

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATION)
FOR PERMIT NO. 63-32573 IN) VOLUME X
THE NAME OF M3 EAGLE, LLC) (Pages 2171 through 2371)
_____)

BEFORE
HEARING OFFICER: GARY SPACKMAN

Date: May 29, 2009 - 9:00 a.m.
Location: Department of Environmental Quality
1410 North Hilton Street
Boise, Idaho

REPORTED BY:

SHERI LUDIKER FOOTE, CSR No. 90, RPR, CRR

Notary Public

1 APPEARANCES:
 2 For M3 Eagle, LLC:
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 4 BY MR. JEFFREY C. FEREDAY
 5 BY MR. MICHAEL P. LAWRENCE
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 9 For North Ada County Groundwater Users
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 11 BY MR. JOHN THORNTON
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 14 For Eagle Pines Water Users Association and
 15 Individually:
 16 BY MR. ALAN SMITH
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 18 Eagle, Idaho 83616
 19 Appearing Individually:
 20 BY MR. NORMAN L. EDWARDS
 21 884 W. Beacon Light Road
 22 Eagle, Idaho 83616
 23
 24 ALSO PRESENT: Vicky Music, Jerry Peterson, Jason
 25 Smith, William Brownlee, James Osiensky

1 THE HEARING OFFICER: Before we start
 2 recording, I promised that I would come this
 3 morning and address the motion for
 4 reconsideration. And I've spent some time in the
 5 statutes and reading the motion. And so, anyway,
 6 I thought I would do that at the outset and then
 7 allow some discussion by the parties after. So,
 8 let's start there if we can. So, let's start
 9 recording. Are we ready?
 10 MS. MUSIC: Sure.
 11 (Recording started by IDWR.)
 12 THE HEARING OFFICER: Okay, today is
 13 May 29th. It is the hour of about five after
 14 9:00 and this is a continuation of the hearing
 15 regarding M3 Eagle's application to appropriate
 16 water.
 17 At yesterday's hearing, Mr. Alan Smith
 18 renewed a -- or asked for reconsideration of a
 19 ruling regarding a motion to dismiss and a motion
 20 for a declaratory ruling that he offered at the
 21 end of the presentation of the applicant's
 22 testimony.
 23 And so, I've read through that
 24 particular motion for reconsideration. I've
 25 looked at the statutes. I actually went back and

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 3 SEAN VINCENT
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 5 Smith
 6 Further Cross Examination by Mr. Fereday 2192
 7 Further Cross Examination by Mr. 2203
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 9 Further Cross Examination by Mr. Alan 2204
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 11 DALE R. RALSTON, PH.D.
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 23 NO. MARKED ADMITTED
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1 looked at the original legislation. I wanted to
 2 make sure that I picked up all of the amendments
 3 or the additions to the code. And I promised
 4 yesterday that I would come in and read into the
 5 record a decision. And so, I'm ready to do that.
 6 And I don't intend to issue written findings of
 7 fact, conclusions of law, and I think I made that
 8 clear yesterday.
 9 The Municipal Act, I think that's what
 10 it's been referred to, of 1996 amended Idaho Code
 11 Section 42-202, which describes the requirements
 12 of an application, it added a definitions
 13 section. And by the way, that definitions
 14 section has now been expanded to include lots of
 15 other definitions, but I think that was the
 16 initial purpose of the statute was to add those
 17 definitions. And those are the definitions that
 18 Mr. Smith has referred to and that defined what
 19 and described what a municipal provider is, in
 20 amended Idaho Code Section 42-217, which talks
 21 about proof of beneficial use, and in amended
 22 Idaho Code Section 42-219, which discusses the
 23 issuance of a license.
 24 There isn't any amendment or any
 25 addition that I could find in the statute that

1 talks about issuance of a permit and what is
2 required during the issuance of a permit. And I
3 want to add that the Municipal Act also amended
4 Idaho Code Section 42-222, which is the statute
5 that governs applications for transfer. So, it
6 allows applications for transfer to go forward or
7 be proposed for municipal purposes and also for
8 reasonably anticipated future needs.

9 And as I looked through it, both the
10 act itself and the code, I don't find it unusual
11 that the definition describes -- in 42-202B,
12 describes what a municipal provider is without
13 any perspective language. I guess I wouldn't
14 anticipate that that definition would say "wants
15 to be" or "thinks it will be." And I think
16 that's consistent with the scheme of the statutes
17 and the appropriation process and I said that
18 before in the initial ruling. And it's my
19 opinion that it doesn't prevent an entity not yet
20 a municipal provider from filing an application
21 for municipal purposes. And again, I'd refer to
22 the Idaho Code Section 42-219 where it talks
23 about issuance of a license and determination at
24 the time of licensing, or at least at the time of
25 proof of beneficial use, that the purpose of use

1 for municipal purposes has been established and
2 that the person or the entity that filed the
3 application and obtained the permit is a
4 municipal provider. And so, I see no prohibition
5 and I see no problem with proceeding ahead with
6 an application for municipal purposes by an
7 entity or person not yet a municipal provider.

8 Now I want to refer back to Idaho Code
9 Section 42-202. And it does say -- and this is
10 Section 2 and I'm reading from the act itself and
11 maybe I ought to read the code. I've checked
12 them. I think they're both the same.

13 And it says: "An application proposing
14 an appropriation of water by a municipal provider
15 for reasonably anticipated future needs shall be
16 accompanied by sufficient information and
17 documentation to establish that the applicant
18 qualifies as a municipal provider and that the
19 reasonably anticipated future needs service area
20 and the planning horizon are consistent with the
21 definitions and requirements specified in this
22 chapter."

23 And it seems to me that this specific
24 language, when it talks about seeking a water
25 right for reasonably anticipated future needs,

1 states that the applicant needs to qualify as a
2 municipal provider. And the definition of
3 municipal provider is in 42-202B.

4 And so, Mr. Fereday, I'm not certain at
5 this point that I have proof that M3 Eagle
6 qualifies as a municipal provider. It seems to
7 me that the language itself says that that
8 qualification must be established as part of the
9 application. So, I'm not sure at this point in
10 time whether the Department has the authority to
11 issue a water right for reasonably anticipated
12 needs to an entity that is not presently a
13 municipal provider. I think it's a legal issue
14 that we need to look at and it may be factual to
15 some degree.

16 And so, I guess my purpose for raising
17 the issue here is to say that I will consider it
18 as part of the process. I want the issue to be
19 fully briefed and allow that opportunity to the
20 parties.

21 I don't intend to delay the hearing.
22 We're far enough into it. And I don't intend to
23 say that M3 can't seek a municipal water right.
24 Because I think M3, it's my ruling that M3 can
25 seek a municipal water right. And I think the

1 statutes contemplate that. And it's only the
2 issue of reasonably anticipated needs that's
3 raised in the language as I read it.

4 Okay, questions? And the issue can be
5 briefed as part of post-hearing briefs if the
6 parties want to do that. Mr. Fereday, if there's
7 a need to present additional evidence, I'll grant
8 that opportunity to you to the extent that you
9 want to do that following, I guess, the
10 presentation of perhaps the Department witnesses
11 and perhaps following Dr. Ralston's presentation.
12 And we'll have time to do that over the course of
13 the hearing.

14 Is there anything the parties want to
15 talk about related to that subject? Mr. Fereday?
16 I'm not seeking extensive oral argument. I think
17 we can move forward.

18 MR. FEREDAY: I understand. Yes, our
19 position is that the statute contemplates that as
20 part of its proof, a municipal water right
21 application seeking reasonably anticipated future
22 needs would include with that proof the plans
23 that it has for establishing a public water
24 system that qualifies under this very statute as
25 that kind of a municipal provider. So, that's

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1 what we think we have done with our evidence,
2 with our engineers, and our planning, and the
3 documents that are in the record.
4 We will certainly look back at those in
5 light of your comments just now to decide whether
6 as part -- I would propose as part of our
7 rebuttal case we would offer any additional
8 evidence at that time rather than doing it now.
9 So, I appreciate your ruling and your
10 comments. I recognize that this conceivably
11 could be a legal issue and that the parties may
12 want to brief it further, but my view of it is
13 that the statute is quite clear that it was
14 intended to allow applications for
15 non-municipality, non-public utility entities
16 that would be establishing a public water system
17 of this type.
18 THE HEARING OFFICER: Okay. And I'm
19 not sure -- I mean, I read that particular
20 language and I'm not sure. It seems to me that
21 it has a present existing tone to it that needs
22 to be addressed.
23 Mr. Thornton -- well, Mr. Smith, you're
24 the one that raised the issue and I'll allow you
25 some short commentary here.

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1 MR. ALAN SMITH: Well, sir, I only
2 have two points. I don't think there's any
3 adequate proof in the record that they have
4 presented plans for how they're going to develop
5 this so-called municipal water system. I would
6 also object to any reopening of their case in
7 chief after we've made the motion, allowing them
8 to come back and now try to make their proof that
9 they didn't make in their case in chief to get
10 around our motion to dismiss for the failure of
11 that proof as well as all of the statutory
12 grounds that we have raised. Thank you.
13 THE HEARING OFFICER: Okay, thank you,
14 Mr. Smith.
15 All right, now, there are just a couple
16 of other cleanups in that particular motion. One
17 of them was a motion for a declaratory ruling,
18 which I think goes to the same issue. And I'll
19 just say that the ruling that I made addresses
20 that particular motion as well. So, to the
21 extent that I need to deny it, it will be part of
22 the ultimate decision that the Department issues,
23 the final decision or the preliminary order that
24 will become final.
25 And I think part of that issue,

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1 Mr. Smith, was you had also raised an issue about
2 planned communities qualifying. And really, your
3 particular motion didn't specify the specific
4 concern about reasonably anticipated future
5 needs. You discussed the issue of whether M3
6 could be a municipal provider and whether they
7 could obtain a municipal water right. And I
8 specifically hold that they can, and that we'll
9 move forward, and that a planned community can
10 seek a water right and -- or can seek a water
11 right for municipal purposes.
12 Now, the other issues that you raised
13 were regarding the proof that's been offered and
14 whether sufficient proof has been submitted to
15 the Hearing Officer to make a prima facie case
16 regarding the issues of injury and sufficiency of
17 water supply. And I will reaffirm my earlier
18 ruling that there's been sufficient proof
19 presented to address those issues by the
20 applicant to at least satisfy its
21 responsibilities. And we'll take in the rest of
22 the evidence at this point.
23 All right, I think that addresses all
24 of the issues that were raised.
25 MR. ALAN SMITH: Could we have the

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1 record show that we have a continuing objection
2 to their reopening their case in chief and trying
3 to offer proof that they never offered prior to
4 our motion?
5 THE HEARING OFFICER: Yes, the record
6 can show that. And I guess my response to that
7 particular issue, and I don't want to spend a lot
8 of time on it, Mr. Smith, but my response is that
9 the Department of Water Resources has a
10 responsibility to take in all of the evidence as
11 well as look at all of the issues. This
12 particular legal issue was raised I think late in
13 the process and the one that I've identified is
14 really being discussed openly here after eight or
15 nine days of hearing. We're nearly done. And I
16 guess from my perspective, these kinds of legal
17 issues are better raised prehearing rather than
18 at this point. And I want the ability to have
19 all of the evidence come in that we need to make
20 a well reasoned decision. And I'm willing and
21 I'll take the heat for some out of order
22 presentation if it has to come in that way.
23 Okay.
24 MR. ALAN SMITH: Did you want briefs
25 submitted?

1 THE HEARING OFFICER: Well, let's talk
2 about that. There will be post-hearing briefs in
3 my opinion at this point.

4 Yes, Mr. Thornton?

5 MR. THORNTON: I just want to -- I
6 appreciate you looking into what the statutes say
7 or the intent is. And I just want to identify
8 that when we were underneath the counsel of
9 Ms. Beeman, I think it was in October, we can get
10 that exact date or document, but we identified
11 the very same concern, that they weren't a
12 municipality underneath the future needs. So, we
13 did identify that probably back in October of
14 last year, so --

15 THE HEARING OFFICER: Okay. All right.

16 MR. ALAN SMITH: One more thing, sir.

17 THE HEARING OFFICER: Yes?

18 MR. ALAN SMITH: We would at this time
19 file a petition for review by the Director or his
20 designee of your ruling on the motion to
21 reconsider. We feel we have to do this. No
22 disrespect for you, but we have to do this to
23 avoid having our appeal in District Court
24 dismissed on the grounds that we haven't
25 exhausted all of our administrative remedies.

1 And I have copies of the motion here for
2 Mr. Thornton and Mr. Edwards and Fereday and one
3 for the Hearing Officer.

4 MR. JASON SMITH: (Handing.)

5 MR. ALAN SMITH: I believe there is a
6 time requirement in the rule for filing this
7 petition for review and we would request that it
8 be file stamped with today's date. I think
9 Mr. Fereday has some time under the rule to
10 answer that, but we would like it filed as of
11 today.

12 THE HEARING OFFICER: Okay. I'm
13 willing to have it date stamped. Do you want a
14 conformed copy?

15 MR. JASON SMITH: Pardon?

16 THE HEARING OFFICER: Do you want a
17 conformed copy?

18 MR. ALAN SMITH: No, as long as it's
19 file stamped today, we don't have to have that.

20 THE HEARING OFFICER: All right. I
21 will be back in the office at noon. I'll take it
22 with me and have it file stamped.

23 MR. ALAN SMITH: Thank you.

24 THE HEARING OFFICER: Okay. Are we
25 ready to go forward here?

1 MR. ALAN SMITH: I think so.

2 THE HEARING OFFICER: Mr. Fereday?

3 MR. FEREDAY: Yes.

4 THE HEARING OFFICER: Mr. Vincent,
5 let's see if we can get through the rest of the
6 questions.

7 MR. THORNTON: Mr. Hearing Officer, I'm
8 sorry, I should have identified that. Obviously,
9 I think we all know we have Dr. Ralston here.

10 So, I would hope that we don't find ourselves
11 moving too late into the morning --

12 THE HEARING OFFICER: I hope that's the
13 case.

14 MR. THORNTON: And we have an
15 opportunity to fully brief with Dr. Ralston.

16 THE HEARING OFFICER: I hope that's the
17 case. Okay, Mr. Smith, you were questioning
18 Mr. Vincent.

19 SEAN VINCENT,
20 previously duly sworn to tell the truth relating
21 to said cause, testified as follows:

22 CONTINUED CROSS EXAMINATION
23 QUESTIONS BY MR. ALAN SMITH:

24 Q. All right, Mr. Vincent, first of all, I
25 wanted to compliment you and Mr. Owsley on the

1 memo that you filed. I thought it had some good
2 logical reasoning and it wasn't so highly
3 technical that a novice like me couldn't at least
4 understand half of it and --

5 A. Thank you.

6 Q. And a full day on the witness stand can
7 be kind of mentally exhausting; can it not?

8 A. It can.

9 Q. Can you see why people don't like
10 lawyers?

11 A. I'm not going to go there.

12 Q. Well, I must admit, in my years on the
13 bench there were many times when I wasn't too
14 fond of some of them either, so -- but I just
15 have a few questions here and there's two or
16 three that are hypothetical questions. If you
17 have an opinion, we'd like to hear it. If you do
18 not, just say so.

19 First of all, I think IDWR predicted a
20 drawdown at Floating Feather and Highway 16 of
21 about 18 feet after 50 years of pumping at
22 4,500 gallons per minute. And that's what, about
23 6.5 cfs?

24 A. No, that's 10 cfs.

25 Q. 10?

1 A. Yes.

2 Q. Okay. Was it a calculated drawdown at

3 that same Floating Feather, Highway 16 site of

4 8 feet arrived at by pumping at 10 cfs for one

5 year?

6 A. Yes, that was the assumptions that went

7 into that image well analysis.

8 Q. Excuse me. I think we're on page 21

9 here. Can you make any calculation as to what

10 the drawdown would be at 23 cfs for one year?

11 A. Yes, in accordance with the Theis

12 equation, the drawdown is directly proportional

13 to the rate of pumping. So, if you double the

14 rate of pumping, you get twice the drawdown.

15 Q. And do you have that figure offhand?

16 A. Well, if we went from 10 cfs to 23 cfs,

17 it would be a factor of 2.3 times.

18 Q. How about for pumping at that rate for

19 a period of 50 years?

20 A. Well, again, and I expressed this in my

21 narrative testimony, I'm not sure that the

22 50-year calculation is a more valid estimate than

23 the one-year calculation. The calculation was

24 intended strictly as a check on reasonableness of

25 the HLI model simulations and I think the

1 one-year time frame is more appropriate in this

2 context.

3 Q. All right.

4 MR. FEREDAY: Mr. Hearing Officer, I

5 would like to interpose an objection here, at

6 least for purposes of clarification. I believe

7 the question was based on 23 cfs pumping and I

8 don't think the testimony is that that's what

9 this water right would do other than as a peak.

10 So, just I'd like to either strike the question

11 and the answer on that basis or have it

12 clarified.

13 MR. ALAN SMITH: We would object. It's

14 already been asked and answered. And we would

15 also ask Mr. Vincent --

16 THE HEARING OFFICER: Okay, just a

17 minute. I'll overrule the objection. I

18 understand based on the prior testimony that

19 23 cfs is the peak. Mr. Smith, the next

20 question?

21 Q. (BY MR. ALAN SMITH) Let me ask you

22 this, Mr. Vincent: If I've got a water right to

23 23.18 cfs and that is my water right and I want

24 to pump all of it every day of the irrigation

25 season from, say, May till October, is there

1 anything anybody can do to stop me when I've got

2 that water right?

3 MR. FEREDAY: Objection, calls for a

4 legal conclusion.

5 THE HEARING OFFICER: Sustained.

6 MR. ALAN SMITH: Very well.

7 Q. (BY MR. ALAN SMITH) I have a

8 hypothetical question or two here, Mr. Vincent.

9 Assuming we have very hot weather, let's say 95

10 to 100 degrees for the last two weeks of July and

11 the first two weeks of August and M3 pumps at

12 20 cfs for that one-month period, what will the

13 drawdown be at that Floating Feather, Highway 16

14 location, if you know?

15 A. I don't know offhand.

16 Q. Okay. Shouldn't we be using or

17 considering a peak drawdown chart instead of an

18 average drawdown chart since the maximum drawdown

19 is what will be affecting the assumed water right

20 holders the most?

21 A. That's an interesting question. In the

22 long term, the average rate is going to drive

23 what the system does. There will be short-term

24 fluctuations. And certainly, increasing the rate

25 for a short period of time will have an impact,

1 especially near the pumping center. But the

2 long-term trend will be driven primarily by the

3 average rate.

4 Whether we use the average or the

5 long-term rate is kind of a function of how

6 conservative we'd like to be. I think if we are

7 looking at impacts right next to the pumped well,

8 perhaps the maximum drawdown that would be

9 predicted with a higher pumping rate might be

10 more of an indication, but I think the average is

11 a better gauge of what the overall impacts are

12 going to be on the aquifer.

13 Q. Okay. But you do recognize, do you

14 not, that if nearby well owners' wells stop

15 producing domestic water, they can't very well

16 wait till the end of the irrigation season, say

17 November, for their water supply to come back;

18 can they? They've got to take immediate action.

19 MR. FEREDAY: Objection, calls for a

20 legal conclusion.

21 MR. ALAN SMITH: It's not a legal --

22 THE HEARING OFFICER: Overruled.

23 THE WITNESS: The affected water users

24 would need to have an alternate source or take

25 measures to ensure that their water supply was

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1 uninterrupted. If that meant deepening their
2 well perhaps or drilling a new well, then that
3 would be necessary.
4 Q. (BY MR. ALAN SMITH) So, they might
5 have to deepen or replace their well right away?
6 A. If the impacts required it, I suppose,
7 yes.
8 Q. So, what we have here is a race to the
9 bottom of the aquifer?
10 THE HEARING OFFICER: I don't think
11 that's an appropriate question nor something that
12 Mr. Vincent should answer, Mr. Smith. If
13 Mr. Fereday won't object, I'll limit the
14 question.
15 MR. ALAN SMITH: I'll withdraw the
16 question. That's all I have.
17 THE HEARING OFFICER: Okay. Let's see,
18 Mr. Edwards, any questions?
19 MR. EDWARDS: No.
20 THE HEARING OFFICER: Back to you,
21 Mr. Fereday.
22 FURTHER CROSS EXAMINATION
23 QUESTIONS BY MR. FEREDAY:
24 Q. Mr. Vincent, yesterday during your
25 examination by the protestants you commented at

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1 some length on geochemistry, on the geochemistry
2 studies. Do you recall that?
3 A. I recall that we discussed geochemical
4 studies.
5 Q. Do you have any reason to, based in
6 science, to dispute the conclusion reached by the
7 Glanzman study that indicates that the source of
8 recharge for the Pierce Gulch Sand Aquifer is the
9 Boise River?
10 A. I don't have any counter to that, no.
11 Q. Do you have any reason to counter the
12 conclusion that the Pierce Gulch Sand Aquifer
13 water is distinct from the water that is in the
14 Willow Creek Aquifer?
15 A. As I identified in my narrative
16 testimony, I'm not a geochemist. So, I'm a
17 little uncomfortable with this whole discussion.
18 Q. So, I take it that the answer would be
19 "No"? I'm just asking whether you have any
20 basis?
21 A. I don't have any basis for that.
22 Q. I'd like you to refer, if you would, to
23 Exhibit No. 45, figure 5.
24 A. (Witness complied.)
25 Q. This is the figure that we spent some

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1 time on yesterday I recognize, Mr. Vincent,
2 comparing water level responses between test
3 well 1 and test well 4. And I'd like to ask you
4 whether you recognize the similarity of hydraulic
5 events and the responses to those events in these
6 two wells as depicted on this exhibit?
7 A. In an overall sense. And again, the
8 scales are quite different. If you look at the
9 right axis which applies to TW-4, a water level
10 change of 2 feet is equivalent to a water level
11 change of 15 feet for TW-1, which is the orange
12 data. So, we need to recognize that.
13 I do see a general mirroring of the
14 pattern. However, I also see where the
15 interpretation has been made that hydraulic
16 events are seen in TW-4 that occur in TW-1. And
17 there's an indicated lag time, that the TW-4
18 responses is lagged relative to what occurs in
19 TW-1. And I guess I take issue with that for the
20 SVR-7 aquifer test because if you were to look at
21 the map that shows the well locations for the
22 SVR-7 aquifer test, which is from Exhibit No. 44,
23 it's figure 2 --
24 Q. Now, excuse me, Mr. Vincent, but I'm
25 not asking you at this point about the SVR-7

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1 aquifer test. Maybe we can get to that. But I
2 just wanted to ask you for your answer as to
3 Exhibit No. 45, figure 5, and I have another
4 question to ask you about that.
5 A. And I guess the shapes of those trends
6 are generally similar, but I disagree with the
7 conclusion that's drawn that the TW-1 responses
8 is lagged relative to the TW-4 response because
9 of the edge of aquifer unconfined conditions,
10 which is identified in the notation on the lower
11 right-hand of that picture.
12 Q. I'd like to refer you to Exhibit
13 No. 52, please. And while you're looking for
14 Exhibit No. 52, Mr. Vincent, you recognize, don't
15 you, that test wells 1 and 4 are on opposite
16 sides of the inferred fault below the panhandle?
17 A. I do recognize that.
18 Q. This Exhibit No. 52, Mr. Vincent, have
19 you seen this before?
20 A. Yes, I have.
21 Q. And was that sent to you by Mr. Utting
22 of Hydro Logic on or about April 8, 2009? I
23 think there's a cover letter with it there that's
24 part of the exhibit. Do you recall receiving
25 that?

