TDS  
16 water, would you assume that the low resistivity value  
17 formation indicates brackish water?

18 A. Would you repeat the question?

19 Q. Yes. If you're provided with information  
20 that a zone of the subsurface with a resistivity of 10  
21 to 20 ohmmeters was producing large quantities of low  
22 TDS water, would you assume that the low resistivity  
23 value of the formation indicates brackish water?

24 A. Well, obviously that doesn't seem to fit.

25 Q. Pardon?

1           A.    That wouldn't seem to fit.

2           Q.    You would say no, right?

3           A.    Correct.

4           Q.    Could it indicate fresh water infractures in  
5 a clay-rich matrix?

6           A.    It could.

7           Q.    Could it indicate fresh water in the thin  
8 sand layers between the dense clay layers with sand  
9 layers too thin to detect by a surface resistivity  
10 survey?

11          A.    Yes.

12          Q.    Would knowledge of low TDS water from wells  
13 within the Muddy Creek Formation make it reasonable to  
14 interpret resistivity values below 20 ohmmeters as more  
15 representative of a predominance of clay-rich materials  
16 and not necessarily as indicative of brackish or saline  
17 water?

18          A.    I'm sorry.  You're going to have to do that  
19 one again.

20          Q.    Pardon?

21          A.    You're going to have to ask me that one  
22 again.

23          Q.    Would knowledge of low TDS water -- and I'm  
24 sorry.  I'll slow down a little bit.

25          A.    That's okay.

1 Q. Would knowledge of low TDS water from Wells  
2 within the Muddy Creek Formation make it reasonable to  
3 interpret resistivity values below 20 ohmmeters as more  
4 representative of a predominance of clay-rich materials  
5 and not necessarily as indicative of brackish or saline  
6 water?

7 A. Quite honestly, I don't know. I'm not sure.

8 Q. So the answer is yes?

9 A. No. The answer is: I don't know.

10 Q. You can't answer that?

11 A. I can't really answer that question.

12 Q. That's fair enough. You can't answer it,  
13 just tell me.

14 MR. LEWIS: Now, I'm going to switch to a new  
15 exhibit. ADWR 1B. This is the USGS Report. And I'd  
16 like to have you go to Page 19. Okay. I think that is  
17 where I want it. If you can expand that to make it  
18 more readable.

19 BY MR. LEWIS:

20 Q. The last paragraph that appears on the  
21 right-hand column there, Mr. Corkhill, could you read  
22 the first sentence where it says gaining and losing?

23 A. Yes. The gaining and losing reaches  
24 downstream from the site S11 are related to the amount  
25 of alluvial channel-fill deposits and capacity for

1 storing water along the length of the stream."

2 Q. That has nothing to do with the Muddy Creek  
3 aquifer, does it?

4 A. That's correct. It doesn't necessarily.

5 HEARING OFFICER: Let me just verify. That  
6 was Page 19?

7 MR. LEWIS: Yes, Your Honor.

8 HEARING OFFICER: Thank you.

9 MR. LEWIS: Yes, Page 19.

10 THE WITNESS: Could I qualify that by saying  
11 not necessarily?

12 BY MR. LEWIS:

13 Q. Did Holmes -- DWR Exhibit 1B, Holmes, et al.  
14 estimate the discharge from subsurface inflow to the  
15 Beaver Dam Wash?

16 A. Did Holmes -- one more --

17 Q. DWR Exhibit 1B, did they estimate the  
18 discharge from subsurface inflow to the Beaver Dam  
19 Wash?

20 A. Yes.

21 MR. LEWIS: And if you move to Page 33.

22 BY MR. LEWIS:

23 Q. Does he base his calculations on changes in  
24 electrical conductivity in the surface water of Beaver  
25 Dam Wash?

1 A. Yes, he does.

2 Q. Does he have any direct measurement of flow  
3 from the Muddy Creek aquifer to the upper alluvial  
4 aquifer?

5 A. Well, I think that it's an inferred increase  
6 in the sense that they have measured gaining condition  
7 in the lower --

8 Q. But do you see a direct measurement in his  
9 report?

10 A. I do not.

11 Q. Could water from another source cause a  
12 moderate change in conductivity in the wash, such as  
13 from the Virgin River upgrade of the confluence?

14 A. Could it?

15 Q. Yes.

16 A. I suppose. Although, it doesn't seem that  
17 would be very likely.

18 MR. LEWIS: I want to go now to ADWR Exhibit  
19 4W.

20 BY MR. LEWIS:

21 Q. Have you reviewed the information that's  
22 contained in Exhibit 4W?

23 A. Which well is this? Oh, 31. Yeah. I've  
24 looked at that.

25 Q. Who is the owner of the well or where the

1 well is located in this one?

