BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATIONS TO)
APPROPRIATE WATER NO. 63-32573 IN) VOLUME III
THE NAME OF THE M-3 EAGLE,) Pages 494-739
_____)

BEFORE

HEARING OFFICER: GARY SPACKMAN

Date: April 22, 2009, 9:00 A.M.

Location: Idaho Department of Water Resources
322 E. Front Street
Boise, Idaho

REPORTED BY:

COLLEEN P. KLINE, CSR No. 345

Notary Public

APPEARANCES:

For M3 Eagle, LLC:
Givens Pursley, LLP
BY MR. JEFFREY C. FEREDAY
BY MR. MICHAEL P. LAWRENCE
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Boise, Idaho 83701-2720

For North Ada County Groundwater User Association:
BY MR. JOHN THORNTON
5264 North Sky High Lane
Eagle, Idaho 83616

For Eagle Pines Water Users Association and Individually:
BY MR. ALAN SMITH
3135 Osprey Road
Eagle, Idaho 83616

Appearing Individually:
BY MR. NORMAN L. EDWARDS
884 W. Beacon Light Road
Eagle, Idaho 83616

APPEARANCES (Continued):

Also Present:
Jerry Peterson
Jason Smith
David Head
Vicky Music

I N D E X

M3 EAGLE WITNESSES

E X H I B I T S

THE HEARING OFFICER: The appointed hour has arrived. Are you ready to start.

Are you ready, Alan?

MR. SMITH: I'm ready.

THE HEARING OFFICER: Mr. Edwards, are you ready?

MR. EDWARDS: I'm ready.

THE HEARING OFFICER: I want to mention one thing as we go on. We're recording, and this is the resumption of the hearing for M3 Eagle, LLC, protested water right matter, and the date is April 22nd.

We're just starting with, Mr. Fereday, your next witness.

MR. FEREDAY: M3 Eagle calls Mr. Roger Dittus.

THE HEARING OFFICER: Mr. Dittus, would you raise your right hand, please.

ROGER DITTUS,

first duly sworn to tell the truth relating to said cause, testified as follows:

DIRECT EXAMINATION

QUESTIONS BY MR. FEREDAY:

Q. Mr. Dittus, please spell your name, and give us your business address.

A. My name is Roger Dittus, and my last name is spelled D-i-t-t-u-s. My business address is 8248 West Victory Road in Boise.
Q. Where are you employed?
A. United Water Idaho.
Q. What is your position with United Water?
A. I'm the hydrogeologist for the company.
Q. Could you describe your background and education with specific reference to hydrogeology?
A. I have a bachelor of science degree from Boise State University, 1992. I have completed graduate level hydrogeology courses. I'm a Registered Professional Geologist in 2001. I'm a licensed drinking water operator in Idaho, run geophysical logs, design wells.
Q. What duties do you have at United Water that pertain to your expertise, which might be relevant in this case?
A. Basically, anything that the company does with ground water. I oversee our well maintenance program, our aquifer storage and recovery operations, water right application permitting, and review of other applications that

we -- that we become aware of, ground water bank applications, injection well permits, those type of duties, monitoring.
Q. Exhibit 32 G, I believe, is your resume. Is that resume up to date?
A. Yes, it is.
Q. Most of your duties concern United Water Idaho's system here in the Boise area; is that -- is that right?
A. That's correct.
Q. Do you work for United Water in -- or any of its affiliated companies in other areas?
A. I have in the past traveled to other United Water systems, Tom's River Operations in Catalina, and Burbank, Delaware, and worked with the engineers there.
Q. Has that been to deliver hydrogeological advice for advice on ground water?
A. That's right, uh-huh. Reviewing plans for aquifer storage and recovery operations, or similar type of work.
Q. How does United Water compare to other companies in its affiliated Suez groups with regard to its dependence on ground water.

A. Compared to -- compared to the average or typical United Water systems, we are more heavily dependent on ground water. Well, we're definitely the largest ground water producer. There are some smaller systems that are dependent primarily on ground water, also, but they are much smaller.
Q. How many years, did you say, you've worked for United Water in these -- in this capacity?
A. 14 years.
Q. Could you describe United Water's overall water system, just in terms of its size, cfs, number of wells, that sort of thing? And, please, feel free to just -- just narrate.
A. Okay. Well, we -- we operate about 85 to 90 supply wells. We have two surface water treatment plants. And we serve about 84,000 customer connections, which I believe is about 230,000 people. The system is broken up into service levels, pressure zones, and those communicate with each other to some -- to some degree.
Q. And, where, generally, is your service -- your service area?

A. Generally, in the city of Boise, but we have -- we have some noncontiguous systems service areas. In the Eagle area, we have a service area. We -- in the past, we've had other service areas, noncontinuous.
Q. Do you have experience monitoring or designing ground water wells?
A. I do. It's -- it's part of what I do.
Q. Is this part of the -- your ongoing job is to measure or monitor wells?
A. Yes, it is.
Q. Does that include determining how much water they are producing from time to time?
A. Yeah. Basically, monitoring the health of the -- of the aquifers that they are producing from, looking at the efficiency of the wells, trying to understand, you know, where maintenance is required, and so -- so that's yes.
Q. You mentioned that United Water has as part of its service area, part of the Eagle area. Are you familiar with the wells generally in the west Boise, North Ada area?
A. Yes, I am.
Q. What about the City of Eagle and Eagle Water Company? Don't they have ground water

wells also in the area?
A. That's their sole source of supply. I am familiar with them.
Q. Have you ever operated any of the systems in that area for other entities?
A. Up until recently, United Water was -- had a contract with the City of Eagle to operate their system.
Q. Which wells were involved in that effort?
A. Those were the Lexington Hills wells.
Q. The M3 Eagle project that is the subject of this application, is United Water intending to serve the M3 Eagle project?
A. No, we are not.
Q. What kind of growth has United Water experienced in recent years in its demand for water, its hookups, or some other reasonable metric that you use?
A. I do know that in the last ten years, we've added, approximately, 26,000 customer connections. And in the last 30 years, I believe, it's in the range of 45,000 to 50,000 additional customer connections.
Q. In the last three years?

A. 30 years. Excuse me.
Q. Oh, 30 years. Sorry.
A. Yeah.
Q. You've listened to Mr. Holt's testimony; did you?
A. Most of it, yes.
Q. Did you listen to his discussion of the amounts of water demand projected for the M3 Eagle project?
A. Yeah, I did.
Q. Do you have an opinion about the reasonableness of his projections for water use per unit developed -- in that development or otherwise?
A. Based on my discussions with the engineers, the planning engineers at United Water, I think they are right in the range, maybe a little bit lower, actually, than what -- than we would use for planning.
Q. Okay. You mentioned that you are a Registered Professional Geologist; correct?
A. Correct.
Q. Have you kept abreast of research related to North Ada County hydrogeology and geology geological conceptual models and the

like?
A. Yes, I have.
Q. I would like you to refer in the binder there to Exhibit 19, if you would. Exhibit 19, I'll represent to you, contains a number of subheadings A through H or so.
And I would just like you to look at those, and see if you can tell me whether you are familiar with any of those publications?
A. Am I looking for 19? Oh, there it is (indicating).
Q. Have you found Exhibit 19, Mr. Dittus?
A. No, I haven't. I'm having trouble. Exhibit 19 --
MR. FEREDAY: Mr. Hearing Officer, if it's okay, I'll have my associate help him?
THE HEARING OFFICER: Yes.
MR. FEREDAY: Thank you.
THE WITNESS: Yes, I have.
Q. (BY MR. FEREDAY) Mr. Dittus, I'm not asking you to testify about any of these, but I would just want to know whether these are familiar to you. Have you seen these, read these?
A. Yes, I'm generally familiar with these,

and the information.
Q. How do you relate United Water's well construction in the Eagle area, in the Eagle portion of your service area, to the area's geology?
A. Our wells in our Floating Feather service level in the Eagle area, and in the west, northwest part of our service area, pump water from the aquifer that's been described as the Pierce Gulch Sand Aquifer deltaic deposits.
Q. Do you agree that that is an accurate description of the aquifer that you are producing from, that appears in, for instance, Hydro Logic's reports?
A. I do agree.
Q. How many wells do you have in this area that penetrate and pump from the Pierce Gulch Sand Aquifer, which I may sometimes refer to as the PGSA? How many wells?
A. Approximately, six, or thereabouts.
Q. Have you also reviewed the studies that have been completed for M3 Eagle?
A. I have.
Q. Have you, for example, reviewed the aquifer test that -- aquifer test report that

Hydro Logic produced for the Spring Valley 7 well test?
A. I -- I believe that came out in 2009, and that's one of the ones I did review, yes.
Q. How about the geochemist report that was produced by Glanzman and Squires?
A. Yes, I reviewed that.
Q. What do you recognize about the PGSA, based on your experience, and your understanding of the geology in the area? What can you tell us about it?
A. It's -- it's a highly productive supply. My -- I concur that the extent of the Pierce Gulch Sand Aquifer does extend between United Water's wells. And --
Q. Do you agree that the PGSA is continuous from west Boise, at least, west Boise to the Eagle area, where your wells are located?
A. I do think that's well supported based on the sediments that were encountered in our wells based on the other information, such as the well log, the geophysical log expression of the Pierce Gulch Sand Aquifer. I think it's that extensive.
Q. Do you feel that it is reasonable

to -- that the conclusions made by Hydro Logic, that the aquifer extends up under the M3 area, is a reasonable conclusion?
A. I do.
Q. What about recharge to the PGSA? What is your view, as a hydrogeologist working in this field, as to recharge sources to the PGSA area?
A. Well, I -- I -- definitely it's my opinion that it's significantly recharged just based on the production from the aquifer, from the wells that I am aware of. And I think it's likely that there is a combination of recharge sources there. It might -- it -- it's likely that there is some leakage from, you know, through overlying low permeability units.
There is -- there is probably recharge from shallower aquifers in some areas where -- where the confining confinement of the aquifer is lower. As -- the aquifer has a dip to it. The geometry of the aquifer may be a very important factor in where the recharge comes from. And if that's the case, it may be coming from the up-dip side of the aquifer in the west Boise, Garden City region.
Q. In general, does the aquifer dip

upwards to the east or southeast; is that -- would that be accurate?
A. The aquifer dips towards -- generally, towards the southwest as it's -- as it's been defined.
Q. And by dip, do you mean dips down?
A. Right.
Q. Okay.
A. Right.
Q. Do you have an opinion of whether the PGSA is tributary, at least in part, to the Payette Basin?
A. I -- I think that that's fairly well supported. I think that that's the case, based on the aquifer geometry, and the measured ground water levels.
Q. In your opinion, do you think that the water that M3 proposes to pump for its project will be drawing from the same aquifer from which United Water's wells produce in this area?
A. I do.
Q. And again, that's the PGSA; is that right?
A. Correct.
Q. Is United Water concerned about the

drawdown effect on United Water's wells from pumping at M3 Eagle?
A. We're -- we're concerned. We -- we just felt like the production and water level information that we have for our wells was sufficient to -- to -- largely sufficient to mitigate those concerns.
Q. In reaching that conclusion, did you do any further reading, or evaluation, or how did you -- how did you come by that conclusion?
A. Well, we -- we -- over the last few years, we've been looking at the information that we have to come -- to come to this conclusion.
M3, before they filed their application, notified us that they were going to seek a water right, and saw us, I believe, as a potential protestant, because we're at -- because we're -- we have wells in the area. And they -- they kept us updated on the conceptual model. And as the reports were produced, we also received those, and reviewed those.
Q. Has M3 been forthcoming to United Water with regard to what it's producing and learning about the aquifer, providing reports, and other information to you?

A. Yes, they have to -- to United Water and to the Department, I believe, and those are public record.
Q. Are you familiar with the M3 Eagle application in this case?
A. Yes, I am.
Q. And United Water did not protest that application as you've just testified. I guess, I just want to make sure I understand why you didn't lodge a protest?
A. We didn't -- we didn't protest.
Q. And the reason for that? Just if you could summarize that for us.
A. We -- we don't see the aquifer as -- in any kind of danger of being over drafted. We believe there is sufficient water for the application.
Q. I would like you to refer to Exhibit 63, which is a map.
MR. FEREDAY: And for the convenience of the Hearing Officer, perhaps we could get that up on the screen as well.
Q. (BY MR. FEREDAY) Are you familiar with this map, Mr. Dittus?
A. Yes, I am.

Q. Does it accurately show the location of United Water Idaho's wells in this North Ada area?
A. Yes, it does.
Q. And to the extent you know, does it also accurately show the locations of other nearby wells, such as those that have been drilled by M3?
A. It appears that it does. Not all the nearby wells, but, yes, it looks accurate.
Q. When you say, "not all the nearby wells," do you mean that not all of them are on there?
A. Right. Right.
MR. FEREDAY: We offer Exhibit 63.
THE HEARING OFFICER: Mr. Thornton?
MR. THORNTON: No objections.
THE HEARING OFFICER: Mr. Smith, any objection?
MR. SMITH: No objection. I can't see the map. No objection.
THE HEARING OFFICER: We may need to turn the lights down a little bit but -- maybe at least on that end.
MR. FEREDAY: Mr. Hearing Officer, if I

could just make a comment here. I believe we have provided a copy to Mr. Smith, and the other protestants. And if he doesn't have one, we could make another one available to him at the break.
MR. SMITH: We're sharing.
THE HEARING OFFICER: Okay. You are okay, then, Mr. Smith, with its admission?
MR. SMITH: Yes, Mr. Hearing Officer.
THE HEARING OFFICER: Mr. Edwards?
MR. EDWARDS: I have no objection.
THE HEARING OFFICER: Okay. It's received into evidence.
(Exhibit 63 admitted into evidence.)
Q. (BY MR. FEREDAY) Could you -- could you please refer now to Exhibit 43, Figure 1, which has now been admitted into evidence? I believe it's a little bit more precise map with regard to the location of United Water's wells. And I want you to help us understand which wells you are talking about, and where they are.
A. (Witness complying.)
Q. Are you on Exhibit 43, Figure 1, Mr. Dittus?
A. Yes, I am.

Q. I see on that, several wells, such as Floating Feather, Redwood Creek, HP, Swift, Goddard. I believe, Island Woods is on there as well; correct?
A. Right, two -- two wells at Island Woods.
Q. Okay. Are these wells: Floating Feather, Redwood Creek, HP, Swift, Goddard, and the Island Woods wells, are those United Water wells?
A. They are.
Q. Are they completed into the PGSA?
A. Yes, they are.
Q. Are any of these designated monitoring wells, as opposed to production wells?
A. There are three monitoring wells shown on the map, three United Water monitoring wells. Actually, if I could correct that. Two United Water monitoring wells, that the monitoring -- the well that's labeled UWID State Street test well, that is now Water Resources well. But United Water originally completed that, and then donated it to the Treasure Valley Hydrologic Project.
At the State and Linder site, there

is -- there is two monitoring wells at that location.
Q. So the State and Linder, and State Street, or if you prepare, TVHP well, those two are not production wells; correct?
A. Correct, they are small diameter size piezometer tubes that measure the pressure in the aquifer.
Q. But the six that you previously mentioned, those are production wells?
A. Right, they are.
Q. Are these monitoring wells also completed in the PGSA, Mr. Dittus?
A. The -- they -- they have piezometer tubes into the Pierce Gulch Sand Aquifer. Actually, I think most of the tubes are. They -- these -- for instance, the State Street test well has four separate zones that it's monitoring. And the two monitor wells at State and Linder also monitor four -- four different levels in the aquifer.
Q. But they are into the PGSA at State and Linder?
A. Correct, three -- three of the -- three of the four are, I believe.

MR. FEREDAY: Could we go off the record for just a second?
THE HEARING OFFICER: Yes.
(Discussion held off the record.)
THE HEARING OFFICER: We are recording, again.
Mr. Fereday.
Q. (BY MR. FEREDAY) Mr. Dittus, the six United Water production wells in this North Ada, Eagle area, together pump how much water?
A. These wells accumulatively pump about four-and-a-half or -- well, about 4,500 acre-feet per year.
Q. 4,500 acre-feet per year?
A. Correct.
Q. From the PGSA; correct?
A. Correct.
Q. How long have these wells been operating?
A. The Swift well is the oldest well of this -- of this group, and it began operating in the late 1970s. I believe, all the other ones have been producing since the mid 1990s or earlier.
Q. So is there -- what would you say is

the average age of these wells that they've been pumping?
A. 15-plus years, something.
Q. Okay.
A. Can I make one correction to one of my previous statements?
Q. Certainly.
A. I see there is -- there is the Gary Lane test well on there. And I -- before I had only identified State Street, and State and Linder as monitoring wells. Gary Lane well is also a monitoring well. It's not completed into the Pierce Gulch Sand.
Q. Okay. I would like you to refer to Exhibit 45, Figure 15.
A. (Witness complying.) Okay. I found that.
Q. Okay. I see this, that this is a graph, or a chart for Redwood Creek well and Floating Feather well. Do you recognize that?
A. I do.
Q. Could -- what can you tell us about this figure, and the data that is portrayed here?
A. This -- this data are manual water level measurements in two of United Water's

production wells in the Eagle area. And --
Q. Did you take those measurements?
A. I -- I did.
THE HEARING OFFICER: Okay. Let me find that, Mr. Fereday.
MR. FEREDAY: Okay.
THE HEARING OFFICER: It's Exhibit 45?
MR. FEREDAY: 45, Figure 15.
THE HEARING OFFICER: Oh, I was too far back. Okay. There it is. Okay. Thank you.
Q. (BY MR. FEREDAY) Have you seen this Figure 15 before, Mr. Dittus?
A. I have.
Q. Do you believe it to accurately portray the data that you provided for it?
A. I do. In addition to the manual water level measurements in these wells, the figure also shows annual production information in millions of gallons for the wells, or for the Floating Feather well, it looks like.
Q. With regard to the Floating Feather well, is that a high-volume well, would you say?
A. It is.
Q. How much does the Floating Feather well produce?

A. It -- it produces typically over half a billion gallons per year.
Q. It's 500 million gallons per year; are you saying?
A. Correct.
Q. How long has it been producing that kind of volume?
A. Approximately, nine years. It -- it came online, I believe, in the beginning of 1996, and it produced 130 million the first year it came into production. The pump was -- was upgraded in 2005 to a larger pump size.
Q. 500 million gallons is -- do you know how many acre-feet that would be on an annual basis, roughly?
A. I believe it's somewhere between one-and-a-half and -- and -- or, actually, no, I don't have -- I would need a calculator to do that.
Q. Okay. This production is year round from this well?
A. It produces -- well, the 500 -- the -- these -- these numbers are the average production, or that's the total production for the year. The well runs on a

variable frequency drive. So the motor can -- can run up to 100 percent. And when it does that, it's producing close to 3,000 gallons per minute. So --
Q. How often does it pump at around 3,000 gallons per minute; would you say?
A. During the summertime, it -- you know, it -- during the months of July and August, through those months, it doesn't turn off, and it -- you know, the majority of the time, it's producing close to that rate.
Q. Do you know how much the Floating Feather well is producing today?
A. Not -- not exactly today. I would, you know, based on looking at the production -- instantaneous production from earlier this week, it was producing 2,200 gallons per minute. So it's sort of in a -- I believe, it's in a ramp-up cycle right now.
Q. With regard to Figure 15, can you tell us what this tells you with regard to water levels at Redwood Creek and Floating Feather over the period of -- that's depicted on the figure?
A. They -- the hydrograph part of this figure shows that recent water levels -- for

instance, the one in late 2008, is very similar to the original level, and it's actually higher than some of the -- some of the intermediate levels.
The Floating Feather well has a below ground water level. And the Redwood Creek is a -- has an artesian water level.
Q. Figure 15 states near the -- near the -- in the notes at the bottom, and I'll quote it. "United Water production wells show relatively stable water levels since they were constructed. Both wells show a rise in water levels from 2002 to 2008 in spite of generally increasing levels of production."
Do you agree with this statement?
A. I do.
Q. Okay.
A. I think the -- the main point of this figure is that the current water levels are very comparable to the original water level. The Floating Feather well rarely turns off.
The -- some of the -- some of the water levels -- intermediate water levels, for example, in the Floating Feather well, while they were -- while they were taken when the well was

not pumping, they may not be -- they may not -- I don't think it's accurate to characterize those as fully recovered water levels.
Q. And why is that?
A. Because they were taken in between pumping periods, and they may not be fully recovered water levels.
Q. Okay. So they would tend to show an even lower level than a recovered water level would show? Is that --
A. That --
Q. -- is that what you are saying?
A. That's what I'm saying.
Q. Is Floating Feather -- the Floating Feather well unique with respect to being a large producing well completed in the PGSA?
A. It's -- it's one of the high producers, but I wouldn't characterize it as unique. We have other wells that -- that produce comparable amounts.
The Hewlett-Packard well, the HP well, also produces -- it produces, approximately, the same annual volume as the Floating Feather well.
Q. You mentioned that the Floating Feather well runs nearly full-time. Is this a reason why

there are only a few data points, relatively speaking, for measurement?
A. That's -- that's why there is few manual measurements, correct.
Q. Before United Water acquired the Floating Feather -- or built the Floating Feather well, do you know whether there was pumping from that site through some other well?
A. There was.
Q. What was that?
A. Prior to construction of the Floating Feather well, there was an existing irrigation well that was very near the site of the Floating Feather well. It was on the same property, maybe within -- within 50 feet from the -- from the Floating Feather well.
Q. Was that irrigation well also completed in the PGSA?
A. That's -- that's correct. It was -- it was completed at, approximately, the same interval as the Floating Feather well.
Q. Was it a large volume production well, or do you know?
A. I don't know the -- the production numbers from that well. But I do know that based

on its construction, it would have to have been a significant producer, and it was an irrigation well.
Q. With regard to the HP well that you've mentioned already, it also pumps nearly full-time; does it? Is that what you testified to or --
A. That's true, yeah. It's also run on a variable frequency drive. So I -- the wells that we operate that we installed the variable frequency drives on, that's the purpose. So they can respond to system pressure, so that they won't turn on and off. They'll ramp down and ramp up. But they -- they typically run much more than a -- than a well that doesn't have a VFD installed.
Q. "VFD" being variable frequency drive; correct?
A. Correct.
Q. Do you know how much volume the HP well has produced in any recent year, roughly?
A. It -- it produces in the range, I think, a little bit more than 500 million gallons per year. That's --
Q. Are you aware of any drawdown problems

related to the HP well?
A. No, I'm not.
Q. Has United Water received any complaints from the Department, or from any well owner, with regard to drawdowns resulting from your pumping in this area?
A. No, we haven't.
Q. Are you familiar with areas in Ada County where there is a predominance of domestic wells?
A. I'm familiar with some areas where there are many domestic wells.
Q. Where would those be, generally?
A. One -- one such area would be in the southern part of United Water's Boise service area, which was relatively recently incorporated. There is -- there is many domestic wells in that area. And then outside the service area to the west of our service area, there are many domestic wells. And I know in the -- in the vicinity of the Floating Feather service level, there are many domestic wells, as well.
Q. Do you recognize the Eagle area as having a large number of domestic wells?
A. Yes, I do.

Q. Have you measured or monitored any domestic wells in the Eagle area?
A. I have. Or, actually, we -- I have, and we have some monitored for us.
Q. I would like you to refer to Exhibit 12, Figure 51. I believe it's on page 133 of that exhibit.
A. (Witness complying.)
Q. I'll remind you, I know you've testified about reviewing HLI's reports. But I'll remind you, that this Exhibit 12 is a document entitled, "Re-Analysis of 16 Aquifer Tests."
First of all, are you -- are you generally familiar with that --
A. I am.
Q. -- with this document?
A. I am.
Q. Did you receive it from M3?
A. Yes, we did.
Q. I would like you to refer to Figure 51.
A. (Witness complying.)
Q. And explain to us, what this is.
A. Do you have a page number to help me find it?