1 A. I do recall receiving this, yes.
 2 Q. And this relates, does it not, to these
 3 same two wells and generally the same two -- the
 4 same period of time as figure 5 of Exhibit
 5 No. 45; correct?
 6 A. Yes.
 7 MR. FEREDAY: Mr. Hearing Officer, we
 8 offer Exhibit No. 52.
 9 THE HEARING OFFICER: Okay.
 10 Mr. Thornton?
 11 MR. THORNTON: No objections.
 12 THE HEARING OFFICER: Mr. Smith?
 13 MR. ALAN SMITH: None.
 14 THE HEARING OFFICER: Mr. Edwards?
 15 MR. EDWARDS: None.
 16 THE HEARING OFFICER: It's received
 17 into evidence.
 18 (Exhibit 52 admitted into evidence.)
 19 Q. (BY MR. FEREDAY) Mr. Vincent, I have
 20 the same question about this BETCO analysis. Do
 21 you see in that similar responses in test well 1
 22 and test well 4 through this period of time?
 23 A. I do in an overall sense, a general
 24 shape, but I disagree with the conclusion that
 25 the aquifer test, the SVR-7 aquifer test, was

1 seen in both TW-1 and TW-4. And, in fact, that's
 2 contradicted by HLI's own analysis.
 3 Q. Don't you agree that this analysis in
 4 Exhibit No. 52 using the so-called BETCO software
 5 is another way of looking at the data produced
 6 through the drawdown plots in these wells,
 7 different from the other methods of analysis that
 8 have been presented?
 9 A. They are water levels over the same
 10 time period, so they can be used for comparison.
 11 There are corrections applied certainly. It
 12 would be standard to do such a thing.
 13 Q. Have you used the BETCO software
 14 yourself?
 15 A. I have not. I believe it was a
 16 correction for fluctuations caused by barometric
 17 pressure is the primary function of the BETCO
 18 software, if I recall.
 19 Q. I'd like you to refer now to Exhibit
 20 No. 12, figure 81, please.
 21 A. (Witness complied.)
 22 Q. And this relates to your testimony
 23 yesterday in response to questions from Mr. Smith
 24 and Mr. Thornton concerning faulting near the --
 25 in the panhandle area and whether that might

1 present a restriction or boundary of some sort in
 2 the Pierce Gulch Sand Aquifer. Do you recall
 3 that colloquy?
 4 A. I'm sorry, can you tell me what page
 5 we're referring to?
 6 Q. I'm sorry, page 220.
 7 A. 220?
 8 Q. Mr. Vincent, do you recall that
 9 colloquy yesterday about the potential for some
 10 sort of a boundary overlying that faulting in the
 11 panhandle?
 12 A. We have discussed that.
 13 Q. This is a straight-line drawdown plot
 14 of the Kling pumping well; is it not?
 15 A. I'm not familiar with this. It appears
 16 that the line has been fitted through the early
 17 data. Whether that's appropriate or not, I'm not
 18 sure. But I'm not sure --
 19 Q. Excuse me. Are you on figure 81?
 20 A. Yes.
 21 Q. Page 220?
 22 A. Yes. So -- but anyway, it does appear
 23 to be a straight-line response after the first
 24 initial time of pumping.
 25 Q. What early data were you just referring

1 to?
 2 A. The data between 2 minutes and 4
 3 minutes. There appears to be a -- is there a
 4 blue line or is that my own writing or somebody
 5 else's writing? This is --
 6 Q. I believe on the exhibit there is no
 7 line there, Mr. Vincent, but perhaps you put one
 8 on your copy.
 9 A. Well, I don't recall putting one on
 10 this copy. There is a blue line drawn through
 11 those data.
 12 THE HEARING OFFICER: I certainly have
 13 one in mine.
 14 MR. FEREDAY: Oh, you do?
 15 THE HEARING OFFICER: There's a line
 16 that's drawn through the first three data points.
 17 Q. (BY MR. FEREDAY) Okay, how would you
 18 interpret that first few minutes on that first
 19 blue line?
 20 A. They're probably just the early
 21 drawdown effects before we have satisfied the U
 22 assumption. And I don't necessarily think that
 23 would be the line that I would have chosen to
 24 fit.
 25 Q. So, that would be the well bore

1 drawdown, for example?
 2 A. Yes.
 3 Q. So, that really, that first line, then,
 4 isn't really telling us much about the aquifer
 5 characteristics; is it?
 6 A. No, but it is fitted. I'm not sure why
 7 that would be.
 8 Q. Is there another line on this chart,
 9 though? There is, isn't there, obviously another
 10 blue line that is covered by black, many, many
 11 black dots?
 12 A. I can't see it. If there is, it's
 13 obscured on my copy.
 14 THE HEARING OFFICER: I don't show a
 15 blue line on mine either, Mr. Fereday.
 16 Q. (BY MR. FEREDAY) Do you see, though,
 17 that there is a line stretching generally
 18 straight toward the lower right-hand of this
 19 figure?
 20 A. I see that the late data, say beyond 10
 21 minutes, have a linear trend.
 22 Q. And that's a linear trend past 1,000
 23 minutes, past 1,100, up to 1,200 minutes; isn't
 24 that about right?
 25 A. That would be towards 3,000 minutes.

1 Q. I'm sorry, 3,000 minutes. Now, do you
 2 see in that line any evidence of a barrier in the
 3 aquifer?
 4 A. I do not.
 5 Q. Would you refer, please, to figure 85.
 6 A. (Witness complied.)
 7 Q. Let's go to, excuse me, figure 84
 8 first.
 9 A. (Witness complied.)
 10 Q. This is a Cooper-Jacob analysis for the
 11 pumping Kling well during its two-day test. Do
 12 you see that?
 13 A. Yes.
 14 Q. And we're looking at the upper blue
 15 data. That has a line drawn through it as well;
 16 correct?
 17 A. Yes.
 18 Q. And can you describe what this is?
 19 A. It's a plot of drawdown versus time,
 20 semi-logarithmic. It's drawdown versus log time,
 21 which is I believe the same basic information
 22 that's presented on the previous figure 81.
 23 Perhaps there's been a correction of some sort.
 24 I don't know that this is different data. Is it
 25 the same data?

1 Q. I believe it is the same data.
 2 A. Okay.
 3 Q. I will represent that to you.
 4 A. Okay.
 5 Q. And my question here is: I really
 6 wanted to go to this one because it does have a
 7 blue line drawn all of the way through. There's
 8 no other reason than that. But this does show
 9 the same data and the same drawdown plot in
 10 another -- plotted a different way; correct?
 11 A. Yes, the Y axis has been reversed.
 12 Q. And does this show any evidence of a
 13 boundary showing up in that pumping Kling well?
 14 A. No.
 15 Q. Is the Cooper-Jacob analysis used,
 16 Mr. Vincent, for revealing boundaries?
 17 A. Yes.
 18 Q. Now, over on figure 85, just to
 19 complete this story, if you will, I'll represent
 20 to you that that is a similar plot, straight
 21 line, at the Kling well taken during its recovery
 22 period. Do you recognize that?
 23 A. I do.
 24 Q. Now, if there is a boundary near a
 25 recovering well, that boundary can be expected to

1 show up on a Cooper-Jacob plot; can't it?
 2 A. Perhaps if the pumping duration is long
 3 enough, yes, if the stress is sufficient.
 4 Q. Do you see any evidence of a boundary
 5 showing up on this recovery plot?
 6 A. I do not.
 7 MR. FEREDAY: No further questions.
 8 THE HEARING OFFICER: Okay,
 9 Mr. Thornton?
 10 FURTHER CROSS EXAMINATION
 11 QUESTIONS BY MR. THORNTON:
 12 Q. Mr. Vincent, you've obviously provided
 13 lots of testimony and answers. So, I'd just like
 14 to sum a couple of things up, if I could. Based
 15 on everything that you've provided and the
 16 questions that you've been asked, which obviously
 17 cause you to reflect on your knowledge of all of
 18 the data that's been presented to you, do you
 19 still believe that the stratigraphy beneath the
 20 M3 site is still complex and not that well
 21 understood?
 22 A. Absolutely.
 23 Q. Do you believe that the hydrologic
 24 boundaries and the recharge mechanisms are not
 25 well defined for the target aquifer?

1 A. I agree with that, yes.
 2 Q. Do you believe that the long-term
 3 sustainability of the aquifer beneath the M3
 4 property is difficult to assess and that there is
 5 still some lines of evidence to suggest that it
 6 may be limited?
 7 A. I think there's room for that, yes.
 8 MR. THORNTON: No further questions.
 9 THE HEARING OFFICER: Okay, Mr. Smith?
 10 FURTHER CROSS EXAMINATION
 11 QUESTIONS BY MR. ALAN SMITH:
 12 Q. I just have two or three questions for
 13 you, Mr. Vincent, about Exhibit No. 43. I
 14 believe if you look at page 4 --
 15 THE HEARING OFFICER: 43?
 16 MR. ALAN SMITH: Yes, Exhibit No. 43.
 17 MR. FEREDAY: Objection, I don't
 18 believe that that was raised in Recross.
 19 MR. ALAN SMITH: I think that was your
 20 first question, about the Boise River.
 21 MR. FEREDAY: Oh, geochem? Okay,
 22 withdrawn.
 23 Q. (BY MR. ALAN SMITH) Looking at page 4,
 24 do you agree with that statement that the PGSA
 25 groundwater originated almost exclusively from

1 ancestral Boise River surface water? And that's
 2 in the third paragraph, about the second
 3 sentence.
 4 A. I agree that that's what the statement
 5 says. I'm a little uncomfortable with those
 6 sorts of conclusions. I'm not a geochemist and I
 7 have to defer to a geochemist that that's a valid
 8 conclusion.
 9 Q. And on page 5 the third paragraph
 10 states: "In summary, the aqueous geochemistry
 11 analytical results indicate that the PGSA is a
 12 distinct regional aquifer containing groundwater
 13 originating from the geologically ancestral Boise
 14 River."
 15 A. That is the statement that's made.
 16 Q. Do you agree with that?
 17 A. I have no reason to doubt that.
 18 Q. Do you recall, and I think you
 19 testified about this, what the approximate age of
 20 the water in the Goddard well was?
 21 A. I do recall that. I believe it was
 22 indicated in Exhibit No. 45 that based on the
 23 work of others, the age of the well water from
 24 the Goddard well is 2,960 years.
 25 MR. ALAN SMITH: That's all I have.

1 THE HEARING OFFICER: Okay. All right.
 2 Thank you, Mr. Vincent.
 3 Do you want to call Dr. Ralston or do
 4 you want a moment to gather yourselves?
 5 MR. THORNTON: Yeah, if we can do that
 6 and then get him set up. Five minutes?
 7 THE HEARING OFFICER: Yes, let's take
 8 five.
 9 (Recess held.)
 10 THE HEARING OFFICER: We are recording
 11 again. Mr. Ralston has assumed the witness
 12 chair. And Mr. Ralston, if you'd stand, please,
 13 and we'll swear you in.
 14 DALE R. RALSTON, Ph.D.,
 15 first duly sworn to tell the truth relating to
 16 said cause, testified as follows:
 17 THE HEARING OFFICER: Please be seated.
 18 And I assume, Mr. Thornton, that you intend to
 19 examine Mr. Ralston?
 20 MR. THORNTON: I do, Mr. Hearing
 21 Officer.
 22 THE HEARING OFFICER: Okay.
 23 DIRECT EXAMINATION
 24 QUESTIONS BY MR. THORNTON:
 25 Q. Dr. Ralston, could you start off by

1 giving your full name and your address, please.
 2 A. Dale R. Ralston, 1122 East B Street,
 3 second letter of the alphabet, Moscow, Idaho,
 4 83843.
 5 Q. And then could you describe your
 6 educational background as it relates to your
 7 knowledge of hydrology, geology, hydrogeology,
 8 geophysics, geochemistry, groundwater data,
 9 geophysical data analysis, well construction,
 10 testing, and aquifer studies. I can repeat those
 11 if you'd like later.
 12 A. No, that's fine. I hold a Bachelor of
 13 Science degree from Oregon State University, a
 14 general engineering program. I hold a Master of
 15 Science degree from the University of Arizona.
 16 And that program was in hydrology and the
 17 emphasis was in groundwater, although there was
 18 surface water as well. I hold a Ph.D. from the
 19 University of Idaho and the degree is in civil
 20 engineering. The emphasis is in water resources
 21 and the emphasis is specifically in groundwater.
 22 Q. Okay. And could you describe your
 23 knowledge in terms of geophysics and
 24 geochemistry.
 25 A. My -- as far as geophysics, I have

1 rudimentary knowledge of surface geophysics
 2 gained primarily from experience. My Master's
 3 thesis topic was in bore hole geophysics,
 4 specifically neutron logging. And so, I have
 5 considerable expertise in bore hole physics.
 6 Since the academic training, I have
 7 been involved in both surface geophysical
 8 projects as an observer and bore hole geophysics
 9 as both an observer and I've operated the
 10 equipment as well. And that's continued as far
 11 as bore hole geophysics up to the present.
 12 Q. And are you familiar with well
 13 construction and well tests and pump tests?
 14 A. Yes, sir. The well construction, again
 15 I didn't have any academic training in design and
 16 construction of wells. My experience there
 17 started with my first job in Idaho with the
 18 agency that is now the Idaho Department of Water
 19 Resources. And at that time I was in charge of
 20 licensing well drillers and developing the first
 21 State well construction standards.
 22 Since then, I have worked around well
 23 drilling a lot. And as part of my role as
 24 Professor of Hydrogeology at the University of
 25 Idaho, perhaps 30 years ago I developed a

1 graduate-level course called "Design and
 2 Construction of Wells" and taught that on an
 3 every-other-year basis for a number of offerings.
 4 After retiring from the University of
 5 Idaho and becoming an Emeritus Professor, I was
 6 contacted by the National Groundwater Association
 7 and asked whether or not I would co-teach a
 8 course in design and construction of wells. And
 9 that course has been offered I believe every year
 10 for the last seven or eight. I co-teach it with
 11 Dr. Allan Wylie, who now works for the Idaho
 12 Department of Water Resources.
 13 Q. And could you describe your experience
 14 in terms of geophysical data analysis and aquifer
 15 studies that you may have been involved in.
 16 A. Geophysical data analysis is primarily
 17 in terms of bore hole geophysics that I have
 18 described.
 19 Aquifer testing, my first job was with
 20 the California Department of Water Resources and
 21 my first assignment was to conduct aquifer tests
 22 for them in the South San Francisco Bay area.
 23 And that has continued on essentially, at least
 24 on probably an annual basis of conducting aquifer
 25 tests since that time. Initially it was in

1 connection with study projects there at the Idaho
 2 Department of Water Resources. And then through
 3 my professorship at the University of Idaho, I
 4 ended up developing a course in aquifer testing
 5 design and development and taught how to conduct
 6 and analyze aquifer tests. That's also part of
 7 the course material for several different
 8 graduate and undergraduate courses I taught. And
 9 again, I've continued to do that both in an
 10 academic sense and in real projects.
 11 Since I formed my own business and
 12 retired from the University, I've conducted again
 13 tests on nearly an annual basis. Dr. Gary
 14 Johnson and I put together a course for National
 15 Groundwater that was taught once, hasn't been
 16 taught since, on the design and evaluation of
 17 aquifer tests. And that was done maybe six or
 18 seven years ago.
 19 Q. Okay. So, your overall years of
 20 experience in terms of working in hydrogeology,
 21 well construction, well testing, and aquifer
 22 studies, how many years approximately?
 23 A. Starting in 1964. So, that's 45 years.
 24 Q. Okay. And then what are you licensed
 25 to practice in the State of Idaho? What areas?

1 A. In the State of Idaho I'm a licensed
 2 professional engineer. I believe it's stamp
 3 No. 2004. And I'm also a registered professional
 4 engineer. I think that's stamp No. 55. And you
 5 didn't ask, but I'm a registered professional
 6 hydrogeologist in the State of Washington. I
 7 don't recall the stamp number there.
 8 Q. Okay. And so, you're a registered
 9 geologist; is that right?
 10 A. I'm a registered professional engineer
 11 and a registered professional geologist.
 12 Q. Okay. All right. Thank you. So, I
 13 just -- a lot of what we'll be going over today
 14 is your report, Dr. Ralston, that you provided.
 15 And we'll be referring a lot to document 47, for
 16 those of you that would like to get that out.
 17 I'd like to start off with some general
 18 questions with you, Dr. Ralston, in terms of what
 19 is a conceptual hydrogeologic model? What
 20 approach do you have in terms of just in general
 21 a hydrogeologic conceptual model? What does that
 22 entail?
 23 A. When we're dealing with hydrogeology,
 24 groundwater, that you're in a -- dealing with a
 25 resource that you can't readily go down and touch

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1 and view at every point. And so, you're faced
2 with using geology as one of your primary tools
3 to understand data that comes from various points
4 or wells.
5 And so, the process is to develop a
6 hydrogeologic conceptual model. What you're
7 doing is taking geology and those aspects of the
8 geologic subsurface that are important to
9 hydrology and putting them there together into a
10 conceptual model.
11 For example, in an unconsolidated
12 sedimentary environment, the depositional
13 environment is a major factor in terms of
14 understanding whether the sediments are likely to
15 be fine grained or coarse grained or vary in
16 porosity or hydraulic conductivity with distance
17 or direction.
18 In a fractured rock environment,
19 obviously the type of rock and its fracture
20 characteristics and its structural history, all
21 of this is then put together into a hydrogeologic
22 conceptual model typically written in word forms
23 and reports. And you then identify aquifers,
24 which are water-producing zones, and perhaps
25 aquatards, which are zones that do not transmit

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1 significant amounts of water.
2 Part of the whole approach is a
3 stepwise progression where you start with a
4 conceptual model based upon whatever information
5 is available, and then you may do data
6 collection, many times either geophysics or well
7 construction, to gather more information. And in
8 which case you then may modify your hydrogeologic
9 conceptual model. And it's a walking process
10 where you initially have a hydrogeologic
11 conceptual model, data collection, revise the
12 conceptual model, data collection. And that's
13 what it is.
14 Q. And then do you have any examples in
15 terms of -- we'll get into the specifics of the
16 M3 model, but do you have any examples just that
17 you could give that we would understand in terms
18 of developing a conceptual model?
19 A. Yes, certainly. One of the projects
20 I'm working on is the Bunker Hill Superfund site.
21 And for those of you in South Idaho, that's up in
22 the panhandle portion of Idaho. And it's in the
23 Coeur d'Alene River drainage, which is tributary
24 to Coeur d'Alene Lake, to Spokane River, and on
25 into the Columbia.

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1 I've also been working at times within
2 the St. Joe drainage. That's another river in
3 North Idaho tributary to Coeur D'Alene Lake. And
4 the hydrogeologic conceptual model that we've
5 been working with is the valley fill aquifers,
6 the sediments within the valley fill in both
7 valleys. There is a deeper groundwater system in
8 sands and gravel near the contact with the
9 bedrock, and then there is a thick clay zone that
10 overlies the deep aquifer, and then there is a
11 thinner sand, gravel, silt, clay layer on the
12 top.
13 And that's what we see in well logs.
14 The conceptual model is beginning to explain why
15 that is there. And the conceptual model is that
16 the deposition of the lower aquifer was at a time
17 when they were free-flowing rivers in those
18 canyons and they're just floodplain sediments,
19 fairly high-energy floodplain sediments. And
20 there was a rather abrupt rise in lake level such
21 that the areas that we're interested in were part
22 of the lake environment. And it was then the
23 deposition of generally silts and clays and very
24 fine sands.
25 And then there was a period of time

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1 when the lake level dropped, and now you're back
2 to having the river meander across this
3 floodplain and deposit sands and gravels and
4 silt. And so, the transfer of information from
5 one site to another site within those valleys is
6 based on to a great extent that conceptual model
7 of why the sediments are there and why the
8 sequence of sediments exists as it does.
9 Q. So, is it not important to have a good
10 information, a good foundation in terms of why
11 that material is there, an understanding of how
12 it was placed there prior to going to a
13 hydrogeologic model?
14 A. Are you referring to a numerical model?
15 Q. Yeah, a numerical model.
16 A. Yeah, the sequence of steps is that you
17 would have an initial hydrogeologic conceptual
18 model. You would gather all of the available
19 data, perhaps drill additional wells, continue to
20 modify that conceptual model. And then if you
21 went to the stage of needing a numerical model,
22 then the numerical model would be designed to fit
23 the hydrogeologic conceptual model in terms of
24 identifying aquifers and confining layers and
25 lateral extent of zones and all of this sort of

1 thing.

2 Q. So, could you describe your
3 understanding of the M3 Eagle hydrogeologic
4 conceptual model?

5 A. Yes, sir. My knowledge of this
6 specific area, the M3 Eagle, comes mostly from
7 Hydro Logic, Inc., reports as well as support
8 documents, geologic primarily. And it's my
9 understanding that we're talking about a
10 lakeshore depositional environment, more
11 specifically a delta system where a river or
12 stream system discharged into the lake and that
13 the series of sand deposits were created in that
14 sort of environment. There are descriptions of
15 them in terms of thickness and in terms of
16 they're innerbedded with silt and clay. And
17 again, that reflects the depositional
18 environment.

19 Then there appears to be a dip to these
20 sediments. And the sediments have been termed
21 the Pierce Gulch Sand Aquifer. In reality,
22 they're a sand deposit. And we typically do this
23 as hydrogeologists, we end up naming them for a
24 reason, instead of the upper sand or lower sand.
25 And so, for that purpose, it was named the Pierce

1 Gulch Sand Aquifer.

2 But I think it's important that we
3 reflect that it's simply a sand deposit and
4 that -- but our conceptual model then helps us to
5 understand the lateral extent and why, for
6 example, it is dipping off to the west-southwest
7 and its potential boundaries. But that's my
8 general understanding.

9 The 2007 HCI --

10 Q. HLI?

11 A. -- HLI report indicates that this unit
12 is continuous from the Eagle-Star area on to the
13 Payette River Valley. And I believe in other
14 documents that it also is continuous from the
15 M3 Eagle on into the Boise Valley.

16 Q. And do you have information, what have
17 you read about how that aquifer is bounded?

18 A. If we could look at a figure out of my
19 report, which was taken from Hydro Logic
20 documents --

21 Q. That would be Exhibit No. 47?

22 A. Exhibit No. 47. And I'm specifically
23 looking at what I have termed figure 1, which is
24 figure 3 of Hydro Logic, Inc.'s, 2007 report.
25 This figure shows a number of

1 interesting things relative to what is termed the
2 Pierce Gulch Sand Aquifer. Contours are given on
3 the elevation of the bottom of the unit. And
4 these contours are based, as I understood that,
5 from interpretation of geologic and geophysical
6 logs from wells. And you can see the contours
7 show the dip of the formation to the southwest,
8 higher elevations to the northeast, lower
9 elevations to the northwest. This is the bottom
10 of the unit.

11 Then there's a West Boise-Eagle fault.
12 That's the dashed red line. And the text
13 indicates that this is presumed to be a boundary.
14 That fault has considerable offset. And that the
15 written material indicates that that is a
16 boundary to this aquifer system.

17 You'll also see a green line that is
18 solid through what is identified as the M3 Eagle
19 property and then dashed farther to the
20 northwest. And this is identified as a -- as the
21 approximate location where because of the dip of
22 the unit, that the Pierce Gulch sand zone is no
23 longer saturated. So, I have termed that as an
24 unsaturated boundary. There are no boundaries to
25 the south or to the west shown on this diagram or

1 any other diagram that I've seen.

2 Q. So, do you have information that you've
3 reviewed provided by M3 that describes the
4 hydrologic connection to surface water?

5 A. There is some indication of
6 identification of recharge areas, and the
7 recharge areas are generally within the Boise
8 River drainage. And they are specific areas, a
9 portion of the Boise River upstream of a given
10 point, a portion of the New York Canal. I don't
11 have those specific zones memorized, but they're
12 in the reports fully identifiable.

13 Q. Is one of them identified as upstream
14 of the Capitol Bridge? Have you heard that?

15 A. Yes, sir.

16 Q. Okay. So, in terms of reviewing the
17 conceptual hydrogeologic model, what if any
18 uncertainty do you see in that model?

19 A. When I reviewed the material and the
20 identification of the Pierce Gulch Sand Aquifer
21 and how it was identified in terms of
22 geophysical, the geophysical signature, I was
23 interested in trying to gain a better
24 understanding of deposition and why it was
25 deposited there. And again, I read a number of

1 the background documents, a lot of homework,
2 authored or co-authored by Professor Emeritus
3 Spencer Wood. And again, it's trying to follow
4 the same process which I follow in all projects,
5 which is trying to develop this conceptual
6 hydrogeologic model of what should be the
7 boundaries? What should they look like?

8 What I could find is basically mostly
9 shown on figure 1 of my report, figure 3 of
10 Hydro Logic's, and also in following figures in
11 my report, figure 2, which is a cross-section,
12 and so on down.

13 What I couldn't find is any information
14 that gives the depositional environment that
15 would result in the Pierce Gulch Sand Aquifer
16 being laterally continuous from the M3 Eagle area
17 on to the Payette River Valley. It seemed like
18 that there was sufficient information in my mind
19 to suggest that the zone had been penetrated in
20 wells heading within the Boise Valley. And I
21 accepted the interpretations of Hydro Logic,
22 Inc., in terms of in those areas I thought it was
23 good work.

24 The unsaturated flow boundary shown as
25 a green line on figure 1, I felt like that there

1 was reasonable geologic, hydrologic basis for
2 that line within the M3 Eagle property and
3 perhaps a mile or so to the west, but I couldn't
4 find any information to indicate what happens
5 farther to the northwest. I could not find any
6 compelling information that says that the Pierce
7 Gulch sand unit was laterally continuous from the
8 M3 Eagle area to the Payette River Valley.

9 There were a few well logs out there.
10 There is a more recent bore hole geophysical
11 presentation that I read. And again, that's
12 interesting, but I didn't feel like it was a
13 compelling discussion, compelling evidence that I
14 understood that. The West Boise-Eagle fault
15 appears to be well established as a boundary.
16 There's really no evidence relative to the
17 southern and western boundaries.