2 A. Virgin Valley Water District.

3 Q. What is the designation of the well?

4 A. I don't know what you mean.

5 Q. The number designation?

6 A. Oh, I don't know where -- is it, you mean a  
7 permit number or something? Oh, you mean, like the  
8 well number?

9 Q. Yes.

10 A. Okay. 31.

11 Q. Could you please read the data present under  
12 the lithologic log.

13 A. You mean go through that entire thing?

14 Q. Yes.

15 A. Okay.

16 Q. Does it tell you when the well was completed?

17 A. I don't know. Oh, yeah. Okay. Down there.  
18 5/21/02.

19 Q. Based on the information under the lithologic  
20 log, could you identify an interval that would be  
21 considered younger quarternary gravel?

22 A. Okay. Well, certainly may be the upper  
23 180 feet. I don't know.

24 Q. Can --

25 A. You know, I haven't looked at this in any

1 detail. So if you want me to start --

2 Q. But does this well appear to be -- appear to

3 penetrate the Muddy Creek Formation?

4 A. Oh, yeah. I'm not disputing that.

5 Q. What is the case to depth of the well?

6 A. Let's see. Perforations from 600 to 1560.

7 Q. Who is the reported well contactor?

8 A. Layne Christensen (sic).

9 Q. Where are they located?

10 A. Looks like they are out of Chandler Arizona.

11 Q. Say that again.

12 A. Doesn't show, but I think that is

13 Chandler, Arizona probably.

14 A. Chandler.

15 Q. In your opinion, would you consider this a

16 local contractor to this area?

17 A. No. I wouldn't.

18 Q. Can you provide a name of any local drilling

19 contractor licensed in the State of Arizona, licenced

20 for this area here?

21 A. Well. Cluff Drilling is one.

22 Q. Pardon?

23 A. Cluff drilling. It's in Utah, I believe.

24 That's the one that all the Wind River applications

25 show.

1 Q. But not licensed in Arizona?

2 A. They would have to be licensed in Arizona to  
3 operate here.

4 Q. In your opinion, what would your cost  
5 estimate be to mobilize a drilling rig from Chandler to  
6 come up here?

7 A. I have no idea. I'm sure it would be  
8 expensive.

9 Q. What's the reported water level in the well?

10 A. Looks like 299.

11 Q. Is there any pump test data associated with  
12 the well log?

13 A. Well, test data I guess that's 3200 gallons  
14 per minute.

15 Q. What is the pumping rate, does that show?

16 A. I think it's want 3200 gallons per minute.  
17 I've not looked at these NOI --

18 HEARING OFFICER: Let's just slow down then.  
19 And if you want to the witness to answer maybe more  
20 detailed questions about this exhibit in particular,  
21 why don't we find him a paper copy and look --

22 THE WITNESS: If --

23 HEARING OFFICER: Excuse me.

24 THE WITNESS: Sorry.

25 HEARING OFFICER: We'll let him look at it

1 more thoroughly, because I do have some concerns that  
2 with the limits of technology and the screen, that  
3 picking numbers and data off an exhibit like this is --  
4 suffers in quality issues. So do we have a paper copy  
5 of this exhibit that we could provide the witness?

6 MR. LEWIS: That's ADW 4W.

7 HEARING OFFICER: Mr. Deeny seems to have  
8 one. And again, is that on -- the computer was showing  
9 11 pages, so I'm assuming then that he will have all 11  
10 if he needs to look at those pages.

11 And, Mr. Corkhill, in terms of sufficient  
12 time to review the information in response to the  
13 questions, take as long as you need. We will certainly  
14 give you ample time.

15 THE WITNESS: Okay. This helps a lot. It  
16 appears that the GPM was 3200.

17 BY MR. LEWIS:

18 Q. And does this appear to be the well log filed  
19 with the Nevada -- the Division of Water Resources that  
20 was analyzed by Dr. Tom Burbey in AWDR 7N?

21 A. I believe so.

22 Q. Okay --

23 A. Although, I will say that that only shows a  
24 well of about 1500 feet in depth. The Burbey Report  
25 only shows a log that's for a well that's 1500 feet.

1 So I don't know if they didn't complete the lower --  
2 1100 feet or not.

3 Q. Would you agree with the analysis presented  
4 in AWRD 7N about that well?

5 A. I have no reason to dispute it. I haven't  
6 analyzed the actual data. But I have no basis to  
7 dispute it.

8 Q. That well is pumping from the Muddy Creek  
9 aquifer?

10 A. It's my understanding, yes.

11 Q. Go to Page 2. You can go to it on your paper  
12 copy. Page 2.

13 A. The well logs, okay.

14 Q. Who is the owner of the well and where is the  
15 well located?

16

17 A. Well, it's Virgin Valley Water District  
18 again. Well 33. Did you ask me where it's located?

19 Q. Where it's located, yes.

20 A. Well, it would be -- I'm not as familiar with  
21 Nevada's coordinate system. It looks like township 12  
22 south, range 71 east, section 16.