Q. I'm sorry. 133.
A. (Witness complying.) Okay. I have it.
Q. Was this a figure -- this hydrograph, the information in it, was it produced in response to a water right application of some kind, or what was its background?
A. These -- these -- this hydrograph shows two domestic wells that were monitored for United Water as a condition of getting it -- the -- one of the water rights for the Floating Feather well. And the wells were monitored for several years in the mid 1990s.
Q. I note that these are denoted, the Miller well and the Vail well. Is the Vail and -- were Vail and Miller objectors or concerned well owners in the area --
A. I --
Q. -- with respect to the Floating Feather application?
A. I believe they were protestants.
Q. Okay. And how far away from Floating Feather are the Vail and Miller domestic wells?
A. These -- these wells are within a few hundred feet, and they are located to the south of the -- of the Floating Feather well.

Q. Are the Miller and Vail wells completed into the PGSA; do you know?
A. They are -- they are not based on the lithology at the Floating Feather site, and based on the depth of these wells. They are not -- they are above it, completed above it.
Q. Based on this hydrograph, do the Miller and Vail wells show any impact, in your opinion, from the Floating Feather well pumping over the measurement period?
A. I -- I don't think that there is an apparent impact from pumping to Floating Feather well. It came online in early 1996. I believe the month of April is -- is when it first produced water, and -- and I don't -- I don't believe that there is any -- that there is any discernible impact from pumping.
Q. Was the Floating Feather well pumping more or less continuously, as you've described it as used, during this period?
A. I -- I don't -- I don't know if it was pumping continuously during this period. But I do know that it produced a significant amount of water during this period.
Q. This hydrograph -- or these two

hydrographs are curious to me. I am interested in the fact that -- let's take the Miller well. The upper graph shows high water levels in the summertime, August, let's say, the August period in each -- in each case. Why -- why would -- why would that be? Do you have an opinion?
A. Well, it -- the data points were collected in -- generally, in the spring, and then in the very early fall, or late summer. And the Floating Feather well would have been producing its highest rates during the summertime, immediately preceding these late summer, early fall measurements.
And those are the highest water levels observed in the domestic wells. And so I would attribute the high -- water level highs to being elevated in comparison to the water level lows for the same well as responding to irrigation.
Q. Okay.
MR. SMITH: Could you state that answer, again? I didn't hear all of it over the --
THE WITNESS: I said, the water level highs on these hydrographs were collected -- were measured towards the end of the irrigation

season. So I think the most logical explanation was that these water levels were responding to that irrigation in the area.
Q. (BY MR. FEREDAY) And, Mr. Dittus, when you say, "responding to irrigation in the area," do you mean they are responding to flood irrigation that might be providing leakage into the zone into which those wells are completed?
A. Correct.
Q. Could you describe United Water's experience with monitoring ground water in the North Ada County, other than the Miller and Vail experience? And with regard to -- and particularly, with regard to what you've testified earlier about your State and Linder monitoring wells. Could you describe what you do there?
A. That -- well, the two monitoring wells at State and Linder are -- I measure those with a -- with a stand pipe, and measure the artesian head there. And that's been ongoing since the wells were constructed in about 1998.
We have allowed the City of Eagle at one time to install pressure recorders on the wells. We allowed Hydro Logic to install

pressure recorders when they did their aquifer tests, the SVR 7 aquifer tests.

Q. Is the State and Linder test well then, a significant and accurate monitoring site for you; do you feel?

A. I feel -- I feel it's one of the better monitoring sites in the area, definitely, because it was, specifically, constructed for that purpose. It's -- you know, we documented the sealing of the well. We know exactly the completion intervals. It's not a pumping well. And so I feel it's a very good monitoring point.

Q. Were you involved in the construction of the State and Linder test well?

A. Yes, I was.

Q. You mentioned that the State and Linder test well has artesian heads. Could you describe for us, what you mean by this?

A. The piezometers that measure the pressure in the Pierce Gulch Sand Aquifer interval of the test well have above ground water levels at that location. And they are in the range of 10 or -- 10 or 12 feet, typically, above ground level.

Q. You mentioned that this well was built

in 1998. And you have monitored it since then?

A. Correct.

Q. The above ground heads, I would like you to explain with reference to Figure 18 of Exhibit 45, if you could. It's just a few pages on -- oh, I'm sorry. It's Exhibit 45, Figure 18.

A. (Witness complying.) Okay. I found that.

Q. Okay. You did take these measurements; correct?

A. The -- I took all the measurements, all the hand measurements after the year 2000. The continuous recorder data that's at the -- the later time was collected by Hydro Logic. There is -- there is also some measurements that the City of Eagle collected in between that time. Before, approximately, 2000, that would have been -- those measurements were collected by either myself or another geologist that we had working at United Water back at that time.

Q. Okay.

A. And the other -- this other precipitation data, I don't -- I didn't collect that.

Q. Okay. The precipitation data on

the --

A. On the bottom I see this precip- --

Q. On the bottom half of Figure 18, you did not collect; right?

A. Yeah.

Q. Do you believe the data on the upper half of this graph to be accurate, Mr. Dittus?

A. It is.

Q. What about the spike in the continuously monitored data that spikes downward sometime, it looks like, the middle of 2008? What do you interpret that to be?

A. Umm --

Q. Let me ask you -- let me ask you another question. Are you aware of the SVR 7 aquifer test that M3 Eagle carried out through Hydro Logic?

A. Yes, I am.

Q. Do you know generally when that was done?

A. That -- that was done in the spring of 2008, I believe.

Q. Do you know whether that spike has any relationship to that aquifer test, or is it just something you are not sure of?

A. I don't -- I don't believe that the -- that that test had an impact of this magnitude that far away.

Q. Okay.

A. This shows a drawdown from approximately 12 feet down to approximately four feet above ground.

Q. Do you know of any other pump test in the more immediate vicinity of State and Linder that may have occurred during that period?

A. Not that I can recall.

Q. Okay. What can you conclude, Mr. Dittus, about the state of the Pierce Gulch Sand Aquifer, based on the hydrograph shown on Figure 18 of Exhibit 45?

A. Well, these -- there are some fluctuations in the pressurize levels at this monitoring well. The heads that have been measured have all remained artesian. Some of those fluctuations may be due to local pumping or a seasonal fluctuation.

But overall, they indicate that from -- you know, prior to the year 2000 up to almost the present time, to the end of the data that we have here, water levels have remained

relatively stable.
Q. Would you refer, please, to Exhibit 44, Figure 48?
A. (Witness complying.)
Q. I note that Figure 48 of that Exhibit 44 is entitled, "Water Levels in United Water State and Linder Test Well No. 1 Showing No Net Decline Over 10 Year Period."
First of all, do you consider that a fair characterization of that chart?
A. I do.
Q. With regard to these two graphs, do you know which one -- whether they were both completed in the PGSA?
A. I'm only seeing on Figure 46. Is that where we're looking at?
Q. Figure 48.
A. Sorry. (Witness complying.)
Okay. Could you ask the question, again?
Q. I guess, first of all, you stated you agreed with the title of this, that water levels in United Water, State and Linder test well No. 1, show no net decline over a ten year period. You stated that was a fair characterization of

this chart?
A. Yes, that's a fair characterization.
Q. With regard to the lower half, the hydrograph in the lower half of that figure, do you know whether that's completed into the PGSA?
A. Yes, these -- these -- the bottom data points that range between 10 and 15 feet, those three piezometer tubes are completed into the Pierce Gulch Sand.
Q. I think you mentioned earlier the phrase, "increasing potential with depth." Can you explain what that means?
A. Well, at a site like this, it means that the deeper that you drill and complete a well, the higher the pressure will be in that -- in that well.
Q. So to summarize, if you could, what does the State and Linder monitoring show us with regard to the PGSA, in your opinion?
A. It shows that the area water levels in the vicinity of this well have been stable since January of 1999 through, you know, the middle of 2008. That the wells have artesian pressures, which -- which are nice for having low pump lifts. They generally show stability at this

area.
Q. Do you know whether the hand measurements of aquifer surface levels have been corrected for barometric effects --
A. On --
Q. -- in these --
A. On these datas?
Q. -- in these datas?
A. No, they haven't.
Q. Okay. Do you know whether the data logger data are corrected for barometric effects, generally?
A. They would be, I believe. Yes.
Q. Okay. What is the significance of above ground artesian heads that you see in this area, Mr. Dittus?
A. Well, one -- one observation, I think, would be that the heads have remained artesian, and have remained stable during a time when the general production from the area withdrawals have increased. And I think that indicates that there is recharge to resupply the aquifer from the pumping.
Q. What does it tell you about the nature of the aquifer itself, geologically?

A. Well, this would be a confined aquifer.
Q. Would you say that it would be a confined portion of the aquifer as well? Could it be unconfined in other areas, and confined here?
A. That's -- that's what I believe to be the case, based on -- I think, that's well documented based on correlating the well logs, and correlating the water levels, and looking at the -- at the mapping of the aquifer.
Q. Mr. Dittus, you testified about the Miller and Vail wells being in the shallower aquifer, not part of the PGSA.
Do you know whether other domestic wells in the Eagle area, also are in shallow, non-PGSA aquifers?
A. I'm sure there are many, many wells in the overlying, you know, productive sediments that are tapped by domestic wells. And there are likely some domestic wells that are also completed into the Pierce Gulch Sand. It would -- it would depend on how the well driller constructed the well, and --
Q. Okay. And returning to the Floating Feather well for a moment. I think you testified

that that's your largest producing well in this immediate area. What is the water level below ground in the Floating Feather well?

A. It's approximately 40 feet below ground.

Q. And what is the drawdown in the Floating Feather well as it is -- as it is pumped?

A. Well, that -- that ranges, obviously, depending on the pumping rate. So at that site, the drawdown can vary significantly, depending on the way the well is being operated. The maximum drawdown is in the range of about 70 feet, and that -- that occurs in the summertime, throughout the summertime.

Q. And that would be when Floating Feather is pumping somewhere around 3,000 gallons per minute?

A. Correct.

Q. And what would be the drawdown out in the aquifer a distance away from this well; do you know?

A. I don't -- I don't know an exact number what -- what type of drawdown effects the well would have. But realize that the water level

measured in the well is going to be significantly lower than the water level immediately outside the well in the aquifer, just because there is a -- there is a head loss to get the water to move through the constructed part of the well. And that typically accounts for a significant portion of the drawdown that's measured within the well.

Q. The measurements you take then of the Floating Feather well water level, of course, are inside the casing; correct?

A. Correct.

Q. And is it a fair characterization of what you just testified, that a drawdown in the casing is going to be greater than the drawdown you'll experience out in the aquifer outside the casing?

A. Correct.

Q. What about the pumping level in the Floating Feather well as it's producing, let's say, through the months of July and August, at or near its full capacity, do you see a steady decline of some kind in that well?

A. Actually, at that site, we see the water level responding to the flow rate. And

it's not apparent that there is a decline that -- that, say, you know, occurs through July and August.

The pumping level in the well when the -- when the pumping rate is decreased at times of lower pressure, say, from 3,000 gallons a minute at -- decreasing to 2,600 gallons a minute, the water level responds and comes up in the -- in the months of August and July.

Q. Would you say that the Floating Feather well's water level responds much to irrigation pumping during that same summer period?

A. Not -- not significantly, as far as I'm aware.

Q. So you said that the well levels -- the water levels in that well tend to respond mostly to that well's own pumping?

A. As far as I'm aware. And, you know, the -- as I said, the well -- this well rarely turns off. And it -- it essentially doesn't turn off in the summer months.

Q. Okay. What can you infer from the water levels and production data you've measured in United Water's wells in this area, with regard to recharge to the Pierce Gulch Sand Aquifer?

A. I would -- I would infer that, you know, based on the production from the wells, and the fact that the information that we have shows that the wells either are slightly above, or at their original water levels, or else in some cases in west Boise, have established a new equilibrium level, that's not significantly different than the original level, that there is sufficient recharge for their -- for their withdrawals.

Q. Are you familiar with the City of Eagle's Brookwood well?

A. I am.

Q. And could you tell us where that's located relative to the Floating Feather well?

A. It is -- I believe approximately -- it's located at Eagle Road and Floating Feather Road. And I believe that's about half a mile or so from the Floating Feather well. It's located to the east. But it's pretty much, due east. And it's completed in a -- at a comparable depth to the Floating Feather well.

Q. So it, too, pumps from the PGSA; correct?

A. Correct.

Q. And what do you see in the Floating Feather well, or any of your other monitoring wells, with regard to the Brookwood's pumping?
A. Well, we haven't -- we haven't -- we haven't seen an effect from pumping of that well.
Q. Do you have experience, Mr. Dittus, with analytical models for estimating pumping impacts, such as, using the Theis equation to evaluate and project potential drawdowns in an aquifer? Do you have experience using that?
A. I do.
Q. Have you read the staff's memo in this case, dated March 2nd? I believe it's Exhibit 50, if you would like to refer to it.
A. Yes, I reviewed the staff's memo.
Q. With regard to Figure 3, on page 22, of the staff's memo, have you looked at that figure? And could you tell us what this purports to be?
A. This is a topographic contour of water levels in the Pierce Gulch Sand Aquifer, based on a model that the staff constructed to -- in an attempt to try to predict drawdown from pumping a well located on M3's property.
Q. Do you know how much pumping was projected there? Does it -- does it -- doesn't

it say, after 50 years of pumping at 10 cfs; isn't that correct --
A. That --
Q. -- in the text there?
A. That's -- that's -- those are the parameters that were input, yes.
Q. Does the drawdown predicted by the staff's Theis approach, if that's what it is, does that accurately predict, in your opinion, aquifer drawdown from pumping wells in this valley, based on your experience?
A. My experience has been that it's a way to -- to -- it's a way to calculate a drawdown based on the reasonable parameters of the aquifer that you input. But it typically over estimates, gives you a conservative drawdown with respect to the impact. So it will typically over -- over estimate a drawdown.
Q. So the Theis equation, are you saying, will typically over estimate drawdown, at least in your experience, for wells in the Boise Valley or Treasure Valley?
A. That's -- that's been my experience. It's a model. And there are assumptions to that model. And where those assumptions deviate

from -- from the -- you know, the real aquifer, those can typically lead to an over estimation of the drawdown impacts.
Q. Is there anything about the Theis equation that helps us to understand why it might over estimate, in your view, drawdowns in many cases?
A. Well, the assumptions for using the equation, for using that -- that -- that analytical model, would be -- one of them would be, there is no recharge assumed. The aquifer is considered to extend in all -- in all directions, infinitely. In this case, the model used another well to simulate a no flow boundary. And that's this line on the top of Figure 3 in the exhibit.
But so there -- there is -- there is significant differences between reality, usually, and the model that result in the Theis equation over estimating the amount of drawdown.
Q. As a hydrogeologist for United Water, would you rely on a Theis prediction to project the amount of drawdown that a new United Water Idaho well might have on the surrounding aquifer, or would you rely on other things as well?
A. I wouldn't rely on that model to give

me an accurate number -- an accurate amount of drawdown at a given distance at a certain time. But it would be a way to look at, say, you know, the potential maximum impacts typically, unless you have other information regarding, you know, the existence of hydraulic barriers or -- or positive recharge boundaries, that type of thing.
Q. Would you please refer to page 20 of the same exhibit. It's Exhibit 50.
A. (Witness complying.)
Q. Do you see there, the staff statement that, quote, "Water levels in the PGSA near M3 are declining," and the quote, "Current aquifer discharge rates exceed current recharge rates"? Do you see those statements there?
A. Are those in the bulleted items on page 20?
Q. Correct. It's right above item 4.
A. Oh, okay. I don't -- I don't consider that an accurate representation of the hydrographs that I've seen when they are all taken together, based on the response to the staff memo that I've seen.
Q. Okay. With regard to the Theis drawdown that the staff -- that we were just

talking about a minute ago, that the staff projected. Those drawdowns were just in the PGSA; isn't that correct, on --
A. Correct.
Q. Would you agree with the statement that, the PGSA receives -- does receive recharge? I believe you testified earlier, that you thought it did. Is that still your view, even in light of what the staff has said?
A. I think -- I think that's -- must be the case based on the way that wells respond.
Q. Mr. Dittus, do you have experience preparing and filing water right applications?
A. I do.
Q. For ground water rights?
A. Correct.
Q. Have you prepared and filed any yourself?
A. I have.
Q. Have you reviewed water right applications --
A. Yes, I have.
Q. -- by others?
A. Yes.
Q. When you propose to drill a new well

for a 2,000 gallon per minute water right, has it been your experience that you do hydrogeologic modeling?
A. No.
Q. What about geochemical studies?
A. No.
Q. What about conducting geologic analyses of the basin in which the water right would be located?
A. No.
Q. What about studies of the aquifers transmissivity and storativity? Do you do those before you file a water right application?
A. No.
Q. Do you carry out aquifer tests in conjunction with an application you would typically file?
A. Not typically.
Q. What about the installation of monitoring wells? Do you typically do that?
A. We haven't installed a monitoring well in -- as a -- in order to get a water right permit, or as part of the application process. We have agreed to monitor wells in the past as a -- as a settlement condition for a protest --

Q. That would be --
A. -- but not --
Q. -- for example, the Miller and Vail situation; correct?
A. Yes, and some others.
Q. What about seismic or magnetometer studies to explore the deep subsurface? Do you do that when you file a water right application?
A. No.
Q. Have you ever had to explain to the Department the exact mechanisms of recharge to the ground water source that you plan to drill?
A. No, we haven't.
Q. What about the locations where you believe the aquifer discharges in the basin? Have you had to do that?
A. No, we haven't.
Q. Mr. Dittus, have you ever seen the amount and quality of hydrogeologic work in support of an application that is comparable to what M3 Eagle has produced here?
A. I have not.
Q. How have you kept yourself informed about the studies and other work that M3 Eagle has done over the past three years in this

matter?
A. As I said, prior to M3 filing their application, they approached us and presented their preliminary update of the conceptual model in this area. I have reviewed the reports that Hydro Logic has produced. There has been discussion of the project at the North Ada County technical advisory group. And those are the ways I've kept myself informed.
Q. Do you have any criticisms of the major conclusions of the hydrogeologic studies and reports and tests that M3 Eagle has done?
A. No, I don't have any criticisms of their conclusions.
Q. What have you found to be the quality and thoroughness of Hydro Logic's reports in this matter, and the reports of the other consultants?
A. I -- I think they are -- they are thorough. They are -- they are rigorous, and I feel that they've increased the understanding of our aquifer system significantly.
Q. Is there anything in this work that suggests to you that M3 Eagle's well pumping will have adverse effects on United Water's water rights?

A. No, there isn't.
Q. What about your opinion of Mr. Squires, who, of course, has been a primary investigator for M3 Eagle? Have you worked with Mr. Squires in the past?
A. I have. I've known Mr. Squires for over 15 years. I think he's very ethical, quite competent, and -- and accept the major conclusions of the work.
Q. Do you have an opinion about the availability of water to serve the M3 Eagle development?
A. I believe there is sufficient water to -- to appropriate.
MR. FEREDAY: Could we take a break at this point? I think I'm just about done.
THE HEARING OFFICER: Yep. Let's take a ten minute break. We're off the record.
(A recess was had.)
THE HEARING OFFICER: Okay. We're recording, again.
Mr. Fereday.
Q. (BY MR. FEREDAY) Mr. Dittus, in your testimony, you have used the term "artesian" and "artesian pressure." Do you recall that?

A. I do.
Q. And do you agree that the artesian conditions in an aquifer refer to the fact that water will rise from the point where it is first encountered in the well bore if it is under artesian pressure?
A. I do.
Q. Do you agree with the following definition, which I will represent to you is taken from Department rules or proposed rules. Artesian water is -- and this is the quote, "any water that is confined in an aquifer under pressure so that the water will rise in the well casing or drilled hole above the elevation where it was first encountered. This term includes water of flowing and nonflowing wells."
Do you agree with this?
A. I agree.
Q. Do you understand, Mr. Dittus, that in the folklore, people often refer to an artesian well, if the well is actually flowing at the surface?
A. Right. Right, that's correct.
Q. Even though the well might be artesian, even though its water level is 50, or 100, or

many hundred feet below ground; correct?
A. Yes.
Q. Okay. Mr. Dittus, has M3 Eagle ever spoken to United Water regarding United Water operating the M3 Eagle municipal water system?
A. Not that I'm aware of.
Q. Has M3 Eagle ever approached or discussed with United Water, to your knowledge, the concept of in any way connecting to, or interconnecting with the M3 Eagle water system?
A. No.
Q. Will United Water Idaho benefit financially if the M3 Eagle water right application is granted?
A. No.
MR. FEREDAY: That's all the questions we have.
THE HEARING OFFICER: Okay. Thank you, Mr. Fereday.
Cross-examination, Mr. Thornton?
CROSS-EXAMINATION
QUESTIONS BY MR. THORNTON:
Q. Mr. Dittus, how are you doing?
A. Good, Mr. Thornton.
Q. Good. Mr. Dittus, are you here today

as an official spokesperson for United Water?
A. I'm here as a hydrogeologist employed by United Water.
Q. So are you their official spokesperson today?
A. I guess -- I guess I would be.
Q. So is your testimony the official position of the United Water Corporation?
A. Yes, it is.
Q. Okay. And could you tell me who the legal counsel is for United Water?
A. The legal counsel?
Q. Yeah, the legal counsel.
A. We -- we have different -- I mean, Givens Pursley is one firm that has represented us. McDeavitt & Miller has represented us. Different -- different -- different firms have represented us.
Q. And are you a spokesperson for either Eagle Water Company or the City of Eagle Water Company?
A. No.
Q. Okay. And then are you familiar with all of United Water wells in the Treasure Valley area?

A. I am more familiar with some than with others. But I would say that that's a generally correct statement.
Q. So are you familiar with the United Water wells, let's say, north of the Boise River?
A. Yes.
Q. Okay. All right. And, Mr. Dittus, we've heard your testimony today that talks quite a bit about the Pierce Gulch Sand Aquifer, the PGSA. And then one year ago when NACGUA filed its protest, and United -- and until about September or October of 2008, we never heard of this terminology.
MR. FEREDAY: Objection. There is no question here. And it's apparently testimony.
THE HEARING OFFICER: That is a --
MR. THORNTON: Okay.
THE HEARING OFFICER: -- reasonable objection, Mr. Thornton.
MR. THORNTON: Okay. Okay. I'll withdraw that.
THE HEARING OFFICER: If you --
MR. THORNTON: I'll withdraw the statement.
THE HEARING OFFICER: Okay.

Q. (BY MR. THORNTON) So prior to M3's application for a water right, and Hydro Logic's subsequent work on the aquifer in the North Ada County area, did you, or any other people that you worked with in your profession, refer to this aquifer as the PGSA, or was it something else?
A. Well, I -- I think the -- the Pierce Gulch Sand units that units the deltaic deposits that researchers have been mapping and the ongoing description of those is -- is not something that's -- that's just a few years old. I think that dates back to many more years.
And calling it the Pierce Gulch Sand Aquifer is just a way of saying that these are the units that have been correlated and that supply the wells that -- that produce from -- from these deposits that are -- that are saturated, or, you know, that -- the storage units for the water supply.
So does that answer the question?
Q. Yes, that's fine. Thank you.
Mr. Dittus, could you describe the three dimensional boundaries of the presumed Pierce Gulch Aquifer?
A. It's -- it's been documented to be

bounded on the bottom of the aquifer by low permeability silts and muds that preceded the sands in age. As the lake levels were lowering, and the deltas were growing.
It's bounded hydraulically on the -- on the northeast side, despite the fact that it doesn't exist, it -- it -- the depth of the aquifer below land surface rises to the northeast. And that is the portion that has been shown to be where the Pierce Gulch Sands have been shown to be undefined.
The northwestern extent of it, I don't think has been fully defined. And I don't know what bounds there would be extending, you know, towards the Payette River valley. And I also don't know that the southwest portion has been defined. I don't know the extent of it in that direction. It hasn't been looked at to the -- to the degree that it has been in the Eagle area.
Q. So do you know the depth of the Pierce Gulch Sand Aquifer?
A. Well, it's a range of depths, depending on where you're -- where you are talking about. In west Boise, it's typically shallower. For instance, the United Water Idaho Swift well, the

top of the unit that's been identified as Pierce Gulch Sand deposits is in the range of a -- you know, 130 feet or so. And it can be lower than that as you move out toward to the west.
THE HEARING OFFICER: Could I ask both of you to speak up a little bit?
THE WITNESS: Okay.
MR. THORNTON: You bet.
THE WITNESS: Okay.
THE WITNESS: There is a bit of a hum coming from the machine.
MR. FEREDAY: We can turn it off.
THE HEARING OFFICER: Yeah, it's more conversational than it --
THE WITNESS: Okay.
THE HEARING OFFICER: And we need to broadcast.
MR. THORNTON: Okay.
THE HEARING OFFICER: Thank you.
Q. (BY MR. THORNTON) And in the description that you've just provided, could you identify what your source of information is?
A. The source of information for the existence of the Pierce Gulch Sand Aquifer is the ongoing geologic mapping and correlation of well

drillers reports, correlation of the geophysical logs that -- that show the existence of these deposits as -- as presented in papers by Dr. Wood and others.