18 So, I finally concluded, and I stated
19 this in my report, that there's insufficient
20 evidence to support the assumption that this
21 Pierce Gulch Sand Aquifer is laterally continuous
22 from the Boise Valley to the Payette River
23 Valley. And the problem with that, again, as I
24 responded to an earlier question, is that the
25 numerical model was based on the hydrogeologic

1 conceptual model, so --

2 Q. So, with all of the information that
3 you were able to review provided by M3 as well as
4 other information that you reviewed, it sounds
5 like some of Dr. Wood's reports or papers, that
6 is again what you're basing your conclusion on,
7 insufficient information in terms of the spatial
8 extent of the Pierce Gulch Sand Aquifer?

9 A. That is true.

10 Q. All right. I'd like to go ahead and
11 move into analysis of the groundwater flow
12 system. So, we have a conceptual hydrogeologic
13 model that you went through. Now, what in terms
14 of the groundwater flow system, what is a general
15 approach for carrying out an analysis of a
16 groundwater flow system?

17 A. The groundwater flow system is built
18 upon the hydrogeologic conceptual model. In
19 other words, that the subsurface geology is very
20 important and controls what goes on. But the
21 flow system analysis includes identification of
22 recharge areas and the controls for recharge,
23 discharge areas and the controls for -- the
24 hydraulic controls for discharge, and the general
25 groundwater flow lines from the recharge area to

1 the discharge area. And those are the aspects
2 that are generally included in a flow system.
3 So, again, understanding not only where the
4 recharge occurs but how it occurs and where the
5 discharge occurs, but how the discharge is
6 controlled.

7 Part of this is understanding the water
8 balance. Again, the groundwater flow system is
9 basically water enters the ground in a recharge
10 area, flows through the ground, and discharges in
11 a discharge area. And part of the -- the whole
12 idea of a flow system is what happens when you
13 put in a well? How does the groundwater system
14 respond?

15 And I wanted, if I could, to draw a
16 simple diagram.

17 Q. You bet.

18 A. There are some former students in this
19 class and they will probably giggle because they
20 have seen this numerous times.

21 Q. You can give them a test.

22 A. It's very informative. Do you want me
23 to carry this with me?

24 THE HEARING OFFICER: I think you'll be
25 all right if you're close enough.

1 THE WITNESS: That if I would simply
2 draw a tank -- and what the tank shows is just
3 it's a rectangular tank open at the top. On one
4 end is a V, like a rectangular -- a V-notch weir.

5 And if we then put in a faucet, and I'm
6 drawing the faucet up here very crudely, and
7 started dumping water into the tank, what would
8 happen?

9 Well, if the tank was empty to begin
10 with, then the water level would slowly rise up
11 in the tank until we have a point where our
12 discharge -- our water coming in, and let's call
13 that Q-in. The water level would rise enough so
14 that water would then come out of the V-notch
15 weir flowing out because of gravity, controlled
16 by groundwater -- by water levels within the
17 tank. And the water level in the tank would rise
18 to the point that Q-in would be equal to Q-out.

19 A key factor here, as I've shown that
20 the recharge -- this is recharge. This is
21 discharge. The recharge is independent of the
22 water level in the tank. Now, it isn't always
23 that way. And that's a very important thing.

24 So, this is pretty much the groundwater
25 system prior to well development, a case of

1 controlled, until the Q-out is reduced by the
2 amount of Q-pump. Okay? That's the way a
3 groundwater system works. Okay?

4 And so, if we have recharge that is not
5 water level dependent, meaning precipitation,
6 meaning infiltration down through an unsaturated
7 zone from a river, the changing in water level
8 doesn't change the input. Changes in groundwater
9 level always change the output. But the
10 groundwater system will seek equilibrium.

11 So, if you pump a well, the water level
12 always declines. That is just a fact. And the
13 decline will continue until you either decrease
14 the output by an equivalent amount, or in the
15 case where there's a hydraulic leakage effect,
16 for example, if there's a river here where you
17 can increase the input by dropping the water
18 level, that occurs. But the whole point is that
19 this system will respond.

20 And so, in this case, if the Q-pump was
21 10 units, ultimately you're going to decrease the
22 outflow from the box by 10 units at equilibrium.
23 Okay? That's in my mind one of the most
24 misunderstood overall concepts. Because what it
25 says is that water level decline is inevitable

1 dynamic equilibrium. If we have a wet year, then
2 water levels in the tank would rise and the
3 discharge would rise. If we have a dry year, the
4 water level in the tank would go down and the
5 discharge would go down. Okay?

6 But we're always in this dynamic
7 equilibrium where input is equal to output plus
8 or minus change in storage. In other words, the
9 water level going up or down.

10 The question then gets asked: What
11 happens if we put in a well? And I'm drawing
12 this as green for no particular purpose. And
13 that we now take out a Q-pump. What happens?

14 Well, an obvious water balance approach
15 would say that Q-in originally was equal to
16 Q-out. Now we have a new withdrawal point; okay?

17 So, what will happen within the tank,
18 and this occurs in a groundwater system, as soon
19 as you start pumping out of the tank, the water
20 level has to drop in that tank until we reach a
21 new equilibrium where Q-in is equal to Q-out plus
22 Q-pump.

23 Now, how can this equilibrium occur?

24 Well, the water level just drops in the tank
25 until -- and the discharge is water level

1 with any groundwater withdrawal from the
2 groundwater system.

3 Q. So, there will probably be a pop quiz
4 for your former students at lunch?

5 A. I suspect that they went to sleep
6 partway through that.

7 Q. Thank you. So, could you give a
8 description of your understanding of the M3
9 groundwater flow system, your understanding of
10 that through review of their documents and
11 reports.

12 A. Again, recognizing a groundwater flow
13 system has the component of a recharge area, a
14 lateral flow, an area where you're looking at
15 flow through the aquifer, and then a discharge
16 area, that we'll look at each one of those
17 separate.

18 If you look at figures 3 and 4 of my
19 report, figure 3 is a water level contour map
20 prepared by Hydro Logic based upon 2006 data.
21 And figure 5 is a water level -- excuse me, the
22 version that's in this document doesn't show
23 water level contours. That's interesting. Let's
24 turn to page -- figure 9.

25 Q. Okay.

1 MR. PETERSON: Figure 4?
2 Q. (BY MR. THORNTON) Why don't you look
3 at your figure 4.

4 A. It's highly confusing when -- my
5 apologies. I did not notice that we printed on
6 both sides of the paper.

7 Q. Okay.

8 A. Figure 4 shows the water level
9 contours. Again, this came out of a report by Ed
10 Squires, 2008, based upon water level data taken
11 in 2007.

12 If you compare the two contour maps,
13 figures 3 and 4 -- it's difficult to compare them
14 because they are opposite sides of the same
15 sheet -- you can see that there has been some
16 change in interpretation. And this is fairly
17 normal for a hydrogeology study, as you -- and
18 the text indicated that there were some wells
19 used in the 2006 water level contour map that may
20 or may not have been completed in the aquifer and
21 some questions about some water level elevations.
22 And so, in the text they indicated that the 2007
23 water level contour map was the one that would be
24 more relied upon and that's figure 4.

25 And what it shows is a blueish color

1 area that is identified, at least the name is
2 there, the Pierce Gulch Sand Aquifer, a lighter
3 blue that's identified as the Willow Creek
4 Aquifer. But you can see that the water level
5 contours are shown in a blue -- a black lettering
6 on that blueish color. And it shows with arrows
7 there the general direction of groundwater flow.

8 And it looks like south and southeast
9 of the M3 Eagle area that the flow is in a
10 northwesterly direction. And then west of the
11 M3 Eagle area there's a component of flow to the
12 west or the west-northwest, and then there's a
13 component of flow that seems to go toward the
14 north or northwest. And so, these are water
15 level contours representing the lines of equal
16 groundwater elevation.

17 The presumption is often made that
18 water flows at right angles to those contour
19 lines. And that's based upon an assumption that
20 the hydraulic properties are independent with
21 respect to direction. In other words, it's not
22 like a corrugated roof set at an angle, it's more
23 like a smooth roof where water will flow directly
24 down the roof. So, the contours are there based
25 upon field data and arrows are there to represent

1 their depiction of flow.

2 My only remaining comment deals with
3 the boundaries of the aquifer. You can see that
4 the major fault is shown as a boundary on the
5 east-northeast side. That green line that was
6 the unsaturated flow boundary I talked about
7 before is shown as a boundary on the portion of
8 the north. And then the green -- the blue color
9 seems to end along the margin of the Payette
10 River Valley and then ends along the range line,
11 I believe that's a range line, between 3 west and
12 4 west and on the bottom of the sheet of paper.

13 So, I've presumed that the boundary to
14 the blue area on the west is just a convenience
15 boundary and isn't necessarily depicted as the
16 actual geologic boundary. I don't know that, but
17 I've presumed that. The same thing on the south.

18 Q. So, with your review of their
19 hydrogeologic model, their flow system, what, if
20 any, uncertainty do you find?

21 A. I looked at detail, as much detail as I
22 could within the reports to ascertain the actual
23 elevations of water levels in wells. And if you
24 turn to figure 9 of my report, you'll see that I
25 have taken the elevations based upon data taken

1 in 2007. And those black numbers just give the
2 actual elevation of water level in those wells
3 taken from Hydro Logic, Inc. Not all of the
4 wells on M3 Eagle are there. They generally make
5 sense and it became really dense to put all of
6 the numbers in there, so not all of them are
7 there.

8 What you -- what I saw was that the
9 contours that are shown there in blue in the area
10 south, more or less upgradient from the M3 Eagle
11 area, pretty well fit the data and make a
12 reasonable amount of sense. But the farther west
13 you go, the more you realize that there are
14 relatively few wells upon which to base this
15 depiction.

16 And so, what I did is I examined those
17 wells in detail, and particularly the well that
18 has 2412 as a water level elevation and the one
19 that has 2450, those are the two westernmost
20 points.

21 There was some question of whether or
22 not the well that has 2412 as the elevation was
23 completed in the Pierce Gulch Sand Aquifer. But
24 regardless of whether it is or not, I then just
25 very simply drew in contours. And those are the

1 dashed red lines, 2425, 2450, to show just a pure
 2 mathematical interpretation of the data from
 3 those three westernmost wells.
 4 And my concern here is that there was
 5 almost no basis for the contour lines that are
 6 shown in blue that show flow to the north. It
 7 appears like if you assume it's isotropic, then
 8 the dashed lines I have shown show flow more to
 9 the northwest rather than north-northwest or
 10 north.
 11 I concluded that the contour lines that
 12 show groundwater flow from the M3 Eagle area in
 13 general to the Payette were not supported by
 14 field data. And I concluded that there was
 15 insufficient evidence both from water level data
 16 and hydrogeologic to support the concept that
 17 there's groundwater flow from the Boise River
 18 Valley to the Payette River Valley.
 19 Now, that does not mean that it does
 20 not occur. It means that I judged that I
 21 couldn't find sufficient evidence to say that
 22 that is what occurred.
 23 Q. And on figure 9 that you referred to in
 24 Exhibit No. 47, you've put those dashed lines in
 25 there. By you doing that, does that -- is it

1 appropriate to assume that you agree that the
 2 Pierce Gulch Sand Aquifer is laterally continuous
 3 there or is that just a reflection of the data
 4 points that were provided by HLI where you would
 5 say the water would flow based on those levels in
 6 the well?
 7 A. I made the presumption that those three
 8 wells, that 2412, the 2477, and the 2450 that are
 9 trying to -- if they are all completed in the
 10 Pierce Gulch Sand Aquifer, then that would be the
 11 water level pattern.
 12 Q. Okay.
 13 A. I could not ascertain to my own
 14 satisfaction whether the well that is 2412
 15 elevation was in the Pierce Gulch Sand Aquifer or
 16 not.
 17 Q. Okay. And then do you believe, then,
 18 that based on the conceptual hydrogeologic model
 19 and then the construction of the numerical model
 20 based on that, and it's then the numerical
 21 model's representation of -- excuse me, the
 22 hydrogeologic model and the groundwater flow
 23 system, from what you've seen, is that flawed or
 24 not?
 25 A. Again, my conclusion relative to the

1 hydrogeology is I couldn't see compelling
 2 evidence that showed that the Pierce Gulch Sand
 3 Aquifer continued on to the northwest on over
 4 toward the Payette River. I concluded that there
 5 was insufficient evidence that there was
 6 groundwater flow in that direction.
 7 Q. Okay.
 8 A. And again, if the numerical model is
 9 based upon the hydrogeologic conceptual model and
 10 if the numerical model is -- part of the
 11 calibration was to match the water level shown on
 12 figure 4, then I had some serious difficulties
 13 with the numerical model.
 14 Q. Okay. Thank you. And then in terms of
 15 we've talked about the numerical model a little
 16 bit. Could you explain what in general, the
 17 aspects of the construction and application of a
 18 numerical model just in general.
 19 A. Yes, a numerical model is an important
 20 tool that hydrogeologists use because it allows
 21 you to integrate a lot of information that after
 22 awhile becomes difficult to hold within your
 23 brain and all of the various things going on.
 24 So, you take the hydrogeologic conceptual model
 25 and then you calibrate that. So, you build the

1 conceptual model hydrogeology. You then input in
 2 the hydraulic factors, the parameters such as
 3 transmissivity or hydraulic conductivity. And
 4 you begin to build a mathematical representation
 5 of that hydrogeologic conceptual model.
 6 And then the calibration process
 7 involves trying to then quantify the water
 8 balance where you calculate inputs and outputs
 9 and put those into that model and then see
 10 whether or not you can then calibrate the model
 11 to the hydraulic head or the water level
 12 elevation that you have measured in the field.
 13 And so, that is a typical approach.
 14 The key to all of that is to have
 15 sufficient knowledge of both the groundwater flow
 16 system and the hydrogeologic conceptual model to
 17 minimize the uncertainty of the outcome of the
 18 model. And part of understanding the flow system
 19 is to have knowledge of the locations, amounts,
 20 and mechanisms of groundwater recharge and the
 21 location, amounts, and mechanisms of groundwater
 22 discharge. And so, those are important in terms
 23 of trying to construct a numerical model to
 24 represent your system.
 25 Q. So, if I heard you and understood you

1 correctly, it is important to understand the
 2 recharge mechanism and the discharge mechanism?
 3 A. That is correct.
 4 Q. Okay. And then in terms of the
 5 analysis of the M3 Eagle numerical model, could
 6 you relate your understanding of that M3
 7 numerical model.
 8 A. The numerical model is a -- first of
 9 all, they used a code, a mathematical code which
 10 is well established and is accepted throughout
 11 the hydrogeologic world, mod flow. And they used
 12 a standard form. And so, there is no question I
 13 think in my mind about the mathematical code they
 14 used and their application of that code. It
 15 seemed like they were using the packages, and
 16 there are packages in mod flow, they were using
 17 those correctly.
 18 They were forced to do, as all modelers
 19 are, to choose boundaries. And in an area where
 20 the boundaries are relatively poorly understood,
 21 that you still have to select boundaries. And
 22 quite often you select them far enough away so
 23 that any difficulties with your arbitrary
 24 representation of those boundaries are minimized.
 25 And so, they certainly did that.

1 In previous generations of modeling
 2 this would have been a one-layer model, because
 3 the previous software packages and computer
 4 systems would not allow you to put -- allow you
 5 to represent vertical flow with multiple layers.
 6 But in this case the technology is there, the
 7 computing capability is there. And so, they
 8 built a multiple layer model. And again, they
 9 tried to have that and represent the
 10 hydrogeology. And again, I have no problems. It
 11 looked to me like in that sense that they did a
 12 good job.
 13 Then they went through a calibration
 14 process. And the calibration process was to
 15 adjust the system so it could reproduce off the
 16 water levels that we -- that we have described
 17 here, the water level contour patterns and the
 18 steady state calibration.
 19 And then they went through a transient
 20 calibration, "transient" meaning non-steady
 21 state. Changing the model from steady state to
 22 non-steady state introduces one more factor,
 23 which is storativity, which is the -- in my
 24 trough up here it's the relationship between
 25 water level rise and the difference between input

1 and output. And so, then they calibrated that to
 2 results of their aquifer tests. And that again
 3 is -- that's what they have to calibrate against.
 4 That's what they used.
 5 My concern about the model is that I
 6 believe that the hydrogeologic conceptual model
 7 is flawed in the fact that I don't believe that
 8 there's adequate information that indicates that
 9 it is laterally continuous on over into the
 10 Payette River area.
 11 The flow system concept is limited in
 12 the fact that the water levels presented and
 13 calibrated to in my opinion are not, do not
 14 represent the field data. But also, and maybe
 15 more importantly is the whole idea of recharge
 16 and where it occurs and how it is represented in
 17 the model and discharge and where it occurs and
 18 how it is represented in the model. And again,
 19 this was partially because their information is
 20 very limited.
 21 In my opinion, the difficulty with all
 22 of this is that it creates a very high degree of
 23 uncertainty associated with model results, and
 24 particularly the prediction of effects from
 25 pumping.

1 Q. In your opinion, for the Pierce Gulch
 2 Sand Aquifer, do you see that as a homogeneous
 3 unit or is it heterogeneous in your opinion?
 4 A. I think the available information
 5 suggests that it's heterogeneous. And that
 6 isn't -- doesn't make it unusual. Essentially
 7 all geologic media out there are heterogeneous.
 8 And so, the fact that this is is not surprising
 9 at all, but it certainly is heterogeneous.
 10 Q. And then I believe you were here
 11 yesterday hearing testimony with Mr. Vincent and
 12 the talk of the Big Gulch stock well. Were you
 13 listening to that testimony yesterday?
 14 A. Yes, sir.
 15 Q. And did you hear how there was a foot,
 16 a foot and a half of drawdown in the Big Gulch
 17 stock well?
 18 A. Yes, sir.
 19 Q. And are you of the understanding that
 20 that is approximately 180 feet in depth, the Big
 21 Gulch stock well?
 22 A. Yes.
 23 Q. So, in your opinion, based on that and
 24 in the M3 Eagle area, what would be your expert
 25 opinion in terms of the potential for pumping at,

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1 in the Pierce Gulch Sand Aquifer with these
2 high-volume municipal demands on that aquifer as
3 far as affecting not only other wells in the
4 Pierce Gulch but other wells in shallower
5 aquifers that go down 100 feet, 150, 200 feet,
6 250 feet?
7 A. A two-part answer to that, if I could.
8 The one part is that it seemed to me there was
9 considerable uncertainty relative to whether the
10 stock well you're referring to was or was not
11 completed in the Pierce Gulch Sand Aquifer.
12 If it was completed in there, then the
13 information from the aquifer test doesn't provide
14 any useful information relative to the impacts to
15 overlying aquifers. If it was completed in a
16 shallower unit, then obviously yes, it
17 provides -- it provides information along those
18 lines. After yesterday's testimony, I have no
19 idea whether it is completed or not completed in
20 the Pierce Gulch Sand Aquifer.
21 But if I could speak to the second part
22 of yours, the numerical modeling report dealt
23 with, had comments and text oriented toward
24 understanding the water level impacts in
25 overlying units. And they I thought did a

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1 reasonable job of presenting that and talked
2 about the magnitude of impacts that would occur
3 in overlying aquifers.
4 Q. Okay.
5 A. Based upon the numerical model as it's
6 presented.
7 Q. So, in terms of a final conclusion, do
8 you believe that there's sufficient evidence to
9 support the hydrogeologic conceptual model and
10 then the outputs of the numerical model?
11 A. I don't believe there's sufficient
12 evidence to support the hydrogeologic conceptual
13 model as represented in the numerical model. And
14 that includes the lateral extent on into the
15 Payette River system. I just don't believe that
16 the information is there to conclude that the
17 aquifer is laterally continuous from the Eagle,
18 M3 Eagle area to the Payette River.
19 So, in that sense, then, that is a
20 serious problem with the numerical model. And
21 so, that leads to problems with the prediction
22 from the numerical model.
23 Q. So, once again, I think a bottom line
24 for you is that if the numerical model again is
25 based on a flawed or an uncertain hydrogeologic

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1 conceptual model, then the numerical model cannot
2 be used to provide reliable predictions of water
3 level impacts; is that correct?
4 A. That is correct. I think I also
5 indicated that it's not only the hydrogeologic
6 conceptual model for which there's difficulties,
7 it's the groundwater flow system depiction in
8 terms of the direction of flow, but equally or
9 perhaps more important in terms of our level of
10 understanding of the dynamics of the recharge
11 area and the hydraulics and the discharge area
12 and those hydraulics.
13 Q. Okay. Thank you.
14 MR. THORNTON: Mr. Spackman, that's all
15 of the questions that I have for Dr. Ralston.
16 THE HEARING OFFICER: Okay, let's break
17 just for a minute.
18 (IDWR recording paused.)
19 THE HEARING OFFICER: My question at
20 this point is how we want to proceed with
21 presentation of testimony, Mr. Thornton.
22 Dr. Ralston, and you have the other witnesses
23 that are aligned with you -- Mr. Thornton,
24 normally I would not ask questions of Mr. Ralston
25 because he's your witness, and because of that in

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1 the presentation of your case there may be some
2 dilution of how information is coming in. And
3 so, I guess I want to know how we want to proceed
4 with questioning? And I want your participation
5 as well, Mr. Fereday, because you'll want to
6 cross-examine. How do we want to go forward? Do
7 we want to allow Mr. Smith and possibly
8 Mr. Edwards to ask questions prior to
9 cross-examination? What's your preference? Do
10 you have any thoughts on it?
11 MR. THORNTON: Are you asking me, then?
12 THE HEARING OFFICER: Yes, sure.
13 MR. THORNTON: I am fine whatever way.
14 THE HEARING OFFICER: Mr. Fereday?
15 MR. FEREDAY: I would suggest that
16 because this witness has not been named by
17 Mr. Smith or Mr. Edwards and the people they
18 represent and has not been called by them that
19 they would be in a position of being entitled to
20 cross-examine this witness, which I think then
21 implies that they should await my cross-
22 examination and they could potentially recross or
23 do their own cross-examination based on that.
24 THE HEARING OFFICER: Okay. Mr. Smith?
25 MR. ALAN SMITH: I thought we did have

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1 him on our witness list. Of course, he's not our
2 expert, but I don't have any problem with doing
3 it the way Mr. Fereday suggests.
4 MR. EDWARDS: Neither do I.
5 THE HEARING OFFICER: Well, what I want
6 to make sure of is that -- and I guess I'll state
7 this: I want some wide latitude in our ability
8 to ask questions of Dr. Ralston perhaps beyond
9 the scope of direct examination if necessary,
10 because I want his expertise to be fully exposed
11 in the record. So, I don't want this process to
12 be something that limits our ability to glean
13 answers from him. So, to the extent that that
14 cross-examination goes beyond direct, I'm willing
15 to allow it to come in. And I probably will have
16 some questions of Dr. Ralston myself. And part
17 of the reason for that, Mr. Thornton, is that
18 there are, there are conclusory or conclusion --
19 conclusory statements that Mr. Ralston has made
20 in his testimony, but we have not explored the
21 basis for some of those statements, particularly
22 in my opinion related to questions that
23 Mr. Ralston has raised regarding recharge and
24 discharge. We've not delved into the details of
25 what those uncertainties are and I guess I want

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1 to know what they are. And so, if they're not
2 explored during examination, I will explore those
3 with Dr. Ralston.
4 MR. THORNTON: Okay.
5 THE HEARING OFFICER: Okay.
6 MR. ALAN SMITH: He is on our witness
7 list, but I don't have any problem with however
8 you want to do it.
9 THE HEARING OFFICER: Well, I'm happy
10 to follow the convention that's suggested by
11 Mr. Fereday as long as everybody realizes that
12 there isn't an opportunity for questioning
13 Dr. Ralston beyond the very -- beyond the
14 boundaries of the scope of direct examination by
15 Mr. Thornton. Okay?
16 MR. THORNTON: Yes.
17 THE HEARING OFFICER: Now, do we want
18 to take a 10, 15 minute break at this point?
19 MR. THORNTON: I think so.
20 MR. ALAN SMITH: Excellent idea.
21 THE HEARING OFFICER: Okay, let's come
22 back at 10 minutes after 11:00. Thanks.
23 (Recess held.)
24 THE HEARING OFFICER: Okay, let's
25 record. Okay, we are recording again.