23 Q. And what's the designation of that well?

24 A. Well, that would be Well 33.

25 Q. 33, correct.

1           Would you read the data present under the  
2 lithologic log.

3           A.   Well, red sand, clay, sand, gravel, red brown  
4 clay, sandy clay, silty sand, sand clay, mostly sand,  
5 sand clay, silty sand clay, sand clay silt -- sorry.

6           Q.   Could you tell us when the well was  
7 completed.

8           A.   3/13/02.

9           Q.   And can you identify an interval that would  
10 be considered younger quaternary gravel?

11          A.   Maybe the upper 130 feet.

12          Q.   I'm sorry. I didn't --

13          A.   Maybe the upper 130 feet. I don't know.  
14 There may not be much quaternary gravel there at all.

15          Q.   And --

16                HEARING OFFICER: Let me interject and ask a  
17 question.

18                Is it your feeling you don't know because you  
19 don't have enough information from this log or because  
20 you don't have sufficient knowledge to render an  
21 opinion?

22                THE WITNESS: Well, I mean, asking some guy  
23 to just sit here and render a log analysis on the spot,  
24 is kind of silly.

25                HEARING OFFICER: So --

1                   THE WITNESS: I mean, you know, I, honestly,  
2 if you're asking me to figure out, you know, is this  
3 the quaternary gravel or not, you know, I mean  
4 obviously that would be at the top. And I look down  
5 here and I see red sand, what does that mean? I don't  
6 know. Maybe that's the Muddy Creek Formation at the  
7 surface.

8                   HEARING OFFICER: And so --

9                   THE WITNESS: Maybe there is no quaternary  
10 gravel, in other words.

11                  HEARING OFFICER: So in answer to my  
12 question, and, obviously, correct me if I'm wrong, and  
13 certainly Mr. Lewis will be free to follow up on this.  
14 The answer to my question is: You don't believe  
15 there's sufficient information on this log?

16                  A. Well, that combined with just not really  
17 knowing. I'd like to see it on the map and see what's  
18 mapped on the surface geology, you know. I know that  
19 Muddy Creek is shown as exposed at the surface more or  
20 less west of the Arizona line in Nevada. And so that  
21 would just be a wild guess that this thing may be Muddy  
22 Creek at the surface.

23 BY MR. LEWIS:

24                  Q. But it appears to be in the Muddy Creek  
25 aquifer, you would agree with that?

1           A.     I will stipulate that all the wells in  
2 Virgin Valley Water District or the deeper wells,  
3 certainly, would be into the Muddy Creek Formation.  
4           Q.     Could you tell us the cased depth of that  
5 well is?  
6           A.     Looks like 718 to 1258.  
7           Q.     What's the reported water level in the well?  
8           A.     433 feet.  
9           Q.     What's the pumping rate?  
10          A.     3000 gallons per minute.  
11          Q.     Do you know where that well is located?  
12          A.     I believe this is -- I'm not sure if it's the  
13 eastern. Well, it's up there. I think this is the one  
14 that's maybe 6 miles sort of southwest of Mormon Well.  
15                  MR. LEWIS:  Would you go to ADWR Exhibit 29,  
16 Page 4.  
17 BY MR. LEWIS:  
18          Q.     Can you find -- wait a minute --  
19                  MR. LEWIS:  Is that Page 4 yet?  Okay.  
20 BY MR. LEWIS:  
21          Q.     Can you find Stop 5?  Do you still have your  
22 pointer right there?  
23          A.     Yes.  I got it.  Sure.  
24          Q.     Could you point that up.  
25          A.     Yes.  That one right there (indicating).

1 Q. Can you find the approximate location of  
2 Mormon Wells?

3 A. Okay. I think that's about where Mormon Well  
4 is there.

5 Q. That would be the distance, estimated  
6 distance from Stop 5 to Mormon Wells is approximately  
7 10 miles, would that be about right?