And the -- the -- calling it the Pierce Gulch Sand Aquifer, I believe, is a relatively newer occurrence, then just identifying that they're are these deltaic deposits, and that they exist over, you know, the areas of investigation.

Q. And then in your earlier testimony, you stated that, you think, the ground water flows from Garden City area to the Payette River; is that true?

A. The -- I believe I stated the Pierce Gulch Aquifer has been identified in, you know, from the west Boise, Garden City area. And I accept the way that it has been mapped and described in over that extent, and the ground water generally flows to the west.

And then based on the information that is available, and based on the aquifer geometry, it definitely appears that it's moving -- as you go west of the M3 property, it begins to go towards the north.

Q. Sir, are you aware of any statistical

or sensitivity analysis of Hydro Logic's data to support this assumption?

A. I -- I'm not -- I don't recall any of that type of analysis. The analysis, I believe, is based on the water level elevations, and the wells that are available show the grading is in that direction.

Q. In your earlier testimony, I believe, that you also stated that the part -- a portion of the recharge of the Pierce Gulch Sand Aquifer is from the overlying shallower aquifers; is that true?

A. I -- I believe that what I said was, that that is one of the likely -- I was just talking to the fact that the aquifer does seem to be recharged by the fact that the well -- that wells recover when -- when -- they don't act like -- the wells don't respond the way that wells in a closed system respond, such as some of the other aquifers in the foothills that have been documented to be bounded, and not receive recharge. And, you know, based on where they are located, you wouldn't expect them to be recharged.

The wells in the Pierce Gulch Sand

Aquifer don't respond that way. And so then it must be receiving recharge. And so I was listing my opinion about potential sources.

Q. And so --

A. And then when -- and -- and obtaining water through low permeability, confining units is one potential way the aquifer could be -- could be recharged. But I don't know if that's a major, or, you know, overwhelming way that the aquifer receives its recharge.

Q. Okay. Fine. And I believe you also stated in your testimony, that United Water is not aware of any domestic wells that have gone dry, we'll say, in the Eagle area, or in the Treasure Valley?

MR. FEREDAY: Objection.

THE WITNESS: I don't --

MR. FEREDAY: I don't believe that was his testimony. But if he knows, I guess, he can go ahead and answer.

THE HEARING OFFICER: Yes. Overruled. Let's see how he responds.

THE WITNESS: I'm not aware of domestic wells that have gone dry. Does that -- if you are talking about wells where the water level

just disappears there?

Q. (BY MR. THORNTON) Yes.

A. I know that in the southeast Boise area, which is a ground water management area, several entities monitor water levels there. And United Water worked with the Department, and supplied information to have that declared a ground water management area, because water levels in domestic wells in that area were declining -- actually, all the water levels in that area were declining. And they -- that area has been a ground water management area for 15 years or so.

Q. Okay.

A. So I am aware of some areas where there are water level problems due to withdrawals that cause that.

Q. And then does United Water, as a matter of business, collect data on domestic wells that have gone dry; monitored domestic wells?

A. No, we -- not as a matter of business. We -- we monitor domestic wells for various purposes. You know, one example would be, we operate some supply wells as injection wells during part of the year to -- as a way to -- to

use the aquifer to store water of better quality.
And one of the things that usually happens during the permitting process is, we review domestic wells in the area, and I contact the owners. And those domestic wells then will get -- will be specified on the injection well permit. And that's a way to monitor the impact from injection.
I have monitored some domestic wells, and sampled some domestic wells in a noncontiguous system, where we might have very much information about water quality as a way to see what the water levels are, and what the water quality is. But not -- there is not -- there is not just a blanket. You know, we will monitor different domestic wells as, typically, there is a reason for it.
Q. So the -- so does United Water periodically look at Department of Water Resources ground water, or applications for re-drilling to determine if there appears to be any ground water declines in the areas in the Treasure Valley?
A. Well, our -- our primary focus would be in and around our service territory. I -- I

don't think -- I haven't looked at re-drill applications for domestic wells.
Q. Okay. All right. If we can go to Exhibit No. 45?
A. (Witness complying.)
Q. And on Figure 15 that we talked about earlier.
A. Yeah. Okay.
Q. And are you at that level?
A. Yes, I am.
Q. Okay. So at the bottom of Figure 15, it states that, "United Water production wells show relatively stable water levels since they were constructed." It goes on to state, "Shows the rise in water levels from 2002 to 2008 in spite of increasing levels of production."
Then it goes on to state that, "Both wells have too few data points for statistically valid trend analysis. But qualitatively the water levels appear to be rising over the past five to six years."
What's your view in using this data when there is not enough data points to show any statistical rigor for identifying an increase in water levels?

A. Well, I think it's -- I think it's useful data. So I think it's definitely something we can use to -- to look at what the water levels in the aquifer have been doing, at least at these points in time.
And as I said in my earlier testimony, I think that the main thing that I take away from -- from this information is the fact that, when you have a recent water level that is very comparable to the original water level in the well, from United Water's point of view, we look at that. And we say, that that indicates that the aquifer is, you know, maintaining aquifer pressures.
As far as the water levels, you know, saying that the water levels are rising, that's -- that's what it qualitatively appears from this data. But I believe I also said earlier, that some of these lower water levels may not have recovered, just because they were -- these measures -- these measurements were taken when the well was not pumping. And the amount of time that the -- that the water levels were allowed to recover would be different between these different measurement periods,

between, you know, for the individual data points.
So I -- I wouldn't say that this -- you know, I think that's -- that's one observation that you can say the data appears to look like the water level is rising. But, you know, as I said, the important thing, I think, is that the water levels are very comparable to the original level.
Q. Thanks. If you could go to Exhibit 12?
A. (Witness complying.)
Q. And Figure 51 on page 133.
A. (Witness complying.) Okay. Got that.
Q. Figure 51, page 133. What are the depths of the Miller and the Vail wells at? I think you stated that earlier, but if you could restate that, their approximate levels.
A. The -- and I might -- I might get these switched. But I know one of them is about 97 feet, according to the drillers report. And then the other one is approximately 120 feet, according to the drillers report.
Q. Okay. All right. And then could you just describe -- or what is the -- for the Miller well, that trendline, is that showing a declining

or increasing water table?
A. Well, the trendline, I think, is just something that was force fit through these data points. When I -- it's showing -- it's -- a trendline is showing a downward gradient or a downward trend in the upper hydrograph.
Q. Okay. And what is the trendline doing for the Vail, just to be fair?
A. It's doing -- it's doing the opposite. And I believe the Vail well is the 120 foot deep well. And the Miller well, I believe, is the shallower well.
Q. And then I -- in your background, I imagine that you are fairly familiar with statistical analysis?
A. No, I'm not fairly familiar with it.
Q. Okay.
A. I'm not -- I'm not very familiar with it.
Q. All right. Then for the R squared values that you see in there for the trend? R squared equals 5.8 for the Miller.
A. Okay.
Q. And are R squared equals 4.2 for the Vail. Can you describe what that means?

A. No, I can't describe what that means.
Q. Okay. And then on this -- on this particular Figure 51, it displays time period from '95 to -- April '95 to April '98; is that correct?
A. That's correct.
Q. And do you have any information on those wells that take it from '98 to 2008?
A. Nope, we -- these were monitored for a specified period based on a previous agreement. And so the answer is, no.
Q. Okay. In that past decade, from 1998 until the present time, has the area in Eagle and north Eagle grown a large amount in terms of their demand for ground water, based on your earlier testimony?
A. Based on the production from our wells in the area, I would say, that's a fair characterization.
Q. Okay. All right. And then just earlier in your testimony here -- let me make sure I'm not putting words in your mouth -- I believe you said that a potential source, you don't know how much of recharge for the Pierce Gulch Sand Aquifer is from the overlaying

aquifers, the shallower aquifers; is that true?
A. That's true.
Q. So is it possible, in your opinion, that pumping at the Pierce Gulch Sand Aquifer at a greater depth could over time, have an effect on water levels in the shallower aquifers?
A. I think that's very possible that it could have an effect. Whether that effect would be -- would be discernible from -- you know, from the effect -- the apparent effect of re- -- of recharge -- apparent recharge from irrigation. Which at this location, it looks like it's in the range of five to ten feet, I would be -- I would be skeptical that you could discern that, but it's conceivable that you could.
Q. Okay.
A. If that was the -- if that was the primary recharge mechanism, which I don't know if it is.
Q. Thank you. So if we could have you go to Exhibit 50?
A. 50?
Q. Let's see. IDWR staff memo.
A. (Witness complying.)
Q. And earlier you were asked questions

and provided testimony regarding the Theis equation, the use of the Theis equation.
A. Correct.
Q. Okay. And I believe you identified that this -- the use of this equation overestimates drawdown?
A. In my experience, that's been the case.
Q. Okay. Could you then identify what is your specific experience with this type of equation, and your source of data to show why it's not accurate?
A. My specific experience? We -- I have done -- used the -- used this method in -- when we apply for a water right, to come up with a conservative estimate for drawdown at a certain distance, which is typically a protestant's well at a certain time, which is typically long enough, say, you know, in the scale of years, so that -- so that the effects would be, you know, experienced from a pumping well.
And in -- in some cases from the pumping tests, if you have a pumping test of a new supply well that evidences a negative boundary, you wouldn't use the Theis equation, because that would -- that invalidates the

assumptions. And in the other cases, it typically over estimates the amount of drawdown that -- because you just don't see that when you go look at the well. You don't see that effect.

One example would be we -- United Water monitored a well near Nampa from a protestant, and the Theis equation showed that there would be some measurable drawdown based on reasonable transmissivity and storativity values. And, of course, there wasn't at that depth. But that's -- that's just the kind of the thing that you see.

But it's an exercise that you go through that gives you some information about, you know, what the -- what the maximum drawdown would be predicted by the Theis equation. But in my experience, it's always been less.

Q. Okay. So can you actually give us any -- refer us to any reports from United Water, the actual date of the wells, and the time periods that the monitoring occurred, and the estimates that came out of the Theis equation, and what was finally there? Do you actually have the reports that you can provide?

A. I think -- I don't remember specific

names. But, I mean, we would have some well completion reports, that type of thing, I would think.

Q. So do you actually have a report that says, this is the estimate of drawdown. This is what we monitored in year one, year two, year three, year five?

A. No, we don't -- we wouldn't have that.

Q. Okay. So -- and then, Mr. Dittus, what is your general characterization of the depths of most private wells in the North Ada County area?

A. My general characterization?

Q. Yeah.

A. Typically, there is six-inch diameter wells, I believe, drilled down probably, depending on -- on whether they are in the foothills, or whether they are in the Eagle area, probably ranging between, you know, 60 feet and 300 or 400 feet.

Q. Okay.

A. And typically completed with air rotary drilling method, I would think. Maybe some older cable tool wells.

Q. Okay. And then, again, what is your general characterization of the depth of the

Pierce Gulch Sand Aquifer in the North Ada County area, or the upper and lower limits of the Pierce Gulch Sand Aquifer?

A. The depth below ground?

Q. Yeah.

A. Probably in -- well, the range would be the Floating Feather well, for instance, encounters the Pierce Gulch Sand at about 180 feet below ground. M3 encounters the Pierce Gulch Sand Aquifer at a significantly deeper depth below ground. And that's just because of the land surface elevation differences.

Q. Okay. Right. So -- and I believe you stated -- let me ask you this: Is it reasonable to expect that if pumping in the Pierce Gulch Sand Aquifer at greater depths, may have some effect on the shallower aquifers; the water table in the shallower aquifers?

A. It -- it may have some effect. I -- I think that that's conceivable.

MR. THORNTON: Okay. Let me just look here. I think I'm close to done.

(Pause in the proceeding.)

MR. THORNTON: I know you are hoping I'll ask you more questions.

(Pause in the proceeding.)

MR. THORNTON: I think that's it, Mr. Hearing Officer.

THE HEARING OFFICER: Thank you, Mr. Thornton.

THE HEARING OFFICER: Mr. Smith?

MR. SMITH: Thank you, sir.

CROSS-EXAMINATION

QUESTIONS BY MR. SMITH:

Q. Mr. Dittus, I believe you stated that you have two surface water plants in Boise?

A. Yes.

Q. In west Boise area, did you say?

A. That's correct.

Q. And where are those located?

A. One of them is located upstream of the Boise River near -- near the Micron complex, and the water is lifted from a pump station on the -- on the Boise River up to that water treatment plant.

The other one is located in east Boise on the river near -- fairly near Municipal Park. That water is -- the water from those two surface water treatment plants that supply the east Boise area.

Q. Is United Water now looking for other surface water rights, if you know?
A. I believe -- I -- I don't know specifically, but I believe we are -- we are -- you know, we -- we have permits under development for flood flows. We have -- we have an engineer that works with canal companies to rent shares. Sometimes we rent shares from the water bank.
I'm not -- I'm not as involved -- I'm not really involved with the surface water right aspect of our water rights portfolio.
Q. But you are aware that some of that is taking place?
A. I believe -- I believe some of -- some of that would be --
(Tape recorder beeping.)
THE HEARING OFFICER: Okay. Just a minute. Let's change the tape.
(Discussion held off the record.)
THE HEARING OFFICER: Okay. We are recording again. I'm sorry for the interruption.
Mr. Dittus, do you recall the question?
THE WITNESS: I think I answered. Did I answer the last question?

MR. SMITH: I believe you did.
Q. (BY MR. SMITH) Are these plants -- or were they constructed in the 1990s, because of ground water management drop levels in southeast Boise?
A. The -- I wouldn't characterize it specifically that way. And what -- and one of the plants was constructed in the mid to late '80s.
Q. Yes.
A. And then the other one was constructed, I believe, about five years ago.
Q. Has United Water located any surface water rights at this time, to your knowledge?
A. The water treatment plants are producing water under water rights that are owned or rented by United Water.
THE HEARING OFFICER: Okay. Mr. Smith, would you also speak up?
MR. SMITH: Yes, sir.
THE HEARING OFFICER: Thank you.
Q. (BY MR. SMITH) What is United Water's total system capacity, if you know?
A. The -- the -- the maximum daily production in the summer is in the range of 85

million gallons per day.
Q. 85 million?
A. Correct. We have -- we have produced more than that in the past, you know, up to the low 90s.
Q. That was during high peak summertime?
A. Correct.
Q. Okay. How much of that capacity comes from surface water, if you know?
A. It's -- it's approximately 20 percent from surface water.
Q. 20 percent. How many wells do you have in the Lexington Hills area?
A. We -- we don't own any wells in Lexington Hills. Those wells belong to the City of Eagle. And United Water did operate those wells for several years. We operated their water system.
Q. Okay. But now Eagle City has taken those over?
A. Yes. My understanding is, they want to have their own water supply owned and operated. And so we no longer have a contract to operate their system.
Q. Do you know what the capacity of those

wells is -- or are?
A. Those, I don't know the exact numbers. I believe they were in the range of 500 gallons per minute.
Q. What's the depth of those wells, if you know?
A. Those -- those wells are, I believe, in the 300 to 400 foot depth range. And I'm just going from memory.
Q. So for the most part, would those be deeper than the small domestic wells that you mentioned?
A. For the small domestic wells completed in the -- in shallower --
Could you restate the question for me?
Q. Well, I was asking you if these 400, or plus 400 foot wells that United Water has, are deeper than the average domestic wells?
A. I believe that our supply wells, which the Lexington Hills wells are not our wells, but I believe that most of the domestic wells are completed shallower than the United Water wells in the area.
Q. So if there is a drawdown effect, it would affect the domestic wells first?

A. No, I don't think -- I don't think that is the case. The -- the other wells in the Pierce Gulch Sand Aquifer are going to -- are going to be more hydraulically connected, I believe, than the shallower wells. That's what we saw from, you know, the Vail and Miller domestic wells that are near the Floating Feather well.

They -- there doesn't appear to be the types of water level change from pumping in the domestic wells, that you would experience in a well in the Pierce Gulch Sand Aquifer. Otherwise, those domestic wells would have, you know, pumping levels significantly below the levels that they had before the Floating Feather well went in.

Q. And that Floating Feather well, that's the one there -- near the Eagle Middle School?

A. Right, correct.

Q. And the one at Floating Feather and Eagle Road, that's the Brookwood well?

A. Correct.

Q. Do you know when it went online?

A. I believe it was -- it was pump tested in early 2007. And I'm not aware exactly of how

much after that it was outfitted. But I know the pump house has been there for -- you know, I'm recalling, you know, a year or more.

Q. You don't know whether it went online in 2008 or not?

A. I don't know the exact date of when it went online.

Q. And I believe you said, you had six wells in the Eagle area that were United Water wells?

A. Well, I think some of the wells that were on the map that we were talking about would be more characterized in the west Boise area than the Eagle area. For example, the Goddard well, the HP well that we talked about, those are in west Boise. There are --

Q. So Floating Feather?

A. Floating Feather is definitely in the Eagle area. Redwood Creek is to the west of that. It's in the Eagle area. The Island Woods wells are, you know, in the south Eagle area.

Q. And Floating Feather and Redwood Creek would both be in the north Eagle area, northwest Eagle?

A. Yeah, I would characterize them in the

Eagle area. They are -- they're -- well, you are aware of where they are located.

Q. I believe you said there was a combination of recharge, and that the shallow aquifers helped in that recharge?

A. Well, I was -- I was talking -- I was speaking to my opinion that the aquifer there is -- has significant recharge based on the fact that the Floating Feather well, and the other wells that are completed into this -- into this sand -- sand deposits that have been mapped, produced significant volumes of water.

But they -- in the case of the Floating Feather well, for example, when the well turns off, the water levels recover. And I -- and I -- that indicates to me, that there is significant recharge to that aquifer.

And I was just talking about the potential -- the potential sources of recharge. And I'm not saying that one was more important than the other one, because I don't have information, or knowledge on the relative ratios that the different recharge mechanisms might contribute.

Q. Do you know, or do any of the

hydrologists -- do any of the hydrologists know what that recharge is?

A. I don't --

MR. FEREDAY: Objection to the extent that he's being asked to testify as to what other hydrogeologists --

MR. SMITH: I'll rephrase the question.

Q. (BY MR. SMITH) Do you know what that rate of recharge is to the PGSA?

A. I don't -- I don't know a number to the -- you know, off the top of my head. There have been estimates made in, for example, the modeling report that -- that M3 commissioned, that would have that information.

And those -- that model would be a model -- a construct that would try and incorporate the -- you know, the most accurate information that's known about the conceptual model of the aquifer system.

Q. But don't those conceptual models also have a lot of assumptions and speculation?

A. There are some assumptions. And I wouldn't characterize -- I don't know if speculation would be the way that I would characterize it. I mean, there are some things

that are unknown. And in order to make the model represent reality, there are some -- there are some -- some properties that have -- that are not known specifically for measurements that you have to -- that you have to assign values to.

Q. And you indicated, you think the recharge -- or the discharge is into the Payette valley. Do we know where the discharge is?

A. Where the -- the -- no, I don't -- I don't know exactly where the discharge is. I'm speaking about flow in the aquifer in that direction based on the way the aquifer has been mapped, and the way that -- and the existing information about the gradients within that aquifer indicates that the water is moving towards that direction.

Q. More north and northwest?

A. I would have to look at the -- at the -- at the map, again, with the water level contours. But I would say, northwest.

Q. All right. Are you familiar with Dr. Wood?

A. Yes, I know -- I know Dr. Wood.

Q. Are you aware that he concluded that the discharge would be somewhere in the Payette

bluff area along the Payette River?

A. I don't specifically recall that, no.

Q. Have you ever been in that area?

A. I have. Not -- not extensively, but...

Q. Have you seen any springs or artesian flow in that area?

A. No, I haven't. I don't -- I don't know that that's the way the discharge would necessarily express itself. You would have to -- you would have to look at the, you know, the water levels, and it could be flowing into the -- into the basin field stream sediments, and it might -- and it could be discharging that way. The --

Q. Could it also discharge under the Payette River floor?

A. That's -- that's conceivable, I suppose.

Q. I believe you said, United Water had some concerns about M3's water application and their pumping?

A. Well, we are concerned when -- when there is a significant water right that is, you know, in the vicinity of some of our pumping wells. But we're always concerned -- we have

many concerns in many other areas that -- that have -- that have hydrogeologic conditions that make us much more worried.

For example, the Ten Mile ridge area south of Boise is an area where you have warm water at a relatively shallow depth below the water table. And the water table itself is at a deep depth. And there is a limited amount of drawdown you can have at that location. So we look at water right applications, and evaluate if we think we need to protest. In this case, we -- you know, I would say, we were concerned -- we are concerned about, you know, several applications.

Q. You don't see any damage to the aquifer, though?

A. To -- from what?

Q. From the M3 pumping.

A. I -- our concern is that we are able to obtain our water rights from our wells. And based on what I know about the way that our wells have been operating, and based on the information that M3 has produced and supplied to us, we decided not to protest. We -- we -- it's my opinion that we are going to continue to be able

to obtain our water rights from our wells.

Q. Would it be your opinion that it could take a year or more, maybe several years for drawdown in the aquifers -- smaller aquifers to show up?

A. I -- it could take more than a year, I suppose.

Q. I believe you said the Floating Feather pump was upgraded in 2005?

A. That's correct.

Q. Would you call that a high capacity well?

A. I would.

Q. Would you call the M3, thousand feet deep well, high capacity wells?

A. I don't -- you mean, the wells that would be completed after the application is approved?

Q. Correct.

A. I believe that they would be based on the -- you know, the pumping rates that have been observed in the -- in the existing smaller diameter wells that are, you know, capable of close to a thousand gallons a minute we know from the tests that they have done.

So I would -- I would think that the wells, that they eventually might end up completing would be -- I would call them high capacity wells, because, I believe, they would be at least a thousand gallons a minute.

Q. Okay. Let's go back to the middle school well, the Floating Feather well. I believe you said that had been an irrigation well, a producing irrigation well before it became the Floating Feather United Water well?

A. At that site there was an irrigation well. But that well -- the existing irrigation well was abandoned by poking holes in the casing, and pressure driving it to seal it. Because it wasn't completed to municipal well standards with respect to well sealing to the material of the well. That -- so it's -- it's not the same well. It's a different well.

Q. But it was not operating?

A. It --

Q. You don't have any flow from it?

A. I don't -- I don't -- I don't have information with me that that, you know, documents how much it produced. But I do know that it was an irrigation well. It had a

valid -- had an existing water right, and it irrigated the Eagle Middle Crandalmire property that's -- that's there and all around where the school is now built.

Q. Did he also have water rights out of the Farmers union --

A. I don't --

Q. -- or do you know?

A. I don't know. I don't know.

Q. Are you familiar with the domestic wells in the Downey Downs Subdivision?

A. No, I'm not.

Q. You don't know anything about any of those going dry?

A. No, I don't.

Q. So I believe you said the water level was stable in the Floating Feather well area?

A. In the Pierce Gulch Sand Aquifer, we've documented that, yes. I believe that's -- that's established.

Q. But if wells were going dry in the Downey Downs Subdivision, would that not indicate that the water level wasn't stable there, if you have an opinion?