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1 Mr. Thornton, I understood that you might have
2 something to offer before Mr. Fereday starts his
3 examination.
4 MR. THORNTON: Yes, I do, Mr. Hearing
5 Officer. Those are the notes from Dr. Ralston.
6 Mr. Fereday on a break asked for the notes that
7 Dr. Ralston had provided or was talking to. And
8 I'd also like to enter those in as an exhibit for
9 the record, if I may.
10 THE HEARING OFFICER: Okay. And do you
11 have some idea of where we're at in the numbering
12 scheme for -- I can ask Vicky -- for the
13 protestants? And this would be for North Ada
14 County. They should be what, 800 and -- no, you
15 were lower than that.
16 MR. THORNTON: Yeah, but we had to jump
17 up to 800 finally. So, I believe we were at
18 probably -- the last one we entered in was the
19 water rights that are backlogged in the queue
20 from the Department of Water Resources.
21 THE HEARING OFFICER: I think that's
22 showing as 850, IDWR reports or records of
23 applications prior to priority date. I show that
24 as 850.
25 MR. PETERSON: 860.

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1 MR. THORNTON: Yeah, we could
2 actually -- we have some documents numbered that
3 we haven't entered in as exhibits yet that go up
4 to 858. So, if we, as was just suggested to me,
5 just number that 860, we'll be sure not to
6 overlap with any other numbering.
7 THE HEARING OFFICER: Okay. All right,
8 we will label that document as protestants
9 Exhibit No. 860.
10 (Exhibit No. 860 marked.)
11 THE HEARING OFFICER: And Mr. Thornton,
12 you've distributed copies to the parties?
13 MR. THORNTON: Yes, I have.
14 THE HEARING OFFICER: Okay.
15 MR. THORNTON: 860.
16 THE HEARING OFFICER: Again, this
17 document I understand is --
18 MR. THORNTON: It's the notes and some
19 of the conclusions that Dr. Ralston was using
20 during his testimony.
21 THE HEARING OFFICER: Okay. Any
22 objection to the admission of this document into
23 the record, Mr. Fereday?
24 MR. FEREDAY: No objection.
25 THE HEARING OFFICER: Mr. Smith?

1 MR. ALAN SMITH: No.
 2 THE HEARING OFFICER: Mr. Edwards?
 3 MR. EDWARDS: (Shaking head.)
 4 THE HEARING OFFICER: It's received
 5 into evidence.
 6 (Exhibit 860 admitted into evidence.)
 7 THE HEARING OFFICER: Okay, and we
 8 agreed during the recess to have Mr. Fereday
 9 examine first and then have you follow,
 10 Mr. Smith, and then you, Mr. Edwards, and then
 11 we'll go back to Redirect. Okay, Mr. Fereday.
 12 CROSS EXAMINATION
 13 QUESTIONS BY MR. FEREDAY:
 14 Q. Dr. Ralston, good morning. It's good
 15 to see you again.
 16 A. Good morning, sir.
 17 Q. You noted in your testimony that
 18 geology is a primary tool of understanding
 19 hydrogeology. Do you recall that?
 20 A. Yes, sir.
 21 Q. Do you think that Hydro Logic has done
 22 a professional job in consultation with its
 23 consultants and colleagues in characterizing the
 24 geology of this area?
 25 A. I believe that the data collection

1 efforts that they've done and the well
 2 construction efforts have been very good and I
 3 applaud them. My thoughts are that the
 4 interpretation of that was less well founded and
 5 that's what I raised questions. It wasn't on the
 6 data they actually collected. I thought that
 7 that was very good.
 8 Q. So, the conclusions that they reached I
 9 take it that you take issue with have to do
 10 primarily with what you testified about, correct,
 11 which is the connection over to the Payette;
 12 correct?
 13 A. The things I had issue with are the
 14 connection to the Payette, the geologic
 15 connection to the Payette, the water level
 16 contours, and then the idea of how well that
 17 we -- you have established the recharge and
 18 discharge locations and mechanisms.
 19 Q. With regard to the geology at least, I
 20 take it that your concern is that the geology
 21 does not suggest to you that there could be a
 22 connection to the Payette; is that a fair
 23 characterization?
 24 A. It's a burden of proof issue, and
 25 that's that I don't see evidence that indicates

1 that it does. I tried to read through the
 2 documents to find a geologic report that
 3 suggested that yes, this was a broad scope thing
 4 and a map that showed the outline of it and I
 5 could not find one. I didn't attempt to go
 6 review numerous well logs and try to do it on my
 7 own. I concluded that there was insufficient
 8 evidence to suggest that it goes that far.
 9 Q. Do you know how big that lake was that
 10 used to be in this area that laid down the
 11 sediments that we're discussing here?
 12 A. I've seen maps that showed its
 13 depiction, but I don't know the dimensions.
 14 Q. How big would you guess it is based on
 15 those maps?
 16 A. The -- as I understand, that the Glens
 17 Ferry formation was partially deposited in Lake
 18 Idaho. And that exists in Glens Ferry,
 19 obviously. So, it extended that far.
 20 Q. And it extended all of the way up
 21 through the Payette and Emmett area that we know
 22 today; did it not?
 23 A. I presume so, yes.
 24 Q. So, as sediments were laid down in that
 25 lake, what is your conceptual model? Given its

1 immense size, what is your conceptual model,
 2 Dr. Ralston, with regard to how extensive those
 3 sediments might be between, even in this small
 4 area between M3 and the Payette Valley?
 5 A. My conceptual model is that you would
 6 have coarse grain sediments near where the
 7 streams came in where there was energy enough to
 8 carry them in. But a relative short distance out
 9 into the lake you would have mostly fine grade
 10 sediments. And that's certainly the experience
 11 of the site I described up on the ancestral
 12 Coeur D'Alene Lake.
 13 Q. But the sediments in the PGSA from
 14 which the large production wells are pumping are
 15 not fine grain sediments; are they, Dr. Ralston?
 16 A. No, sir.
 17 Q. Would you say that this lake, just to
 18 give a visual to the Hearing Officer, is about
 19 the size of Lake Ontario or do you have a notion
 20 of that?
 21 A. I've never visited Lake Ontario.
 22 Q. Do you agree that Hydro Logic has
 23 followed the kind of stepwise progress to develop
 24 its conceptual model that you testified to? Has
 25 it followed a logical progression in your

1 opinion?
 2 A. Yes, they did.
 3 Q. With regard to the St. Joe Basin
 4 aquifers that you have been studying, could you
 5 describe for us some of the work that you have
 6 done with regard to test well drilling. Have you
 7 drilled test wells there into the St. Joe
 8 aquifers?
 9 A. The St. Joe, we've drilled test wells
 10 for the City of Coeur D'Alene and then
 11 production wells -- excuse me, the City of
 12 St. Maries and production wells for the City of
 13 St. Maries. We did surface geophysics to attempt
 14 to better understand the subsurface.
 15 Q. How many test wells did you drill for
 16 the City of St. Maries?
 17 A. I believe three or four.
 18 Q. Were they within the city itself?
 19 A. No, they were not.
 20 Q. Did you run geophysics in those wells?
 21 A. I don't believe we ran bore hole
 22 geophysics in those wells, no.
 23 Q. Did you produce a conceptual model of
 24 what that aquifer looks like, Dr. Ralston?
 25 A. I produced a report for the City of

1 St. Maries that yes, it described the aquifer and
 2 the probable recharge areas and the reasons why
 3 they had some water quality issues.
 4 Q. Did you base your conceptual model --
 5 you mentioned you didn't base it on geophysics,
 6 but did you base it on well drillers' reports
 7 from well logs?
 8 A. The well drillers' reports and then we
 9 had samples collected and in some cases I
 10 collected those samples. And then you review the
 11 samples to determine the stratigraphy.
 12 Q. What drilling method did you use in
 13 putting in those test wells?
 14 A. It was direct air rotary.
 15 Q. Are those wells sealed to depth
 16 throughout their depth outside the casings?
 17 A. The wells have to, of course, meet
 18 state well construction standards. And so, they
 19 had -- their pump chamber casing extends down
 20 into that confining layer and is sealed to
 21 surface, yes.
 22 Q. How about outside the well casing, as I
 23 mentioned? I take it the seal is only the top
 24 18 feet; correct?
 25 MR. ALAN SMITH: We would object to

1 this line of questioning as irrelevant.
 2 THE HEARING OFFICER: Mr. Fereday,
 3 what's the relevance?
 4 MR. FEREDAY: The relevance is to -- he
 5 testified about his work in the St. Joe. And my
 6 purpose in asking these questions is to see what
 7 kinds of standards he's applying there and what
 8 kinds of data he's using to reach conclusions
 9 there to see whether that same standard might be
 10 met here.
 11 THE HEARING OFFICER: Okay, I'll
 12 overrule the objection right now and allow some
 13 limited inquiry in this area, but I don't -- I
 14 guess I don't want it to turn into an inquisition
 15 about whether he's using proper well construction
 16 standards, Mr. Fereday. Go ahead.
 17 Q. (BY MR. FEREDAY) Those test wells were
 18 sealed just in the top 18 or so feet; would that
 19 be accurate?
 20 A. No, sir.
 21 Q. How far are they sealed?
 22 A. The -- I do not recall the specific
 23 seal depth, but the obvious purpose of the seal
 24 is to protect the aquifer. As well, these wells
 25 flowed at land surface. And so, you had to make

1 sure that you weren't allowing water to escape up
 2 the outside. So, they were properly sealed. The
 3 depth I don't recall.
 4 Q. Did you produce a numerical model for
 5 the St. Joe work?
 6 A. No, sir.
 7 Q. You've produced other numerical models,
 8 though; haven't you?
 9 A. I've been involved in numerical models,
 10 yes, for a long time.
 11 Q. In the numerical models that you've
 12 produced, you have always set boundaries;
 13 correct?
 14 A. If I could clarify that in most cases
 15 in recent decades, I didn't produce the model.
 16 In some cases I had the student produce the model
 17 and in many cases I was an advisor to the
 18 production of the model, but I didn't actually
 19 manipulate the computer and create the model.
 20 Q. In establishing the model exercise,
 21 though, boundaries were set for the model, the
 22 numerical model; correct? Physical or geographic
 23 boundaries; correct?
 24 A. The model had boundaries, yes.
 25 Q. And isn't it a fact that the boundaries

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1 are set at some reasonable distance from the area
2 that you are interested in pumping from to
3 produce what you hope will be relatively accurate
4 representations of the aquifer? Would that be a
5 fair statement?
6 A. No, sir.
7 Q. What would be a fair statement?
8 A. A fair statement is the model
9 boundaries would hopefully represent
10 hydrogeologic boundaries. And only in those
11 somewhat extreme circumstances when you couldn't
12 extend your model to a hydrogeologic boundary
13 would you simply place a boundary there without
14 going to an actual hydrogeologic boundary.
15 Q. But you have worked with models that
16 don't go to hydrogeologic boundaries; correct?
17 A. That is correct.
18 Q. With regard to the uncertainty that
19 you've testified to about Hydro Logic's
20 conceptual model of the basin and its, in your
21 view, failure to be convincing to you as to the
22 continuation of the PGSA toward the Payette, have
23 you reviewed any of the exhibits in this case
24 that might bear on that, such as Exhibit No. 45,
25 figures 3 and 4? Would you refer to that,

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1 please.
2 A. I'm sorry, what exhibit again?
3 Q. Exhibit No. 45, figures 3 and 4. Start
4 with 3.
5 A. (Reviewing document.)
6 Q. Have you seen these figures before,
7 Dr. Ralston?
8 A. Yes, sir.
9 Q. With regard to figure 3, do you
10 recognize that these are -- that this shows the
11 location of a cross-sectional depiction based on
12 some deep well drilling in the general area of M3
13 moving to the northwest?
14 A. Yes, sir.
15 Q. What is your interpretation, then, of
16 the next figure, figure 4, as to the
17 hydrogeologic cross-section depicted there? What
18 is your comment on that, sir?
19 A. I reviewed this and concluded that the
20 distance between the wells and that the
21 information presented on the bore hole
22 geophysical logs were such that I did not give it
23 much weight.
24 Q. Did you give any weight to the
25 signature of the pro delta mudstone unit as shown

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1 on figure 4 that shows up in the geophysical
2 logs?
3 A. Would you explain what you mean by
4 that, please.
5 Q. It's shown on figure 4, the pro delta
6 mudstone unit at the bottom.
7 A. I don't understand what your question
8 is.
9 Q. My question is: Do you agree that the
10 geophysical logs support the depiction of a pro
11 delta mudstone unit at the bottom of the Pierce
12 Gulch Sand Aquifer?
13 A. If I could explain in this way: If I
14 had the bore hole geophysical logs that are here
15 and the interpretation wasn't there, I wouldn't
16 have identified it.
17 Q. You wouldn't identify this this way?
18 A. I would not have independent of the
19 interpretation that was here have identified it.
20 Q. Do you have any reason to question this
21 interpretation, which I'll represent to you was
22 done by Dr. Wood?
23 A. No, I respect Dr. Spencer Wood a great
24 deal. But I just answered your question, which
25 is I would not have necessarily thought this was

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1 the interpretation.
2 Q. And what would that be based on?
3 A. The distance between them and the fact
4 that the signature is simply a signature of a
5 stratigraphic interval. I have -- I think it is
6 a considerable leap to go from looking at what is
7 a -- and the signature is of sand versus a
8 mudstone. That's what I presume his
9 interpretation is, and that that sequence could
10 have occurred many times in that lake
11 environment. And to interpret that as this
12 continuation over that distance I thought was
13 speculative.
14 Q. And you would say that because of the
15 distance, sir, or because of the repetition of
16 the figure -- or the signature?
17 A. A combination of the two. For example,
18 that I looked at this and looked at the signature
19 in the Oroco gas well for the Pierce Gulch Sand
20 Aquifer and I looked at the signature of the
21 other, the El Paso natural gas well, and thought
22 that I wouldn't have necessarily connected those
23 as being the same in terms of interpreting a
24 sandstone versus a mudstone or a sand versus a
25 mud.

1 And then the second part is the
 2 distance, so that even if there was a sand, mud
 3 sequence, how do I know it's the same sequence?
 4 Q. Dr. Ralston, you don't have any
 5 experience interpreting North Ada County geology;
 6 do you?
 7 A. I could not understand you.
 8 Q. You don't have any experience in
 9 interpreting North Ada County geology other than
 10 what you've been asked to do in this case;
 11 correct?
 12 A. I have not worked in North Ada County
 13 geology prior to this project.
 14 Q. And you also don't have a degree in
 15 geology; do you?
 16 A. I do not have a degree in geology.
 17 Q. You agree that the Pierce Gulch Sand
 18 Aquifer is a dipping layer, though; correct? I
 19 think you testified earlier?
 20 A. The depiction of the Pierce Gulch sand
 21 unit on the cross-sections with the available
 22 information convinced me that yes, it appears to
 23 be a dipping unit.
 24 Q. And you're also convinced, aren't you,
 25 that the hydrogeologic work that has been done

1 for this case establishes the connection between
 2 the M3 area and the West Boise area vis-a-vis the
 3 Pierce Gulch Sand Aquifer?
 4 A. The information presented supports that
 5 conclusion and I reached that conclusion, yes.
 6 Q. Dr. Ralston, with regard to your tank
 7 depiction here, I'd like to ask you a few
 8 questions. Now, if that tank had a lid on it and
 9 still had the spout coming down through the lid
 10 and the tank was full, it's possible that the
 11 spout would simply overflow water around that
 12 tank; isn't that right?
 13 A. I don't think your depiction is
 14 correct. Could you ask it in a more clear way?
 15 Q. Well, let's put it in aquifer terms.
 16 If we have an aquifer that has confined
 17 characteristics and it has above-ground heads in
 18 its wells, isn't that aquifer rejecting recharge,
 19 net rejection of recharge?
 20 A. If I could respond in this way: That
 21 water flows from a higher hydraulic head to a
 22 lower hydraulic head. So, if the hydraulic head
 23 within the aquifer is above land surface, if your
 24 question is would you have infiltration into the
 25 aquifer from like irrigation and precipitation,

1 the answer is no, you would not.
 2 Q. If you pump a well into the tank as
 3 communication through an aquifer to recharge
 4 sources, that pumping can induce recharge from
 5 sources other than just the faucet; correct?
 6 A. If there -- if the recharge is
 7 head-dependent recharge -- and by "head-
 8 dependent," it is a saturated flow from -- and
 9 generally "head-dependent" means it's a surface
 10 water body, but it's a surface water body where
 11 there's saturated hydraulic connection.
 12 If there's unsaturated hydraulic -- in
 13 other words, if there's unsaturation below the
 14 river, then you're not going to induce any more
 15 recharge. It has to be saturated.
 16 Q. "If there's unsaturation below the
 17 river," could you explain that?
 18 A. Yes, there are portions of the Snake
 19 River in Southern Idaho that are what we call
 20 "perched" above the aquifer. And that the
 21 leakage out of those reaches of the river are
 22 independent of hydraulic head within the river.
 23 Q. If the PGSA is a dipping aquifer, as
 24 you've testified, wouldn't you expect it to come
 25 up-dip and encounter the Boise River or units

1 associated with the Boise River at a shallow
 2 depth?
 3 A. That's a really good question and I
 4 would have loved to have been able to read
 5 something about that. Because I think what
 6 you're heading toward is what is the nature of
 7 recharge? Where does it occur and how is it
 8 hydraulically controlled? I haven't read
 9 anything that identified that. But logically
 10 you're correct, it should subcrop out underneath
 11 shallow alluvium. Now, whether that's in
 12 hydraulic connection, saturated hydraulic
 13 connection with a river, I don't know, but I
 14 suspect there would be cases where it would be.
 15 Q. With regard to the continuation of the
 16 aquifer toward the Payette or not, would you
 17 agree that you know of no evidence to show that
 18 it does not flow in that direction?
 19 A. That is correct.
 20 Q. And would you also agree that the
 21 question of water budget in the Boise drainage
 22 would be affected if water does flow toward the
 23 Payette through this area?
 24 A. If you're saying that there's water
 25 flowing from the Boise system across to the

1 Payette system, if you are doing a water budget
2 within the topographic domain of the Boise, then
3 yes, that would affect the overall budget.
4 That's water going out of the basin.

5 Q. You agree that the Pierce Gulch Sand
6 Aquifer is recharged; don't you?

7 A. I don't believe we've established a
8 recharge mechanism or a recharge area, but yes, I
9 believe it's recharged.

10 Q. Are you familiar with the Treasure
11 Valley Hydrologic Project?

12 A. Yes, sir.

13 Q. What's the basis of your familiarity
14 with that?

15 A. Dr. Christian Petrich is a former Ph.D.
16 student of mine and a good friend and he, of
17 course, worked on that. And we chatted about it
18 off and on over an extended period of time. I
19 did not work on the project in any way.

20 Q. Are you aware that the Treasure Valley
21 Hydrologic Project, perhaps due to just a lack of
22 data or the need to establish a boundary
23 somewhere, did put a hydrogeologic boundary north
24 of the Boise River somewhere in the vicinity of
25 M3? Are you aware of that?

1 A. Yes, sir.

2 Q. Meaning that groundwater would not flow
3 in their model across that boundary; correct?

4 A. That is correct.

5 Q. With regard to the Treasure Valley
6 Hydrologic Project's model, do you know what the
7 description was of recharge and discharge in that
8 model?

9 A. Not in detail, no.

10 Q. Do you know it in general?

11 A. Certainly in general, that the water
12 budget would include water from the Boise River
13 and the Boise Project as a primary -- one of the
14 primary sources. And the discharge would end up
15 being into, again, to the Boise River and the
16 Snake River. But just in generalities, not in
17 specifics.

18 Q. With regard to your figure 9 and your
19 discussion in your report, Exhibit No. 47, do you
20 know whether the Treasure Valley Hydrologic
21 Project looked at some of these same wells that
22 are depicted in this figure?

23 A. I do not.

24 Q. Do you consider the Treasure Valley
25 Hydrologic Project numerical model reliable in

1 projecting groundwater pumping effects in the
2 area of M3 Eagle?

3 A. I was never asked to review it and I
4 have limited knowledge. My opinion would be
5 based upon the critiquing that was done of that
6 model and it apparently satisfied the reviewers.
7 So, that's the limit of my knowledge.

8 Q. Returning to figure 9 with regard to
9 the contours that are on there that are in blue
10 that were placed there by Hydro Logic, those
11 contours were placed there, were they not, based
12 on actual water level measurements in wells?

13 A. They do not appear to be that way, no.

14 Q. And what is that opinion based on?

15 A. What I did was to -- the red circles
16 and the number alongside are the data off of the
17 table within the publication. And I don't recall
18 that at this point in time.

19 I plotted those with the idea just to
20 evaluate the point you made. And I believe I
21 indicated that south and southeast of the site
22 the contours reasonably represent the field data.
23 But once you get west and particularly northwest
24 of that site, there are contours but almost no
25 field data.

1 Q. I think my question, though, was
2 whether you know whether the field data that was
3 used to place these contours here by HLI was
4 actual well measurements? Are you saying that
5 actual well measurements were not taken?

6 A. I misunderstood the question. The well
7 measurements as I understood were taken by
8 Hydro Logic and they were in a table. And I
9 assumed that they were accurate and I did not
10 question those.

11 Q. So, that is actual field data; is it
12 not?

13 A. The red -- the numbers alongside the
14 red dots are actual field data, yes.

15 Q. Do you agree that the groundwater
16 levels in the Payette Valley are lower than those
17 in this vicinity of M3 and in the Boise Valley?

18 A. My only basis for knowledge is this
19 contour map. And I believe there was one data
20 point out there and that was lower elevation. I
21 did not independently evaluate that.

22 Q. If there is a lower elevation of the
23 groundwater measurements in the Payette Valley,
24 isn't it a fact that groundwater will flow in
25 that direction?

1 A. There's certainly a component of flow
 2 from high elevation to lower elevation. The
 3 amount of flow depends upon the hydraulic
 4 conductivity of the material.
 5 Q. With regard to figure 9 of Exhibit
 6 No. 47, your two dashed red contour lines that
 7 you placed there are not significantly different,
 8 at least in terms of the west-northwest flow
 9 picture, than HLI's; wouldn't that be fair to
 10 say?
 11 A. The contour labeled as 2450, my dashed
 12 contour and the blue contour are similar over
 13 much of the length. The other contours are quite
 14 different.
 15 Q. I would take it that you're saying that
 16 your contour further to the west is quite
 17 different from HLI's because it doesn't swing
 18 quite as far north; correct?
 19 A. That is correct.
 20 Q. Now, with regard to your statement just
 21 now about water moving from areas of greater head
 22 to lower head and between M3 and the Payette
 23 Valley, wouldn't you agree that the contours
 24 would still be correct regardless of the amount
 25 of flow, that the amount of flow does not affect

1 the placement of contours on a groundwater map?
 2 A. That is true.
 3 Q. Now, isn't a contour map essentially a
 4 simplified flow net, to use the hydrologist's
 5 term?
 6 A. No, it is not.
 7 Q. It is not?
 8 A. No.
 9 Q. Can you describe what a flow net is?
 10 A. It's one that is where you take equal
 11 potential lines, which are contours of equal
 12 groundwater elevation, and affix to those actual
 13 flow lines and you make some assumptions based
 14 upon that. The primary assumption is that the
 15 material is isotropic, meaning that the hydraulic
 16 properties don't differ in the X/Y direction, in
 17 which case then you would draw a line that would
 18 cross the equal potential lines or water level
 19 contour lines at right angles from a point in
 20 this case on the southeast corner on through the
 21 area onto the northwest. And if you get parallel
 22 ones, you would create what is typically known as
 23 a flow net. And that can be quantitatively
 24 interpreted. The lines that are drawn on here
 25 were apparently not intended to be a part of a

1 flow net.
 2 THE HEARING OFFICER: We need to change
 3 the tape.
 4 MR. FEREDAY: This might be a good time
 5 to break for lunch. We have a number of
 6 questions still.
 7 THE HEARING OFFICER: Okay, is that
 8 acceptable to everybody?
 9 MR. THORNTON: Yes.
 10 THE HEARING OFFICER: Do we want to
 11 come back at 1:00?
 12 MR. ALAN SMITH: 1:00 is great.
 13 THE HEARING OFFICER: Good.
 14 (Luncheon recess taken.)
 15 THE HEARING OFFICER: Okay, let's
 16 record. We're recording after the lunch recess.
 17 Mr. Fereday, you're in the middle of
 18 examining Dr. Ralston.
 19 Q. (BY MR. FEREDAY) Dr. Ralston, before
 20 lunch we were talking about your contour map
 21 which is figure 9 of your Exhibit No. 47. And I
 22 believe your testimony was that the contours are
 23 in general, I'll make a general statement here,
 24 the contours in the lower right part of this map
 25 moving up toward M3 are well supported, but that

1 your concern is after they get to west of M3,
 2 you're concerned that maybe there's not enough
 3 field data. Do you recall that testimony?
 4 A. Yes, sir.
 5 Q. With regard to rules having to do with
 6 establishing flow lines relative to contour
 7 lines, I believe you testified that the flow line
 8 needs to be placed perpendicular, at least
 9 generally speaking perpendicular to the contour
 10 line; isn't that correct?
 11 A. If it's assumed to be isotropic, yes.
 12 Q. And with regard to an unsaturated zone
 13 and a no-flow boundary such as the green line,
 14 the famous green line on this map, would you
 15 agree that a contour line would be in this
 16 setting the parallel to that green line or be
 17 more or less perpendicular to it?
 18 A. Perpendicular.
 19 Q. And so, is it a fact that a no-flow
 20 boundary will always have a contour line that is
 21 perpendicular to it?
 22 A. If there's a hydraulic gradient.
 23 Q. If there's a hydraulic gradient moving
 24 the water somewhere; correct?
 25 A. That's correct.