8 A. I don't know. What is Stop 5? Is that one  
9 of the well sites? I think it might not be quite that  
10 far.

11 Q. Approximately, 10 miles, somewhere in that  
12 area?

13 A. 6 to 10.

14 Q. Is Stop 5 the approximate location of the  
15 well designated as Virgin Valley Water District Well  
16 No. 33?

17 A. I believe so.

18 Q. This well is located north of the Virgin  
19 River?

20 A. Yes, sir.

21 Q. Now, I want to go back to ADWR 4W, Page 2.  
22 That's the paper copy you have.

23 A. Page two?

24 Q. 4W, Page 2.

25 A. I guess I'm on it.

1 Q. This well is designated as VVW Well No. 33?  
2 A. Yes, sir.  
3 Q. Producing from the Muddy Creek aquifer?  
4 A. Yes, sir.  
5 Q. Do you recall how many production wells are  
6 operated by Virgin Valley Water District?  
7 A. What I read was nine.  
8 Q. Nine?  
9 A. Nine.  
10 Q. Are all the production wells contained in  
11 ADWR 4W, in that package you have there?  
12 A. Well, I think they are but I'll count them.  
13  
14 Q. Let me tell you, they are.  
15 A. Okay.  
16 Q. I will just ask you to move to Page 6.  
17 And can you tell me what the reported  
18 production rate is there.  
19 A. Okay. This is the typewritten one. It would  
20 be 1650 gallons per minute.  
21 Q. Page 7, what's the reported production rate  
22 on that well?  
23 A. 1800 gallons per minute.  
24 Q. Page 8.  
25 A. 2000 gallons per minute.

1 Q. Page 9.

2 A. 2000 gallons per minute.

3 Q. Page 10.

4 A. 2900, and later, 1750.

5 Q. Now, I think it would take, I think you would  
6 agree, that it who take a competent hydrologist to  
7 locate the production wells for Virgin Valley Water  
8 District.

9 A. It would take a competent hydrologist to  
10 locate?

11 Q. Yes.

12 A. In other words, to -- through groundwater  
13 exploration, to site them, is that what you mean?

14 Q. Right. It's more than just luck, right?

15 A. Certainly.

16 Q. It takes somebody who would well versed in  
17 the hydrology of the lower Virgin River basin, like  
18 Michael Johnson?

19 A. I admit that this is -- obviously, these  
20 wells were located with a lot of thought.

21 Q. Do you know what the primary standard under  
22 the Safe Drinking Water Act is for total dissolved  
23 solids?

24 A. 500.

25 Q. Do you know what the secondary standard is

1 under the Safe Drinking Water Act for total dissolved  
2 solids?

3 A. I believe 1000, but I'm not certain on that  
4 one.

5 Q. Have you reviewed the information contained  
6 in ADWR 7G?

7 A. By number, I don't know what that is.

8 MR. LEWIS: Let's go to 7G, Page 15.

9 BY MR. LEWIS:

10 Q. What is the total dissolved solid  
11 concentration recorded for VVWD Well No. 31?

12 A. Hang on. 31. Oh, okay.

13 Q. Would it be 510 milligrams per liter if you  
14 see --

15 A. If you point it, it would be easier for me.

16 Q. Would you consider this total dissolved solid  
17 concentration to be saline?

18 A. Well, could you point at that, because I  
19 actually didn't see that. I'm trying to read this.

20 Oh, okay. I see the number there now. 510. Would I  
21 consider that to be saline?

22 Q. Yes.

23 A. No.

24 Q. What is the total dissolved solid  
25 concentration reported for VVWD Well No. 33?

1 A. 630.

2 Q. 630 milligrams per liter?

3 A. Yes.

4 Q. Would you consider this total dissolved solid  
5 concentration to be saline?

6 A. No.

7 Q. If you consider the water to be -- excuse me  
8 -- Strike that question.

9 If VVW Well No. 33 and VVW Well No. 31,  
10 producing for the Muddy Creek aquifer, located down  
11 gradient, and are not considered saline, how come the  
12 Muddy Creek aquifer and the Mormon Wells area is  
13 considered saline in your testimony presented on March  
14 the 3rd?

15 A. That was on the basis of the interpreted  
16 resistivity data by Zohdy and by Holmes.

17 Q. Moving to a different subject.

18 What's the typical composition of a confining  
19 layer?

20 A. Would be fine grain clay.

21 Q. Are there clay layers present in the  
22 Paparella, Michael Well, remember testifying yesterday  
23 about that one?

24 A. There were, yes.

25 Q. Remember you said you found this -- you were

1 looking for well information on a well, and you found  
2 the Paparella Well in an old file at ADWR, do you  
3 remember that?

4 A. Yes, I do.

5 Q. Are you aware as that that's the same well  
6 that we've been referring to here as the Michael Well?

7 A. Yes, I am.

8 Q. Would the clay units be likely to act as a  
9 confining or semi-confining units on that well?

10 A. With the knowledge of the just local extent  
11 of that well log, I could not make a determination  
12 based on no pumping data.

13 Q. What would the vertical hydrologic  
14 conductivity be for a layered system of clay and silt  
15 would it be low or high?