A. I'm not aware of where the Downey Downs

Subdivision is. But the water level declines that you would expect to see from pumping of a well would typically be apparent in that pumping well to the highest -- to the highest degree of the wells that we would be responding. It's the pumping center.

Q. Is there a general decline in the water levels in the wells north of the Eagle area?

A. Not that I'm aware of.

Q. And I believe you mentioned the water level had risen in the Floating Feather well after the irrigation season?

A. No, that was -- that was what I infer from the hydrographs of the domestic wells. They -- the measurements were taken in the spring, and then in the late summer, early fall, and they were higher after the irrigation season. The -- this October measurements were higher than the measurements in the spring, previous spring.

Q. Wouldn't you expect those water levels to rise after the irrigation has ended?

A. I would expect them to rise during the time they were receiving -- you know, if they are receiving input from irrigation. I mean, that's what I -- that's what I infer from the hydrograph

data. So I guess the answer would be, yes.

Q. Let's go to the Linder and State Street monitoring well. You say that's not a producing well?

A. Correct.

Q. Does its location near the river affect the stable levels that you've gotten from it?

A. It has water levels that are well above the river level. And so I don't -- I don't think that there -- that the river flows would impact the stability of the water level measurements that we see.

I think the main thing that the State and Linder well is showing is that the artesian pressures in the Pierce Gulch Sand Aquifer, whether flowing or not flowing, this just happens to be a flowing well, if it's uncapped, the water levels above ground, those have not changed. That's -- that's what the hydrograph -- the main point of the hydrograph shows me.

Q. And I believe you view the inference in response to one of Mr. Fereday's questions about the Floating Feather well, that the recharge is sufficient. Is that for just that well, or the whole PGSA?

A. That -- I was -- I was speaking to the fact that the water level in the Floating Feather well hasn't declined since the well was completed. So there must be sufficient recharge for that to occur, at least.

And that's -- you know, that type of information from -- from our experience is -- is one of the reasons that we -- that I -- that it's my opinion, that there is additional water available in that aquifer to be appropriated.

Q. Is that only an inference?

A. It's an -- it's an opinion. It's my opinion.

Q. After the Brookwood well went online, are you aware that some wells went dry around the Beacon Light area?

A. No, I'm not aware of that.

Q. You don't know anything about the Lawton or Steiner wells --

A. No.

Q. -- going dry?

A. Do you -- what -- can you please define what "going dry" means?

Q. Well, either having to be deepened or the pumps lowered.

A. I'm not aware of -- I'm not familiar with those wells.

Q. Okay. And I think you mentioned something about over estimating the drawdowns?

A. I -- if you are -- if you are referring to my opinion about the drawdowns that are predicted from using the Theis equation, applying that?

Q. The Theis equation; correct.

A. Yes, in my experience, they over predict the drawdowns that actually occur, because that's a model that doesn't represent the reality that we have here in most --

Q. And you are saying that?

A. -- in most --

Q. I'm sorry.

A. -- in most cases.

Q. And you say that equation or method assumes no recharge at all?

A. Correct.

Q. So your conclusion is that the IDWR staff memo is not accurate in that respect?

A. I am not -- I'm not saying that -- I don't believe that the staff was saying that they had developed a model that is -- that's more

accurate than any other model. I think they were going through an exercise in much the same way that I was describing the way that, you know, I might go through the exercise, of looking at what might be the impacts.

But then following that, there needs -- there -- there is typically a discussion, which I believe the staff did, and they contended that their model -- they, while not including recharge, did, you know, of course, because of the method that -- analytical method they used, assumed an aquifer of infinite aerial extent, which I think everyone agrees is not the case.

And so I -- I don't -- I don't think that they were saying that the numbers that they got were -- were numbered -- were -- with -- as far as with respect to drawdown, were numbers that -- that they were, you know, firm about.

I don't think I'm mischaracterizing that. I think -- I think it was one estimate. One way to get an estimate of the potential impacts just of the Pierce Gulch Sand Aquifer.

Q. When IDWR considers a water right, wouldn't it be safer to over estimate the

drawdown, rather than underestimate it?

A. I don't -- I don't know that I have an opinion on that.

Q. Well, are you aware of what's happened in the Snake River Plain?

A. Yes. Yes, I'm generally aware that there is water calls in the area because of water level declines.

Q. Would you say that was because the aquifer was over allocated?

MR. FEREDAY: Objection. Beyond the scope.

THE HEARING OFFICER: Sustained.

MR. SMITH: All right.

Q. (BY MR. SMITH) The north Eagle area, would you say, there is a lot of faults in that area that affect the underground water?

A. There -- there has been, to my knowledge, the primary fault system, the west-Boise Eagle fault is -- is the only one that I'm aware of that affects the flow of the water. Just based on the fact that it -- it just supposes nonaquifer sediments with aquifer sediments.

Q. Could those faults also affect the

sustainability of an aquifer under heavy pumping, or do you know?
A. I'm not aware -- I'm not aware of any information that shows the hydraulic defect of those faults, so I don't -- I don't have an opinion on that.
Q. All right. If the recharge is partly from the shallow aquifers, did not deep pipe capacity wells effect that recharge?
MR. FEREDAY: Objection. I'm sorry. I -- maybe if you can restate the question, I'll --
MR. SMITH: Yeah.
MR. FEREDAY: -- better understand what you are getting at, but I think it was beyond the scope. But maybe you could just restate it.
Q. (BY MR. SMITH) Well, let me ask it this way: Will not deeper height capacity wells cause the recharge of the shallower aquifers to be less?
A. No, I don't think so.
Q. So if they are helping recharge the deeper aquifer, it wouldn't affect that?
A. Well, I -- I think I understand where you are going. I think the recharge to the

shallow aquifer would be the recharge to the shallow aquifer. And if it is the case that pumping from a deeper aquifer, such as the Pierce Gulch Sand Aquifer, would induce recharge from the shallow aquifer, then it would -- then it would be -- it would be just inducing recharge from the aquifer. And in that respect, the -- I understand what you are saying, and -- and, yes.
Q. Are you aware of all of the domestic wells in Ballantyne, Homer Road, north Eagle Road, the Beacon Light area?
A. I know there is -- there is many, many domestic wells in the Eagle area.
Q. Are you aware that some 40 of those have gone dry?
A. I'm -- I'm not aware of any specific wells that have -- that have experienced problems.
Q. Would you say a well is virtually gone dry if the static level of the water is only about two or four feet above the pump?
A. It depends on the pump setting, I would say. If you are talking --
Q. It might be possible to lower the pump. It might also require drilling a deeper well;

would it not?
A. If that's -- that's -- if that's the case.
Q. Now, I believe you said the six-inch wells range from only, I think you said, 60 to 400 feet deep?
A. That was -- that was my general understanding of -- of, you know, a depth range. I don't -- I don't -- they -- you know, it's conceivable that some are shallower. And I -- I -- I don't know if any are deeper than 400 feet. But I don't know in that area, that you would need to go deeper than 400 feet to obtain water. So that's the -- my basis for giving that depth range estimate.
Q. And you did notice a downward trend on the Miller well?
A. The statistical fit of a straight line through the data points down, if you look at the -- that figure of the Vail, Miller hydrographs, the measurements on October during the measurements -- measurement period from '96 through '98, those are actually trending upward.
So the highest water level was measured at the -- at the end of -- at the end of the

monitoring requirement.
Q. Are you familiar with the Owsley and Vincent staff report?
A. I did -- I read that, yes.
Q. Are you aware that their estimate was at 10 cfs, not 23 cfs?
A. Well, as far as in their analytical model, is that what we're --
Q. Correct.
A. Yes, they -- I believe they didn't use the 23 cfs, because they were looking at the long-term pumping effects for estimating the long-term pumping effects. And the 23 cfs would be the capacity if -- if -- if all -- if at full build out, if the wells were all pumping, I believe, that's the plan, M3's proposed plan. But the value that, I believe, the staff used was representative of the average -- an average cfs. So that's -- that's my understanding of why that flow rate was chosen.
Q. Do you recall what their estimated drawdown was at the Floating Feather, Highway 16 well at 10 cfs?
A. The which well?
Q. The drawdown, I believe, it's the

Floating Feather Highway 16 well, or in the area.
A. I would have to look at the figure to re-remind myself about what it would be. Where was that, again?
MR. FEREDAY: I believe that's Exhibit 50, Figure 3, page 22.
THE WITNESS: (Witness complying.)
Q. (BY MR. SMITH) Yeah, it's Figure 3 on page 22.
A. Okay. Well, I don't see the -- Highway 16 and Floating Feather Road. I don't -- I don't see the exact location, because the roads aren't on this figure. But I do see the water level contours. I see a 15-foot contour just barely on the map. I see a 20-foot contour. And a 35-foot contour right around the simulated pumping center on the M3 property. Okay. There (indicating) is 16. There (indicating) is Highway --
Q. Would it -- excuse me.
A. -- 44. Would it be somewhere between 20 and 25 feet is the location you are talking about? Is that --
Q. 22 feet; would that be accurate?
A. I'm not seeing the exact location of Floating Feather Road on here. But if you -- I

see Highway 16.
Q. All right. Let's go to the hot summer month, a few days a year that 23 cfs is being pumped. Would that not substantially increase that drawdown in that same area?
A. I don't -- I don't know. I -- it --
Q. Would it seem logical that it would?
A. Well, there would -- there would be more drawdown in the Pierce Gulch Sand Aquifer when the wells -- when the wells would be pumping more. And there would be less when the wells would be pumping less. And this is -- this is representing an average drawdown, which is the 10 cfs average at -- after full development in the Pierce Gulch Sand Aquifer.
I don't -- I don't know that -- I don't know to what degree other wells completed above or potentially below the aquifer would -- how they would respond to pumping. And this is, in itself, is just an estimate. But, yes, basically, higher pumping rates have higher drawdowns in the aquifers that they impact.
Q. Well, in fact, we don't know what the drawdown would be; do we?
A. In -- with respect to?

Q. To the 23 cfs, even for only a few days out of the month.
A. Well, we have -- we have -- I don't -- I don't myself, don't know what the drawdown would be. I don't know if others have projected that based on -- based on, you know, the aquifer parameters that have been calculated.
You know, they are estimates. 23 cfs hasn't been -- hasn't been pumped from the pumping center. So I would say that -- that you are probably correct in that statement.
MR. SMITH: All right. Thank you. I believe that's all I have.
THE HEARING OFFICER: Okay. Mr. Edwards, questions?
MR. EDWARDS: No.
THE HEARING OFFICER: Redirect, Mr. Fereday?
MR. FEREDAY: I guess we're right at noon. If you want to take a break, I probably have 15, 20 minutes at the most.
THE HEARING OFFICER: Okay. Do you think this is a reasonable time for a break? It is noon.
MR. FEREDAY: Yes.

THE HEARING OFFICER: Okay. Let's come back at five after 1:00.
(A lunch recess was had.)
THE HEARING OFFICER: We're recording again after the lunch recess.
Mr. Fereday, redirect.
REDIRECT EXAMINATION
QUESTIONS BY MR. FEREDAY:
Q. Mr. Dittus, you were asked several questions about the Miller and Vail well, and the figure that went with those wells near the Floating Feather well. Do you recall that?
A. Yes, I do.
Q. Do you know whether United Water ever provided any well deepening, well improvement, or any other kind of mitigation or payment to either Miller or Vail as a result of your monitoring?
MR. THORNTON: Objection; beyond the scope of cross-examination.
THE HEARING OFFICER: Overruled.
THE WITNESS: I know that we have not provided any of those.
Q. (BY MR. FEREDAY) Has either Miller or Vail ever contacted you, since that monitoring was done, with regard to their wells or water

levels in their wells?
A. They have not.
Q. Do you know whether they have ever complained to the Department of Water Resources about water levels? Do you know?
A. I don't. I don't know.
Q. Mr. Dittus, you were asked, especially by Mr. Smith, a number of questions about wells having allegedly gone dry. Do you recall that?
A. I do recall that.
Q. Do you know whether any wells have gone dry in the Eagle area?
A. I'm -- I'm not aware of any wells that have gone dry.
Q. Do ground water wells have a life? Do they cease operating after a certain period of time, or do they go on forever? What's your view on that?
A. Wells are -- you know, they are like other kinds of infrastructure, like a bridge, or something that ages. And as it ages, it typically becomes less efficient. Sometimes they can fail. With respect to a well, there can be collapse problems, sand and fill problems. They can develop holes in the casing, and start

producing sand. So they -- they do age.
Q. And when they do age and exhibit those problems, do they sometimes fail to produce water?
A. That -- that can be one of the results of the general aging process of a well.
Q. And they can fail to produce water even though there is plenty of water in the aquifer there? That is to say, that the pump is below the general aquifer level in the area, but they still can fail to produce water; is that a possibility?
A. That's -- that's a definite possibility, yes.
Q. Have you had experience with this happening?
A. I -- I have. We have wells that have declined in efficiency to the point where their production is severely limited just because of the inability of water to enter the well for the same amount of drawdown.
Q. Even though there is plenty of water in the aquifer?
A. Correct. In other words, the hydraulic efficiency of the well, the head losses,

the -- as the water moves into the well, can increase over time. And so for the same amount of drawdown, you can get in the same well a decreasing quantity of water. Sometimes to the point that the pump will break suction, or that's a -- some to the point where there won't be enough suction head over the pump intake, and the pump will cavitate, and it will appear that -- that -- well, the -- you just won't be able to produce water from the well.
Q. And would it be possible that a layperson might describe that well, as a well that has gone dry?
A. It's -- it's possible, yes. If you don't -- if you don't have a measurement of the -- of the water level in the well when the well is not pumping to compare that to, you know, the -- you know, the water level when the well is pumping that can --
So in other words, it could be a well construction problem as opposed to an actual decline in the water level in the well.
Q. If a well produces sand along with the water, is that an indication that there may be problems with the well, or that the well's life

may be shorter than otherwise would be the case?
A. Well, I know definitely it affects pumps, and I think it's possible that it can affect the well, too. I mean, some domestic wells, maybe most of them are completed without well screen. And in some cases they can, because of lowering of the pressure during pumping, that can cause sand to come up inside the pipe, and that's going to decrease the efficiency of the well. And that's one possibility that could cause the well to respond as if it's not -- as if it's not getting enough water from the aquifer.
Q. Mr. Smith asked you several questions, and Mr. Thornton did as well, about the use of the Theis equation in the staff's report at Figure 3; Exhibit 50, Figure 3. Do you recall that?
A. Yes, I do.
Q. The drawdown curves drawn on that Figure 3 are intended to depict drawdowns in the Pierce Gulch Sand Aquifer; isn't that right?
A. Yes, that's correct.
Q. And not in any other aquifer, such as in an overlying aquifer?
A. That's correct.

Q. In your colloquy with Mr. Smith about depths of domestic wells, you indicated that you are aware generally, I believe your testimony was, of various depths of domestic wells in the Eagle area. Do you recall that?
A. I do.
Q. Now, when you talk of a depth of a domestic well, you are talking about the depth from land surface. Is that -- or is that -- is that correct?
A. That's correct.
Q. And the land surface, of course, in north Eagle varies quite a bit; does it not, up into the foothills?
A. It does.
Q. So if one is up in the foothills aways, one might have to drill, 200, 300, 400 feet before he got to the same water table that could be reached by someone at 90 feet down below. Is that a reasonable hypothetical?
A. If you are very high up in the foothills, I would say, you might have to drill that far.
Q. Okay. You were asked questions also about faulting. Do you see in any of your -- in

any of the six production wells that you've described, or in your tested wells, for that matter, in the Eagle area, do you see any effect on these wells that you would attribute to faulting?
A. Not -- we don't see evidence of negative boundaries in our wells in the Eagle area when they are pumping.
Q. Okay.
A. I have not observed that.
Q. Do you see any kind of boundary effects; negative or positive?
A. Well, the water levels in the wells during the summertime, for instance, in the Floating Feather well, they show a stabilization, and so they -- that indicates that they are obtaining sufficient water to not continue to drawdown. That's the deviation from -- from a drawdown curve that we observe in those -- in the Floating Feather well and other wells in that area.
Q. If you could refer to Figure 1 of Exhibit 19 B with regard to faulting. I would like to ask you a few questions. I believe you testified about your understanding of the

location of some faults.
A. (Witness complying.)
Q. Mr. Dittus, have you seen that map before?
A. I have.
Q. And can you tell us what it depicts?
A. This shows the M3 property. It shows some lines of cross section, generally, going down, dip in the Pierce Gulch Sand Aquifer. And it shows some faults that were identified in the magnetometer survey.
Q. Are the faults, the lines that have shading around them, that trend generally from the southeast to the northwest?
A. Yes, they are.
Q. Could you locate for us where the Floating Feather well is on this map?
And just to -- yeah, maybe with your pointer would be good?
A. I believe it's this (indicating), right there (indicating).
Q. So the Floating Feather well lies between the fault denoted in blue on the right, and perhaps the extension of the short fault that is shown there on the left; would that be --

A. If -- if the fault on the left extended to the southeast, then, yes, it would.
Q. Do you know whether the fault -- that fault on the left would extend to the southeast?
A. I don't know how far it would extend, if it does extend, no.
MR. FEREDAY: I think that's all the questions we have on redirect, Mr. Hearing Officer.
THE HEARING OFFICER: Okay.
Recross, Mr. Thornton.

RECROSS-EXAMINATION

QUESTIONS BY MR. THORNTON:
Q. Mr. Dittus, did you testify earlier this morning that the Pierce Gulch Sand Aquifer on the northwest and southwest extensor are still undefined?
A. Yes, I -- that's -- I said that was my -- my belief, yes.
Q. Okay. Thanks. As a spokesperson for United Water, are the projections for use of ground water in the Treasure Valley looking to be a large increase, modest increase, staying stable?
MR. FEREDAY: Objection. I think

that's beyond the scope of --
THE WITNESS: Yeah, I --
MR. FEREDAY: -- of redirect.
THE WITNESS: I don't think they are --
THE HEARING OFFICER: Just a minute. Mr. Thornton, argument?
MR. THORNTON: I wanted to verify, based on earlier questions with Mr. Dittus, about the projections that United Water had for increased use in the area.
THE HEARING OFFICER: Well, this is beyond the scope. I'll allow a little bit of latitude. So overruled, at least right now.
Mr. Thornton, I want to give you significant information in the area. But they were not part of Mr. Fereday's questions, and otherwise, we'll be here a long time.
MR. THORNTON: I can withdraw that question. That's fine.
THE HEARING OFFICER: Whatever you choose.
MR. THORNTON: I'll withdraw it. That's fine.
Mr. Hearing Officer, maybe outside the

scope, I don't fully understand what that means. So let me know if it --
THE HEARING OFFICER: Well, let me just explain to the protestants. And perhaps we had -- I thought we had this discussion. But the way in which the questioning is narrowed, so that we don't re-ask questions and cover ground that we've already covered.
Is that your cross-examination initially needs to be within the scope of what Mr. Fereday asks. So within the subject matters that he asks questions about, then your questions need to be related to those. And then his redirect needs to be within that narrower boundary of the questions that you ask on cross-examination. So his could or could not be within that scope. And if it's outside, then you could object.
And then the same is true for your recross. So theoretically, every one of those sets of questions should be circumscribed by a narrower boundary of subject matters. If that makes sense?
MR. THORNTON: Okay. It does. And so if I overstep, I apologize ahead of time.

THE HEARING OFFICER: Okay.
MR. THORNTON: So, thanks.
Q. (BY MR. THORNTON) Did you earlier testify that United Water did not protest M3 water right application?
A. I did.
Q. Okay. Could this partially be due to United Water highlighting a concern for the ground water resources, thus causing some heightened concern, either with the Department of Water Resource or the general public --
MR. FEREDAY: Objection the same -- sorry.
Q. (BY MR. THORNTON) -- when United Water asked in the future for more water rights?
MR. FEREDAY: Objection.
THE HEARING OFFICER: Okay.
MR. FEREDAY: -- the same basis.
THE HEARING OFFICER: Okay. I'll allow some latitude, again, but I don't want it to go too far.
THE WITNESS: That -- that is not the reason that we didn't protest the water right.
Q. (BY MR. THORNTON) Okay. If you could refer to Exhibit No. 50, Appendix A, the IDWR

staff memorandum.
MR. THORNTON: And, hopefully, with this I'm not over stepping the boundaries here, Mr. Hearing Officer.
Q. (BY MR. THORNTON) If you go to Exhibit A, under 50.
A. (Witness complying.) Okay. The staff memorandum?
Q. Yes. And then there is an Exhibit A in the back.
A. (Witness complying.) Is there a page number that you could --
Q. I -- you know, I actually don't think it will have -- it's towards the back. It will have a separate cover sheet --
A. Okay.
Q. -- saying Appendix A.
A. Is it the March 2nd, 2009?
Q. Yes, it is.
A. Okay. Well, it's -- (Witness complying.) Okay.
Q. And did you state earlier in your testimony, that you had read and were familiar with this report?
A. I've read it, yes.

Q. Okay. And can you explain in Appendix A, all the declines in ground water level from the wells represented there, suggesting a decline in ground water table? Can you describe why that may not be occurring?

MR. FEREDAY: Objection; the same basis.

THE HEARING OFFICER: Yeah, I think I'll sustain that objection. Mr. Thornton, we really didn't talk about these particular declines in the --

MR. THORNTON: Okay.

THE HEARING OFFICER: -- cross examine -- or the redirect. And I think we would spend a lot of time here.

MR. THORNTON: Okay.

THE HEARING OFFICER: My sense is that, there will be an opportunity to have these explained through other witnesses.

MR. THORNTON: Okay.

THE HEARING OFFICER: Okay.

MR. THORNTON: So I'll withdraw that. Okay.

Q. (BY MR. THORNTON) Did you just testify, when asked by Mr. Smith in regards to

IDWR's -- or excuse me -- Hydro Logic's drawdown, calling it depression curves in their reports, that you did not actually know the amount of drawdown?

A. Which drawdown curves, and in which reports?

Q. Yeah, and it was a poorly phrased question. And I apologize.

MR. FEREDAY: Objection. It refers to Mr. Smith's questions not mine.

THE HEARING OFFICER: Yeah, but it is the subject matter that was discussed in redirect, where we referred, I think, back to the Figure 3, page 22 of the Department's report, Exhibit 50.

MR. THORNTON: Correct.

THE HEARING OFFICER: I think that's where the question is heading.

THE WITNESS: (Witness complying.) Oh, this is not Hydro Logic's.

Q. (BY MR. THORNTON) Right. And that's, actually, this figure, I think, this figure just after that, that's Hydro Logic's.

A. Okay. No, I don't think I testified to the Hydro Logic's drawdowns.

Q. Okay.

A. I don't recall that.

Q. Okay. Then we don't need to have that marked.

Did you state in your prior testimony, that as a spokesperson for United Water, that you had no opinion regarding the appropriateness for generally underestimating the amount of ground water sustainability when applying for an application for permit?

MR. FEREDAY: Objection; the same basis.

THE HEARING OFFICER: Sustained.

I don't understand the question, Mr. Thornton. Even beyond that, I don't understand what the question is.

MR. THORNTON: Okay.

THE HEARING OFFICER: It needs to be within the scope of the question.

MR. THORNTON: And I do believe Mr. Fereday is right. It was based on a question that Mr. Smith had, so...

THE HEARING OFFICER: Okay.

MR. THORNTON: So withdraw the question.

THE HEARING OFFICER: Well, I sustained the objection.

MR. FEREDAY: Sustained it. Okay.

THE HEARING OFFICER: Yeah.

Q. (BY MR. THORNTON) In Mr. Fereday's question to you, did you identify that there were wells that had failed even with water in the aquifer? That pumps were below the aquifer water table?