1 Q. Do you see based on your figure 9 any
2 no-flow boundaries in the lower right-hand
3 portion that we've discussed down from West Boise
4 moving up through M3 based on the contours?

5 A. Based on the, what are they, 25-foot
6 contours? The 2525 -- no, 2575 contour shows us
7 intercepting at a right angle in the same way you
8 just described to the fault.

9 Q. And that would be the West Boise-Eagle
10 fault; correct?

11 A. Yes, sir.

12 Q. And wouldn't it also be true that the
13 2550 contour as it moves up through the M3
14 property and comes up close to the 2551 well is
15 hitting that green line at right angles as well;
16 correct?

17 A. One would presume so.

18 Q. Does that appear correct to you or the
19 proper way to conceive of this groundwater flow
20 here?

21 A. That's the proper way. It's hard to
22 tell on this diagram given the scale and the
23 numbers.

24 Q. Dr. Ralston, do you remember the
25 transmissivity calculations that Hydro Logic made

1 with regard to this area here south of M3 between
2 M3 and the Boise River, West Boise area?

3 A. Not specifically, no.

4 Q. Could you refer, please, to Exhibit
5 No. 12. It's a big exhibit and right at the
6 front of it is a map, small i1. And before I get
7 to i1, which does show some transmissivities,
8 with regard to the no-flow boundary question I
9 just asked you, other than the green line and the
10 West Boise-Eagle fault, do you see any no-flow
11 boundaries moving up through M3 based on this
12 contour?

13 A. The contour map that is figure 9?

14 Q. Correct.

15 A. No, sir.

16 Q. Let's go then to Exhibit No. 12,
17 figure i1, which is near the front of that
18 exhibit. Have you seen this map before,
19 Dr. Ralston? Did you review this in your work
20 for the protestants in this case?

21 A. Yes, sir.

22 Q. Do you have any reason to dispute any
23 of the transmissivity values that were calculated
24 for these various locations shown by dots on this
25 map?

1 A. The only -- my only question is that I
2 believe that transmissivity values were
3 calculated using the original data and then there
4 were transmissivity values after compensating for
5 partial penetration. And I believe that I raised
6 in the deposition some questions about the
7 calculation of transmissivity using the partial
8 penetration effect.

9 So, I don't know which numbers these
10 represent. It doesn't seem to be identified
11 whether they're the original numbers or whether
12 even that correction was made.

13 Q. Do you recall from your deposition,
14 though, that you stated that compensating for
15 partial penetration effects and calculating a
16 transmissivity is a scientifically supportable
17 way to evaluate transmissivity?

18 A. If I recall correctly, and obviously
19 it's been a little while for both of us, that I
20 think my comment was it isn't anything that I
21 would do, but it may be within the realm of what
22 a different hydrogeologist might think is an
23 appropriate thing. I don't think it is, but they
24 might. And I think that's the way we left it, if
25 I recall correctly.

1 Q. Transmissivity is a calculation,
2 though, that is based on hydraulic conductivity
3 and thickness; correct?

4 A. Except you calculate transmissivity.

5 Q. Is that correct, it's based on those
6 two factors?

7 A. It is the product of those two factors,
8 but what you measure in an aquifer test is
9 transmissivity, you don't measure hydraulic
10 conductivity.

11 Q. But to calculate transmissivity, we
12 need to at least understand thickness; do we not?

13 A. To calculate transmissivity, no, I'm
14 not sure you would have to understand thickness.
15 To interpret the data, obviously you need to
16 understand the hydrogeology.

17 The calculation of transmissivity comes
18 out of all of the hydraulic equations. There's
19 no place that I can recall in the input to
20 Aqtesolv using the standard Theis and some of
21 those that you have to put in aquifer thickness
22 for a confined aquifer.

23 Q. You just have to put in a value for T,
24 your transmissivity; don't you?

25 A. No, the calculated trans --

1 Q. If you calculate --
 2 A. Transmissivity is the thing that's
 3 calculated.
 4 THE HEARING OFFICER: Okay, I need to
 5 tell both of you: You're conversing and cutting
 6 each other off now. So, I need to have a very
 7 measured question and then a pause and then an
 8 answer and vice versa. Thank you.
 9 THE WITNESS: Sorry.
 10 Q. (BY MR. FEREDAY) So, are you
 11 testifying that Aqtesolv does not require
 12 inputting thickness of the unit into the equation
 13 to calculate T?
 14 THE HEARING OFFICER: You're fine.
 15 THE WITNESS: There are many, many
 16 different methods embedded within Aqtesolv. If
 17 you are using the Theis application within
 18 Aqtesolv, as I recall, that it does not require
 19 you to put in aquifer thickness.
 20 Q. (BY MR. FEREDAY) Do you agree that
 21 these transmissivity values in this area south of
 22 M3 moving back up the contours toward the Boise
 23 River are relatively high values?
 24 A. Yes, sir.
 25 Q. Are you familiar with the pumping

1 history and current water level status of any of
 2 the wells here, such as the Floating Feather
 3 well?
 4 A. No, sir.
 5 Q. With regard to your comment about the
 6 model and its lack, I believe you said, of a
 7 specific boundary at a recharge source, do you
 8 understand that the model boundary for the M3
 9 model is set at a position that is upgradient of
 10 these high transmissivity values that we've just
 11 been talking about in Exhibit No. 12?
 12 A. If possible, I would like to have you
 13 refer me to the right publication so that I can
 14 look at that.
 15 Q. I believe it's Exhibit No. 16.
 16 A. 16?
 17 Q. Yes.
 18 MR. THORNTON: Is there a figure in 16?
 19 I'm sorry.
 20 MR. FEREDAY: I believe the cover of
 21 the figure, just to start there, shows the corner
 22 of the model domain.
 23 Q. (BY MR. FEREDAY) I'll represent to
 24 you, Dr. Ralston, that the cover of this
 25 represents the model domain. And if you would

1 like, you can also go to page 56. That might --
 2 MR. FEREDAY: Can we go off the record
 3 for just a moment? I'm sorry.
 4 THE HEARING OFFICER: Yes.
 5 (Discussion held off the record.)
 6 MR. FEREDAY: We'll go back on.
 7 THE HEARING OFFICER: We're recording
 8 again.
 9 Q. (BY MR. FEREDAY) Page 50 shows the
 10 domain, figure 6. Does that appear to you,
 11 Dr. Ralston, to be a reasonably sized model
 12 domain to model the groundwater conditions and
 13 potential effects of pumping beneath the M3 site?
 14 A. I'm not sure I can answer that. The
 15 model boundaries depend upon the purpose of the
 16 model. And if you would ask: Are these the
 17 boundaries I might choose or are these the
 18 boundaries someone else might choose, that's a
 19 different question. I have no idea whether these
 20 boundaries, and I have not -- include all of the
 21 areas that you thought recharge occurred. If
 22 they do, then yes, I think those are appropriate
 23 boundaries.
 24 Q. Dr. Ralston, with reference to the map
 25 that we just looked at and the high

1 transmissivities, do you think it reasonable to
 2 establish a model boundary that is upgradient
 3 from flow, groundwater flow through an area of
 4 high transmissivity and known values to establish
 5 the input boundary to the model?
 6 A. Yes, I do.
 7 Q. And to go back to your horse trough
 8 example, if we could, wouldn't this be similar to
 9 just noting that there is a certain amount of
 10 flow through and flow out of the model and,
 11 therefore, one could assume that there is
 12 recharge coming in by seeing the flow through
 13 this boundary area?
 14 A. I think that's a logical approach if
 15 you know what the flow is. If you don't know
 16 what the flow is, then it becomes a lot less
 17 logical.
 18 Q. Are you aware that the M3 model relied
 19 on the recharge -- aquifer recharge findings of
 20 the Treasure Valley Hydrologic Project for
 21 evaluating what the upgradient input might be?
 22 A. I was aware of that, yes.
 23 Q. Do you think that that was a reasonable
 24 thing for the HLI modelers to do?
 25 A. Yes, sir.

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1 Q. And if pumping in the area of concern
2 here, the M3 area, would not have measurable
3 effects on the model boundary, don't you think
4 that that also is an indication of the boundary
5 being established in a reasonable place?
6 A. Can I elaborate on an answer?
7 Q. Well, you can just answer first and
8 then you can elaborate.
9 A. Okay, ask me the question, then. I
10 already lost it.
11 Q. Well, let me ask you another question
12 before that. Are you aware that the inflow
13 assumed to occur across that boundary, and I
14 believe it was about 115 cfs for the section of
15 the boundary designated in the southeast, is not
16 allowed to increase as the model runs are made,
17 in other words, that's a fixed amount, were you
18 aware of this?
19 A. I don't recall it, but I'm sure I must
20 have read it.
21 Q. Do you think that's a reasonable
22 approach to take, to assume that you have a fixed
23 amount of flow that will not increase in terms of
24 trying to evaluate how the model will predict
25 drawdowns?

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1 A. No, I don't.
2 Q. And why is that?
3 A. It seems to me like the best approach
4 is to represent recharge where and how it occurs
5 and whether or not it's head-dependent or not
6 head-dependent.
7 Now, if what -- by setting an
8 artificial fixed amount, then obviously pumping
9 cannot increase recharge. Okay? Is that the way
10 the natural system is? And the answer is: I
11 don't know.
12 If we're trying to have an accurate
13 representation of what's out there, it would --
14 if we had some idea of whether it is head-
15 dependent recharge, then it makes sense that you
16 would put it as head-dependent recharge. And
17 there are boundary conditions to do that.
18 If you know that it's not head-
19 dependent recharge, then the boundary you've
20 selected is just fine. And so, that must have
21 been what they assumed because that's what they
22 are doing. But I didn't read that, not that I
23 recall at least.
24 Q. From my description do you understand,
25 then, though, that the HLI model is not allowing

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1 additional recharge to come into the model
2 despite the amount of pumping? You understand
3 that's the fact?
4 A. Yes, sir.
5 Q. And I think we can both agree, can't
6 we, that that's an artificial construct; correct?
7 A. Yes, sir.
8 Q. Because additional pumping ultimately
9 would cause more recharge to come into the model
10 domain; correct?
11 A. If it's a head-dependent recharge.
12 Q. If there is head driving groundwater
13 toward that boundary; correct?
14 A. No, if there is a saturated zone
15 between the source of recharge, whether it's
16 surface water, if that's what it is, if there's
17 saturated flow between, for example, a canal or
18 the river, then that's head-dependent.
19 Q. Would you expect that this Boise River
20 area is producing head-dependent conditions?
21 A. I would presume so, yes.
22 Q. Could you describe a non-head-dependent
23 situation?
24 A. Certainly, a lined canal.
25 Q. A lined canal would be non-head-

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1 dependent in the sense that it isn't putting
2 water out into the groundwater; is that the idea?
3 A. No, it could still leak, but that it
4 isn't head-dependent. An unlined canal could be
5 non-head-dependent. It just doesn't leak enough
6 water to form saturation under it, and thus the
7 rate of leakage is independent of water level.
8 Q. So, do you agree, Dr. Ralston, that the
9 establishment of the southeast model boundary
10 here for the M3 model is a conservative gesture
11 or would you say it's aggressive?
12 A. I'm not sure what either one of those
13 terms mean. Could you define them?
14 Q. Yes, let's say "conservative" meaning
15 that establishing the model boundary in that
16 manner would tend to increase the predicted
17 drawdown from pumping within the model.
18 A. That is correct.
19 Q. I'd like to return briefly to the
20 discussion we had about Lake Idaho and I'd like
21 to refer you to a map in one of Dr. Wood's
22 publications. You said that you have read
23 Dr. Wood's publications; correct?
24 A. Yeah, whether I've read all of
25 Dr. Wood's publications is a question. I've read

1 some of them.
 2 Q. I'm referring to Exhibit No. 19G. And
 3 it's page 105, figure 2, which is a map of the
 4 Western Snake Plain showing the outline of what
 5 is believed to be Lake Idaho. Have you seen that
 6 before?
 7 A. Yes, sir.
 8 Q. I recognize that there are few modern
 9 day markers placed here, but we do have the City
 10 of Boise, you see over there on the right side, a
 11 little --
 12 MR. LAWRENCE: I don't think he's
 13 looking at the same thing.
 14 THE WITNESS: I see the City of
 15 Caldwell.
 16 Q. (BY MR. FEREDAY) I believe you're on
 17 the wrong page.
 18 MR. LAWRENCE: There you go
 19 (indicating.)
 20 Q. (BY MR. FEREDAY) Now you've been
 21 directed to figure 2. Do you see the two-legged
 22 drainage coming in from the right, I'll represent
 23 to you right opposite TD1, if you will, coming in
 24 from of the west? I believe, would you agree
 25 with me that that could represent the Payette

1 River?
 2 A. Near where it says "A prime"?
 3 Q. Correct.
 4 A. I don't know that that does, but that's
 5 fine. If you represent that, then that's fine.
 6 Q. Now, do you understand that the general
 7 gradient in this entire figure is toward Hells
 8 Canyon, that is in a generally northwest trend?
 9 Would you agree with that?
 10 A. I would presume so.
 11 Q. And do you recognize that these lake
 12 sediments were laid down, laid down as the lake
 13 was drained --
 14 A. Yes.
 15 Q. -- as well as when it was full?
 16 A. Sorry. Yes, sir.
 17 Q. What happens to the lakeshore and delta
 18 deposits as the lake is -- as a lake such as this
 19 is drained; do you know? Or have you read?
 20 A. I have read that as the lakeshore goes
 21 down, then the shoreline -- as the lake level
 22 goes down, then the shoreline obviously follows
 23 it down. And if you've got a delta, then those
 24 delta deposits, the sediments would deposit it at
 25 a lower elevation than when the lake is high.

1 Q. And those deposits would be moved
 2 around and spread by fluvial action as well;
 3 correct?
 4 A. I presume so, but don't know.
 5 Q. Would you agree that the deposition of
 6 those sediments along the lake margin could
 7 become quite widespread as the lake drains?
 8 A. If you look at that as the Payette,
 9 then I'm assuming the gap where the Payette comes
 10 in, if that's where you're suggesting the
 11 sediment comes from, that the source of the
 12 Payette would always be in that general location
 13 in the gap in the bedrock. And I'm assuming that
 14 the sediments would extend out from that, the
 15 coarser grained sediments.
 16 Q. The sediments would extend out from the
 17 mouth of that Payette structure, but also the
 18 sediments would be at other locations along the
 19 margin of the lake; right?
 20 A. To the extent to which there were
 21 streams to bring the sediments into the lake.
 22 Q. Do you have any reason to question the
 23 proposition that lake sediments extend a
 24 substantial distance into these -- into the lakes
 25 and form the aquifers that we see today?

1 A. If you ask do sediments extend out into
 2 the lake, the answer is yes.
 3 Q. And with regard to your testimony this
 4 morning about Exhibit No. 45, I think it was
 5 figures 2 and 3 that we talked about, the oil
 6 well geophysical logs and the long distance of,
 7 in your view, between M3 and the Ted Daws well,
 8 for example, are you testifying now that you find
 9 that unrealistic that sediments could be spread
 10 across that entire area through this process?
 11 A. I'm saying that sediments could be
 12 spread across there. Sediments would be spread.
 13 Q. Okay, thank you. Dr. Ralston, you I
 14 believe commented upon certain aspects of the
 15 aquifer tests that HLI carried out. Do you
 16 recall that?
 17 A. I don't recall the instance.
 18 Q. I'd like you to refer now, please, to
 19 some of the aquifer -- some of the aquifer tests
 20 report information that is in this record. Have
 21 you reviewed that from Hydro Logic?
 22 A. Which reference are you talking about?
 23 Q. For the Kling test at Exhibit No. 12,
 24 the reanalysis of 16 aquifer tests?
 25 A. Yes, sir, I reviewed it.

1 Q. I'd like you to refer, please, to
2 Exhibit No. 12, figure 81.
3 A. (Witness complied.)
4 Q. And you may recall, this is one of the
5 same figures I believe I discussed this morning
6 with Mr. Vincent. Excuse me, let's first go to
7 figure 84, just a few pages on, because that's
8 the drawdown plot. And I essentially want to ask
9 you the same questions I asked Mr. Vincent.
10 Based on your experience in conducting
11 aquifer tests, Dr. Ralston, do you see any
12 evidence of a boundary throughout the duration of
13 that aquifer pumping test in this pumping well?
14 A. I'm assuming that this is the pumping
15 well that we're looking at and not an observation
16 well; is that correct?
17 Q. That's correct.
18 A. I don't see a change in slope, the
19 change in slope that might indicate a boundary.
20 Q. What about back on -- or up on
21 figure 85, which is the recovery analysis for the
22 same well? Do you see any indication there that
23 there's a boundary?
24 A. No, sir.
25 Q. Do you know how far the Kling

1 irrigation well is from the so-called inferred
2 panhandle fault?
3 A. No, sir.
4 Q. Okay. I'd like you to refer to Exhibit
5 No. 45, figure 7. You testified this morning
6 about the Big Gulch stock well and your concerns
7 about it. And I'd like you to look at figure 6
8 in Exhibit No. 45, which is a Cooper-Jacob
9 analysis for the Big Gulch stock well. I'll
10 represent to you that at least it's the drawdown
11 plot. What kind of a boundary do you see showing
12 up in that, or do you see a boundary at all
13 showing up in that plot?
14 A. My analysis of aquifer tests, if I can
15 elaborate a moment, involves initially observing
16 the data and making sure there are no errors, and
17 I presume this is error-free data, and then
18 looking at the hydrogeology and then assembling a
19 list of the potential mechanisms that could cause
20 a deviation from the Theis equation, which is
21 just essentially just a modification of the
22 Theis.
23 And so, what it looks like is that
24 there's greater drawdown at late time than the
25 Theis predicts. Okay? So, certainly, then you

1 would run through what are the alternative
2 explanations? And certainly the idea of
3 antecedent trend and late time data, that could
4 be an issue. And presuming HLI took that out if
5 it was there, I don't recall.
6 It could be a lower pumping rate. And
7 so, I'd go back and see -- I mean a greater
8 pumping rate. And I'd go back and see if the
9 pumping rate is -- you know, look through all of
10 the potential explanations. And if the one
11 remaining is a negative boundary, then that's
12 probably what I would conclude. I have not gone
13 through all of that, but that's what I would
14 infer.
15 Q. Thank you. Now, if you'd turn the page
16 to figure 7 in Exhibit No. 45, please. And here
17 we have a Theis recovery analysis, which
18 progresses from the upper right to the lower left
19 on that plot. This is the recovery in the Big
20 Gulch stock well. What do you see there with
21 regard to boundaries, Dr. Ralston?
22 A. First of all, this is corrected for
23 data trend, I note. And the other one was
24 corrected for data trend. I didn't even notice
25 that.

1 It appears to be a reasonably linear
2 line. I'm not sure that I would conclude
3 anything of significance other than it's a
4 reasonable line.
5 Q. And no boundary shows up there?
6 A. I'm not sure that I would conclude that
7 there was a boundary at that time. One of the
8 things that I try to do when I'm operating a test
9 is to field plot information to the extent to
10 which I can. Because the question is always:
11 When do you quit pumping? It could be when you
12 run out of fuel for your generator or it could be
13 running out of money, but it's always frustrating
14 if something is changing at the time you quit.
15 And so, most of the time I field plot and see if
16 this is an appropriate time.
17 Q. By "field plot," what do you mean?
18 A. I mean taking the data that have been
19 collected and inputting them into the computer
20 and doing a field -- a creation of a plot much
21 like this. And so, it looks like there's action
22 right at the end, but I'm not sure how you would
23 interpret that, "action" meaning deviations from
24 the line.
25 Q. What is your experience, Dr. Ralston,

1 with the length of aquifer tests? What kinds of
2 lengths of tests have you run in terms of
3 minutes, hours, days?

4 A. Some as short as a relatively few
5 hours, depending upon the objective. I ran one
6 test for 30 days because the question had to do
7 with long-term productivity and it was a fish
8 hatchery site. And then I ran one test for 90
9 days. And that had to do with a question of
10 whether there was hydraulic connection with a
11 nearby river, again a fish hatchery site, with
12 the idea that if -- it's in a relatively arid
13 portion of Northern Idaho, and that if there was
14 no hydraulic connection, it probably was not a
15 good fish hatchery site because of long-term
16 pumping effects. They pumped thousands of
17 gallons. So, we ran that one for 90 days. But
18 that's unusual. Generally 24 hours, 48. It
19 depends on the objective.

20 Q. How many tests would you figure you've
21 run that are greater than a week?

22 A. Very few, perhaps less -- certainly
23 less than ten, yeah.

24 Q. Have you run any that are longer than
25 nine days other than the two you mentioned?

1 A. I don't believe I've run any longer
2 than nine days other than those two. I'd have to
3 think about that, but I don't believe so.

4 Q. And how many aquifer tests have you
5 run, would you estimate?

6 A. Oh, it's hard to know. Probably an
7 average of maybe 10 to 15 a year for 40 years.
8 Now, realize that in teaching groundwater
9 hydraulics classes, I had to arrange for a field
10 research site. And so, you would run them as a
11 class assignment. You would run them just on a
12 routine basis, so --

13 Q. One other question on figure 7 that we
14 were just talking about, the recovery plot for
15 Big Gulch stock. Would you say that this, that
16 there is a negative boundary revealed by this
17 data?

18 A. It would be difficult for me to
19 conclude that simply because the deviations are
20 small and it's corrected data. It would just be
21 difficult to come to that conclusion.

22 Q. So, there was a negative boundary in
23 the drawdown in Big Gulch stock but not in the
24 recovery. What does that tell you?

25 A. Again, if you'll recall back that I had

1 gone through my list of potential things that
2 could cause a deviation from the Theis plot and
3 that that's again my normal approach. You go
4 through all of these alternatives. I didn't
5 personally check to see if any of the other
6 potential things, such as a changing pumping rate
7 or something else was going on.

8 Certainly, if I had both of these and I
9 ascertained there was nothing else extraneous
10 going on, then I'd take a look at that and try to
11 figure out why that occurred.

12 Q. Do you feel that the Big Gulch stock
13 well provided useful data even though its
14 drawdown was only 1-1/2 feet?

15 A. The problem, as I've heard it
16 yesterday, in the Big Gulch stock well is the
17 idea of it's an open well, as I understand it,
18 and that it may or may not be completed in the
19 aquifer. And the primary problem is trying to
20 interpret what it means. And after listening to
21 the discussion yesterday, I have no idea how the
22 well is completed, so --

23 Q. Dr. Ralston, I'd like you to refer,
24 since you're in Exhibit No. 12, I believe, there,
25 to -- I'm sorry, 44, Exhibit No. 44. Move on to

1 page 126.

2 A. Of Exhibit No. 44? Is that what
3 you're --

4 Q. Yes.

5 A. (Witness complied.) Yes, sir.

6 Q. And Dr. Ralston, before we discuss 44,
7 which I think may make this same point, you
8 mentioned that any boundary that you might have
9 been looking for there in the Big Gulch stock
10 well might be caused by barometric effects, you
11 mentioned that, and pumping. You recognize that
12 those are possibilities?

13 A. I think the way I worded it is that if
14 there's deviations from the Theis equation, then
15 I would look for all of the potential
16 explanations and see if I had collected
17 information to either support them or refute
18 them. So, I presumed the data were collected to
19 know if it was barometric and I'm assuming it was
20 not an accuracy error problem. But again, I'd
21 have to look at the data.

22 Q. But if it were another pumping well or
23 a barometric effect, that would be what is known
24 as a "transient boundary"; would it not?