16 A. Very low.

17 Q. Would it be considered a confining unit?

18 A. If it was a continuous unit, yes.

19 Q. Can you predict the vertical hydrologic --  
20 conductivity of the geologic unit with any degree of  
21 certainty based on compressed graphical logs of  
22 lithology on cross sections such as AA, BB, and CC in  
23 the Holmes '97 Report?

24 A. No.

25 Q. And can you make an accurate determination of

1 the presence of the confining unit based on such an  
2 illustration?

3 A. No.

4 Q. Has ADWR ever prepared a potentiometric  
5 surface map for the lower Virgin River basin?

6 A. The Holmes and Rascona Report -- I'm not sure  
7 how far the extent of that. It might only be in the  
8 Arizona portion.

9 Q. Now, in order to fully investigate the  
10 hydrologic parameters at the Mormon Well site, what  
11 type of well construction would be required and how  
12 many monitor wells should be installed?

13 A. Well, I don't know that we know that for  
14 certain. It would start out, certainly, with at least  
15 a production well and a couple of monitor wells. But I  
16 think, we heard a lot of testimony last night that it's  
17 a complex area and you wouldn't necessarily know right  
18 off the bat. You'd have to do some exploration.

19 Q. Now, I'm assuming that you would not disagree  
20 with Michael Johnson's testimony as to how we would  
21 construct that well? You heard his testimony?

22 A. Well, certainly for the production well, it  
23 would need to be very -- well, all the casing, the  
24 grouting, sealing off units, that sort of thing,  
25 absolutely. You need that sort of thing. In terms of

1 what you would need to do a temporary test, you might  
2 be -- it would be able to stress the aquifer  
3 significantly -- you might be able to do something with  
4 a somewhat lesser design.

5 Q. Now, in order to drill the type of well that  
6 Michael Johnson was talking about with -- all of the  
7 safety factors he would put in or are there any local  
8 drillers in the Virgin Valley basin that have the  
9 capability of drilling that type of well?

10 A. I do not know.

11 Q. Has ADWR previously -- previous to your visit  
12 here -- well let me ask this question: Had you visited  
13 the Beaver Dam Wash area prior to January of this year?

14 A. No. Other than years ago, driving through  
15 just, but nothing relative to work.

16 Q. Has ADWR or anyone from ADWR previously  
17 visited Beaver Dam Wash and documented flow or lack of  
18 flow from the confluence of the Virgin River upstream  
19 to the head waters?

20 A. Actually, I think there's been some gaging  
21 that's been done over the years as -- I'm not familiar  
22 with exactly who or what, but I know that there has  
23 been some gaging done I believe. But I can't tell you  
24 more specifically about it.

25 Q. Who made the field trip that you discussed in

1 your direct testimony and the photographs that you  
2 took? Who accompanied you on that field trip?

3 A. Scott Deeny and Andy Kirtz.

4 Q. Did any of the local residents meet with you  
5 or go with you on that field trip?

6 A. No.

7 Q. Did you meet with any of them prior to the  
8 field trip or after the field trip?

9 A. No.

10 Q. Yesterday, you had an exhibit where you  
11 showed, I think, it was 212 wells that certificated in  
12 the area. Do you know how many of those 212 wells have  
13 been completed and are actually diverting water?

14 A. No, I don't.

15 Q. Do you know how many of those wells were  
16 completed in the Muddy Creek Formation?

17 A. Didn't do an analysis -- based on well depth,  
18 not too many of them. That's -- in other words, we  
19 don't necessarily have well logs on very many of them,  
20 so it's really hard to make a determination. But based  
21 on well depth and general relationships, not too many  
22 of them.

23 Q. I think, then, you would agree with me that  
24 most of the wells are producing from the shallow  
25 quaternary gravels?

1           A.    I imagine.

2           MS. RONALD:   Excuse me, Your Honor.  I object.  
3  He just inserted the word quaternary gravels into that  
4  question.  The witness has previously testified that  
5  based on well log information, he can't determine  
6  whether it is really quaternary or not.  And perhaps  
7  the witness can narrow his answer to what is within his  
8  knowledge based on well logs.

9           HEARING OFFICER:  Yes.  Why don't we let him  
10 expound based upon that.

11          MR. LEWIS:  Certainly, that can qualify his  
12 answer.  He's already answered the question.  No  
13 problem.

14          HEARING OFFICER:  Well, hang on a minute.  
15 Well, I'll ask him, then, because I want to get a good,  
16 clear record --

17          MR. LEWIS:  I'm sorry.  I misunderstood your  
18 statement.  I misunderstood what you said, Your Honor.

19          HEARING OFFICER:  Let's make sure we're  
20 clear.  And, again, my purpose on all of this is just  
21 to make sure we get good, clear accurate information,  
22 whether I ask the questions or somebody else.