A. Definitely.

Q. Okay. And do you have specific information, as to which of those wells are, that you could provide us?

A. From my -- from United Water's wells?

Q. Yes.

A. Yes, I do. We have -- we have -- we have several recent cases where that has occurred.

Q. Thank you. And then I believe you also -- did you recently state that most domestic wells are completed without a well screen?

A. I said I believe that what I -- what I -- my opinion is that many domestic wells are completed without a well screen. I believe many domestic wells are open bottom pipes. But I do

know that there are domestic wells that have well screens, and they might be a significant number.

For instance, the wells that were monitors with respect to the Floating Feather application, I believe one of those had a well screen in it. It's common to -- it's not unheard of to put a well screen in a domestic well.

Q. So I believe I heard you just state, that it is not uncommon to put well screens in domestic wells?

A. That's correct. It's not uncommon. I don't know if it's in the majority of the cases.

MR. THORNTON: That's all the questions I have, Mr. Hearing Officer.

THE HEARING OFFICER: Okay. Thank you. Mr. Smith?

MR. SMITH: Thank you, sir.

RECROSS-EXAMINATION

QUESTIONS BY MR. SMITH:

Q. Can you explain to us what you mean by head lock -- what you mean by head lock?

Head loss, is that what you said? Head loss, not lock?

A. Right. I never heard of head lock, but...

MR. JASON SMITH: It's a wrestling move, I believe.

THE WITNESS: Head loss, yes.

Q. (BY MR. SMITH) So it's head loss that causes the pump to break suction?

A. Well, the pump -- the pump will -- will create a vacuum bubble in the pump impellers when the pressure in the impellers is less than -- is less than a certain threshold, a vapor pressure of water, I believe it is.

So it's -- so it's not actually sucking an air bubble down from above. But it to -- to the appearance of a person at the surface looking at a well pump breaking suction, it looks just like it's just spitting -- spitting air with the water.

That's -- that's -- I don't think I was speaking about head loss in that respect. Only in that it -- that when a well becomes inefficient, there -- there is a greater head loss as the water goes from the outside of the well to the inside of the well. But the aquifer itself is -- it may not necessarily be the problem in that situation.

Q. Would you not say, that declining water

levels are also a primary cause of well failures?

A. I would say, they are not a primary cause of well failures in my experience in United Water service area, the -- or, you know, other areas that I'm aware of. I think it's in more cases than not, the problem is with the well itself, at least that's been our experience.

Q. And would you attribute that to failure of the well drillers?

A. No, not necessarily. I would attribute it to the fact that it's typically a piece of steel casing submerged in water for decades. And I've -- I've run many video surveys in wells, and they begin to degrade relatively rapidly, you know, forming -- forming, you know, rust, grinds, and there is corrosion, and barnacles on it -- you know -- you know, basically a degradation of the well casing is something that -- that's quite common to see.

So it -- it can be either one. But in my -- in my opinion, it's -- and in my experience, it's more likely that the problem is with the well construction.

Q. Let's go to this fault that's the far left fault, I believe, Mr. Fereday called it on

the map up there. That's a very short fault. Do you know why that is?

A. I believe it's based on the boundaries of the survey that was done to define it, and so it wasn't -- I believe it wasn't extended, because it's not known how far it extends.

Q. So we don't know how far to the northwest it goes, or how far to the southeast it goes?

A. I'm not -- I'm not aware of, to what extent, it extends past the definition there on the map.

Q. Would a much longer fault have a big effect on that?

A. I don't think so.

MR. FEREDAY: Objection. The question was vague. Would a much longer fault have a big effect on that? I don't -- I guess I would appreciate if the question could be rephrased. I don't understand what the question was.

THE HEARING OFFICER: Mr. Smith, would you like --

MR. SMITH: I thought he had already answered.

THE HEARING OFFICER: Well, and I -- he

did, and I won't force it.
So if there is an objection, Mr. Fereday, I'll overrule it.
MR. FEREDAY: Okay.
Q. (BY MR. SMITH) Let's go to Exhibit 50, Figure 3.
A. Is there a page you can give me, Mr. Smith?
Q. 22.
A. 22. Oh, right there (indicating). Okay. Okay. I have that.
Q. Yeah, page 22. I believe you said, you believed that the Theis method overstates the actual drawdowns in the PGSA?
A. In my opinion, the Theis method typically over estimates the drawdown in the aquifer.
Q. Would not production of the -- on the M3 property in the hot summer months of 23 cfs cause greater drawdowns? Okay. I'd represent that 23 --
THE HEARING OFFICER: Okay. I want to -- I want to interject here, Mr. Smith, because I think we covered this line of questioning before. There was -- there were

significant -- a significant number of questions on the issue --
MR. SMITH: Very well.
THE HEARING OFFICER: -- of 23 cfs --
MR. SMITH: I'll withdraw the question.
THE HEARING OFFICER: -- that I don't think Mr. Fereday asked questions about.
MR. SMITH: That's all the recross I have.
THE HEARING OFFICER: Okay. Mr. Edwards?
MR. EDWARDS: No questions.
THE HEARING OFFICER: Okay. Mr. Dittus, I have a couple narrow questions for you, I hope.

EXAMINATION

QUESTIONS BY THE HEARING OFFICER:
Q. You are familiar with the study that was conducted some years ago entitled, or called the "Treasure Valley Hydrologic Project"?
A. Yes, I am.
Q. Are you familiar with some of the documents that were produced as a result of that study?
A. I am.

Q. And as part of that study and others, are you familiar with the characterization, general characterization of aquifers in the Treasure Valley in the various groups, depending on their depths?
A. Yes.
Q. And is that -- is the grouping of shallow intermediate, or medium, and deep aquifers, one that you've heard, or are familiar with?
A. Yes, it is.
Q. And can you tell me where -- which of those zones the Sand Pierce -- or the Pierce Gulch Sand Aquifer is located within?
A. The -- it would be for -- I forget. I don't recall exactly how many layers they -- that the Treasure Valley hydrologic project model used. I know it was looking at a more coarser, general characterization of the ground water flow through -- you know, from -- all the way from one end of the valley to the other. So I believe it would be in layer two, probably.
It -- I -- I don't think you can line up the layers, or the actual Pierce Gulch Sand Aquifer, with one specific layer in the Treasure

Valley Hydrologic Project model.
Q. Okay. I wanted to ask you some specific questions about the monitoring well at State and Linder owned by United Water.
How is that well constructed?
A. The drilling method was a direct rotary mud drilling method. And I believe that we may have used weighted drilling fluid, because of the artesian heads there. But it was -- it had a -- it had a -- it was an eight-inch diameter drilled hole, both the wells were. And two-inch piezometer tubes were installed into one of the wells. One --
The other well has an actual steel casing that goes down to about, I think, it's in the range of 500 to 600 feet, and measures the pressure at that depth. And then has another monitoring tube going down to a deeper, much higher potential, a much higher head aquifer. And so -- and there was -- there was a filter pack installed around the two-inch monitoring tubes. They have slotted screens on the bottom of them.
Q. Now, I want to come to -- which of the wells, I guess, have we been referring to in this

examination of your examination?
A. Of the State and Linder?
Q. Yes.
A. The well that has the shallower two completion intervals, which I believe are in the range of 250 feet to 400 feet that -- that -- more like that depth range.
Q. So you are referring to the well with the multiple piezometer tubes placed in them?
A. Yes, correct, the two two-inch tubes.
Q. Okay. And I want to refer specifically to -- to the two piezometer tubes that were installed in that well at the lower depths.
A. In that well?
Q. Yes.
A. Uh-huh.
Q. Are you aware of the construction or the placement of those two particular piezometers and the well log that was filed related to the construction?
A. I'm familiar with -- generally, familiar with the construction, yes.
Q. And what did -- would it be your testimony -- well, let me ask.
What do you know about the separation

of those, and the distance between those two piezometers?
A. I know they are -- there is not an impermeable seal between the two completion zones. One of the shallowest of the piezometer tubes is measuring the pressure in the upper part of the aquifer. And it is -- it is, essentially, you know, a continuous sand unit with a few very thin layers that could -- could hydraulically separate the tubes.
And that's -- that's why there isn't a seal between those two tubes. But the one's measuring near the top, and the one's measuring near the bottom.
Q. So is it your testimony that those two piezometer tubes are measuring pressure within the same aquifer unit?
A. One is measuring near the top, and one is measuring near the bottom. They -- the pressures are very similar, although they are not identical.
Q. And are those pressures being measured in the Pierce Gulch Sand Aquifer?
A. Yes. Yes, they are.
Q. Okay. It's a very small thing. But I

want to refer to Exhibit 45, Figure 18. And I don't have that in front of me.
A. (Witness complying.)
Q. And if you'll look at this hydrograph, Mr. Dittus, I think you testified about the hydrograph portion of this from about 2007, through perhaps, the end of 2008, or at least to the end of the graph itself; is that correct?
A. I believe that's correct.
Q. Okay. And in particular, I think you were asked about the apparent one drop in -- and this would be, apparently, artesian pressure that would be somewhere in 2008 --
A. Yes.
Q. -- a significant drop?
A. Mm-hmm.
Q. And you attributed that drop to what?
A. I don't -- I -- I believe, I didn't know the well that caused that influence in that well. It wasn't the SVR 7 aquifer test.
Q. Okay. And you said, it was not then?
A. No, it was not, no.
Q. Now when you said SV --
A. Sorry. This monitor -- this was a monitoring well for an aquifer test that M3

commissioned. And it did not show a response like this during the test.
Q. Okay. I thought perhaps in your testimony, you had referred to a pump test that was conducted by the City of Eagle?
A. Oh, I think that might have been -- I referred to the City of Eagle when they did a pumping test in, I believe, it was June of 2006. And they contacted United Water, and asked if they could install pressure transducers on the well. And we -- we said -- we gave them permission to do that.
And so I guess what I was saying was that there was -- this is not all the monitoring data for this well, but it did -- it would -- it would fit right in with the range that you see here.
Q. Okay. Fine. And perhaps, I misunderstood your testimony. I thought you were referring to that pump test as having -- done by the City of Eagle as having been done in 2008. That was not true; was it?
A. No, I don't know what caused that.
THE HEARING OFFICER: All right, thanks. That's all the questions.

Mr. Fereday, redirect?
MR. FEREDAY: Yes.
REDIRECT EXAMINATION
QUESTIONS BY MR. FEREDAY:
Q. Mr. Dittus, you testified earlier, I believe, in response to some questions I had about the PGSA, that it is a dipping aquifer. Do you recall that?
A. Yes, I do.
Q. And in your response just a few minutes ago to the Hearing Officer with regard to which layers of the Treasure Valley hydrologic conceptual model the PGSA might occupy, you gave a response. Do you recall that?
A. Yes, I do.
Q. Do you believe that your testimony earlier about the dipping nature of this aquifer is relevant to the Hearing Officer's question?
A. That's not completely relevant, because the -- I think the Treasure Valley Hydrologic Project model is a much -- it's looking at a larger -- the complete flow regime. And it was -- it didn't incorporate the type of detail that we -- and in mapping of the Treasure Valley -- or of the Pierce Gulch Sand Aquifer,

that we -- that we have in the current conceptual model that's been defined by the researchers.
Q. Did the Treasure Valley Hydrologic Project conceptual model involve dipping model layers or horizontal layers?
A. I believe it was horizontal layers.
MR. FEREDAY: Okay. No further questions.
THE HEARING OFFICER: Okay. Mr. Thornton?
MR. THORNTON: No questions.
THE HEARING OFFICER: Mr. Smith?
MR. SMITH: No questions.
THE HEARING OFFICER: Mr. Edwards?
MR. EDWARDS: No questions.
THE HEARING OFFICER: Thank you, Mr. Dittus.
THE WITNESS: Thank you.
(Witness excused.)
THE HEARING OFFICER: Mr. Fereday, your next witness.
MR. FEREDAY: We would like to call Sean Vincent, please.
THE WITNESS: Mr. Vincent, come forward please.

Let me swear Mr. Vincent, and then let's have a discussion.
SEAN VINCENT,
first duly sworn to tell the truth relating to said cause, testified as follows:
THE HEARING OFFICER: Now, Mr. Fereday, you indicated initially that Mr. Vincent would be called as an adverse witness. I don't know whether you still consider him to be such and --
MR. FEREDAY: Yes, we do.
THE HEARING OFFICER: Okay. Just for the -- just for the protestants, when an adverse witness is called, and the intent is that they be treated as an adverse witness, counsel then has the ability to examine that person anticipating that the answers will be -- may not be friendly. And consequently, the examination may assume the form of cross-examination, or something much more similar to it. So the questions can be much more leading, to elicit from the witness the answers that counsel is trying to get. So you've got to be patient through that process.
Now, the other side of that is, and Mr. Fereday, because this witness is being called as an adverse witness, but has no protection from

counsel, I guess it's my responsibility to assume that role. But my guess is, based on my prior experience with you, that that won't be a problem.
MR. FEREDAY: Thank you, sir.
THE HEARING OFFICER: All right.
DIRECT EXAMINATION
QUESTIONS BY MR. FEREDAY:
Q. Please state your name and give your business address, please.
A. Sean Vincent with the Department of Water Resources. Three -- what is the address? 320 --
THE HEARING OFFICER: 322.
THE WITNESS: 322 East Front Street.
THE HEARING OFFICER: He remembered his name.
THE WITNESS: I never mail anything here.
Q. (BY MR. FEREDAY) Is that not our location as we speak, sir?
A. Yes, that's our location.
Q. Mr. Vincent, what's your position with the Department?
A. I'm the section manager with the

hydrology section.
Q. How long have you served in that position?
A. It will be four years in July.
Q. What did you do before then, professionally?
A. I worked as a practicing hydrogeologist, primarily with Morrison Knudsen, later Washington Group International. Primarily environment, we also did mine dewatering studies, and some numerical modeling, and that sort of thing.
Q. How many years were you in that position?
A. Approximately, 15 years.
Q. And before that?
A. I was in graduate school at the University of Idaho.
Q. Okay. What degrees do you hold?
A. I have a BS and BA in geology from the University of Kansas, 1985; an MS in hydrology with ground water emphasis, 1989.
Q. What experience do you have with Treasure Valley geology, Mr. Vincent?
A. I have worked on the Eagle water right

application, looked at that matter and aquifer test that was presented in support of that application.
Q. Excuse me. Was that the City of Eagle's --
A. City of Eagle, yes.
Q. -- application?
A. That's right.
Q. Was that the application that the City of Eagle filed two or three years ago?
A. Yes. Yes.
Q. Okay.
A. I've been involved with the M3 matter, of course. I'm serving on the North Ada County hydrogeologic characterization project technical working group.
Q. By the way, with regard to that technical working group, I've heard it called the TAC, the Technical Advisory Committee, or the NACTAC. Can we agree that if we refer to it as the "TAC," or "Technical Advisory Committee," we know what we're talking about there?
A. That's fine.
Q. With regard to North Ada?
A. Right.

Q. Okay. What other experience do you have with hydro- -- excuse me -- with geology -- geological evaluations in the Treasure Valley?
A. While at Morrison Knudsen, we did some studies of the Boise Rail Shop, and the characterization of the hydrogeologic setting there. They had a dense non-acquiesce phase liquid problem associated with chlorinated solvents that they used there.
Q. Mr. Vincent, could I ask you to speak up just a little bit?
MR. FEREDAY: Maybe, Michael, we ought to do is turn this off, until we need it.
MR. LAWRENCE: Sure.
Q. (BY MR. FEREDAY) I would appreciate you speaking up a little bit.
So could you repeat that answer, please? You worked in southeast Boise for the locomotive shop?
A. Yes. When I was at Morrison Knudsen, MK had a rail shop located in southeast Boise with a contamination problem contaminating ground water. And we did some characterization work out there trying to characterize the nature and

extent of the contaminate plume there.
Q. Which aquifer was involved there in southeast Boise?
A. That was the upper most shallow aquifer in that -- in that area. It was up on the Bench.
Q. Do you know what that aquifer is called?
A. I do not.
Q. Are you familiar with work that has gone on in southeast Boise pertaining to the ground water management area in that location?
A. Yes.
Q. And what's your familiarity based on there?
A. Well, I guess I have sort of passing knowledge of it, just because of my involvement with the Department over the last four years. In -- staff are involved in water level monitoring in southeast Boise. Those folks are under my direction. We also took a tour out to the Micron facility, and we discussed the situation out there with water levels as part of that tour.
Q. Who led that tour?
A. Some -- I -- Micron personnel. I can't

recall --
Q. Okay.
A. -- who it was, specifically.
Q. Okay. Have you personally carried out any geologic studies in the Treasure Valley?
A. I've -- I've done some water level analysis. Geologic analysis, it wasn't direct. We looked, obviously, at the geologic information that we had available in order to do that. And, again, that was for the rail shop.
Q. What geologic information did you look at, then; do you recall?
A. Drillers logs, and there was some characterization work that had been done by Rich Reed, who was with the locomotive shop.
Q. Was he a geologist; do you know?
A. Yes.
Q. Did he produce a published report out there; do you recall?
A. It's -- it's been a long time. I don't recall.
Q. I understand. Did you -- did you rely on any of the literature then that relates to the regional geology?
A. Again, it's been a long time. I don't

recall.
Q. Okay. I take it from your answers so far, Mr. Vincent, that you have not done any geologic mapping yourself in the Treasure Valley?
A. I have not.
Q. What about geologic structural analysis?
A. I have not.
Q. What about, to turn now to, the hydro part of the geology. How about hydraulic testing in aquifers in the Treasure Valley? Have you done any of that?
A. There was an aquifer test conducted at the rail shop. And I was not actively participating in that. I believe we looked at the data. Again, it's been a long time. We did do a water level analysis in which we looked at water levels as a function of depth, and we're looking for hydraulic communication. We did barometric pressure corrections, that sort of thing.
Q. Do you recall how many wells you measured in that effort?
A. I didn't measure wells, personally. I looked at the data.

Q. Do you know how those wells were measured? Were they measured by hand, using a tape? Were they -- did they use some electronic device; do you recall?
A. I think it was a combination. I'm sure that some of the wells were fitted with pressure transducers.
Q. But you don't know how many wells were involved in that effort?
A. I don't recall.
Q. Do you know whether there was an actual pumping well involved in that effort with regard to stressing the aquifer so that you could see how these other wells responded?
A. The analysis that I was referring to was looking for similarities in static water level fluctuations.
Q. So in that effort out there in southeast Boise, there was no actual pump test, no hydraulic test, in the sense of a pumping well measuring its effects on surrounding wells; correct?
A. I'm trying to recall. I thought there was also a pumping test.
Q. Okay.

A. But I wasn't involved directly in that analysis.
Q. Okay. And you didn't design a pumping test; did you?
A. No.
Q. Have you ever designed a pump test?
A. Yes.
Q. When did do that?
A. I've designed a lot of pumping tests over the years. Primarily, I guess, for the mining group at Morrison Knudsen, where we were looking to design mine dewatering wells, and I designed a number of tests for that purpose, as well as tests for characterizing sites, contaminated sites from an environmental characterization point of view.
Q. Were those tests designed, Mr. Vincent, to determine aquifer characteristics in terms of transmissivity, storativity, amount of, and rate of water in movement of aquifers?
A. The primary purpose of those tests was to define aquifer properties, transmissivity, and storage, as well as aquifer boundary conditions.
Q. And how many aquifer tests have you designed and carried out, would you say?

A. That's a good question.
Q. And by the way, before you answer that, maybe you can just tell me. Were they all done in your prior work for MK before you came to the Department?
A. Yes.
Q. Okay. So how many, would you say?
A. Well, we also did slug tests, which are much more smaller scaled tests, for low permeability characterization. And I did literally tens, maybe a hundred. I don't know. For -- in terms of aquifer tests, in the field, less than ten. But I did analysis of data that was collected by others on many more occasions.
Q. When you speak of a "slug test," what is that? I'm not familiar with that term.
A. That is a hydraulic test for the purpose of determining hydraulic connectivity. It's fairly limited in scope. It's only generally used for determining hydraulic connectivity, fairly low permeability materials.
And it's -- it's a test method involving a slug. It's a volume -- and a slug of known displacement. You would introduce that into a well, or remove it from a well. There is

both rising head and falling head slug tests. And the rate of response -- the water level response is monitored. And that is used to develop an estimate of hydraulic connectivity.
Q. So would it be accurate to say, that a slug test would be designed around pumping, let's just pick a number, 100,000 gallons out of a well as quickly as you could, and then evaluating what the effects of that were in surrounding wells? Would that be a good description of it?
A. Actually, wells that would be suited for characterization using slug tests would probably not be capable of producing large volumes of water, so...
Q. Well, I was just picking a number --
A. But --
Q. -- any number. But it would be a defined volume of water, you would pump out as rapidly as possible; is that right, and then see what happens?
A. You can do it by pumping, or by inserting or removing a block, a cylinder of known volume, also.
Q. A cylinder of water, or sediments, or aquifer material?

A. A solid block of material that has known volume would be introduced into a well. The well -- the water level in the well would be allowed to equilibrate. And then you would pull the block out, and monitor the water level response.
Q. So that would not involve pumping at all in that case?
A. That's correct.
Q. Would you recommend a slug test for evaluating any property of the Pierce Gulch Sand Aquifer, as you understand it?
A. No.
Q. How many of the aquifer tests that you've designed and carried out, were actual tests where you were pumping ground water, in evaluating the effects of that pumping?
A. All the tests that I described earlier that were not slug tests, I was referring to generally constant rate pumping tests. Occasionally, they were step drawdown tests. And usually, those would be done before a constant rate test, although sometimes in lieu of a constant rate test. And then we also did packer tests, which is another variety of aquifer tests

that's well suited to fractured rock.
Q. Would the packer test be a good test to use for evaluating the PGSA?
A. No.
Q. What about the -- what did you call it -- the step down?
A. The step drawdown test?
Q. Yes.
A. Let me back up. The packer test could be used provided the sediments were well lithofied. But I'm not aware that that's the case here with the PGSA.
The step drawdown test could be used as a quick and dirty way of determining -- of coming up with a transmissivity, which is, you know, one of the aquifer properties that we'd be interested in. But it wouldn't be used to evaluate aquifer boundary conditions.
Q. Okay. In the aquifer tests that you conducted, how many of them do you think used the technique that would be appropriate for evaluating an aquifer, such as the PGSA?
A. All the aquifer testing that I did for the mining group would fall into that category. They were all constant rate aquifer tests, with

the exception of the step drawdown tests that were occasionally run beforehand, primarily just to determine what the sustainable pumping rate might be.

Q. In those aquifer tests, you were running a pump 24 hours at a time for what; two, three, four, five days? Is that an accurate description of what you would do?

A. We ran longer term tests, ten days, on that order. The mining group, some of the tests that I looked at the data from, were 30 day tests. So --

Q. Were these -- go ahead.

A. Typically, on the order of ten days might be a good test.

Q. These tests were not designed by you, though; correct?

A. Some were, yeah.

Q. Some were. And when -- when these tests were carried out, were you on site to observe how they were carried out?

A. Unfortunately, yes.

Q. Sometimes it goes long into the night; correct?

A. And the next day and the next night.

Q. With regard to the aquifer tests that you've done, wouldn't you agree, that at some point an aquifer test ceases to deliver additional meaningful data that you are near a constant output parameter that doesn't change much? Would you agree with that?

A. It depends on the hydrogeologic setting. If you have an infinite aquifer, and you -- all indications are that the boundaries are well removed from the center of pumping. And the response is such that there is no indication of a boundary effect, then, you know, a straight line extrapolation sometimes would be a reasonable assumption.

But typically, especially for the mining group, we're looking to really characterize the water resource, and understand how to -- how to dewater it. And it's a -- you know, it's a dollar sort of thing here. We have to figure out, what is the minimum number of wells that's going to do the job, and what's going to be the really long-term impact of pumping. Because we're extrapolating from a test that's of a reasonably short duration into, you know, a dewatering project that might last years,

literally.

And so the thing that we would look at there would be, what's going on at the end of the test? Are we seeing some sort of a boundary condition at the end of the test? If there was an indication that there was a hydraulic boundary at the end of the test, we would continue the test.