25 A. I don't think I've ever even heard that

1 term, a "transient boundary."
 2 Q. That term is not familiar to you as a
 3 hydrogeologist?
 4 A. It is not.
 5 Q. A boundary caused by a transient
 6 effect?
 7 A. Not in the term of boundary. Certainly
 8 there could be other pumping effects, but I
 9 wouldn't term it as a boundary.
 10 Q. It's not a physical boundary we're
 11 talking about, but a boundary effect showing up
 12 in a plot based on a transient event, such as
 13 pumping or something like that, not a geological
 14 or a physical effect.
 15 A. I think we're just discussing words.
 16 The effect of other pumping wells, certainly I
 17 would deal with that. I just never had called
 18 them boundaries. If you wanted to call them
 19 boundaries, that's fine, but I just never had.
 20 Q. Let's go to page 126, then, figure 44
 21 of Exhibit No. 44. Do you see there that the Big
 22 Gulch stock well plots along a curve that is
 23 right on line with SVR-7 and test well 4, both of
 24 which are completed in the PGSA?
 25 A. Could I have an explanation? There's

1 multiple curves on this graph that I don't see
 2 identified what they are. There's four different
 3 curves shown.
 4 Q. Well, in the upper right-hand corner,
 5 the blue dots are SVR-7 data. That's the pumping
 6 well, from the SVR-7 test. The brown dots in the
 7 lower left I'll represent to you are test well 4,
 8 zone 2, which is one of the piezometer nest wells
 9 that M3 has constructed. The Big Gulch stock
 10 would be in the middle of the other blue dots, as
 11 noted.
 12 A. My question, sir, didn't have to do
 13 with the data points. There are four different
 14 curved lines on the plot. And I didn't know what
 15 the different -- what I would call type curves.
 16 There appear to be four different type curves and
 17 I don't know what they represent.
 18 Q. Well, perhaps figure 45, the very next
 19 page, would help a little. The solid line there
 20 represents a type curve. Do you understand what
 21 a type curve is?
 22 A. Yes, sir.
 23 Q. Would you agree that wells that plot
 24 along the same type curve can be said to be in
 25 the same aquifer?

1 A. If I can, let me make sure I understand
 2 what we're looking at, that we're plotting at a
 3 selected period of time. I haven't looked at
 4 this. What period of time do these data plots
 5 represent?
 6 Q. Well, I believe the time is noted at
 7 the -- excuse me, this is a distance drawdown,
 8 not a time drawdown.
 9 A. I realize that.
 10 Q. But it was a nine-day test.
 11 A. But the question is: At what time were
 12 these data taken? They had to be taken at the
 13 identical time to be meaningful. What time were
 14 they taken?
 15 Q. I think at 5,000 minutes, as noted on
 16 the figure.
 17 A. Thank you. I did not see that. Okay,
 18 now that I understand the plot, what was your
 19 question?
 20 Q. My question was: Does this support the
 21 conclusion to a reasonable degree of scientific
 22 certainty that the Big Gulch stock well is in the
 23 same aquifer as test well -- as SVR-9, for
 24 example, the pumping well, test well 4, zone 2?
 25 A. I think my conclusion would be that

1 SVR-9, test well 4, zone 2, and the Big Gulch
 2 stock well appear to be on close to what is the
 3 type curve. Now, again, there's four different
 4 curves on this plot as well. Is the black one
 5 the type -- the Theis curve and what are the
 6 other -- there's four different curves on this.
 7 Q. Down below it says the solid line
 8 represents the type curve.
 9 A. Again, there's three different solids.
 10 I'm not trying to be argumentative, but there's
 11 three different solid lines and there's one
 12 dashed line.
 13 Q. I believe that the three are dashed and
 14 one is solid. It may be difficult to pick that
 15 up. They don't appear to be very far off the
 16 same line in any event; do they?
 17 A. They do not appear to be very far off
 18 the same line.
 19 Q. And would you say that it's more likely
 20 than not that these are in the same aquifer?
 21 A. It would appear that they are, yes.
 22 Q. Thank you. Exhibit No. 45, Exhibit --
 23 excuse me, Exhibit No. 45, figure 5, I'd like you
 24 to refer to next. And this one has to do,
 25 Dr. Ralston, with taking groundwater level

1 measurements.

2 Where in the -- based on this figure
3 for these two wells, and let's focus on the upper
4 well, which is test well 1, where would you say
5 the best time would be to take a water level
6 measurement in that well?

7 A. There is no best time. It depends upon
8 your objective. Obviously, if you want to
9 measure the highest water level, you would
10 measure in the middle of the winter. If you want
11 to measure the lowest water level, you would
12 measure in the late summer. So, I'm not sure
13 there's a best time. It depends what your
14 objective is.

15 Q. If you are attempting to determine
16 long-term trends, what kind of measurement
17 program would you use in terms of the time of
18 year during which you would measure?

19 A. It's a complicated thing to determine
20 trends. This is in an area where the groundwater
21 levels appear to be the highest in the winter,
22 early spring, and the lowest in the summer. And
23 I'm presuming that is an effect of groundwater
24 pumping; okay? And so, if that's the case, then
25 typically the historic that I'm familiar with

1 have taken the highest water level as the way in
2 which you would determine trend.

3 Now, there's a difficulty with that.
4 If, in fact, the start of pumping the next year
5 occurs before recovery is completed, it gets to
6 be complicated. The ideal thing is to take the
7 trend wells, locate the trend wells where they're
8 not really close to major production wells so
9 that they have less noise to have to work out of.

10 Q. But if you were to try to evaluate
11 aquifer level trends, wouldn't you at least try
12 to pick something close to the same date every
13 year? For example, would you pick a March date,
14 an April date, and a May date and then attempt to
15 use that to determine what the long-term trend
16 was for the aquifer based on this figure?

17 A. It would be very -- I would have to
18 think about this for awhile of how to get a trend
19 out of data that have this much fluctuation from
20 one year to the next. If I had to choose
21 immediately, I would probably choose the highest
22 water level, but that doesn't occur at the same
23 time each year. So, my answer would be: It
24 would be very complicated to end up with some
25 meaningful idea of whether the water levels in

1 this well have gone up from 2007 to 2008 or have
2 gone down.

3 Q. Thank you. Now, with regard to the
4 drawdown plot once again in the Big Gulch stock
5 well, if the drawdown plot did show a negative
6 boundary and the recovery curve showed a positive
7 boundary or at least a lack of the negative
8 boundary, then isn't the conclusion there that
9 whatever is causing the boundary is not a fixed
10 physical aquifer boundary condition but, rather,
11 is some other event?

12 A. I think the way in which I would report
13 that is a lot of uncertainty. You're getting --
14 you're not getting a systematic response. And
15 so, I would report that as uncertain.

16 Q. But if it was a physical boundary,
17 wouldn't you see it, Dr. Ralston, in the plot?

18 A. If it is a physical boundary and if
19 there are no problems with the data set, that you
20 would anticipate seeing it, it should be
21 reproducible. If it's an absolutely critical
22 thing and if it was possible, I would run the
23 test again to see if I could find it out.
24 Because the potential problem or boundary is a
25 late time thing. And so, there are numerous

1 things that could cause that, or maybe it's real.
2 And if it's a critical thing, then I would rerun
3 the test if I could possibly rerun the test.

4 MR. FEREDAY: Could we take about a
5 five or ten-minute break? We're about an hour
6 into it.

7 THE HEARING OFFICER: Sure. Let's
8 break for ten minutes.

9 (Recess held.)

10 THE HEARING OFFICER: Okay, let's
11 start. We're recording again. Mr. Fereday, more
12 questions?

13 MR. FEREDAY: A few more, yes. Thank
14 you.

15 Q. (BY MR. FEREDAY) Dr. Ralston, to
16 return now to figure 9, let us go full circle on
17 your report, the contour map with your dashed
18 contour lines added. If we were to postulate a
19 pumping center in the Pierce Gulch Sand Aquifer
20 right in the middle of the M3 property, say at
21 well 2551, and whether we adopt your red dashed
22 lines as where the water flows or we adopt the
23 blue dashed lines that Hydro Logic postulates, do
24 you see that making a significant difference on
25 the effects on wells to the south in Eagle?

1 A. Potentially, yes.
 2 Q. And what would that be based on?
 3 A. First of all, the prediction of impacts
 4 is based upon the numerical model. And the
 5 numerical model represents a much larger chunk of
 6 real estate. And so, when you use the numerical
 7 model over long periods of time to predict
 8 drawdown, it -- the boundary effects that are put
 9 into that model become fairly important as well
 10 as the whole characteristics.
 11 And I think that the answer is that if
 12 the water doesn't flow into the Payette, for
 13 example, and that that whole portion of the model
 14 was excluded, for example, the question is would
 15 that lead you to different drawdown estimates?
 16 And I have not calculated that and I obviously
 17 can't without redoing the model, but my feeling
 18 is it would.
 19 Q. My question, though, is constrained
 20 just to the contour lines that you set up as
 21 compared to the contour lines that Hydro Logic
 22 set up. They're, I submit, relatively similar
 23 here in figure 9. I think you agree with that;
 24 correct?
 25 A. A different orientation, but the same

1 general area.
 2 Q. My question is whether pumping in the
 3 middle of M3 based on the difference in those
 4 contour lines would have any significant effect
 5 on the drawdowns to the south in Eagle?
 6 A. My response, and we may not be
 7 understanding each other, my response is the
 8 different water level contours indicates a
 9 different conceptual groundwater flow system,
 10 which would then change the model. In other
 11 words, that if you're going to represent
 12 groundwater flow that turns and goes to the
 13 Payette, then obviously your model has done that.
 14 If there is no flow to the Payette, then
 15 obviously you would build a different model, you
 16 would have the model different. And the revised
 17 model may very well have different predicted
 18 drawdowns.
 19 Q. Dr. Ralston, do you recall that, first
 20 of all that you answered this same question in
 21 the negative during your deposition?
 22 A. No, I have no idea. That's been
 23 awhile.
 24 Q. That is to say it would make no
 25 difference to the pumping -- or to the water

1 levels in Eagle? Are you aware that M3 did or
 2 had done a model run based on their model which
 3 assumed no flow to the Payette? Are you aware of
 4 this?
 5 A. No, sir, I have not read anything about
 6 that.
 7 Q. Do you know -- so, you wouldn't know
 8 what the results of that model run are?
 9 A. No, sir.
 10 Q. What do you think the model run would
 11 show if they adopted, for example, the no-flow
 12 boundary that the Treasure Valley Hydrologic
 13 Project adopted, which runs somewhere through or
 14 to the south of M3?
 15 A. I obviously have not done it. So, I
 16 have no firm ideas. My general concept is that
 17 there would be greater drawdown because simply
 18 that the water can only come to the well
 19 essentially from the south rather than coming to
 20 the well from the west and around the corner and
 21 on from the Payette. So, in that sense, I would
 22 presume greater drawdown, but I obviously don't
 23 know that.
 24 Q. Did you review the geochemical study
 25 done for M3 by Glanzman Geochemical and HLI?

1 A. Yes, sir.
 2 Q. And what was your general impression of
 3 that report?
 4 A. I thought it was a reasonably well
 5 written report. I know Dick Glanzman from
 6 various other projects. And I didn't spend a
 7 huge amount of time, but I read it and I thought
 8 it was a reasonable bit of scientific work.
 9 Q. Do you recognize Mr. Glanzman as an
 10 authority in this area?
 11 A. I recognize that he is -- how do I say
 12 this? I recognize that the consulting firm CH2M
 13 Hill relies on him and my experience has been
 14 that they would rely on competent individuals.
 15 I've got no other way of judging it.
 16 Q. What is your experience, if any,
 17 working with Pacific Groundwater Group, who did
 18 the modeling for the M3 project?
 19 A. A very, very slight connection. One of
 20 their technical people by the name of Linton
 21 Wildrick was working on a well in the Moscow-
 22 Pullman area. And he's a friend and I helped him
 23 out onsite a couple of times free gratis. And
 24 then one of their other technical folks, and his
 25 name escapes me, which is embarrassing, is a

1 former U of I hydrology student, Steve Swoop, and
2 Steve works there. I don't know if either one of
3 them worked on this project. I didn't see their
4 names.

5 Q. Are you aware of PGG's reputation in
6 the field as modelers?

7 A. Not necessarily as modelers, no.

8 Q. Going back to your figure 9 and your
9 response to my hypothetical, based on your
10 contours, where would the -- where would the cone
11 of depression propagate in this hypothetical
12 pumping from the middle of M3?

13 A. Again, if I make the presumption that
14 the contours are there because the flow cannot go
15 to the Payette, if I make that presumption --

16 Q. I'm sorry, that was not the presumption
17 that I asked --

18 A. Okay.

19 Q. -- you to assume. I asked you to
20 assume the contours that you placed on figure 9.

21 A. The contours just indicate a direction
22 of flow to the west and that the drawdown is
23 superpositioned. So, you would superimpose the
24 drawdown effects on that. You already have a
25 no-flow boundary, as I understand it, on the east

1 and one immediately on the north of the M3 Eagle.
2 So, it would be a skewed drawdown cone based upon
3 those no-flow boundaries.

4 MR. FEREDAY: No further questions.

5 THE HEARING OFFICER: Okay. Mr. Smith,
6 questions?

7 MR. ALAN SMITH: Yes, I have just a
8 few.

9 CROSS EXAMINATION

10 QUESTIONS BY MR. ALAN SMITH:

11 Q. Dr. Ralston, I believe you stated here
12 just a few minutes ago that --

13 MR. PETERSON: (Moving microphone.)

14 THE HEARING OFFICER: Thank you.

15 Q. (BY MR. ALAN SMITH) -- that there will
16 most certainly be impacts on the overlying
17 aquifers. Do we know how severe or slight that
18 might be?

19 A. The -- I'm not sure we know what they
20 are. The mathematical, the numerical model
21 created by Hydro Logic and Pacific Groundwater
22 Group has a section in which they predicted what
23 those drawdowns would be. And I thought that
24 that was a fairly reasonable representation. And
25 I don't have that in front of me, but as I

1 recall, a significant percentage of the drawdown
2 in the aquifer would propagate -- in the pumped
3 aquifer would propagate up into the shallow
4 aquifer. We could look that up if you so desire.

5 Q. You would describe it as significant,
6 then?

7 A. Yes.

8 Q. Now, if the Big Gulch well is only
9 180 feet deep, is there some doubt if it's even
10 in the PGSA?

11 A. Yes, sir.

12 Q. Didn't Mr. Vincent talk about that
13 earlier? I think you heard his testimony.

14 A. That is correct.

15 Q. And I believe Mr. Vincent also said
16 that there were two or three different depths
17 shown for the PGSA varying from maybe 180 feet at
18 the Pierce Gulch well to 400 feet. What is it?

19 A. I have not -- I have not attempted to
20 sort that out.

21 Q. Okay. So, you discussed the difference
22 of input and output on the equilibrium as far as
23 the aquifer is concerned. Could you turn to
24 Exhibit No. 50, page 20.

25 A. (Witness complied.)

1 Q. And about the third or fourth paragraph
2 down, Petrich states that groundwater level
3 declines were observed in the areas between
4 Northwest Boise and Eagle. And that was back in
5 2004. Have you found that yet?

6 THE HEARING OFFICER: Where are you
7 referring to?

8 MR. ALAN SMITH: Page 20, about halfway
9 down the page.

10 THE HEARING OFFICER: Are you looking
11 at one of the bulleted paragraphs?

12 MR. ALAN SMITH: It's about the fourth
13 paragraph, Exhibit No. 50.

14 THE HEARING OFFICER: So, the fourth
15 bulleted paragraph down?

16 MR. ALAN SMITH: On page 20.

17 THE HEARING OFFICER: It starts: "All
18 four undifferentiated wells"?

19 MR. ALAN SMITH: Right.

20 Q. (BY MR. ALAN SMITH) And the last part
21 of that sentence or quote there is that
22 groundwater level declines were observed in the
23 areas northwest of Boise and Eagle clear back in
24 2004.

25 A. I see that. What was your question?

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1 Q. Well, I just wondered if you agree with
2 that?
3 A. I have got no basis other than reading
4 it to agree or disagree. I'm presuming it must
5 be correct or Dr. Petrich wouldn't have written
6 it, but I don't know that.
7 Q. But it's your opinion that there will
8 be impacts in the overlying aquifers from the M3
9 pumping?
10 A. I think that in my opinion, and
11 certainly my simplified horse trough model shows,
12 that there will be water level declines. There
13 have to be in order to reach equilibrium. And
14 the numerical modeling efforts suggest that those
15 will propagate up into the overlying shallow
16 aquifers. Now, how much that is is a good
17 question on either case, how much drawdown in the
18 pumped aquifer and how much propagation upward.
19 Q. The Eagle area has had significantly
20 more ground demands, groundwater demands in the
21 last few years. Do you have any knowledge about
22 that?
23 A. No, sir.
24 Q. If that's true, would the number of
25 wells needing to be deepened or replaced with

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1 deeper wells in the Eagle and North Eagle areas?
2 A. I didn't understand your question, sir.
3 Q. Okay. Well, if that's true that the
4 demands are more -- have been greater in the last
5 few years, would the numbers of wells needing to
6 be replaced or deepened in the North Eagle area
7 increase?
8 A. Not necessarily. It's -- you would
9 only deepen or replace your well if for some
10 reason that the pumping water level got so low
11 that you couldn't operate your pump. If you have
12 a fairly -- a 200-foot well where your pump is
13 set at 130 feet and the water level drops
14 10 feet, that probably is not a significant cost
15 to you. However, if your pump is already near
16 the bottom of your hole, then it is significant.
17 So, I have no idea.
18 Q. Do you have questions, as Owsley and
19 Vincent did, about the completeness and accuracy
20 of the M3 information provided in various HLI
21 reports?
22 A. I think, as I indicated before, that
23 the well construction, the actual numbers and all
24 of that I have reasonable confidence, very good
25 confidence in. The disagreement, if there is

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1 one, comes from the interpretation of those. And
2 I've elaborated on that in my testimony.
3 Q. What are your concerns about the
4 interpretations?
5 A. That as I've indicated, that the report
6 clearly stated that the aquifer was laterally
7 extensive from M3 Eagle to Payette, and I don't
8 believe there's information to support that. And
9 that there's groundwater flow that flows to the
10 north and northwest from the area of the M3 Eagle
11 or west of it into the Payette, and I don't think
12 that information exists either. I think there's
13 a lot of uncertainty on those conclusions.
14 Q. Do you have your summary of Owsley and
15 Vincent's memo there with you?
16 A. Which page is that?
17 Q. Your summary. I think it's page 2,
18 paragraph 4.
19 THE HEARING OFFICER: Well, give us an
20 exhibit number.
21 MR. THORNTON: Exhibit 50.
22 MR. PETERSON: Ralston's summary.
23 MR. ALAN SMITH: The summary dated
24 March 31, 2009. I don't know that it's been
25 admitted as an exhibit.

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1 THE HEARING OFFICER: Okay.
2 MR. THORNTON: It has not.
3 MR. ALAN SMITH: And it's paragraph 4
4 on page 2.
5 Q. (BY MR. ALAN SMITH) Do you agree with
6 Owsley and Vincent?
7 THE HEARING OFFICER: Just a minute.
8 Let's make sure we have in front of Dr. Ralston
9 what it is that you're referring to. And do the
10 parties have copies of this document?
11 Q. (BY MR. ALAN SMITH) Do you not have
12 that, Dr. Ralston?
13 A. I don't know what document you're
14 referring to. Is there an exhibit number on it?
15 THE HEARING OFFICER: If there's not,
16 then we ought to identify it by date or you need
17 to provide a copy to Mr. Ralston and the parties.
18 MR. LAWRENCE: I believe it's Exhibit
19 No. 49.
20 MR. ALAN SMITH: It's dated March 31,
21 2009.
22 THE HEARING OFFICER: Mr. Lawrence has
23 identified Exhibit No. 49 as a possible
24 candidate, Mr. Smith. Can we turn to 49 and see
25 if that's the document you want to refer to.

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1 MR. JASON SMITH: We don't have 49 with
2 us.
3 MR. ALAN SMITH: All right, we'll
4 withdraw the question.
5 THE HEARING OFFICER: Well, I don't
6 mean to make it too difficult. It appears,
7 Mr. Smith, that we have it. If you don't have 49
8 but you have the document in front of you, you're
9 welcome to pursue it, if that's the document that
10 we want to talk about.
11 Q. (BY ALAN SMITH) Well, let's go to the
12 November 26th memo that -- do you have that
13 there, your memo?
14 THE HEARING OFFICER: Now, would that
15 be No. 47, Mr. Smith?
16 MR. ALAN SMITH: I think so.
17 MR. JASON SMITH: What's the date
18 you're looking for?
19 MR. ALAN SMITH: November 26th.
20 THE HEARING OFFICER: But this is dated
21 January of 2009 and you were referring to a
22 November memo?
23 MR. JASON SMITH: Is it this one?
24 THE HEARING OFFICER: Let's go off the
25 record.

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1 (Discussion held off the record.)
2 THE HEARING OFFICER: We're recording
3 again, Mr. Smith. If you'll refer Dr. Ralston to
4 particular documents.
5 Q. (BY MR. ALAN SMITH) Do you have
6 Exhibit No. 49 there in front of you,
7 Dr. Ralston? I believe that was your summary of
8 the Owsley-Vincent report.
9 A. Yes, sir.
10 Q. And do you agree with Owsley and
11 Vincent's conclusion that water levels in the
12 PGSA near M3 are declining and suggest that
13 current aquifer discharge exceeds current
14 recharge rates? I think that's at page 2,
15 paragraph 4.
16 A. You're asking me whether I agree with
17 that?
18 Q. Yes, correct.
19 A. I'm not sure that I do. I think that I
20 would have to go back and look at that in more
21 detail. But my perusal was that it didn't appear
22 like that there were presently much in the way of
23 water level declines out there. I could go look
24 at the original data, but that would be my
25 present thinking.

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1 Q. All right, we'll give you an
2 opportunity to do that. If you'd go to Exhibit
3 No. 46, which was your November 16th -- or
4 November 26th at page 5, about the third
5 paragraph.
6 THE HEARING OFFICER: Is Mr. Smith
7 audible for everyone? Is his voice audible?
8 THE COURT REPORTER: It's difficult.
9 THE HEARING OFFICER: Well, let's cut
10 the fan, I guess, I'm sorry, or at least --
11 MR. ALAN SMITH: I can talk louder.
12 THE HEARING OFFICER: Okay, please
13 speak up, if you would, Mr. Smith.
14 Q. (BY MR. ALAN SMITH) November 26,
15 that's Exhibit No. 46 at page 5, paragraph 3. I
16 believe you state that long-term water level
17 decline would occur if the consumptive withdrawal
18 of groundwater is greater than the annual rate of
19 recharge. Is that still your opinion?
20 A. What -- I'm down on that page.
21 Q. Okay. It's down toward the bottom of
22 the page.
23 A. Oh, I see what you're saying. Yeah,
24 that is just simply a water balance statement,
25 that if consumptive withdrawal of groundwater is

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1 greater than the annual rate of recharge, then
2 obviously you would have long-term water level
3 decline.
4 Q. Okay. By "consumptive withdrawal,"
5 what do you mean?
6 A. That -- and I don't know if this
7 pertains here, but certainly some of the water
8 pumped from many systems recharge the aquifer
9 again either as wastewater or irrigation water or
10 lawn watering. And so, "consumptive" by that
11 term is the water that was pumped that doesn't
12 return back to the aquifer.
13 Q. So, you mean via wells when you talk --
14 A. Yeah, that you pumped it out on wells
15 and you may have run it through a wastewater
16 treatment plant that's someplace else. So, it
17 doesn't end up back in the aquifer.
18 Q. Okay. Also on page 5 of Exhibit
19 No. 46, you state at the bottom of the page
20 there, the next to the last sentence: "I
21 conclude that the characterization of the target
22 aquifer system, including a predevelopment water
23 balance, has not been complete enough to support
24 an analysis of impacts from full project
25 development." Do you still have that opinion?

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1 A. Yes, sir.
2 Q. If you go to Exhibit No. 46, that's
3 your November 26th -- at page 5, paragraph 4, the
4 last sentence.
5 THE HEARING OFFICER: And when you say
6 paragraph 4, you're referring to the first bullet
7 with a circle bullet or with a light center? How
8 do we count, Mr. Smith?
9 MR. ALAN SMITH: Okay, I'll withdraw
10 that question.
11 Q. (BY MR. ALAN SMITH) Is it your opinion
12 that any water right if granted to M3 should be
13 phased? I'm basing that on Exhibit No. 49, your
14 January of 2009 memo at page 13, the last
15 sentence.
16 MR. FEREDAY: We're going to have to
17 object to this because we believe it's beyond the
18 scope of his expertise and calls for a legal
19 conclusion.
20 THE HEARING OFFICER: Sustained.
21 MR. ALAN SMITH: All right, it is
22 stated in the exhibit anyway.
23 THE HEARING OFFICER: Well, what's the
24 reference again, Mr. Smith?
25 MR. ALAN SMITH: Exhibit No. 49.