23          As I understand it, the question was, from  
24 Mr. Lewis:  "Would you agree that most of the wells  
25 completed, of the 212 wells, would you agree that most

1 of those wells are completed in a quaternary gravels?"

2 Do you agree with that?

3 THE WITNESS: Well, I guess to be -- I will  
4 say it is quite possible that that's correct. However,  
5 without having looked at well logs and depths and the  
6 actual locations relative to the land surface and  
7 elevation relative to the stream bed and that sort of  
8 thing, I will just say that in general the wells are  
9 shallower here.

10 HEARING OFFICER: Now, let me ask a follow-up  
11 question, then. To me this seems like the counterpart  
12 or the other side of the coin, if you will, to the  
13 question: How many of the 212 wells do you believe are  
14 completed in the Muddy Creek aquifer formation? Is  
15 that your understanding of these two questions? That  
16 they're to the large degree, opposites? There are  
17 other choices, potentially, but most the wells are  
18 either in the alluvial gravels or in the Muddy Creek  
19 Formation or I've got that wrong?

20 A. Yes. I think you're correct on that, that  
21 it's one or the other. I'll say, based again, on our  
22 analysis of well depths, and most of these wells did  
23 not -- well, some had well logs, some didn't. And so  
24 we haven't done a detailed -- should be clear. We  
25 haven't done a detailed analysis of available well logs

1 to determine whether wells are actually completed --  
2 and so maybe I'm overstating what I really know about  
3 it. To say that I know for certain that these wells  
4 are all or mainly in the gravels or not. I can't say  
5 that for certain. Based on depth, it would seem to be  
6 that most of them would probably be in the gravels.  
7 However, there definitely are some wells that are in  
8 Muddy Creek Formation; the Biasi Wells. For example,  
9 there's two deep ones that definitely get down into the  
10 Muddy Creek. And I'm sure there's others.

11 HEARING OFFICER: All right. Go ahead, Mr.  
12 Lewis. And obviously, you can ask any clarifying or  
13 questions you care to about that.

14 BY MR. LEWIS:

15 Q. Mr. Corkhill, do you still have that Table 1  
16 through Table 4 that you were testifying to yesterday,  
17 do you still have that with you, the paper copies so  
18 you can read it?

19 A. Yes.

20 HEARING OFFICER: I'm sorry. These are the  
21 Exhibit 40A, B, C, and D that were the Excel files,  
22 right?

23 MR. LEWIS: I think that was the exhibit  
24 numbers. Yes, Your Honor.

25 HEARING OFFICER: They are those Excel files,

1 right? That we didn't get opened on our computer? It  
2 looks like Dr. Janson has --

3 MR. LEWIS: These are the ones. We put them  
4 on the computer yesterday, but they didn't show up well  
5 enough and --

6 HEARING OFFICER: Again, I show these as  
7 Exhibits 40A, B, C, and D. I just want to make sure  
8 that, one, anyone listening; two, all of us here are  
9 talking about the same information. Go ahead.

10 BY MR. LEWIS:

11 Q. What is the, from those tables, what is the  
12 largest producing well on the Arizona portion of the  
13 lower Virgin River basin?

14 A. What is the largest producing well?

15 Q. Yes.

16 A. Well, you know, these tables really don't  
17 provide that information.

18 Q. You can't tell from those tables what the  
19 largest producing well is?

20 A. No, I can't.

21 Q. I got my notebook out and now I'm ready to  
22 start your real cross-exam. Okay?

23 A. Okay.

24 Q. What was your role in processing the Wind  
25 River application?

1 A. None.

2 Q. And when did you -- you didn't have anything  
3 to do with processing the application, when did you  
4 start to work on this matter?

5 A. Some time probably in January of this year.

6 Q. With the field trip?

7 A. Right. I'd been told that I would be  
8 involved with this. We figured -- I've been figuring  
9 that some time probably late November, didn't really do  
10 anything other than to start to read reports.

11 Q. Do you know why you were brought in to work  
12 on this matter as opposed to the people who had done  
13 the hydrologic analysis questions that were submitted  
14 to ADWR?

15 A. I can't really state all the reasons. But I  
16 have a long experience with looking at ground-water  
17 systems, analyzing data ground-water data, analyzing  
18 ground-water modeling. I have a lot of experience with  
19 modeling of stream channel -- surface water,  
20 groundwater, interaction, types of things like that. I  
21 am a registered geologist in the State of Arizona.  
22 That was a consideration. Those are the types of  
23 things.

24 Q. Now, have you actually personally drilled any  
25 wells in this area?

1 A. No.

2 Q. Have you drilled any wells in Arizona?

3 A. I've been involved with the drilling of some  
4 monitor wells for the State in the Prescott Active  
5 Management Area, and also a deep-test boring in the  
6 Strawberry area. It's done for Gila County, but the  
7 State had a lot of involvement with that.