Q. Is it your experience that hydraulic boundaries show up very late in a test?

A. Not -- they can -- they can show up at any time.

Q. Where were these hydraulic tests carried out? Were they carried out in Idaho?

A. Most of the aquifer testing I did was in Texas in the lignite country down in the San Antonio area of Texas. We -- I did aquifer testing in Missouri all -- with MK, you travel a lot. So it was not generally in Idaho, though. You are right.

Q. Have you done any in Idaho?

A. Again, I seem to recall reviewing a test I thought that was done at the rail shop. But as far as actually carrying out a test myself, being in the field, I don't recall ever

doing that.

Q. With regard to the tests in the lignite area in Texas, were those aquifers there comparable to the Pierce Gulch Sand Aquifer in any --

A. They were --

Q. -- geologically similar?

A. -- fluvial lacustrine deposits. So there were some similarities there, sands, and lower permeability sediments, layer deposits. So I would say, that there is some similarities there.

Q. Do you agree that the Pierce Gulch Sand Aquifer has -- or the Pierce -- let's say, the Pierce Gulch Sands, were deposited both through lacustrine and fluvial processes?

A. Yes.

Q. Mr. Vincent, have you designed any wells in the Treasure Valley?

A. I don't believe I have.

Q. Have you inspected any drill cuttings from any well in the Treasure Valley?

A. Not -- I don't think so.

Q. Have you authored or coauthored any peer reviewed scientific analysis of any geology

in the Treasure Valley?
A. I have not. Outside of just the work that I've done with the Department.
Q. Okay. And the work you've done with the Department, by and large has not involved a peer review process; has it?
A. We have a peer review process, yeah. The staff memo, for example, was reviewed by the authors, Rick Raymondi, my boss, reviewed it. So there is a peer review process there.
Q. And by the "staff memo," you are referring to what's been identified as Exhibit 50 here, your March 2nd, 2009 memo?
A. That's correct.
Q. Okay. Did you seek any peer review of that document from outside the Department?
A. No.
Q. I would like to ask you some questions about faulting. You probably are not surprised at that.
Are you familiar with the types of geologic faults that we see in, I guess, in the west, such as normal faults, thrust faults, strike/slip faults?
A. Yes.

Q. Normal faults are also known as extensional faults; aren't they?
A. Yes.
Q. Which refers to a process of some type of pulling apart; correct?
A. Right.
Q. As opposed to a thrust fault, which would involve geologic formations colliding in some way, or pushing together and slipping?
A. That's correct.
Q. Are you familiar with the types of faults that are present in the Boise River valley?
A. Yes.
Q. And what kind are they in this -- are they normal? Are they thrust faults? What kind of faults are they?
A. Normal faults.
Q. Normal faults. Now, you appear to be very focused in your memo on the question of faulting in this North Ada County area. Could you explain to us why that is?
A. Yeah, I guess when we look at the sustainability of a resource, which is the big question in my mind, the -- the number one thing

for me is, we need hydraulic connection to a source of recharge. And anything that might limit that hydraulic connection is a concern to me. As a reviewer of the water right application, that's why there was the focus on faults.
Q. Uh-huh.
A. Depositional environments would be another issue that could cause there to be limited hydraulic communication. Of course, the whole issue of, you know, where is the recharge, and how much do we have? That's intertwined in that same single issue.
Q. Mr. Vincent, with regard to ground water applications that come before the Department, this is the first time, isn't it, that you've ever raised the question of source of recharge as a -- as a potential requirement in seeking that application? Or have there been other instances? Is this normal with you?
A. Well, I was involved in a hearing a couple of weeks ago, where we were concerned about recharge in east Ada County.
Q. Which hearing was that?
A. That was the Neavitt hearing for the

Elk Creek Canyon development, proposed development.
Q. And that's out by Mountain Home?
A. Umm --
Q. Mountain Home desert it's called?
A. Mayfield area, yeah, north of the freeway.
Q. And are there any other examples where you've raised recharge as an issue, other than this M3 case?
A. I don't recall.
Q. Have you done any mapping of geologic faults in the Treasure Valley? And I take it from your earlier answer, that you haven't?
A. I have not done any mapping.
Q. Have you mapped faults anywhere; in Texas, or any other place?
A. I attempted to map faults in Colorado. I gave it up.
Q. With regard to the faulting described that you refer to, at least, in the North Ada County area, have you observed any of these faults yourself?
A. Yes.
Q. Which ones have you observed?

A. We took a field trip with Hydro Logic personnel and Dr. Spence Wood, and we observed faulting of the sediment layers. I believe what we looked at was the west-Boise Eagle fault. And we also looked at an out crop up along Freezeout Hill, which I believe there was some offset up there.

Q. The west-Boise Eagle fault, you saw that where? You were shown that where? Where were you on the ground where you were shown that; do you know?

A. That, I think -- I'm not sure it was the west-Boise Eagle fault. I believe we saw some examples of faulting along in the Stewart Gulch area. And I'm not sure what those faults were, or had been named, if they've been named.

Q. Now, the faults over in Stewart Gulch, it's not your testimony, is it, that those have anything to do with this water right application?

A. No. However, they are basin margin faults, and that is a concern for this water right application.

Q. And it's a concern, because you feel that the Pierce Gulch Sand Aquifer extends into Stewart Gulch, and might be bounded there by a

fault; is that -- would that be accurate?

A. No, it's a concern, because M3's property is on the north margin of the Boise Basin. And there is faulting along the margin of the basin. And so that -- that possibility, and the possibility that faulting has some sort of control on ground water flow, is the -- is the concern with the faults.

Q. Have you ever gone to North Ada County, in the foothills, or other areas relevant to the M3 application, on your own to look at faults, or search them out? Or was it just this one time with Hydro Logic?

A. Well, you know, some of the faults don't have a surface expression. So it would be difficult to see them.

Q. But I asked you whether you've ever gone to look on your own?

A. I have gone back to Stewart Gulch, and looked at the sediments in Stewart Gulch.

Q. Now, the sediments in Stewart Gulch show slight faulting; wouldn't you agree? Slight traces of faulting?

A. Well, the fact is, you see outcrops of the Pierce Gulch up -- elevated quite high above

their -- their elevation down in the valley. So that's evidence of quite a bit of displacement, I think.

Q. It's your testimony, that the appearance of the Pierce Gulch Sands at a higher elevation than the valley floor is evidence of displacement rather than deposition?

A. Yes.

Q. So you -- it's your belief as a geologist, that the reason that we see Pierce Gulch Sands in the foothills at a higher elevation than they are encountered in the aquifer, is due to faulting not deposition?

A. Yes, that's the explanation that was given me.

Q. And that was given you by whom?

A. That was my understanding from the field trip, talking to Dr. Wood and Mr. Ed Squires.

Q. Okay. Do you recall the fault trace that is visible on Freezeout Hill? You mentioned Freezeout earlier.

A. I don't recall much about it, actually.

Q. Okay. Do you remember stopping there with Mr. Squires and Dr. Wood on that field trip?

A. I do.

Q. Do you remember ever noticing that fault ever before that trip?

A. No, I don't.

Q. Do you know whether that fault on Freezeout has been mapped, or described by anyone in writing, in some sort of a report?

A. I believe Dr. Wood makes reference to it in one of his publications; one or more.

Q. Okay. And that, again, is a normal or extensional fault; correct?

A. I believe so.

Q. Is it your opinion that the fault that you observed on Freezeout Hill would serve as a no flow boundary at that location?

A. I -- I don't know. There is -- I don't know what the depth to ground water is there. What we were looking at was unsaturated sediments, and I don't know the location of the fault, or the depth to water, or -- I don't know.

Q. The offset indicated on Freezeout Hill does not tell you, does it, whether there is a sand layer offset against an impervious layer; correct?

A. The amount of offset doesn't tell you

that, no.
Q. And the fault at that location, at least as far as you can see on Freezeout, shows sand faulted against sand; doesn't it?
A. Yes, that's the way I recall it.
Q. But this means, does it not, that if those sands were saturated, despite their being offset, water would still flow through that section; correct?
A. It is possible to have faults where there is no effect on -- or essentially, no effect on ground water flow.
Q. Well, isn't it a fact that if you have -- let's hypothesize, a 300 foot thick sand section, that is an aquifer. And if it is offset to the tune of, let's say, 50 feet, isn't it a fact that there would be ground water flow still through that -- through that section despite the existence of that normal fault?
A. Provided there wasn't gouge, provided, you know, there was reasonable flow without the fault, yeah, most likely there would be appreciable flow still through that.
Q. With regard to gouge, you've not seen any evidence, have you, that there is any gouge

in any of the faults that you've observed either, as you say, in either Stewart Gulch or on Freezeout?
A. I'm not aware of any.
Q. Is it a fact that faults often actually form conduits for water flow? That is, they create water flow, rather than block it?
A. They can serve that hydrologic function, yes.
Q. In your staff memo at page 11, you state -- and I'll -- go ahead and look at it, if you'd like. You state that, quote, "Several lines of evidence suggest that the aquifer may be bounded by faults."
Could you describe for us what those lines of evidence are?
A. Well, I think if you read through the staff memo, there are several, more or less, independent lines of evidence that are -- that are offered. Nonconclusive, mind you, but suggestive that -- that it's a possibility that -- that faulting is playing a role in ground water flow.
We have the different patterns of water level fluctuation on the opposite sides of

the -- Wood identified fault, the one, in the southwest part of M3's property that is northwest, southeast oriented. That's not conclusive evidence by any means. But that is a line of evidence suggesting that something is different on one side as compared to the other.
In addition, there are two aquifer tests in close proximity to that fault. And for whatever reason, in both cases, Hydro Logic elected to analyze those aquifer tests using the package of AQTESOLV, which is the computer-aided program for the analysis of aquifer test data. That wasn't my decision. They felt it appropriate to use that package. I think that means something.
Certainly, the geophysics suggests that there is a fault at depth. Whether or not it extends in -- in across of Pierce Gulch, I don't know. But I think it was a concern of Hydro Logic's, insofar as they decided to run a magnetometer survey and a seismic survey, both. There was obviously some concern.
I mean, given the fact that we're looking to characterize the Pierce Gulch Sand Aquifer, not the deep bedrock, I think it's

somewhat disingenuous to say, all we're trying to do is characterize the deep bedrock. Why would you do that? Why would you spend money to characterize the deep bedrock if there was no potential for impact on the Pierce Gulch Sand Aquifer, and that's the target aquifer?
Q. Okay. So these -- these four items are the lines of evidence to which you refer?
A. Let me stop for a second, and think if there was perhaps another one.
During the aquifer testing -- and again, this was somewhat inconclusive in both tests. But there was never observed response -- what Hydro Logic determined to be observable response that they could positively attribute to the pumping of the test well on the opposite side of the fault. That applies to both the clean irrigational test and SVR 7 test.
Q. And those are -- so those are the lines of evidence; those five? And I believe that last one is the same as your first one. Different patterns of water flow, you felt existed on either side of this fault, this inferred fault?
A. Different patterns of water level fluctuations.

Q. Okay.
A. So we see different -- different responses, different static water levels of patterns on opposite sides of the fault.
Q. Now, are any of these lines of evidence, lines of evidence that you developed through your own research? Or is it just your observations of the work of Hydro Logic and others?
A. Those are our observations of the work that was done by Hydro Logic.
Q. Let's look at Exhibit 50, page 9.
MR. FEREDAY: And it might be useful to get a map back up on the screen for the Hearing Officer.
(Mr. Lawrence complying.)
Q. (BY MR. FEREDAY) Mr. Vincent --
A. I -- I might also mention?
Q. Yes.
A. There are a couple of other little pieces, maybe not distinct. But in the SVR 7 test, at the end of the test, there was -- as we've pointed out in our staff memorandum, there was a definite increase in slope that was observed in the Big Gulch stock well.

And it appeared to be a greater deflection than perhaps it really was. Because as we come to find out, the correction -- the water level trend correction had been misapplied, and there was a negative versus positive sign that got mixed up in HLI's correction.
But after the correction, the new trend still shows a deflection. And that's kind of going back to what I was talking about before. That for me, as somebody who has been involved in characterizing water resources with the goal of assessing the long-term performance of an aquifer, I would have liked to have seen that test continued to -- to try to see what was going on with that. It's a little inconclusive, I guess, I'd say at this point.
In addition, the recovery, it looked initially like there was a -- oh, I guess that was the plus, minus sign. But in both cases there was some correction that needed to be done with the water levels.
But the recovery data, there -- it -- it wasn't that the water level didn't recover during the period of monitoring, but rather that the slope of the line didn't come

back to a zero intercept, which is what you would expect in a -- in a more or less infinite aquifer. The slope of the line was some positive residual amount. And that was the concern for us, so...
Q. So is it your testimony then, that the Big Gulch stock well's response to the SVR 7 aquifer test, which was a nine-day test, was anomalous? That it did not plot appropriately on a drawdown line -- curve?
A. Can you define "appropriate"?
Q. Well, "appropriate" in terms of it being -- not being bounded by some sort of a fault, which is what we're talking about here? Or did it show the existence of a fault?
A. What I would say is that, the deflection during drawdown in the Big Gulch stock well, at the end of the test, is consistent with the possibility that the cone of depression had intercepted a -- some sort of a barrier boundary. And also, if -- and less definitively, there appeared to be an issue with the recovery, too.
Q. So is it your opinion that the SVR 7 test as evaluated by means of the drawdown in the Big Gulch stock well, shows the existence of a

fault-induced boundary somewhere between -- somewhere in the vicinity of the Big Gulch stock well; is that your testimony? Is that your opinion?
A. Can you restate that question?
Q. Is it your opinion that the response of the Big Gulch stock well in the SVR 7 aquifer test, shows the existence of the fault-induced boundary somewhere affecting the Big Gulch well?
A. I would say that the response to pumping that was observed in the Big Gulch stock well, is consistent with the -- a negative boundary condition. I wouldn't say that it's definitive, necessarily. But it is consistent with a negative boundary condition.
And the fact that we had it on -- in the aquifer test on the other side of the fault, or we appeared to have it, or Hydro Logic at one point thought that it had occurred, it was their decision to make the analysis using the fault package. They obviously thought they had some sort of an effect.
And the fact that it was on the other side, sort of eliminates the possibility that it could have been the west-Boise Eagle fault that

was being intercepted by the cone of depression.
Q. Mr. Vincent, perhaps the Hearing Officer is a bit confused about where these faults are that you are asserting, and where the Big Gulch stock well is, and how this all works out.
Could you please, using your pointer, describe where the Big Gulch stock well is, where the SVR 7 is on this exhibit that's up on the screen?
A. (Witness complying.) Are the wells labeled on there?
Q. It's Exhibit 19, Figure 1. Could you -- in the first place, let me ask you a few questions here.
You see the outline of the M3 property there, do you not, with a -- with a leg coming down to the southwest that I -- can we refer to that as the panhandle?
A. Yes.
Q. There in the panhandle, there is a short fault, is there not, that I think Mr. Dittus testified about; correct?
A. That's correct.
Q. And is that fault, is the fault that

was detected in a magnetometer survey that was carried out on behalf of M3; isn't that correct?
A. That's correct.
Q. And that's an inferred fault; isn't it?
A. It's based on interpretation of data. It's inferred at depth certain -- it's inferred -- yes, it's inferred.
Q. And it's inferred in the bedrock, correct? At several thousand feet below surface; correct?
A. Yes.
Q. Well, below the aquifer; correct?
A. That's correct.
Q. And we don't know, do we, whether that fault extends to the surface, and in any way affects water flow in the Pierce Gulch Sand Aquifer? We don't know that; do we?
A. We don't know that for a fact, no.
Q. Now, the aquifer -- or excuse me -- the faults over on the right side, the blue one and the rose-colored one above it. Do you see those there?
A. Yes.
Q. What are those faults? Or that one fault perhaps, if it's one?

A. That's the west-Boise Eagle fault.
Q. Is it your testimony that the west-Boise Eagle fault does not form an aquifer boundary for the PGSA, or do you know?
A. On M3 there is a feature -- I'll call it a -- because the aquifer is dipping, it's the up dip limit of the PGSA that occurs to the west of the west-Boise Eagle fault on M3 property. To the south --
Q. Can you point with your pointer up there on the map, and show the Hearing Officer where that is? And --
A. Perhaps --
Q. -- show us where you are talking about; where the PGSA goes up dip and daylights?
A. It's identified on a number of Hydro Logic figures. Perhaps, we should reference one of those, Mr. Fereday?
Q. Pardon me?
A. We could use a figure from one of the Hydro Logic reports to better identify that.
MR. FEREDAY: Let's do. Let's go off the record for -- if we could, Mr. Hearing Officer, just a moment.
THE HEARING OFFICER: Okay.

MR. FEREDAY: Maybe it's time for a break.
THE HEARING OFFICER: It's getting close. Is this a good time?
MR. FEREDAY: I --
THE HEARING OFFICER: Fine with me.
MR. FEREDAY: I would say, it's a good time.
THE HEARING OFFICER: All right. It's 20 to the hour. So let's come back at five to the hour. Let's take 15 minutes for the afternoon.
(A recess was had.)
THE HEARING OFFICER: We're recording. Mr. Fereday.
Q. (BY MR. FEREDAY) Mr. Vincent, I would like to, after the break here, go back over a few things that we just discussed.
First of all, just -- just so we're clear here with regard to the potentially truncating faults of the PGSA in the M3 vicinity. Is it accurate to say, that your view is that there are two potential faults that are involved here, the west-Boise Eagle fault on the northeast, and what we'll call the panhandle

fault on the southwest; is that fair?
A. We don't know in truth where all the faults are along the basin margin. And, in fact, I think that's self-evident. I mean, the fact that Dr. Wood located this fault along the panhandle, that was previously unidentified.
My thought is that there is a -- there is zones of faulting. And I would consider the basin margin a zone, rather than a -- than a -- thinking of it in terms of discreet faults that occur. And once you've identified them, you are done. I think there may be other faults, that we don't know where they are yet.
Q. But for purposes of your opinion, can you identify any other faults that would -- that would be evidence by any pump test, or any other data, other than these two; the west-Boise Eagle fault, and what we've dubbed the panhandle fault?
A. If I could refer to --
Q. Now, this is a fairly simple question. I'm just asking whether you have any data for any other that would -- that would truncate -- that you think might truncate the PGSA?
A. I don't have any information that suggests that on M3 property . But there are

other faults as identified in the map that accompanies Dr. Wood's magnetometer survey report.
Q. And that's Exhibit 19 B, Figure 1; correct?
A. Yes.
Q. But with regard to those that might affect the PGSA in the vicinity of, or on the M3 property, we're just talking about these two; isn't that right?
A. On M3, that's correct.
Q. Okay.
A. I believe there is indications of other -- I don't know whether they are faults -- but negative hydraulic boundaries that transect the PGSA.
Q. But again, you have no professional opinion as to whether any other such faults exist; isn't that right?
A. As I said, I believe there is evidence of other negative hydraulic boundaries that transects the PGSA away from the M3 property.
Q. Okay. Well, it -- I would like to hear what those are, and what your opinion is based on?

A. Okay. In a 1992 report authored by Mr. Ed Squires, Dr. Spence Wood, and Dr. Jim Osiensky, there was a description of the Goddard No. 2 well. And the Goddard No. 2 well is in -- I'll call it the Garden City area. And indications in the response to our staff memorandum, the indication is that that is a PGSA well. And --
Q. Do you agree that that's a PGSA well, or do you know?
A. I don't know. I don't know.
Q. Have you ever done any evaluation of the Goddard well yourself?
A. I have not.
Q. Have you looked at any geophysical evaluations of wells near the Goddard well?
A. No.
Q. But this 1992 report, and it's authored by Squires, Wood, and Osiensky, shows us what? And could you please refer to a page?
A. I don't have it in front of me. But I do recall that there is an aquifer test plot for the Goddard well, which as I said, was identified as a PGSA well in the response to our staff memorandum. And that aquifer test plot includes

an arrow, and a label, and it says, negative hydraulic boundary. That's not necessarily a fault, mind you, but it is an impedance to ground water flow in a PGSA well.
Q. And the hydraulic boundary shown in that Goddard well drawdown plot, could be a pumping well, could it not; another well?
A. I don't know that I would suspect that.
Q. You don't suspect that?
A. No.
Q. Do you think it's impossible that that could be the case?
A. No, it could be -- it could be another pumping well. That's possible.
Q. Okay.
A. That's one of, I think, five different possibilities that are suggested on the figure as the cause of -- or the possible cause of the negative hydraulic boundary.
Q. Mr. Vincent, I'm handing you what, I believe, is what you've just described. And if you would take a look at that, and identify that, please?
A. (Witness complying.) This report --
Q. Is that that '92 study?

A. It is the '92 study. It's entitled, "Hydrogeologic Framework of the Boise Aquifer System, Ada County, Idaho."
Q. Is this a document that you submitted subsequent to your staff memo?
A. Yes, we hadn't reviewed this as part of our staff memorandum.
MR. FEREDAY: Okay. I would like to mark this as the next exhibit.
THE HEARING OFFICER: Okay. Do know what number in the order of what you have marked, Mr. Fereday?
MR. LAWRENCE: 67 would be an appropriate number.
MR. FEREDAY: We'll mark it as M3 Exhibit 67.
MR. SMITH: 6-7?
MR. FEREDAY: Correct.
(Exhibit 67 marked.)
THE HEARING OFFICER: Do the protestants have copies of this documents?
MR. THORNTON: We do.
THE HEARING OFFICER: I think there were copies made of this, it was my understanding.

Mr. Vincent, could you give me that for a minute?
(Witness complying.)
Q. (BY MR. FEREDAY) And while we're at it, Mr. Vincent, I'll show you the other two documents, that I believe you have submitted. Would you identify these, please?
A. These actually were submitted by my colleague. The first one is "Hydrogeologic Framework of the Boise Valley of Southwest Idaho," authored by Dr. Spence Wood, April 21, 1997. And the second one is dated October 17, 2007. It's a memorandum from Hydro Logic, Ed Squires to Mr. John Westro, with the western- -- who is the western regional manager of IDWR.
Q. Have you reviewed the 1997 Wood report since your staff memo?
A. The 1997?
Q. The one you just identified.
A. I have -- I have -- I have not. I believe that Mr. Dennis Owsley has undertaken a review.
Q. And was it Mr. Owsley who suggested this be submitted as further support for your

memo?
A. Yes.
Q. And how about the 1992 report by the three authors? Did you suggest that as further support, or did Mr. Owsley, or someone else?
A. We were both aware of the study, and both had copies of it on our bookshelf, and thought that it was pertinent to the subject.
Q. Primarily, because of the Goddard well information?
A. I think the study area is between M3, and the postulated recharge area upstream from Capitol area -- or Capitol bridge, rather. And we were interested in assessing the hydrogeology within that area to evaluate the connection of the PGSA at M3 to the postulated recharge area.
Q. But you evaluated that after you produced your staff memorandum; correct, in connection with this case?
A. I think we were both familiar with, and had already read that report.
Q. Did you cite it in your staff memorandum, Exhibit 50?
A. No, we did not.
Q. The same goes for Wood, 1997, and 2007

HLI memo; correct?
A. That's correct.
MR. FEREDAY: We would like to mark these other two as Exhibit 68, the 1997 Wood report; and 69, the 2007 HLI report. And we offer all three in evidence.
THE HEARING OFFICER: So the HLI report, this would be a letter to John Westro, would be 69? And the document by Spence Wood would be 68, Mr. Fereday?
MR. FEREDAY: That's correct.
(Exhibits 68 and 69 marked and admitted into evidence.)
THE HEARING OFFICER: We're ready, Mr. Fereday.
MR. FEREDAY: Okay.
Q. (BY MR. FEREDAY) Mr. Vincent, I would like to go back to where we were before the break.
Now, we've gone over some ground that maybe we needed to be covered a little bit more. And you also, I believe, had an additional thing to say about the Pierce Gulch stock well, and its response to the SRV 7 aquifer test, the nine day test.