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1 THE HEARING OFFICER: Okay.
2 MR. ALAN SMITH: The January of 2009
3 memo.
4 MR. JASON SMITH: That's 47.
5 MR. ALAN SMITH: Or page 47 -- I'm
6 sorry.
7 MR. JASON SMITH: Exhibit.
8 THE HEARING OFFICER: So, it's Exhibit
9 No. 47?
10 MR. JASON SMITH: Right.
11 THE HEARING OFFICER: Page what?
12 MR. ALAN SMITH: Page 13, the last
13 sentence.
14 Q. (BY ALAN SMITH) I believe you
15 recommended three alternatives and one of those
16 was phasing, but I'll withdraw that question.
17 THE HEARING OFFICER: Well, the exhibit
18 I think is received into evidence.
19 MR. ALAN SMITH: Yes.
20 THE HEARING OFFICER: Okay.
21 Q. (BY MR. ALAN SMITH) On Exhibit No. 46,
22 which is your November 6 memo at page 5, I
23 believe you stated up there at the top of the
24 page, about the second sentence, and why did you
25 state this, that characterization of all of the

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1 aquifer boundaries is a necessary step for
2 analysis of impacts from full project
3 development? Could you explain that?
4 A. Certainly. The typical approach on
5 this is to do what that M3 has done, which is to
6 construct a numerical model to help predict
7 drawdowns and impacts from a really fairly
8 complicated system. And my feeling is you needed
9 to characterize the boundaries to know how to
10 represent them in the model.
11 Q. Did the model do that?
12 A. No.
13 Q. Okay. On Exhibit No. 46, page 5,
14 paragraph 3, is it your opinion that continuous
15 pumping of high-capacity wells even at less than
16 23 cfs will cause an ever increasing cone of
17 depression?
18 A. Yes, sir, it's the -- yeah, what I say
19 is: "Continued operation of wells would result
20 in an ever increasing cone of depression until
21 the pumping effects reach the recharge end or
22 discharge areas." And that is again simply
23 hydraulically that's the way it would work.
24 Q. Okay. Does that cone of depression
25 keep spreading as it increases?

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1 A. As long as you keep pumping, yes, the
2 water has to come from someplace, and so the cone
3 of depression continues to spread. It spreads
4 slowly, but it continues to spread.
5 Q. Okay. Is it your opinion that
6 long-term sustainability of the Pierce Gulch
7 Aquifer could be limited? And I'm referring to
8 your statement at Exhibit No. 49, page 2.
9 A. I'm looking at page 2. And where on
10 there did you find that?
11 Q. I believe you said right at the top,
12 the first sentence, is that still your opinion
13 that long-term sustainability of the Pierce Gulch
14 Aquifer could be limited?
15 A. What I'm doing here is I'm quoting from
16 Owsley and Vincent. And that's a quote from
17 their -- I'm just summarizing the key points and
18 that that was their statement. I'm not sure I
19 agree with that statement.
20 Q. If you'd go to that same page down at
21 the first sentence in the last paragraph, you
22 say: "In my opinion, the conclusions within the
23 IDWR memo are closely aligned with my comments."
24 So, do you agree with that long-term
25 sustainability statement of Owsley and Vincent?

1 A. The sentences that we're talking about
2 says: "In our opinion, the possibility of
3 limited long-term sustainability for the PGSA
4 also cannot be discounted based on current
5 available data."

6 Yeah, it can't be discounted, but I --
7 I'm not sure I would have worded it exactly that
8 same way. So, in general I agree with it, but
9 that's not the wording I would have put in there,
10 I don't believe.

11 MR. ALAN SMITH: All right, fine. I
12 believe that's all I have.

13 THE HEARING OFFICER: Okay,
14 Mr. Edwards?

15 MR. EDWARDS: (Shaking head.)

16 THE HEARING OFFICER: Redirect,
17 Mr. Thornton.

18 MR. THORNTON: Since this is the first
19 time I'm kicking off Redirect, do I need to focus
20 in on what has already been --

21 THE HEARING OFFICER: Yeah, that's
22 normally the directive.

23 MR. THORNTON: Okay.

24 THE HEARING OFFICER: But at the outset
25 I said that I would allow some latitude, so --

1 MR. THORNTON: Okay. All right, thank
2 you.

3 REDIRECT EXAMINATION
4 QUESTIONS BY MR. THORNTON:

5 Q. Dr. Ralston, if you could, go to
6 Exhibit No. 45 on figure 4.

7 A. (Witness complied.) Yes, sir.

8 Q. And I believe you were having a
9 discussion with Mr. Fereday regarding your
10 knowledge as to in geology as to being able to
11 interpret the hydrogeologic cross-sections and
12 the resistivity logs there. Do you remember
13 that?

14 A. Yes, sir.

15 Q. And would you mind identifying what
16 department you were a professor in at the
17 University of Idaho.

18 A. It changed at various times. Initially
19 it was the Department of Geology and then it
20 became the Department of Geology and Geological
21 Engineering and then it ended up being the
22 Department of Geosciences.

23 Q. Okay.

24 A. I think it still is Geosciences.

25 MR. OSIENSKY: Geological Sciences.

1 THE WITNESS: Geological Sciences, I'm
2 sorry.

3 Q. (BY MR. THORNTON) And if you could go
4 to Exhibit No. 47, it's your document on page
5 figure 9. And on that figure 9 there is a well
6 represented that identifies 2412, the elevation,
7 in the kind of northwest portion of that figure.
8 And can you see that on your figure there?

9 A. Yes, sir.

10 Q. Are you aware that there has been
11 previous testimony by Mark Utting that the known
12 construction and the sealing of that well, it's
13 unknown?

14 A. I was not here for Mr. Utting's -- I've
15 heard you say that. So, I have no knowledge
16 beyond that.

17 Q. And have you seen any information to
18 suggest that that well is in the Pierce Gulch
19 Sand Aquifer?

20 A. I looked at that in some detail and had
21 trouble determining if it was or was not.

22 Q. And so, as you've stated before,
23 groundwater typically would flow based on the
24 hydraulic gradient; correct?

25 A. That is correct.

1 Q. And so, if you were to look even at
2 your figure 9, is it even possible that if you
3 were to look at the well by Star of 2503, that
4 elevation -- do you see that well there?

5 A. Yes, sir.

6 Q. Or you see another well of 2504 up on
7 the M3 panhandle property?

8 A. Yes, sir.

9 Q. And then you see one down by Caldwell
10 at 2450?

11 A. Yes, sir.

12 Q. Did you even draw a line there?

13 A. I chose to just draw my lines based
14 upon the westernmost of the three wells. I
15 didn't deal with the rest.

16 Q. Is identifying water level contours
17 from just a few wells a difficult task to do?

18 A. It's simple to draw because there are
19 very few data points, but it certainly does not
20 have as much credibility as if you had a number
21 of data points.

22 Q. Is it also possible that there could be
23 some features, some fault line or some impediment
24 to flow towards the Payette River that we don't
25 know about yet?

1 A. It is possible.
 2 Q. Okay, let's see. And then if you would
 3 refer to Exhibit No. 45 and figure 3.
 4 A. (Witness complied.)
 5 Q. And are you onto that figure, then,
 6 Dr. Ralston?
 7 A. Yes, sir.
 8 Q. Okay. And then I'd also like to have
 9 you pull up at the same time Exhibit No. 68. And
 10 Exhibit No. 68 is a paper by Dr. Wood entitled
 11 "The Hydrogeologic Framework of The Boise Valley
 12 in Southwest Idaho."
 13 A. I'm sorry, there's a tab that goes from
 14 65 to the next tab is 100.
 15 Q. We'll provide you our copy. I'm not
 16 sure what happened to the other copies that used
 17 to be up there. We've referred to this document
 18 in prior testimony.
 19 MR. PETERSON: (Handing.)
 20 Q. (BY MR. THORNTON) And so, you do have
 21 Exhibit No. 45, figure 3 in front of you. And
 22 then you have Dr. Wood's paper, Exhibit No. 68,
 23 is it, in front of you?
 24 A. Yes, sir.
 25 Q. Okay. We'll make sure everyone else

1 has that.
 2 THE HEARING OFFICER: Let me find it.
 3 I have it, Mr. Thornton.
 4 MR. THORNTON: Thank you.
 5 Q. (BY MR. THORNTON) And then on figure 3
 6 in Exhibit No. 45, it identifies a map of some
 7 well locations and transect lines for
 8 hydrogeologic cross-sections; does it not?
 9 A. Yes, sir.
 10 Q. And then if you look at the distance
 11 between the Oroco O&G, if you would, number --
 12 called the Ted Daws site and downriver in the
 13 Payette Valley, as compared to the El Paso
 14 Natural Gas site identified No. 1 Webber-State,
 15 can you see those two?
 16 A. Yes, sir.
 17 Q. And I think earlier we had said that it
 18 was somewhere between 18 miles or so between
 19 those two points. And then if you look at the
 20 distance, the physical distance between the
 21 El Paso Natural Gas No. 1 Webber site and the M3
 22 test well No. 1 site, I forget what it was,
 23 somewhere around 12 miles, let's say. And so,
 24 knowing those distances and knowing that there's
 25 been an extrapolation of information there, I'd

1 like you to look at Dr. Wood's statement on --
 2 what page is it? The third page, I guess it is,
 3 or the second page where he talks about being
 4 careful about extrapolating over large distances.
 5 MR. THORNTON: Could you maybe,
 6 Mr. Peterson, point that out.
 7 MR. PETERSON: (Indicating.) It would
 8 be on page 7, the first paragraph.
 9 Q. (BY MR. THORNTON) About the third line
 10 down there is a sentence there. Could you read
 11 that one?
 12 A. It said: "One should view with
 13 distrust cross-sections attempting to correlate
 14 over distances of several miles unless the
 15 section is along strike and sedimentary facies is
 16 identified."
 17 Q. Are you in agreement with Mr. Wood's
 18 statement there or sentence in his paper?
 19 A. In general, yes.
 20 Q. All right. Thank you. Let me see. In
 21 terms of the model domain for any model,
 22 conceptual model, is it important to within that
 23 model domain to have the recharge area or not?
 24 A. Are you talking of a numerical model?
 25 Q. Yes.

1 A. Yeah, I think it -- in my opinion, it's
 2 optimum to have the recharge area within the
 3 model domain and, hopefully, knowledge about the
 4 relationships between water levels and recharge
 5 mechanisms, if there is one.
 6 Q. Okay. And then if you would look at
 7 Exhibit No. 16, page 50. And then on that figure
 8 can you identify the outline of the domain for
 9 the M3 model?
 10 A. Yes, sir.
 11 Q. All right. Have you heard testimony or
 12 are you aware that M3 has identified in a general
 13 sense that they believe recharge is up in the
 14 Boise River upstream of the Capitol Bridge?
 15 A. I heard that testimony, yes.
 16 Q. And I'm not sure how intimately
 17 familiar you are with the City of Boise, but I'll
 18 submit to you that on the eastern boundary of the
 19 north-south line where you see part of that line
 20 going through Garden City, it goes through the G
 21 in Garden City, can you see that?
 22 A. Yes, sir.
 23 Q. That roughly represents Overland --
 24 MR. PETERSON: Cole.
 25 Q. (BY MR. THORNTON) -- excuse me, Cole

1 Road. I don't know for sure, but it's probably
2 three or four miles, two to four miles downstream
3 from the Capitol Bridge.

4 And so, in your estimation, does this
5 model represent a good location in terms of
6 identifying the recharge area that M3 has
7 generally stated?

8 A. If you're asking the question does the
9 model include that recharge they've identified,
10 it does not.

11 Q. Okay. And then -- here it is. In
12 terms of looking at drawdown curves or predicted
13 water level declines in the M3 model, when you're
14 looking at the domain here on page 50, figure 6
15 of Exhibit No. 16, they also include the Payette
16 River; correct? The Payette Valley, Payette
17 River?

18 A. Yes, sir.

19 Q. And do you remember the approximate
20 percentage in their model that they attributed to
21 the Payette River?

22 A. I quoted that number and as I recall,
23 it was like 25 percent of the water balance.

24 Q. Yeah, I'll submit it's probably 27, but
25 I'll go with probably 25 percent.

1 So, do you believe there's much
2 uncertainty in not establishing a no-flow
3 boundary to the Payette River? If they were to
4 rerun that model with a no-flow boundary and
5 looking at water level declines over a long
6 period of time, 10 to 15, 20, 50 years, would you
7 expect a difference in drawdown effects?

8 A. If you're asking me, if we're looking
9 at figure 6 on page 50 of Exhibit No. 16, if you
10 put a no-flow boundary essentially where it says
11 "Boundary," "M3 Eagle boundary," if you made that
12 a no-flow, an east-west no-flow, would it affect
13 the predicted drawdown? And I would presume that
14 it would.

15 Q. And do you know how much it would be?

16 A. No, I do not.

17 Q. And then if you would go back to figure
18 45 on -- excuse me, Exhibit No. 45 and figure 4,
19 and also at the same time if you could pull out
20 Exhibit No. 44. And on figure 45, which is on
21 page 127 -- we'll wait till we have those
22 documents, those exhibits up.

23 THE HEARING OFFICER: We're in 44?

24 MR. THORNTON: Yeah, two exhibits. One
25 in Exhibit No. 44 on page 127, and that's figure

1 No. 45. And then also to have out in front of us
2 on Exhibit No. 45, figure 4. I'll make sure
3 everybody is ready.

4 THE HEARING OFFICER: Okay.

5 Q. (BY MR. THORNTON) On Exhibit No. 44,
6 figure 45, I believe in a discussion you just had
7 with Mr. Fereday, looking at the shape of the
8 curves for the drawdown analysis, there is an
9 attempt there, I believe, or would you agree
10 there was an attempt to identify the Big Gulch
11 drawdown as similar to some of the other wells,
12 TW-2, TW-4?

13 A. I think the question that I answered
14 was are the -- do the -- and this is drawdown
15 versus -- the log of drawdown versus the log of
16 distance as of 5,000 minutes of pumping. That
17 the question was SVR No. 9, test well 4, zone 2,
18 the Big Gulch well, and SVR No. 7 after well loss
19 has been removed, do they appear to fall on a
20 similar, what's generally called a type curve?
21 And my answer was that yes, they looked like they
22 did.

23 Q. And if they -- if they are similar in
24 the type curve, is that the potential, then, for
25 them being out of the same aquifer?

1 A. It's very complicated to sort this out.
2 What it's saying is the drawdown at the distance
3 the Big Gulch stock well is, is similar to what
4 you would anticipate it would be. And it's quite
5 likely that that would be the case if it was
6 completed within the aquifer. It may be also the
7 case if it's only completed a few feet up into
8 the overlying material. We just simply don't
9 know.

10 Q. Okay.

11 A. But it does look like it appears on
12 the -- it is the drawdown that you would
13 anticipate based upon this type curve.

14 Q. Okay. And then if you'd refer to
15 Exhibit No. 45 on figure 4, and if you look at
16 test well No. 1, M3 Eagle test well No. 1, and do
17 you interpret the top of that looking on the
18 Y axis, do you interpret the top elevation is at
19 about 2600 feet elevation?

20 A. The well head?

21 Q. Yes.

22 A. Yes, it looks like it's about 2600.

23 Q. Okay. And if you were to look at what
24 is depicted here as the -- in the red line as the
25 top of the Pierce Gulch Sand Aquifer at the

1 interface with the overlying mudstone dominated
2 unit, would you agree that that line is
3 approximately 400 feet below ground level?

4 A. At that -- at M3 Eagle test well 1,
5 yes, that's what it looks like.

6 Q. Okay. And are you aware that those,
7 those two wells are let's say relatively close --
8 I guess the question would be: What is the depth
9 of the Pierce Gulch Sand Aquifer, the top and the
10 bottom depths? Have you heard a consistent
11 message?

12 A. In which well are you asking?

13 Q. Let me try that whole question over.
14 I'll withdraw the question. It was pretty
15 jumbled. I apologize.

16 Is the M3 test well No. 1 the -- it
17 appears to be, does it not, that the top of the
18 Pierce Gulch Sand Aquifer is at about 400 feet
19 roughly --

20 A. It looks like --

21 Q. -- below ground?

22 A. -- if that scale is correct, more like
23 350 feet.

24 Q. 350 feet? Okay. And then yet not that
25 far away we have the Big Gulch stock well that's

1 at 180 feet; is that correct?

2 A. That's my understanding.

3 Q. So, the question that I have is of a
4 concern to a lot of the protestants who have
5 heard and seen in written testimony and in verbal
6 testimony and in the documents provided by M3, is
7 that since the Pierce Gulch is much deeper, that
8 many of our wells that are 150, 200, 250 feet
9 won't be impacted. With the data that you have
10 before you on these two documents that I've had
11 you open up to, do you believe that there is a
12 chance for -- or is there a chance or even more
13 than a slight chance of impact from pumping at a
14 deeper level in the Pierce Gulch Sand Aquifer for
15 the overlying wells?

16 MR. FEREDAY: We're going to have to
17 object. I don't think that was an accurate
18 statement of what M3 has said. It hasn't said
19 that there will be no impact in overlying
20 aquifers.

21 Q. (BY MR. THORNTON) I would just say:
22 Would there be little impact, if I could modify
23 my --

24 THE HEARING OFFICER: Well, I consider,
25 although we haven't formally recognized

1 Mr. Ralston as an expert, but I consider him to
2 be an expert witness and it's posed as a
3 hypothetical question to him. So, I'll allow him
4 to answer, if you remember what the question is.

5 THE WITNESS: Yes, I think I remember
6 what the question is. My concern about answering
7 that is the Big Gulch stock well is quite a ways
8 away from the private wells and that the
9 formation dips off to the south-southwest. And
10 so, I'm not sure that there's a direct
11 transferability from one to the other.

12 I think my answer back to you is to
13 reflect on what the modeling report, the M3 Eagle
14 modeling report, and their discussion about
15 propagation of drawdown effects upward, and I
16 think that's probably a fairly reasonable
17 representation.

18 MR. THORNTON: All right. I guess the
19 last thing, it's not so much of a question, but
20 Mr. Hearing Officer, you just identified a
21 potential concern, is to make sure that we have
22 Dr. Ralston identified as an expert witness. I
23 would like to formally do that. I'm not sure if
24 that's appropriate, but I do want to have it on
25 record as Dr. Ralston being an expert witness.

1 THE HEARING OFFICER: You can move to
2 have him recognized. Normally it would come
3 after you've questioned him about his
4 credentials.

5 MR. THORNTON: Okay, and that was my
6 oversight.

7 THE HEARING OFFICER: Well, I'm not
8 sure we've actually recognized anybody as an
9 expert yet in this hearing that I recall. So,
10 Mr. Fereday, any objections?

11 MR. FEREDAY: We would have no
12 objection to his being recognized as an expert in
13 hydrology. But for the geology of the Boise area
14 or the Eagle area, no, although he has been asked
15 for his opinions. And the other experts have
16 given opinions, thereby providing evidence of an
17 opinion nature. So, they are de facto recognized
18 as experts in my view by that fact.

19 THE HEARING OFFICER: Sure. Okay.
20 Mr. Smith, any objection?

21 MR. ALAN SMITH: No. I thought we were
22 all experts.

23 THE HEARING OFFICER: Mr. Edwards?

24 MR. EDWARDS: (Shaking head.)

25 THE HEARING OFFICER: Well, for me it's

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1 always on a comparative scale, Mr. Smith.
2 MR. ALAN SMITH: Well, compared to me
3 they certainly are.
4 THE HEARING OFFICER: All right. Now,
5 I recognize Dr. Ralston as an expert witness.
6 And he's already, Mr. Fereday, expressed in his
7 testimony the limitation of his knowledge
8 regarding the Boise Basin. So, I think he's been
9 forthright about that.
10 MR. THORNTON: And with that, I'm done
11 with my questions.
12 THE HEARING OFFICER: Okay, Further
13 Cross-Examination, Mr. Fereday?
14 MR. FEREDAY: Yes. Could we go off the
15 record for just a second?
16 THE HEARING OFFICER: Sure. I think
17 we'll finish with Dr. Ralston today. So, let's
18 take 15 minutes and let the fan run for awhile.
19 (Recess held.)
20 THE HEARING OFFICER: We are recording.
21 MR. FEREDAY: Dr. Ralston --
22 THE HEARING OFFICER: Just a moment.
23 MR. FEREDAY: Sorry. Should we close
24 the door?
25 THE HEARING OFFICER: Perhaps. And if

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1 the folks in the gallery could either quiet down
2 or step out, I would appreciate it.
3 Okay. Thank you, Mr. Fereday.
4 RECROSS EXAMINATION
5 QUESTIONS BY MR. FEREDAY:
6 Q. Dr. Ralston, Mr. Smith asked you
7 whether you believe water levels are declining
8 and exceed recharge rates in the PGSA. And you
9 said you did not necessarily agree. I would like
10 to refer you, please, to Exhibit No. 133 at
11 page 3. I think it's already open in front of
12 you up there to your upper left.
13 A. 133?
14 Q. Yes.
15 A. Yes, thank you.
16 Q. And I'll represent to you that this is
17 an aquifer test report addendum signed by
18 Christian Petrich and Chris Duncan. And on page
19 Roman III, just one page in, item 11 says:
20 "Substantial increases in groundwater withdrawals
21 for municipal purposes in Eagle over the last 10
22 years have not resulted in substantial local
23 water level declines."
24 And this is a 2007 report. Do you have
25 any reason to disagree with Dr. Petrich's --

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1 A. No.
2 Q. -- conclusion there?
3 A. I'm sorry. No, sir.
4 Q. And down at paragraph 13 under "Aquifer
5 Capacity," Dr. Petrich and Mr. Duncan concluded:
6 "The aquifer in the vicinity of the proposed
7 diversions has capacity for additional diversions
8 based on currently stable water levels."
9 Do you have any reason to disagree with
10 that?
11 A. That is -- the previous one was data
12 analysis. This is their opinion. I'm not sure I
13 agree or disagree. I haven't done the analysis
14 to support it either way.
15 Q. Could you refer, please, to Exhibit
16 No. 45, figure 17.
17 A. (Witness complied.)
18 MR. ALAN SMITH: Figure 17?
19 Q. (BY MR. FEREDAY) Do you note that this
20 is a plot of water level trends from roughly 2000
21 through mid 2008 for TVHP well No. 1?
22 A. I see that.
23 Q. Do you know where TVHP well No. 1 is,
24 also known as the State Street well?
25 A. Not for sure, no.

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1 Q. What does this trend indicate to you?
2 And you'll note that this is in the Pierce Gulch
3 Sand Aquifer, as noted on the figure. What does
4 this trend indicate to you in terms of what's
5 going on in groundwater levels in the TVHP, at
6 least as indicated at the location of this well?
7 A. If I could make sure I understand, the
8 top half of the graph is water levels and the
9 bottom half of the graph is precipitation; is
10 that correct?
11 Q. That's correct.
12 A. Okay. Well, the available data -- oh,
13 I see. The available data would suggest that
14 there isn't a pattern of water level decline over
15 the period from 2000 to 2008.
16 Q. Okay. With regard to the very next
17 figure, figure 18, I really have the same
18 question there. What can you tell us about that
19 figure? And again looking at the top, this is
20 State and Linder test well, zone 2.
21 A. There appears to be more scatter to the
22 data, but again no long-term decline evident from
23 these data.
24 Q. I believe in response to Mr. Thornton
25 you indicated that the M3 project's pumping would

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1 cause significant drawdown, or did I mishear
2 that? Is that what you said?
3 A. I don't recall exactly what I said.
4 Q. Okay. Do you recognize that the M3
5 model projects about 5 feet of drawdown, at least
6 under one of the model runs, in the Eagle area
7 after 50 years of pumping at 10 cfs?
8 A. I saw that run, yes, model.
9 Q. Have you evaluated what the staff also
10 projected in their drawdown analysis using the
11 Theis solution?
12 A. I read their report, yes.
13 Q. And would you agree that it's not far
14 from that same range, 5 feet, 8 feet, something
15 like that, down in the Eagle area?
16 A. Yes, sir.
17 Q. After 50 years of pumping at 10 cfs,
18 would you consider that a significant drawdown at
19 that distance?
20 A. If those are true values, no.
21 Q. With regard to Mr. Thornton's inquiry
22 about the water balance coming from the Payette
23 River based on the conceptual model, do you
24 recall that interchange?
25 A. Yes, sir.

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1 Q. Do you recognize that M3 did a model
2 run based on the TVHP assumption? I think we
3 talked about this earlier, that there is a
4 boundary in the TVHP at a point at or south of
5 M3. Do you recall that?
6 A. I recall that you said that you did the
7 run.
8 Q. Are you aware that that model run also
9 assumed that there would be no water to or from
10 the Payette?
11 A. No, I'm unaware of that.
12 Q. Have you in your work on aquifer models
13 always characterized all boundaries of the
14 aquifer within the model domain?
15 A. That is certainly an objective. That
16 is not always an attainable objective.
17 Q. Have you used models that are of that
18 nature, that is that don't have all of the
19 boundaries characterized within the model domain?
20 A. Yes, sir.
21 Q. And have you relied on such models?
22 A. Yes, sir.
23 Q. With regard to Exhibit No. 68 and
24 Mr. Thornton's inquiry as to that, Dr. Wood's
25 paper, perhaps you should refer to that.