8 Q. So I would assume that you would differ to  
9 Mr. Johnson's, more than 20 years of knowledge in this  
10 area, as someone who probably knows the geology  
11 hydrology of this area better than anyone else?

12 A. I can't say that.

13 Q. You don't --

14 A. I'm not in any way trying malign Mr. Johnson.  
15 But I can't say that somebody might not know more.

16 Q. No. That's not my point. My point is you  
17 would agree that he would know more than you do about  
18 this particular area, in terms of the geology and  
19 hydrology, just based on fact that he's been drilling  
20 wells here for 20 years, correct?

21 A. I'm sure he's more familiar with the area.

22 Q. Are you aware of any statutory provision or  
23 Arizona Administrative Code regulation that says in  
24 specific language that a specific, site-specific  
25 hydrology study is required for an application to

1 transport water across state lines?

2 A. Well, the statute says, the 292 Statute --  
3 and I'm paraphrasing because I'm -- basically, says  
4 that studies sufficient to the director to determine  
5 the probable impacts are required.

6 Q. So it says the probable hydrologic impact,  
7 right?

8 A. That's my memory of it. It may not be.

9 Q. That's certainly different from a  
10 specific-hydrologic impact?

11 A. Well, that's splitting probable. What does  
12 that mean? Probable has no real quantitative meaning  
13 to me. 50 percent, 20 percent, you know. Who knows?

14 Q. Did you know that the current director of the  
15 Department of Water Resources, Mr. Herb Guenther, was  
16 the sponsor of the bill that became this legislation?

17 A. No. I found that out yesterday.

18 Q. You know Mr. Gunther, I assume from working  
19 at ADWR?

20 A. Yes.

21 Q. I think you know Mr. Gunther to be a person  
22 who knows what to say -- how to say what he wants to  
23 say?

24 A. I don't know what you mean by that.

25 Q. Well, if he says -- if he puts language in

1 the statutes that says, "Probable hydrologic impact,"  
2 would you assume that that's what he meant?

3 A. I can't make any assumption about what  
4 Mr. Gunther may have meant with that language. I  
5 really don't.

6 Q. I think you would agree with me that the Wind  
7 River application is not an application under ARS  
8 Section 45108 for evaluation of the subdivision water  
9 supply and is not subject to the Arizona Administrative  
10 Code Assured Water Supply application provisions?

11 A. Not that statute.

12 Q. As a matter of fact, outside of the statutory  
13 provisions in the Water Transport Statutes, there are  
14 no Arizona Administrative Code regulations that have  
15 any application to establish any rules or regulations  
16 relating to an application to transport water out of  
17 state, right?

18 A. As far as I know.

19 Q. There are for assured-water supply  
20 certificates?

21 A. Yes.

22 Q. And for the assured-water supply certificate,  
23 you're not required to show hydrologic impact, correct?

24 A. No, that's not correct. As far as I know,  
25 you do have to show.

1 Q. Well, can you show me where somewhere in your  
2 regulations that says you have to show hydrologic  
3 impact? It's my understanding that all you have to  
4 show is that you have a 100 year water supply; isn't  
5 that correct?

6 MS. RONALD: Your Honor, I'm going to object  
7 here. Mr. Corkhill was offered in and has testified as  
8 a hydrologist. There is no foundation here to indicate  
9 that Mr. Corkhill has any knowledge of how  
10 applications -- and I'm sorry. Mr. Lewis keeps  
11 referring to the Assured Water Supply Program. I don't  
12 know if that is intentional. That applies to active  
13 management areas. Whether Mr. Corkhill, even is  
14 involved in processing those applications.

15 MR. LEWIS: Maybe I misunderstood. But it  
16 was my understanding from his proposed testimony that  
17 he was -- maybe it was Sandra Fabritz Whitney. But one  
18 of the witnesses was supposed to testify that the  
19 Assured Water Supply requirements were going to be --  
20 were applicable to this proceeding. If it wasn't  
21 Mr. Corkhill, I'll leave this subject matter.

22 MS. RONALD: It's not the Assured Water --  
23 just to clarify the record. It's not the Assured Water  
24 Supply requirements. It's the Adequate Water Supply  
25 requirements because we're outside of an

1 active-management area. And there has been already  
2 information put into the record in written form  
3 regarding that information. And in fact, Wind River,  
4 itself, obtained information regarding those adequacy  
5 files through Public Records Request from ADWR.

6 HEARING OFFICER: In response to the more  
7 specific question. I did review my outline that I  
8 prepared, based on the proposed testimony for your next  
9 witness. Is Mr. Lewis correct that Ms. Fabritz-Whitney  
10 is going to address some of those issues?