Could you describe what that further comment is?
A. Yes, thank you. I just wanted to correct my testimony. I believe I said something about a zero intercept. And what I was trying to say, this is a very technical matter only. But the trend of the residual drawdown plot, if you were to extend that to a T or T prime value of one. It -- the concern was that the intercept was nonzero. It was a positive value.
I believe I stated that incorrectly in my previous testimony. I just wanted to get that straight for the record.
Q. And it was incorrect, in what sense? That it was a negative boundary?
A. I believe I was talking as if it was the zero intercept that was positive, which is -- doesn't make sense.
Q. Okay. I would like to have you refer to Exhibit 42, Figure 1, I believe.
MR. THORNTON: Which exhibit is that? I'm sorry.
MR. FEREDAY: That's the application.
Q. (BY MR. FEREDAY) Actually, Exhibit 42, under Tab A 4, Figure 6. It looks similar to

what you see up here on the screen.
A. (Witness complying.) Tab A?
Q. (BY MR. FEREDAY) Tab A 4.
A. Thank you.
Q. Mr. Vincent, is it your testimony -- to get back to a question I asked earlier. Is it your testimony, your opinion, that the west-Boise Eagle fault truncates the Pierce Gulch Sand Aquifer on the M3 property?
A. Based upon the information that's been provided to us, the Pierce Gulch Sand is -- it's the Willow Creek aquifer -- it's the underlying Willow Creek aquifer that's truncated by the west-Boise Eagle fault.
Q. Do you see on Figure No. 6, this green line that goes to the west, northwest and becomes dashed?
A. Yes.
Q. Do you understand what that line is? Could you describe it for us?
A. I believe that's the contact between the Pierce Gulch Sand Aquifer bottom structure and the top of the underlying mud stone. So it's that intersection with land surface or surficial sediments in -- at least.

Q. Is that the area where the Pierce Gulch Sand Aquifer becomes more and more unconfined, and ultimately, unsaturated?
A. Yes, as you -- it would be to the southwest of that, where you would start to get unconfined conditions in that aquifer, provided -- I'm not sure what the sediments overlying are. But in theory, yes.
Q. You would get unconfined conditions as you proceed to the southwest; is that your --
A. As you proceed to the northeast and approach that line.
Q. Okay.
A. That represents the base of the PGSA.
Q. Does that represent a boundary, in your opinion, in the PGSA, in the aquifer?
A. It appears to, yes. It's the -- it's the end of the aquifer more or less.
Q. So the aquifer would have a boundary at that location; would you agree?
A. Assuming that the underlying sediments are of lower permeability, yes.
Q. Now, with regard to Dr. Wood's work that detected an inferred fault down in the panhandle based on magnetometer data, do you

recognize that that has the sediment section over the top of that deep basement where the fault was of at least 3,000 feet?
A. I do.
Q. And you don't have any evidence, do you, that that fault propagates up into the sediments that would comprise the PGSA; do you?
A. I do not, other than -- well, other indirect lines of evidence, I suppose.
Q. I would like to turn to your point about doing magnetometer and seismic studies. You seem to be critical of M3 and Hydro Logic for having carried out seismic and magnetometer studies on this site. Is that a -- is that a fair assessment of what you said?
A. I hope that wasn't what was implied. I think it's good to collect that sort of information. I think what I was intending was that there was concern with the shallow subsurface. And the intent of the seismic survey was to see what was going on in the -- in the sediments, in specifically, at depths less than a thousand feet.
Q. What about -- what about the magnetometer study? Do you recognize that that

was to find what the basement rocks were shaping up to be?
A. Insofar as it apparently is only sensitive to what's going on in the basement, then obviously, yes. But I think -- I -- my interpretation is that there is -- there was concern on the part of the investigators, that perhaps the faulting, not only transected the basement rocks, but perhaps there was offset in the shallow sediments as well, which would include the PGSA.
Q. Are you an expert in evaluating magnetometer data?
A. No, I'm not.
Q. What about seismic data?
A. I am not.
Q. With regard to M3's position here, don't you agree that it would make sense for M3, with a water right of this size, to carry out all types of studies that might reasonably provide some data as to this site, such as magnetometer and seismic?
A. Yes. And I think -- I applaud them for their efforts, and I think it's useful information, although the seismic study proved

inconclusive.
Q. The seismic study proved inconclusive, isn't it a fact, because seismic often has trouble dealing with sediments, and really seeing into sediments as opposed to bedrock; isn't that right?
I know you said you are not an expert. But do you know that, in fact?
A. Yeah. And we were also told by those who are experts at the BSU's Center for Subsurface Geological -- CGISS -- I can't remember the acronym there -- but the experts think we might be able to see the sediments with a larger source. And that's why we're proposing to do a larger source seismic survey this summer, actually, in both North Ada and east Ada.
Q. But you don't fault M3, do you, or feel that HLI has been disingenuous by doing these studies, even though they may not have shown anything in terms of offset in the sediments; right?
A. No, I applaud their efforts.
Q. With regard to the two day Kling test, the Kling well is well down in the panhandle; correct?

A. That's correct.
Q. And the Kling well would be southwest of this inferred fault line in the panhandle; correct?
A. That's correct.
Q. Did you do any simulations or any calculations of your own with regard to the Kling aquifer test, or did you just look at the data that was provide by the workers at HLI?
A. We just reviewed their -- their work.
Q. So you didn't do any calculations to determine whether the cone of depression from that test would have propagated to the upper gulch wells in that time frame; did you?
A. We did not for the Kling well. We did for SVR 7.
Q. Do you know whether, based on the transmissivity data that was -- that has been arrived for this aquifer, whether the cone of depression would be measurable at the site of the upper gulch wells, nearly 10,000 feet away after that two day test from Kling, or do you have an opinion about that?
A. I -- I'd have to look at the geometry again. I'm not exactly sure that the locations

of the various wells. But it occurs to me, that during a two day test perhaps, the cone of depression did not have an opportunity to expand a distance that far. Yeah.
Q. In the drawdown plot of the pumping well in the two day Kling test, did you see any evidence of a negative hydraulic boundary? And I would ask you to refer to Exhibit 12, Figure 81.
Exhibit 12 is the re-analysis of 16 aquifer tests that was carried out by HLI. Do you recall that document?
A. Yeah.
Q. Did you read that document, by the way?
A. Yes. And there are a large number of data plots. There were 16 different aquifer tests, and many wells for each, so...
Figure 81, you said?
Q. Correct.
A. What page?
Q. Page 220.
A. (Witness complying.)
Q. Mr. Vincent, have you found Figure 81?
A. I have.
Q. In that drawdown plot, you recognize that that's the drawdown plot for the pumping

well itself; correct?
A. Correct.
Q. And you agree, don't you, that a pumping well if it -- if it encounters a negative or no flow boundary, will show that no flow boundary in its plot; will it not?
A. Yes. More -- yeah.
Q. Do you see any evidence in this plot of a negative or a no flow hydraulic boundary?
A. I don't on that plot, no.
Q. How about positive boundaries? Do you see any of those?
A. It looks to be a pretty straight line. Once a time has past, once you get past, say, eight minutes in the test.
Q. At about a minute and seven or eight, we see a more positive deflection; do we not?
A. We do, yes.
Q. Does that suggest to you that there would be a no flow boundary at that point?
A. I'll tell you, I didn't undertake an extensive analysis here. I didn't analyze 16 different aquifer tests, and look at all the plots, and all the monitor well monitors here.
And I look at Figure 86, for example,

or page 225, and I -- and I --
Q. And before we get to page 86 -- or Figure 86, and I promise you, I'll take you there in a minute.
A. Okay.
Q. I would like just like to finish up with 81.
A. Okay.
Q. Isn't it -- isn't it a fairly basic precept that what we're seeing there at that first deflection, is a positive aquifer response, not a negative one?
A. Well, I think initially, you get a big drawdown in the well when you are basically evacuating the well bore. And then from there, you have, you know, maybe a trend to look at. I would want to look at, you know, the size of the well, and look at well bore storage, and look at U assumption. And there is a whole -- a whole bunch of things you need to look at before you can make definitive determinations here.
But something that happens in the first couple minutes of the test, is generally not a good indication of what's going on.
Q. How about out at the far bottom end of

this -- of this plot, do you see any -- any indication of a trend there? Have you attempted to draw a line, or figure out anything about that trend? Does that look positive or negative to you?
A. As I said, once you get past, say, eight minutes, somewhere in there, from then on it looks like a very linear trend.
Q. In the very next figure, Figure 82, it shows drawdown curves. This also shows no evidence, does it, of a no flow boundary, that you can tell? Do you see any evidence of negative boundaries in either 81 or 82, Mr. Vincent?
A. Again --
Q. Such as would be caused by a fault that truncates the aquifer and causes it to be no flow?
A. Again, it was not my conclusion that there was a negative hydraulic boundary here. That was the conclusion that was presumably reached by Hydro Logic. I haven't had a chance to look at this. Late in the test, there are some bends in the data.
As I recall, they talked about how the

different zones behaved differently. But the composite looked fairly linear. And, indeed, that seems to be the case.
THE HEARING OFFICER: Could we go off the record just for a minute --
MR. FEREDAY: Yes.
THE HEARING OFFICER: -- Mr. Fereday?
I don't want to interfere with how the evidence is coming in, but let me just --
(Discussion held off the record.)
THE HEARING OFFICER: We are recording again, Mr. Fereday.
Q. (BY MR. FEREDAY) Mr. Vincent, you are aware that Hydro Logic, on behalf of M3, did two aquifer pump tests as part of their work in this matter; correct?
A. That's correct.
Q. They did a two-day test; correct, based on the old Kling irrigation well?
A. That's correct.
Q. And the Kling irrigation well, which is shown here on Figure 80, which is part of Exhibit 12, is down there in that southern extreme of the panhandle; correct.
A. That's correct.

Q. And it would sit fairly close to, and just southwest of the dashed line there, that is that inferred fault, that we've been discussing in the panhandle; correct?
A. Correct.
Q. M3 Eagle also did another pump test, did they not, involving the SVR 7 well, which was shown up there near the -- out of the panhandle into the main part of the property; correct?
A. Correct.
Q. And that was a nine day aquifer test, pumping at 900 gallons a minute; correct?
A. Correct.
Q. And you've had the results from both of those tests for quite some time now; haven't you?
A. The Kling irrigation test for much longer, yes.
Q. And the SVR 7 test was done in early 2009; isn't that correct?
MR. JASON SMITH: '08.
Q. (BY MR. FEREDAY) Or excuse me. 2008?
A. The test was done then. We didn't get the report until January 23rd of 2009, the full report, with the analysis.
Q. I don't want to belabor this point

right now, Mr. Vincent. But we may return to it at a later time.
But with regard to my questions about that Figure 81, I'm just asking you, regardless of what you -- what you know about the document in which this appears, which this is a very thick document, a very thick study.
As a hydrogeologist, are you saying that you are unable to say, whether there is a negative boundary showing on this, such as a boundary from the Kling pumping well, that would show up from a truncating fault?
A. Not on that plot, I do not see that.
Q. Did you or your staff in working on your memo, run any geophysical surveys of any bore holes?
A. No.
Q. Have you received any formal training in geophysics?
A. Not formal, but I've undergone self-study. I have standard references on interpretation of bore hole geophysics.
Q. Do you consider yourself an expert, Mr. Vincent, in geophysical log interpretation?
A. I do not.

Q. In preparing your staff memorandum, did you rely on materials provided by Dr. Dale Ralston, that have been filed in this case, and that are in evidence?
A. No, we merely included his findings as part of our staff memorandum as requested by the Hearing Officer. We didn't -- we didn't undertake any sort of analysis of his -- of his work, or rely upon his work in any way.
Q. Have you discussed any of the topics addressed in your staff memo with Dr. Ralston?
A. Absolutely, not.
Q. Have you discussed the M3 project, or any other thing having to do with M3 with Dr. Ralston?
A. No.
Q. Is Dr. Ralston on the NAC TAC, the Technical Advisory Committee; do you know?
A. No, he's not.
Q. So he has not attended any of the NAC TAC meetings, to your knowledge?
A. He has not.
Q. Do you know whether in preparing his memos, Dr. Ralston did any independent analysis, or went out and collected any data on his own?

A. It didn't -- it didn't appear so.
Q. Do you know whether Dr. Ralston has done any geophysical study in the North Ada area?
A. I'm not aware of that.
Q. Who, inside the Department, did you discuss the subject matter of the March 2nd staff memo with?
A. It would be limited to hydrogeologists, and my staff, and my immediate supervisor Rick Raymondi.
Q. Did you receive any instructions inside the Department with regard to this memo?
A. Other than the requests from the Hearing Officer, no.
Q. And the Hearing Officer simply asked you to look at the data out there, and prepare a memo?
A. It was a formal request; written.
Q. Have you provided comments of -- to this extent, or that were this extensive on any other water right application, that you know of?
A. No.
Q. How thick do you think the Pierce Gulch Sand Aquifer is in this M3 area? Did you -- do you recall that?

A. It's conceptualized as being approximately 300 feet, I believe.
Q. So would it be your testimony then, that you would need offset in a fault of at least that much to create a no flow boundary; would that be right?
A. It depends. There are low permeability layers within the sand unit. I don't know what the section looks like exactly along the fault. I don't know --
Q. Have you looked at --
A. I don't --
Q. Excuse me.
A. I don't know that it would take 300 feet to cause a serious reduction in flow, but that would make it more probable.
Q. I would like you to refer to Exhibit 23, which is Hydro Logic's ground water contour evaluation.
A. (Witness complying.)
Q. Have you got it there?
A. Figure 1?
Q. Yes.
A. Yes.
Q. Do you know what that is? And could

you describe it to the Hearing Officer, please?
A. This is a potentiometric surface map, which depicts the elevation of the potentiometric surface within the Pierce Gulch Sand Aquifer in the vicinity of M.3, and includes some inferred flow directions based upon those contours, as indicated by arrows, which point to the direction of flow that's thought to be occurring.
Q. Do you --
A. It's for 2007.
Q. Okay. Do you -- Mr. Vincent, do you have any -- any data to contradict the location of any of those ground water contours, other than, let's say, the dotted ones that are inferred?
A. It -- you know, I'm probably not the best person to answer that question. I haven't really involved myself as much with the water level data as Dennis Owsley. I'm not aware of anything that necessarily refutes it.
I'm comfortable in saying that, I think it's plausible that ground water flow could be from the M3 property towards the Payette drainage at some point. I don't know that I have anything that suggests that that's impossible. I don't

pretend to know.
Q. But you don't know of anything that would contradict that conclusion that it flows to the west, northwest; would you?
A. I don't. But again, I haven't really been involved in the water level monitoring in that area, and I don't really have firsthand knowledge. So I'm not the best person to ask about that.
Q. But you signed the memo; correct, that --
A. I --
Q. -- that we're talking about?
MR. SMITH: Objection; argumentative.
THE HEARING OFFICER: Overruled.
THE WITNESS: I was a co-author, yes.
Q. (BY MR. FEREDAY) You have not measured any water levels in this area; have you?
A. Again, I have not.
Q. Do any of these contours suggest to you, as a hydrogeologist, that there is a no flow boundary impeding ground water flow through this area in the PGSA?
A. Those contours as shown don't necessarily suggest that. I guess I go back to

what our memo stated about ground water flow in the vicinity of M3. I believe we said that it looked, based on available data that was presented to us, that the flow was primarily west on M3 property, and then it turned northwest.
And I suppose, depending on where you make the turn, you know, a fault -- a southwest, north -- or southeast, northwest oriented fault could cause that -- that turn. Certainly, if the flow is through the postulated fault, then that would suggest that it's not a significant barrier to flow.
But I don't know that we have a lot of control on ground water flow direction right there. And I think the fact that we have this northwest component makes it sort of inconclusive, as far as the role of the fault.
Q. When you say, you don't have much control on ground water flow in that area, what do you mean?
A. I mean that, once you get between M3 property and the inferred flow direction towards Letha and the Payette, there aren't a lot of control points. And that's what we stated in our staff memorandum.

Q. And this question of flow to the northwest, what difference does that make, Mr. Vincent, in -- with regard to this water right application, in your opinion?
A. That --
Q. Does it make any difference to aquifer productivity or drawdowns? What does it -- what difference does it make?
A. That's a good question. I think that it's important, insofar, as understanding the aquifer system. In order to be able to predict it accurately, I think it's necessary to know where aquifer recharge occurs, and where aquifer discharge occurs. And it -- it lends support to the numerical modeling if you -- if you know that.
But I would agree with your observation, that it's a bit of a red herring in terms of what the actual hydrologic impacts are. I think the actual hydrologic impacts are going to be superposed on the potentiometric surface that exists right now.
And so it doesn't really matter whether it flows to the Payette Basin or if it's already left the Boise Basin. You are going to still

have drawdown spreading radially away from the pumping center, unless there is some sort of a hydraulic barrier to -- to stop it.
And I think that the modeling that was done by M3, and our calculations that were done with the Theis solution, they all show that. It -- that it -- the drawdowns, the impacts, radiate away from the pumping center, both up gradient and down gradient.
Q. Did you hear Mr. Dittus testify this morning about his experience with the Floating Feather well, and other wells in the United Water portfolio in this area?
A. I did.
Q. Did you hear that Mr. Dittus saw no evidence of any negative hydrologic boundary from the pumping of the Floating Feather well?
A. Yes, I did. I did.
Q. Do you have -- do you have any reason to dispute what Mr. Dittus has said about the stability of water levels in the Floating Feather and other wells?
A. I don't have any firsthand evidence, no.
Q. As a hydrogeologist, what does it tell

you, that Mr. Dittus has these data and these records dating back many years, with regard to the stability of the aquifer in that area? What does that tell you with regard to your -- the question you've been asked here, which is to evaluate the likelihood of impacts from the M3 pumping?
A. I suppose it lends support to the idea that some amount of additional appropriation might not cause significant impacts at least at that location.
I'd point out, that we're in a different location. And that what we're talking about, is not an insignificant amount of water in relation to the amount of water that is pumped out of the Floating Feather well. So I think that needs to be considered as part of the picture.
Q. You are saying that it's a greater amount of water that is pumped out of the Floating Feather well? Is that the problem?
A. My understanding from listening to Mr. Dittus' testimony this morning was that -- and I don't know exactly which wells he was referring to, but I remember the number 4,500

acre-feet per year. And the estimated average withdrawal that M3 is applying for is 6,535. So that's more than a doubling of the rate of withdrawal. And it is, as I mentioned, in a different location.
Q. You are saying that 6,500 is more than a doubling of 4,000 acre-feet --
A. It --
Q. -- from the United Water wells?
A. It represents a doubling I -- 4,500 is 100 percent. We're talking about being now 200.
Q. Half again -- half again larger; would that be right? Or half -- roughly, half again larger? It wouldn't be a doubling of 4,500; would it?
A. The total.
Q. Wouldn't that be 9,000?
A. The total -- the cumulative withdrawal will be now more than that 10,000 acre-feet. Whereas, the total withdrawal right now, is 4,500 acre-feet per year.
Q. Oh, you are speaking of the aquifer overall in this whole area?
A. And that's what we're --
Q. I see.

A. -- assigned to look at.
Q. I see. Now, if the Pierce Gulch Sand Aquifer were affected by faults, at least in the Floating Feather area, that would truncated the aquifer, they would have shown up in the Floating Feather well, though; isn't that right?
A. Yes, you would -- you would think. And, in fact, the reanalysis performed by HLI has a discussion. I don't know that they saw significant impacts. I think they put in a boundary in their analysis.
There is a -- there is a known boundary in the vicinity of the Floating Feather well. It's not isolating, but it is a known boundary.
Q. And what boundary is that?
A. That's the west-Boise Eagle fault.
Q. And based on Mr. Dittus' testimony, can you -- can you give an opinion that that well is showing an effect from that boundary?
A. I would assume after some period of time, yes, that impact -- that boundary would be -- would be felt. That doesn't mean that it would necessarily cause water level declines all by itself. But it would cause an accelerated rate of water level decline.

Q. You say, it would. But it hasn't shown up yet; has it?
A. I believe it probably has.
Q. But do you know of any evidence in the data we have, such as the hydrographs that he spoke to this morning, that would show the existence of that boundary?
A. I -- it's --
Q. I'm asking you about the data that he showed.
A. It --
Q. Does it show it to you as a hydrogeologist?
A. The data that he showed isn't an aquifer test. I think that if pumping of the subject well was treated as an aquifer test, that if you allowed that well to recover, and then you began to pump it. Eventually the cone of depression would extend, and hit that barrier boundary, and that you would likely see an increase in the rate of drawdown, unless recharge was sufficient to -- to cause it to cease proper -- you know, the cone of depression to cease growing. And eventually, the fact that it stabilizes, I -- suggests that there is some

recharge source somewhere.
Q. So you would agree, that there is a recharge source coming to the Floating Feather well?
A. Based on the information that Mr. Dittus presented, if the water level is stable, and it's been pumped for a long time, I would agree.
Q. With regard to the lack of a pumping test at Floating Feather, which was what you were just stating, isn't it a fact that the Floating Feather well's own pumping, since it was begun in something like 1996, provides its own observable aquifer test, given the fact that it has been monitored all these years? At least at that pumping note itself; isn't that -- isn't that a fair statement?
A. Certainly, there is a trend of pumping water level data that can be followed.
Q. I would like you to refer to Exhibit 29, which is another ground water contour map, dated 1991. Do you see that?
A. (Witness complying.)
Q. And I would just like to ask you whether you, in preparing your memo, evaluated

this map?
A. (Witness complying.) I re- -- I've seen this map before, yes.
Q. Okay. And this map shows, does it not, some degree of flow -- ground water flow up through that M3 area moving to the west, and also slightly to the north; isn't that correct?
A. Yeah, the -- that's what's suggested by those -- by that pattern of water level contours, yes.
Q. And this dates from 1991; correct?
A. That's what it says.
Q. Do you have any evidence to contradict what Mr. Newton found back in 1991?
A. I don't. But again, I haven't focused on water level data.
Q. And in this contour plot, do you see any evidence of a no flow boundary?
A. Well, the flow direction leaving M3, those arrows, are parallel to the strike of the fault. So that doesn't suggest that the fault doesn't have an effect on ground water flow. Perhaps --
Q. But the contours continue on right through where the faults are; correct? Where

your inferred --
A. I see.
Q. -- panhandle fault is?
A. There isn't a water level discontinuity suggested by those contours I see.
Q. Yeah. But what about on Exhibit 31, just a couple pages further on, Lindholm 1980. Similar -- similar questions, similar contours. Do you have any reason to disagree with those contours, and the continuity of ground water flow there?
A. I don't. I would point out, that these are -- these are really broad brush regional contours that were developed for the entire Eastern and Western Snake Plain. So this is a very regionalized picture of what's going on.
Q. But they were based on actual well data; correct?
A. Yeah, but --
Q. Actual water level contours?
A. -- not necessarily in the Pierce Gulch Sand Aquifer.
Q. Do you know what other aquifer they would be in?
A. There are other aquifers at depth

beneath the Pierce Gulch Sand. The Willow -- the Terteling Springs formation has been identified as an aquifer. Yeah, I don't -- I don't know. There is contours that extend east of the known lateral extent of the Pierce Gulch Sand.
Q. We can talk about those aquifers in a minute. But I would just like to confirm, that you don't see in this plot, any discontinuity of flow; do you?
A. Discontinuity of flow, I -- I don't see that.
Q. Okay. About what about Dr. Ralston's flow map, Exhibit 47, Figure 9? Could you take a look at that?
A. (Witness complying.)
Q. And I'll represent to you, that this is a contour map that Dr. Ralston did of the Pierce Gulch Sand Aquifer based on some selected wells in the Pierce Gulch Sand Aquifer in the vicinity of M3.
Do you see his inferred contours there that, I believe, are dashed red lines?
A. Yes.
Q. And those trend, do they not, generally to the west, northwest in the M3 area? Do you

have any reason to disagree with Dr. Ralston in that regard?
A. No, I would just point out that the flow direction, again, is a little bit different than in the other maps. I don't have any reason to suspect that one is better than the other regional sort of picture.
Q. Dr. Ralston based his on three ground water con- -- ground water levels; isn't that correct? Or do you know?
A. I don't know.
Q. Okay. I would like you to refer to Exhibit 140, Figure 1, please?
A. (Witness complying.)
Q. And I'll represent to you, that this is part of a study done by SPF Water Engineers.
MR. HEAD: What's the reference, Mr. Fereday?
MR. FEREDAY: Exhibit 140, Figure 1.
Q. (BY MR. FEREDAY) Mr. Vincent, just so that we can maybe have a perimeter on ground water flows across contour lines. If we focus first, on the far right of this map, the light colored contours.
Would you agree with me that in the

upper part there, the ground water flow is directly down off the mountain front going to the -- basically to the west, perpendicular to those contour lines?
A. Assuming it's isotropic conditions, yes, the indicated flow direction is generally perpendicular to the flow lines? And that's what's indicated.
Q. Are you familiar with the nature of the sediments through which those flows would occur up there in the -- on the front? Do you know what the geology is there?
A. It's complicated on the front. And, you know, we're kind of mixing some different aquifers here when we construct a contour map like that.
Q. Well, I'm just asking you what you know about this contour map. I understand, we're not talking about the Pierce Gulch Sand Aquifer up on the front.
But I would just like you to answer my questions with regard to how you see ground water flowing, whether you have any reason to disagree with this map?
A. I -- I haven't reviewed these data. I

have --
Q. Ground water flows from high head to low head; does it not?
A. Yes.
Q. And it will plot on a map once you find potentiometric surface in wells; correct?
A. You can make a plot, yes.
Q. And isn't that what this map shows?
A. Yes, it's a -- contouring is a process that involves interpolating between points. And that's what this is, a contour map.
Q. And if there is a conduit between points on a -- in an aquifer, say, such as a sand unit, ground water will flow from high gradient to low gradient through that sand unit; correct?
A. Yeah, generally.
Q. And over on the right side of this map, we're talking about low permeability volcanics and granitics; aren't we?
A. That's right.
Q. And over on the left side, where the contours are spaced farther apart, we're talking about more sedimentary basins; aren't we?
A. Yeah.
Q. Where the head moves at a lower

gradient across and through those sediments; correct?
A. The water moves.
Q. The water moves.
A. Through the sediments.
Q. Right.
A. Yes.
Q. And would you agree that it moves normal to these contour lines here, such as 2,400 line, it would be moving at some points to the south, and to some points to the north? But generally trending to the west, northwest; is that a fair assessment?
A. It -- this contour map suggests that, yes, it moves --
Q. In that direction?
A. Yes.
Q. And again, you don't have any evidence, do you, to suggest that -- that water would flow in some other direction other than what SPF found?
A. Again, I'm not the person to ask about that. Dennis Owsley, who is heading up the North Ada investigation, has a lot better handle on the water levels in -- in that area.