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1 A. I think I gave it back.
2 MR. PETERSON: (Handing.)
3 Q. (BY MR. FEREDAY) The statement says:
4 "One should view with distrust cross-sections
5 attempting to correlate over a distance of
6 several miles unless the section is along strike
7 and the sedimentary facies is identified."
8 You're aware, aren't you, Dr. Ralston,
9 that both strike and sedimentary facies have been
10 identified with respect to the PGSA in this area?
11 A. I know that strike has. I'm not sure
12 what you mean by "sedimentary facies" as it's
13 used in this sentence.
14 Q. Do you recognize that HLI in its
15 conceptual model has repeatedly pointed out the
16 locations and nature of sand and clay facies in
17 the PGSA?
18 A. I recall text that indicated that they
19 identified that they exist, yes.
20 Q. Dr. Ralston, I'd like to refer you now
21 to Exhibit No. 45, I think you still have it
22 there in front of you, figure 15 this time. And
23 in light of Dr. Petrich's statement that you were
24 shown and your comments earlier about water level
25 trends, could you please review figure 15 and

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1 tell me what you see there in terms of the water
2 level measurements in those two production wells,
3 Redwood Creek and Floating Feather.
4 A. (Reviewing document.) There are some
5 points here I don't understand. There appears to
6 be diamonds -- first of all, triangles that
7 appear to be pumping rates at the top and water
8 levels appear to be diamond with red in them.
9 It's difficult to see what's going on here.
10 It appears like that there's five water
11 level measurements spread from 1994 to 2008. And
12 they're all within a magnitude of ground level to
13 5 feet above ground level. I think that's the
14 way I would read it.
15 Q. And with regard to Floating Feather?
16 A. It looks to me like there are -- again,
17 there's confusion. There are blue squares that
18 say "Floating Feather water levels" and then
19 there's blue squares with red in the middle that
20 I have no idea what they are. They're not
21 identified.
22 But if you take the two water levels
23 that it appears like the water level in 1994, '95
24 appears to be several feet higher than the water
25 level in 2007 perhaps. I don't know what the

1 other two water levels on that graph indicate.
2 Q. Do you happen to know what the pumping
3 production from these two wells is?

4 A. No, other than the annual pumping is
5 shown on the graph.

6 Q. If pumping from these wells has caused
7 little or no decline, how does this fit with your
8 trough model with regard to what it might tell us
9 about recharge in light of what Dr. Petrich has
10 said, what you've said, and what your trough
11 model shows us? What does this tell us in terms
12 of recharge in this area?

13 A. If I could preface my answer that
14 these are water level data taken from pumping
15 wells. I think the data would be much better if
16 they're taken from non-pumped wells so that we
17 don't have the question about pumping effects.
18 They apparently are not available in this area.

19 But what these show is that there
20 hasn't been a very large, if any, water level
21 change in these wells based upon these few
22 measurements that are taken.

23 Q. And what does that tell you about
24 recharge coming to these wells?

25 A. That the water being pumped from these

1 wells is obviously coming from some source and
2 that if there's no long-term decline, okay, that
3 means that the amount pumped is coming from a
4 nearby source, and I'm presuming the nearby
5 source is probably the river. I don't know what
6 else it would be.

7 But it's obviously saying that if
8 you're pumping that amount of water without
9 decline, then the water is coming from a source
10 and it -- you know, I don't know what that source
11 is, but that's the most logical explanation.

12 Q. That recharge is occurring; correct?
13 You would agree?

14 A. That the water being pumped is
15 ultimately coming from a source of water other
16 than groundwater. It's ultimately coming most
17 likely from surface water.

18 Q. Do you agree that that's what
19 Mr. Glanzman pointed out in his geochemistry
20 study, that the water in the PGSA comes from the
21 Boise River?

22 A. I'm not sure that's what he pointed
23 out. He pointed out it comes from the Boise
24 River, but he was talking about this ancestral
25 Boise River. And so, that raises interesting

1 questions relative to timing and flow. And so,
2 I'm not sure that it supports that. It's just
3 an interesting sidelight.

4 MR. FEREDAY: No further questions.

5 THE HEARING OFFICER: Okay. Mr. Smith?

6 MR. ALAN SMITH: Yes, thank you.

7 RE-CROSS EXAMINATION

8 QUESTIONS BY MR. ALAN SMITH:

9 Q. Mr. Ralston, I believe Mr. Fereday
10 indicated to you that one of the model runs
11 indicated a drawdown around Eagle City at about
12 5 foot. Are you aware that this model used
13 10 cfs and Eagle is at least 5 miles from the M3
14 site?

15 A. I would have to look at the actual
16 model run information to know exactly what they
17 did do. I saw the report, but I don't recall the
18 details of it.

19 Q. Are you aware that the State and Linder
20 well is near the Boise River?

21 A. In general terms, yes.

22 MR. ALAN SMITH: I believe that's all I
23 have.

24 THE HEARING OFFICER: Okay.
25 Mr. Edwards?

1 MR. EDWARDS: (Shaking head.)

2 THE HEARING OFFICER: I think we've
3 been through twice with Mr. Ralston.

4 EXAMINATION

5 QUESTIONS BY THE HEARING OFFICER:

6 Q. Dr. Ralston, I have a couple of
7 questions. I think in the examination I heard
8 you say that you were not here for Mr. Utting's
9 testimony; is that correct?

10 A. That is correct.

11 Q. I would like to ask you a few questions
12 about the numerical model or models that were
13 developed. Have you had a chance to review the
14 exhibits that discuss the modeling, the numerical
15 modeling effort conducted by M3?

16 A. Yes, sir.

17 Q. And I believe that as I look at the
18 summary or the table of contents of these, that
19 that particular document is Exhibit No. 16; is
20 that correct?

21 MR. LAWRENCE: That's correct.

22 Q. (BY THE HEARING OFFICER) And I don't
23 know that I would ask you specifically specific
24 questions out of that, Dr. Ralston, unless you
25 wanted to refer to it, and I just identify it as

1 a document.

2 And in your testimony, I heard you say
3 that in a numerical model you would want, for
4 this area you would want to better characterize
5 the aquifer boundaries. Is that a correct
6 restatement of your testimony?

7 A. Yes, sir.

8 Q. Okay. And would you tell us how you
9 would go about characterizing or better
10 characterizing the aquifer boundaries.

11 A. Certainly one approach would be to
12 formulate the aquifer boundaries where there's a
13 geologic boundary. And certainly if you're
14 modeling the unconsolidated sediments in the
15 valley, then you could formulate the model
16 boundary along the contact with the foothills
17 with the -- not necessarily the foothills but
18 with the consolidated rock.

19 That you could then present as a
20 no-flow boundary and then introduce whatever
21 water you thought came from that hillside in as
22 maybe some sort of injection well or there's
23 various boundary configurations you could do.

24 I think if I could elaborate, another
25 thing that is critical isn't necessarily the

1 external boundaries, but it's the idea of how the
2 surface water systems are represented. And I
3 think that's a very important aspect that needs
4 to make sure that those are accurately
5 representing what actually occurs.

6 Q. And so, when you say that you would
7 want to better represent the surface water, I
8 didn't write it down correctly, but the surface
9 water features, what are you talking about in
10 "better representing"?

11 A. If I follow the line of questioning
12 that Mr. Fereday just did, which is there are
13 production wells that have considerable
14 production but almost no long-term water level
15 decline, I think that's basically what he was
16 trying to head toward, what that reminds me of is
17 there is most likely a surface water source
18 that's relatively nearby, that essentially these
19 wells are drawing water from that surface water
20 source. That's what my initial conclusion would
21 be.

22 And so, if that's the case, then the
23 question is: How does that actually occur and
24 how can you represent that in the numerical model
25 and is it being represented in the numerical

1 model? And that I think is a fairly critical
2 aspect of getting a model that will accurately
3 represent what's out there.

4 Q. I know this question is probably unfair
5 to you, but when you use the word "nearby," can
6 you assign any distance to that particular term?

7 A. I think with some thought a person
8 could, but I think you're talking within miles.
9 I don't think you're talking within tens of
10 miles. So, I think it's -- again, these are
11 obviously comments without having done all of the
12 mathematics to go back them up. But I would
13 certainly, if those hydrographs are as
14 represented, and I presume they are, and the
15 pumping rates are as represented, then the only
16 way that's going to occur is if the cone of
17 depression has reached out to what we would call
18 "positive boundaries," which is surface water
19 systems. And if that's what's occurring, that's
20 a very important aspect and one that I would
21 think that you would have quantified to the best
22 possible extent. And that's probably far more
23 important than the external boundaries of the
24 model in a lot of ways. But again, those are
25 thoughts off the top of the head after listening

1 to all of this.

2 Q. And so, you've been talking about
3 recharge and the recharge features of the
4 numerical model; correct?

5 A. Yeah. And again, I use "recharge"
6 interchangeably with "discharge." Because some
7 of these -- some of the -- the hydraulic
8 connection with the river may very well be not
9 increasing recharge, it may be decreasing
10 discharge. But it's the hydraulic, saturated
11 hydraulic connection that I think is very
12 important to this case and all of this general
13 area.

14 Q. And so, I'll refer to both of those
15 terms, "recharge" and "discharge," because in
16 your testimony you said that one of your concerns
17 was that there was not enough information about
18 where it occurs or how it happens. And that's
19 what I wrote down.

20 A. Yes, and I still agree with that. And
21 it makes a big difference, for example, if
22 there's a portion of the Boise River that's
23 perched above the aquifer -- and I don't know if
24 there is or not, I would suspect not -- where
25 that the leakage out of the river is not a

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1 function of hydraulic head. If it's an intimate
2 hydraulic connection, then pumping a well causes
3 water level decline, which will either decrease
4 discharge to the river or cause reverse and flow
5 out from the river. And that may occur by
6 pumping the deep aquifer and the drawdown effects
7 propagating up through and going to the shallow
8 aquifer and then affecting the river. But that
9 sort of conceptual model I think is essential to
10 this in all of the aspects of Northern Ada County
11 in terms of how the pumpage will affect long-term
12 water levels.

13 Q. And so, how would you go about defining
14 these, better defining these functions, recharge
15 and discharge?

16 A. That's an interesting one. And again,
17 and the Hydro Logic folks may have already picked
18 all of the low-hanging fruit, but certainly if
19 there's not monitor -- groundwater level
20 monitoring of shallow aquifer right near the
21 river, I think that's essential, to begin to look
22 at how the shallow groundwater system varies with
23 the river and whether or not you can see an
24 effect of the seasonal pumping.

25 I'd have to think about that. If I

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1 thought about it, I could certainly write a memo
2 to that effect. But I think there are things
3 that you could do that would improve the
4 understanding a great deal.

5 Q. And so, do you think in attempting to
6 better define these functions that the effort in
7 that definition or in trying to accomplish that
8 definition would be extensive and much more
9 expensive?

10 A. I do, but let me explain why I think it
11 does, is that there's several alternatives that
12 occur in my mind to what's going on in the
13 Northern Ada County. One is that you simply say,
14 "No, there cannot be any more wells" because of
15 impacts. The second is that, of course, you just
16 allow them and we have no idea how it's going to
17 turn out in the long term.

18 And I think either one of those are
19 very expensive alternatives compared to
20 understanding what's going on out there. And if
21 you could gain that understanding, I think that's
22 a very useful thing.

23 And I think it's not far different than
24 what's gone on in -- I worked with the Department
25 on the American Falls -- the Blackfoot to Neeley

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1 reach that includes American Falls. And it's the
2 same basic question: What's the surface water,
3 groundwater interaction? And I think there that
4 they have concluded some shallow wells near the
5 river and monitoring as you go through hydrologic
6 cycles would greatly improve our knowledge of how
7 that works. And it seems to me that would be a
8 useful thing here as well.

9 So -- but it isn't cheap, but it is --
10 I think if you -- I think you're going to be
11 making decisions in the absence of a suitable
12 level of understanding if you don't do that. But
13 that's -- I realize we're still on the record,
14 but I'll say it anyway. I was accused the other
15 day about being a data hog, meaning I always want
16 more data. And I am a scientist and that's maybe
17 where I am, but in this case I think it is
18 probably a worthwhile effort.

19 Q. Now, in answers to some questions that
20 Mr. Fereday asked you, you testified that you had
21 used or developed numerical models that have not
22 defined boundaries to include all of the recharge
23 and discharge areas, and yet you've been an
24 advocate in your testimony of that kind of model.

25 So, my question for you, Dr. Ralston, is: Why

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1 would you compromise to rely on those models that
2 would produce -- or that would have inputs of
3 lesser value?

4 A. Because I don't have control over them.
5 My opinion was expressed, but the decision makers
6 chose to do it a different way.

7 Q. But is it sometimes a matter of limited
8 resources?

9 A. It is certainly a matter of limited
10 resources. And it's often a matter of limited
11 data, where even if you encompassed all of the
12 way to geologic boundaries, you have no
13 information. And so, what you gain may not be
14 worth the additional effort. But I argued
15 against it in each one of these cases, that --
16 because if you don't go to boundaries, you
17 introduce uncertainty.

18 Q. And this is not meant as a statement
19 about M3's resources, but if they were to come to
20 you and say, "We have this much money to spend on
21 a study" and you decided or a group of people
22 decided that the boundaries needed to be
23 circumscribed in a more limited way and you
24 wouldn't be able to encompass all of the recharge
25 and discharge areas, how would you then go about

1 characterizing those boundary inputs on the
2 boundaries, recharge and discharge?

3 A. First of all, I wouldn't do it at the
4 end of a long day. But beyond that, the question
5 is the one that the Snake Plain Aquifer has dealt
6 with, because you've got -- the Snake Plain
7 Aquifer does not go up in tributary valleys like
8 up the Big Lost or the Little Lost. And so, they
9 try to quantify the amount of water that comes
10 out each one of those in their water budget. And
11 that's a source of uncertainty, but that's just
12 the decision they have to make.

13 In this case, I think if you understand
14 how the river works relative to shallow and deep
15 aquifers, that's probably more important than
16 some of the more distant boundaries. But again,
17 I'd like to think about it before I commit to
18 anything that I would stick my stamp on.

19 Q. Okay. And this is an unfair question
20 and really I need to ask probably Mr. Utting this
21 question, but is there a way to determine across
22 a boundary the amount of any flow through that
23 boundary based on transmissivity values and slope
24 of the aquifer itself?

25 A. It's -- again, I should pass this on

1 because he -- but I don't have sense enough, so
2 I'll answer it anyway.

3 The difficulty there is assessing the
4 hydraulic properties of any sort of boundary
5 condition of -- the hydraulic gradient you can
6 measure hopefully in the field and there isn't
7 much error associated with that. A cross-
8 sectional area, you can deal with that. But the
9 hydraulic properties can vary over many, many
10 orders of magnitude. And it makes it really,
11 really difficult to get an accurate estimate of
12 flux, just really difficult.

13 Q. Do you use this type of estimation for
14 models to determine that flux in the boundary?

15 A. Yeah, that you do out of -- because you
16 have no other alternatives.

17 Q. So, it is a method of determining
18 inflow --

19 A. Yes, it is.

20 Q. -- to the model?

21 A. Yes, sir.

22 Q. All right. I guess the other line of
23 questions I would ask is: What are your concerns
24 about the discharge side? We've talked about the
25 recharge I think more than the discharge. And

1 can you talk about that? You did to some degree,
2 but I want to know about discharge on maybe the
3 downgradient side of the model.

4 A. Certainly. Recharge can be head-
5 dependent or not. Discharge is always head-
6 dependent. Okay? And the discharge, the
7 relationship between how much water discharges
8 versus hydraulic head is unique to every
9 discharge area. And so, it's simply a
10 lowering -- if you lower groundwater levels, it
11 will propagate to the discharge area lower than
12 hydraulic gradient and discharge will decrease.
13 It's just as simple as that.

14 Now, do we know where the discharge is
15 and the hydraulics? And in most cases we don't
16 know the hydraulics. You may know where the
17 discharge is.

18 The example of this would be the
19 springs immediately above American Falls
20 Reservoir. They're a large springs and they're
21 dependent upon hydraulic head and the aquifer.
22 And so, that's where maybe we're going to put in
23 some shallow wells so we get a better idea of how
24 much water level change does it take to affect
25 the discharge?

1 Q. In a numerical model that is developed
2 for the area that was shown, and you saw the
3 boundaries of the area for this model, would the
4 discharge function depend on the boundaries and
5 direction of flow on the downgradient side of the
6 model?

7 A. Yeah, that you're going to -- you're
8 going to represent the discharge in some way.
9 And the mod flow has a river package that will
10 allow the water to go into the river if the water
11 level in the river is lower than the aquifer.
12 And then there's a hydraulic conductivity
13 function that allows you to control how much
14 water goes in by adjusting hydraulic
15 conductivity.

16 The other function the model does is a
17 drain function, which essentially says that it
18 discharges water like a spring, but if the water
19 level drops below the drain, it simply goes dry.
20 If the water level drops below the river, then it
21 reverses and comes back.

22 Those are the way you would represent
23 them in the model. And the problem is your
24 understanding of the physical system is probably
25 less than your ability to model them. It's

1 relatively simple to model them.
 2 Q. But that certainly would be true if the
 3 boundary, the discharge boundary truncates before
 4 you reach that approximate terminus of the
 5 discharge; right?
 6 A. How do you mean that?
 7 Q. Well, let's refer back to the model
 8 boundary that you've looked at several times for
 9 the M3 numerical model. That discharge boundary
 10 didn't extend to a river; did it?
 11 A. I don't recall. No, it's right here.
 12 It did not.
 13 Q. Okay. And would not then be -- that
 14 discharge boundary would not be shown as
 15 discharging to that ultimate terminus, then?
 16 A. No, again, as soon as you take an area
 17 like this, then you've got to manufacture ways to
 18 discharge the water and ways to input the water,
 19 and that's what we've been talking about. But
 20 again, if you go to much larger scale, you've
 21 either got a huge model or you've got such a
 22 coarse grade you don't have much definition.
 23 THE HEARING OFFICER: All right, I
 24 don't have any further questions. I will allow
 25 one more round based on my questions.

1 Mr. Fereday? Well, wait a minute.
 2 Let's go to you first, Mr. Thornton, for
 3 questions.
 4 MR. THORNTON: Thank you.
 5 FURTHER REDIRECT EXAMINATION
 6 QUESTIONS BY MR. THORNTON:
 7 Q. Dr. Ralston, you were asked a question
 8 about the, I believe by the Hearing Officer,
 9 about previous numerical models you've worked on
 10 and maybe the intensity or the rigor of data
 11 analysis that is complete; is that correct?
 12 A. Yes, sir.
 13 Q. I believe you were also asked, were you
 14 not, in some cases did you use limited data and
 15 in other cases did you use pretty intensive data;
 16 is that correct?
 17 A. That's correct.
 18 Q. What is your opinion in terms of --
 19 well, I believe you also stated that at some
 20 point a certain amount of data may not be more
 21 beneficial, may not benefit you more in terms of
 22 your result; is that correct?
 23 A. It may not be cost effective. I think
 24 there's very few times that more data don't
 25 benefit in some way.

1 Q. Okay.
 2 A. But it may not be cost effective.
 3 Q. And then potentially stepping out of
 4 your engineering field, what is your opinion in
 5 terms of collecting that more data, that
 6 incrementally more data, in terms of the
 7 potential values at risk? And let's take as an
 8 example, if I could for you, I believe you said
 9 you worked on a couple of fish hatcheries. And
 10 you've got a certain amount of investment and
 11 risk there. The question I have is when you're
 12 sitting down in the North Ada County area where
 13 there's I think we've all acknowledged 2,000,
 14 2,500 wells generally in the mapped area north of
 15 the river and more development, does it just seem
 16 prudent to you to get that incremental more data
 17 to help learn more and reduce the risk of injury
 18 down the road?
 19 A. I think -- I think that learning more
 20 helps you to understand what the impacts might
 21 be. But a decision is still, I think, a
 22 political, social, legal decision of what occurs.
 23 And so, the collection of the data, if it
 24 influences the decision, then it's effective. If
 25 it doesn't influence the decision, then perhaps

1 it hasn't benefited much other than knowledge of
 2 the system.
 3 Q. Would you agree that a decision should
 4 be based upon the potential values at risk as
 5 well? Should that be incorporated somehow?
 6 MR. FEREDAY: Objection, I think that
 7 calls for a legal conclusion.
 8 MR. THORNTON: And what I asked for was
 9 an opinion, not a legal conclusion. I'm just
 10 trying to look at it in terms of balancing a risk
 11 assessment model in terms of what is at risk.
 12 You know, are we out in the desert with nobody
 13 out there or are we looking at lots of values out
 14 there? I'm trying to look at a balance there,
 15 not a legal opinion.
 16 THE HEARING OFFICER: All right. I'll
 17 overrule the objection for this question.
 18 MR. THORNTON: Okay.
 19 THE WITNESS: John, I think that's
 20 probably out of my field of expertise.
 21 Q. (BY MR. THORNTON) Okay.
 22 A. I'm trying to respond.
 23 Q. Okay.
 24 MR. THORNTON: No further questions.
 25 THE HEARING OFFICER: Mr. Fereday?

1 FURTHER RECROSS EXAMINATION

2 QUESTIONS BY MR. FEREDAY:

3 Q. Dr. Ralston, would you agree that
4 long-term monitoring is a very useful tool in
5 evaluating what is happening in an aquifer over
6 time?

7 A. Yes, sir.

8 Q. Have you evaluated the monitoring
9 program that M3 has put in place so far? And if
10 so, could you give us an opinion as to the
11 usefulness of that in terms of a long-term
12 monitoring program?

13 A. I honestly don't recall seeing a
14 document that said, "This is groundwater
15 monitoring." I've looked at the data that you've
16 presented in all of these documents, but I have
17 no idea how many of those wells are part of a
18 monitor well --

19 Q. With regard to the model and
20 Mr. Spackman's questions about its adequacy, do
21 you have an opinion as to how the M3 model
22 compares in terms of its ability to evaluate this
23 particular area, this Eagle area, how it compares
24 to the TVHP model?

25 A. Only limited, in the fact that the --

1 further questions.

2 THE HEARING OFFICER: Mr. Edwards?

3 MR. EDWARDS: I have no questions.

4 THE HEARING OFFICER: Thank you,
5 Mr. Ralston. I appreciate your testimony.

6 THE WITNESS: Thanks.

7 MR. FEREDAY: Could we take just five
8 minutes?

9 THE HEARING OFFICER: Yes. Let's go
10 off the record.

11 (Recess held.)

12 THE HEARING OFFICER: I think it's a
13 good time to quit. It's Friday and I think we'd
14 only get partway into Dennis Owsley anyway. I
15 mean, I'd like to use all of the time we have,
16 but I think for us to start in and then come
17 back --

18 (Discussion held off the record.)

19 THE HEARING OFFICER: Okay, we'll see
20 you on the 5th.

21 (Proceedings adjourned at 4:11 p.m.)

1 that this model if you look has a number of
2 multiple layers and a great density of notes and
3 in that sense, it's -- it is a good model. I
4 have been concerned and continue to be concerned,
5 as I've expressed numerous times, about the
6 conceptual model or the groundwater flow system.
7 And so --

8 Q. What about the M3 model's treatment of
9 the stratigraphy, the layering and how the
10 stratigraphy lies in comparison with how the TVHP
11 treated that?

12 A. I don't have enough knowledge to
13 compare those.

14 Q. Do you recall that the TVHP model used
15 essentially flat-line stratigraphy and the M3
16 model assumes dipping stratigraphy?

17 A. Yes, I would.

18 Q. Could that be a significant difference
19 in your opinion?

20 A. It's certainly more sophistication, a
21 greater sophistication. Whether or not it's a
22 significant addition, I don't know.

23 MR. FEREDAY: No further questions.

24 THE HEARING OFFICER: Okay, Mr. Smith?

25 MR. ALAN SMITH: I don't have any

1 REPORTER'S CERTIFICATE

2 I, SHERI LUDIKER FOOTE, CSR No. 90,
3 Certified Shorthand Reporter, certify:

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

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

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

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

17 IN WITNESS WHEREOF, I set my hand and seal
18 this 8th day of June, 2009.

19
20 Sheri Ludiker Foote

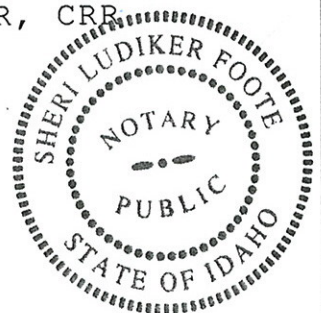
21 SHERI LUDIKER FOOTE, CSR, RPR, CRR

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25 My commission expires January 17, 2010



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