11 MS. RONALD: Your Honor, we have been  
12 conferring about whether -- given the time that's  
13 involved, our time constraints, we believe that an  
14 adequate record has already been created on the issues  
15 that are going to be addressed by Ms. Fabritz-Whitney.

16 Last night, there was some testimony by the  
17 interested persons regarding how the Adequacy Program  
18 works. There are at least, I believe, five different  
19 files that were put into the record by Wind River,  
20 adequacy application files.

21 Wind River drew into question the presence or  
22 absence of regulations within this area by challenging  
23 the constitutionality of the statute. In the record,  
24 we have placed the materials that we think address  
25 those issues; the Mohave County General Plan, the

1 Virgin Valley Water Community's area plan, the Mohave  
2 County Land Ordinance, all of which address those  
3 issues. So in the interest of time and because these  
4 matters have already been covered, we were considering  
5 not calling Ms. Fabritz Whitney. So I do not want to  
6 create a situation here where we say, Oh, yeah, sure we  
7 got a witness coming and we don't.

8           My point is that I know, from my personal  
9 knowledge, and we can get into this through testimony,  
10 Mr. Corkhill is not responsible in the Department for  
11 processing applications for adequacy determinations.  
12 Now, he has, of course, some general knowledge about  
13 the program and how it works because he works in the  
14 hydrology section, and he has been part of the  
15 Department fabric for quite a while. But he certainly  
16 is not an expert in that and what it is we do on a  
17 day-to-day basis within that program area.

18           HEARING OFFICER: Where do you stand on it  
19 then, Mr. Lewis?

20           MR. LEWIS: Well, Your Honor, if they don't  
21 intend to call Sandra Fabritz-Whitney, I don't know  
22 that we care one way or another because this area is  
23 controlled by the General Arizona Water law. The  
24 Maricopa or Mohave County requirements say nothing  
25 about a hydrologic-impact study. There is no

1 requirement for hydrologic-impact study by anybody in  
2 this area, including somebody seeking a certificate of  
3 adequate or assured water supply. And as the record  
4 stands, there's nothing in the record, other than the  
5 General Arizona Ground-water Log and transfer  
6 provisions. And we know what the law is in this area  
7 because of the recent decision by the Ninth Circuit,  
8 Brady v. Abbot Laboratories.

9           If they don't want to present her as a  
10 witness, that's up to them.

11           HEARING OFFICER: Well, then maybe what we  
12 ought to consider then, and, again, from what you've  
13 stated there, it sounds to me, you consider this to be  
14 more of a matter of law than a fact question, correct?

15           MR. LEWIS: Would you state that again, Your  
16 Honor?

17           HEARING OFFICER: If I understood what you  
18 just said, you consider this to be more a legal  
19 question rather than a fact question?

20           MR. LEWIS: Exactly.

21           HEARING OFFICER: Okay. Then let me just  
22 make sure, because what we could do, if need be, is  
23 take a lunch break and give me some time to think about  
24 it. But I get the feeling we've come to some  
25 resolution here, that you don't care from Wind River's

1 prospective whether or not the next witness addresses  
2 this, correct?

3 MR. LEWIS: I want to confer with my  
4 co-counsel. But I --

5 HEARING OFFICER: All right. Why don't we  
6 take our break then. Let each side go ahead and do  
7 whatever conferring they want. And quite frankly, it  
8 may be a situation where after you each meet  
9 separately, you may be able to strike a resolution that  
10 you can just present to me after lunch.

11 Why don't we go till 1 o'clock. We will take  
12 an hour and ten minutes, if that meets everyone's  
13 needs.

14 MR. LEWIS: Your Honor, we may, since she is  
15 present, we may want to call her and ask her a few  
16 questions. But I'll talk to my co-counsel and see.

17 HEARING OFFICER: All right. Great. Thank  
18 you. So we'll call it 1 o'clock on the clock there.

19 (Whereupon, a lunch break was taken at  
20 11:54 a.m.)

21  
22  
23  
24  
25

1 STATE OF ARIZONA )  
2 COUNTY OF PINAL ) ss.

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7 I HEREBY CERTIFY that the foregoing was taken  
8 before me, YVETTE RODRIGUEZ; that all proceedings had  
9 upon the taking of said hearing were recorded and taken  
10 down by me on a steno machine as backup and thereafter  
11 reduced to writing by me; and that the foregoing pages  
12 contain a full, true, and correct transcript of said  
13 record, all done to the best of my skill and ability.

14

15 WITNESS my hand this 26th day of  
16 of March, 2007.

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YVETTE RODRIGUEZ  
Certified Court Reporter

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