Q. Okay. Are you familiar with the geologic section shown in the wells and outcrops between M3 and the area around Letha in the Payette valley?
A. No.
Q. You've never been over there, or looked at it as a geologist?
A. From -- you know, I've seen surface exposures at Freezeout Hill, and looked at the ground. But the subsurface, I haven't -- I haven't seen that.
Q. I would like to shift gears a little bit here, Mr. Vincent, and talk a little bit about ground water chemistry.
In your staff memo, you suggest that there should be an isotope study done, or that might make some sense. Would that be a fair characterization?
A. Yeah, I think we -- we thought that would be an appropriate thing to do, yes.
Q. Do you consider yourself an expert in geochemistry or ground water chemistry analysis?
A. No.
Q. So was it your idea to include the suggestion for an isotope study?

A. I don't recall whether that was my idea or Dennis', but I think we both agreed that that would be a good idea.
Q. And you agreed to that, even though you are not an expert in this area?
A. That's correct.
Q. What is your personal experience, using ground water chemistry to differentiate ground water between aquifers, or otherwise evaluate ground water?
A. Mostly academic. I haven't done a lot of water chemistry -- inorganic water chemistry analyses myself.
Q. How about organic chemistry ground water analysis?
A. Well, I've looked at a lot of contaminate problems that involve organic chemicals, yes.
Q. Have you -- I take it, you haven't published any reports, or done any peer review studies yourself about ground water chemistry; correct?
A. Not inorganic, no. And --
Q. Have you ever used ground water chemistry to evaluate continuity between aquifers

or aquifer units?
A. No.
Q. Did you evaluate Dr. -- or Mr. Glanzman's report that was done in conjunction with Hydro Logic in this matter?
A. Yes, we did.
Q. And what's your opinion about that report?
A. My opinion about that report is that it raises some issues with regard to the hydrogeologic conceptual model that HLI has made as the basis for their numerical model.
Q. And what are those issues?
A. The issue, as explained in the staff memorandum, one of the issues, is that the water beneath M3 is thought to be sourced almost exclusively from ancestral Boise River water. That concept that we have very old water doesn't jibe with the concept that the aquifer is strongly recharged, and very transmissive, and flows whether there is pumping or not, from southeast Boise somewhere to the Payette.
Q. Is it your opinion that by using the term "ancestral water," the intent was that it was to be deemed "very old water," to use your

words?
A. The terminology that's used elsewhere in that memo is actually "geologically ancestral." And, yes, that would be very old. It would be at least thousand of years, I think, most people would interpret that to mean.
Q. And how many thousands? Do you have a number?
A. It's an imprecise term. But we're talking geologic time, not -- not the time frames that you and I would normally think in.
Q. Geologic time, do you mean, millions of years?
A. I don't -- I don't know, but it suggests that the water would be very old.
Q. Would "very old," in your opinion be older than, let's say, 4,000 years, 5,000 years?
A. It would be old enough that I would be curious to find out. And I would like to run an isotopic study, and I think that was our recommendation.
Q. Do you believe that an Isotopic study of PGSA ground water would deliver definitive information about the age of this water?
A. I would have to defer to the experts on

that matter. We have been talking with the USGS. I believe we've got a proposal from them to do an isotopic study of ground water in North Ada County.
Q. And who, at the USGS, have you discussed this with?
A. Jim Bartolino.
Q. Is he a geochemist?
A. I believe that he is, or he would be working with a geochemist. I'm not 100 percent sure what his involvement would be in that. But I'm sure that the USGS would have an expert geochemist involved in that activity.
Q. Do you know whether the isotopic study that you are thinking of, or perhaps that Mr. Bartolino is thinking of, would be a carbon 14 isotope study based on radionuclides by -- of carbon 14, or would it be a stabilize isotope study, such as a deuterium or Oxygen-18 study?
A. You know, I don't know exactly what's been proposed. Certainly, whatever is done needs to provide for age dates within the -- within the range of -- of what we have. So it may be a combination of different isotopic ratios that would be looked at.

And again, I don't -- I don't profess to be an expert on this. I -- all I can tell you is, I read the Glanzman, Squires report, and it raised some concern to me that -- that we have -- that we have geologically ancestral water being produced from an aquifer that is, by all counts, very transmissive, and basically passes water through at a high rate of speed.
Q. With regard to that last comment, as to the very transmissive aquifer, do you have any reason, based on the data you've seen, to question that transmissivity?
A. The data that I've seen shows that it's transmissive in the vicinity of M3, certainly. What the PGSA --
Q. That it's transmissive -- highly transmissive?
MR. SMITH: Let the witness finish his answer.
MR. FEREDAY: Well, I've asked him -- I've asked him a question, and he's not answering.
THE HEARING OFFICER: Okay. Mr. Smith, that's my job, not yours. Thank you.
THE WITNESS: Let's use numbers. I

think the transmissivities that are on the order of 100,000 gallons per day per foot. 200-and-some odd thousand gallons per day per foot was determined to be an average transmissivity in the aquifer in the area of M3.

By most counts, that's a transmissive aquifer. Certainly, very productive. By the standards of the Eastern Snake Plain, maybe not so much. It's a relative term. Again, it -- the term, it's imprecise.

Q. (BY MR. FEREDAY) But for the Treasure Valley, it's a fairly transmissive and productive aquifer; wouldn't you agree?

A. And we wrote to that in our memo, yes.

Q. With regard to your concern about the age of this water and recharge, is it your opinion that water that -- let's just pick a number -- that's 10,000 year old -- 10,000 years old, must have been recharged 10,000 years ago. And that if it's pumped out today, it will take 10,000 years before that aquifer will recover back to where it was?

What is it that you're -- that you're getting at here? What is your theory on recharge --

A. It's --

Q. -- age?

A. It's an issue of residents time. How long does the water stay in the aquifer? And it's -- the issue is for me, I look at the numerical model. The numbers are all there. We have a transmissivity. We have a hydraulic gradient. We have a porosity that can be estimated.

We know how long it would take the water to go from Point A down gradient to Point B. And that number is much smaller number than the age that -- well, there is no precise age. But it's not geologically ancestral time frame that we're talking about. It's, as pointed out in the staff memorandum, on the order of -- I don't know. It depends on the assumed properties, but say, 50 years, maybe 100 years. It's less than a thousand years by a fair amount, which is not geologically ancestral.

Q. Do you rely on any other evidence for your assumption that this water is geologically ancestral? Or do you put a number on it in any way based on some other evidence?

A. It's really not my job. I was asked to

look at the submitted information, and to comment on that. And I'm noting to the Hearing Officer, that there is a -- there is a discrepancy here. There seems to be a bust here.

So I don't know what it is. And I don't profess to know. But I do know that these two things seem to be inconsistent. That that is -- that we have a strongly recharged very transmissive aquifer, with no restrictions to flow. And yet, we have geologically ancestral water. Those two things -- something is -- something has not been explained to me.

Q. Do you recognize that head and pressure can propagate through an aquifer much quicker than geologic time?

A. Head and pressure can -- yes.

Q. Do you agree that ground water levels in the valley increased during the 20th century due to incidental recharge from flood irrigation?

A. Yes.

Q. Do you know how much the ground water levels were increased during that time?

A. I -- I don't recall that -- that -- those numbers. And, of course, that's a site specific sort of thing. It would

vary by location, proximity to canals, and that sort of thing. But definitely, affirmative.

Q. Do you agree that trilinear diagrams, such as were presented in the Glanzman, Squires report, are an appropriate way to evaluate ground water chemistry?

A. Yeah, I think that's a pretty standard method for categorizing ground waters.

Q. Hypothetically, what would you expect to see on a trilinear diagram of ground water from a course grain fluvial aquifer that receives recharge only from precip -- precipitation on to the aquifer itself?

A. Are you wanting me to identify in which corner of the plot it's going to -- to likely occur?

Q. I would just like to know what you would expect to see, or do you know?

A. I -- I -- I don't know. I haven't done a trilinear plot in a while. I have no reason to doubt that the -- that the work that was done by Glanzman and Squires is a fair characterization.

Q. Okay. Did you participate in the effort to evaluate ground water levels in the PGSA, or was that left to Mr. Owsley or

Mr. McVay?
A. That assignment was given to Mr. Mike McVay.
Q. Did you instruct him in any way as to what his assignment was, or what you expected?
A. It was fairly open ended. I -- I let him do the analysis.
Q. Did you check his analysis after it was completed?
A. I -- I looked at the memorandum that he prepared. It was -- I think my name was on the distribution. Otherwise, I did not -- I did not hand check the values that were used in any way.
Q. Was the method used in Mr. McVay's analysis, an appropriate scientific method, in your opinion?
A. I think that Mr. McVay's analysis was unbiased. And as he indicated, it was not statistically rigorous. I think that his intent was to -- to look at water level trends removed from seasonal fluctuations. And in order to do that, he chose a time frame that was before the irrigation season, in an attempt to also eliminate that other variable.
I think it is scientific to try to

eliminate variables. And that was the intent of his analysis.
Q. Why, in your opinion, would it be appropriate to take measurements prior to the irrigation season?
A. Because, again, we're trying to eliminate variables. And if you superimpose on the potentiometric surface, the impacts caused by pumping, you've thrown another variable into the mix that can complicate the analysis. It just --
Q. Don't you agree, though, that many of Mr. McVay's water level measurements were taken after the irrigation season had begun?
MR. SMITH: I would object to this line of questioning, Judge. He's trying to use one witness to impeach another one.
THE HEARING OFFICER: Overruled.
THE WITNESS: Could you restate the question?
Q. (BY MR. FEREDAY) Wouldn't you agree that many of the water level measurements taken by Mr. McVay were taken during the irrigation season?
A. That -- that perhaps was an unintended

result based on availability of data. I'm not -- I don't recall the exact time frames for each of the values. But unfortunately, there weren't -- we didn't have the exact same date in each of the wells. And that's just sort of the nature of the beast.
But I think he -- I think -- I think his attempt was genuinely unbiassed. And he was trying to eliminate variables. And I think that's what you need to try to do.
Q. What kind of variables was he trying to eliminate?
A. Impacts caused by pumping, and seasonal fluctuations. I think I already answered that, but...
Q. Did you help him select the wells that he measured?
A. No. But I think in his memo, he explained that those wells were just wells in the -- in the regular monitoring, the IDWR monitoring network that were in the vicinity.
Q. Have you had a hand in selecting wells for monitoring in the IDWR monitoring network for the NAC?
A. I haven't. Actually, that's been left

to Dennis Owsley.
Q. Do you have any knowledge of the construction of any of those wells?
A. I don't.
Q. Do you know whether all of those wells were even in the Pierce Gulch Sand Aquifer?
A. I know that they were not. And -- and Mr. McVay wrote to that in his memo.
Q. Was it -- is it your view, though, that the water level analysis conducted by Mr. McVay should be used to evaluate water levels in the Pierce Gulch Sand Aquifer?
A. I think it's a worthwhile analysis that yielded results that, perhaps not conclusive, but certainly something that needs to be considered.
Q. Do you know why the effort did not include other wells, such as the TVHP well No. 1, the State and Linder well, or any of United Water's wells?
A. I think --
MR. SMITH: Can I have the same objection shown for the record, please?
THE HEARING OFFICER: Which is?
MR. SMITH: That he's using this witness to try to impeach another.

THE HEARING OFFICER: Well, often that's what witnesses are for. Overruled.
THE WITNESS: I'm going to let Mr. McVay answer that.
Q. (BY MR. FEREDAY) Okay. Can you tell us, Mr. Vincent, about the NAC effort, the NAC studies that are going to be coming up, and what your -- what your office is planning to do?
A. Yeah, we have several activities on tap for this year. We have an analysis of our modeling needs, sort of a big picture thing, that are not just for North Ada County, but also would include the Treasure Valley and into east Ada County. We're also charged with characterizing the Mountain Home plateau. So we're going to look at that collectively, and see what we need in terms of a ground water flow model. Whether perhaps there is -- we can revamp the Treasure Valley hydrologic model to meet our needs.
In any event, I don't presuppose an answer. But we've contracted with Dr. Donna Cosgrove to perform that evaluation of the existing models.
In addition, we have Dr. Lee Liberty with CGISS on tap to do seismic work in both

North Ada and east Ada. Hopefully, M3 will cooperate, and allow us to have access to their property. Like I discussed earlier, we want to use a bigger source. The thinking is that we would, perhaps, get meaningful data if we had a bigger size resource.
Q. You mentioned that some of the effort has now moved to east Ada. That's out on the Orchard plateau, if you will, or the Mountain Home desert; correct?
A. Correct.
Q. So how much is your budget for studying the North Ada County area now?
A. Dennis has the budget. I think I would defer to him. I know that our budget was, unfortunately, reduced. But our efforts on both North Ada and east Ada, the funding for that is still in place. And so we've made some cutbacks -- I'll let him answer that. I don't -- I don't recall what the exact number is.
In addition, we have the isotopic study. There are some stream gauging that we're considering. The water level monitoring, that work is being expanded, and we're installing transducers in additional wells.

Again, he would be the better person actually to talk about the entire scope, so...
Q. With regard to the modeling that Ms. Cosgrove is being asked to do, is she being asked to provide, or prepare a model that will tell you -- is designed to tell you more about the Pierce Gulch Sand Aquifer than has already been displayed?
A. No. Actually, she's sort of -- she's not charged with doing any modeling. She's charged with looking at the modeling that has been done to date, and to evaluate whether or not that might be useful for our purposes.
One of the primary things we're looking at is -- is answering questions for the comprehensive aquifer management planning program, which is our -- which is our charge from the Legislature. And we're supposed to characterize North Ada County as part of that -- that overall characterization program.
And so we need to provide data for the water planning bureau in order that they can take a look at -- at what might happen with the water resource looking, say, 50 years into the future.
Q. Mr. Vincent, is it your understanding

that the Comprehensive Aquifer Management Plan and the funding for it, is intended to be used in evaluating water right applications, such as this? And that these applications need to be held up pending the outcome of those efforts?
A. No, that's not a -- that's not a primary goal for this.
Q. Is it a secondary goal, to hold up applications like this?
A. No, it's not a goal to hold up applications.
Q. So is it your view, that given the evidence is there to show, by a preponderance that there is adequate water for a project like this, that it can go forward despite the pendency of North Ada studies?
A. I don't think --
THE HEARING OFFICER: I will be active on this one, Mr. Fereday. I think this borders on asking Mr. Vincent a legal conclusion about what we're doing in water allocation side of things.
THE WITNESS: And --
THE HEARING OFFICER: He doesn't work there.

THE WITNESS: And that would be my response. I don't concern myself with those matters.
MR. FEREDAY: Can we go off the record for just a moment?
(Discussion held off the record.)
THE HEARING OFFICER: We're recording again.
Q. (BY MR. FEREDAY) Mr. Vincent, at the beginning of your testimony, you referred to the two aquifer tests that M3 Eagle conducted. And you referred to Hydro Logic's choice of using AQTESOLV in evaluating those tests. Do you recall that?
A. Yes.
Q. Could you explain what you -- what you meant by your concern there? And I'll remind you, that this was one of your lines of evidence, to suggest that the aquifer may be limited, to the extent that maybe this water right should not be granted. Do you --
A. Yeah.
Q. -- recall that?
A. Yeah. Yes, it wasn't the use of Aquasol. Aquasol is a full-feature aquifer data

test analysis program. It has a number of different built-in analytical models for helping to evaluate aquifer test data.
One of those is a fault package, which allows you to -- to compare your data with what would be the response if you had a negative hydraulic boundary. And --
THE CLERK: Oh, the tape has ended. Sorry.
MR. FEREDAY: Are we off the record now waiting for the tape?
THE HEARING OFFICER: Yes, we are.
(Discussion held off the record.)
THE HEARING OFFICER: We are recording again. I don't recall what -- at what point we were.
(The reporter read back the following requested testimony. "A. Yeah. Yes, it wasn't the use of Aquasol. Aquasol is a full-feature aquifer data test analysis program. It has a number of different built-in analytical models for helping to evaluate aquifer test data.
One of those is a fault package, which allows you to -- to compare your data with what would be the response if you had a negative

hydraulic boundary. And --")
THE WITNESS: And in these tests, the Kling irrigation well, and the SVR 7 test, there was a decision made by HLI data analyst to use the fault package to evaluate the test data. And that suggests to me, that they thought it appropriate to look at the response if there was a fault.
And so if you look at a plot -- I just happen to have this open in Exhibit 12, Figure 88, page 227. There is a little notation that says, that the best fit -- "best fit with no flow boundary, 1,500 feet to northeast of pumping well."
And I suspect that the Kling irrigation well is probably 1,500 feet away from the fault that was delineated with the magnetometer survey. I know that it's northeast. And so this suggests to me strongly, that the analysts thought it was appropriate to use the fault, and to evaluate the test data, with the hydraulic effect of the fault as part of the analysis.
Q. (BY MR. FEREDAY) In other words, to assume that there is a fault with a no flow boundary, and to put that constraint into

that -- into that model run; is that correct?
A. Yes, the type curve that was generated, the curve -- the hydraulic response, which the data were fitted to, had that fault feature embedded into the response. So you -- it's a -- it's a curve matching procedure, which involves comparing the observed water level response in a well to the theoretical water level response.
And what this tells me, is that the best fit was -- was made when the observed response was compared to the theoretical response if you had a no flow boundary.
Q. Did you inquire of HLI, or its analysts, as to what they intended by using that?
A. I think what they are trying to do --
Q. No, I just asked you whether you asked them?
A. I did not.
Q. Okay. And so you don't really know what their intent was, do you, for using that particular tool; do you?
A. The tool is to allow determination of aquifer properties --
Q. I'm just asking --

A. I do know.
Q. -- you what you know.
A. I do know that they were attempting to get aquifer properties from this test.
Q. But you don't know exactly what their purpose was; do you?
MR. SMITH: Objection; asked and answered.
Q. (BY MR. FEREDAY) I'm just asking --
THE HEARING OFFICER: Overruled.
Q. (BY MR. FEREDAY) I'm just asking for you to answer that yes or no whether you know, or whether you are inferring that from your own assumptions?
A. The purpose of the analysis was to come up with these hydraulic properties. And the best fit -- the best fit -- in other words, they were most comfortable -- they had the least deviation between the observed and theoretical response, according to this notation, when they included the fault in their analysis.
MR. FEREDAY: Mr. Hearing Officer, I think we'll end with this witness at this time. But we would like to recall him at some future time, because we didn't get into a lot of things,

in deference to your comments --
THE HEARING OFFICER: Sure.
MR. FEREDAY: -- that we would like to, especially with regard to aquifer testing.
THE HEARING OFFICER: Okay.
MR. FEREDAY: And as you've heard, he has deferred to other members of the staff for other subjects, and we would like to call them in the future as well.
THE HEARING OFFICER: Okay. Well, my intent is, and I think I said this at the outset of the hearing, I would allow you to call the witnesses as adverse witnesses, if you chose to do that. But following the presentation of your case in chief, then I would have them placed on the stand, be under oath, and testify, and narrate testimony. I suppose I could go out and find a Deputy AG to come in -- come in and do the examination. But I don't necessarily want to do that. And then they would be subject to cross-examination after that narration.
Then I think we have the evidence in from those people, who produced the information within the reports that's in the files of the Department. And then we had a statement of their

position.
And then with all that evidence in, then I think it's much easier to elicit and distinguish, and either add credibility or discredit, as the case may be. I think it's a much better way to bring the evidence in.
So I guess that's my preference. And I guess I would suggest we keep that in mind, as we anticipate calling other Department witnesses.
And I don't know who may want to -- I know, at least Mr. Owsley and Mr. Vincent would narrate testimony. And I assume, based on what's been presented here, that Mr. McVay would as well. So we would have all three of them here.
MR. FEREDAY: Okay.
THE HEARING OFFICER: Okay?
MR. SMITH: We would also like to reserve the right to re-call this witness. Although we didn't call him, but we haven't had a chance to question the witness.
THE HEARING OFFICER: You'd Have every opportunity to do that after the witness testifies. And so I guess that's my hope is the way we'll proceeding.
Do we want to launch into

cross-examination, or should we pull it off, or should we just pull the plug right now? It's about ten minutes before 5:00.
MR. THORNTON: It's my opinion, it would be to pull the plug. We've got quite a few questions. And we'll just barely get into it, and lose continuity.
THE HEARING OFFICER: It's probably a good time. So let's recess. And we'll start at 9:00 tomorrow morning.
(Hearing adjourned at 4:51 p.m.)

REPORTER'S CERTIFICATE

I, COLLEEN P. KLINE, CSR No. 345, Certified Shorthand Reporter, certify:

That the foregoing proceedings were taken before me at the time and place therein set forth, at which time the witness was put under oath by me;

That the testimony and all objections made were recorded stenographically by me and transcribed by me or under my direction;

That the foregoing is a true and correct record of all testimony given, to the best of my ability;

I further certify that I am not a relative or employee of any attorney or party, nor am I financially interested in the action.

IN WITNESS WHEREOF, I set my hand and seal this 5Th day of May, 2009.

Colleen P. Kline

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COLLEEN P. KLINE NOTARY PUBLIC STATE OF IDAHO

My commission expires September 17, 2011

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