STATE OF NEW MEXICO
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

ORIGINAL

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF LIGHTNING DOCK GEOTHERMAL HI-01, LLC, FOR APPROVAL TO INJECT INTO A GEOTHERMAL AQUIFER THROUGH THREE PROPOSED GEOTHERMAL INJECTION WELLS AT THE SITE OF THE PROPOSED LIGHTNING DOCK GEOTHERMAL POWER PROJECT, HIDALGO COUNTY, NEW MEXICO. Case No. 15357

and

APPLICATION OF LIGHTNING DOCK GEOTHERMAL HI-01, LLC, TO PLACE WELL NO. 63A-7INJECTION-GEOTHERMAL RESOURCES AREA, HIDALGO COUNTY, NEW MEXICO Case No. 15365

REPORTER'S TRANSCRIPT OF PROCEEDINGS
COMMISSION HEARING
VOLUME 5
October 9, 2015
Santa Fe, New Mexico

BEFORE: DAVID R. CATANACH, CHAIRPERSON
ROBERT S. BALCH, COMMISSIONER
PATRICK PADILLA, COMMISSIONER
BILL BRANCARD, ESQ.

This matter came on for hearing before the New Mexico Oil Conservation Commission on Friday, October 9, 2015, at the New Mexico Energy, Minerals, and Natural Resources Department Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

REPORTED BY: PAUL BACA, CCR #112
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H E A R I N G I N D E X

LIGHTNING DOCK GEOTHERMAL REBUTTAL CASE:

I N D E X (cont'd)

LIGHTNING DOCK GEOTHERMAL REBUTTAL CASE:

WITNESS JOHN SHOMAKER

WITNESS ROGER BOWERS (Recalled)

(Time noted 8:33 a.m.)

CHAIRMAN CATANACH: I call the hearing back to order at this time, and I believe that you were done with your direct case, Mr. Lakins?

MR. LAKINS: Yes, sir.

CHAIRMAN CATANACH: And you were going to call some rebuttal witnesses?

MS. HENRIE: Yes, Mr. Chairman. Before I do that, I would like to just address the Commission really briefly. Our team listened to AmeriCulture's concerns yesterday. While we may disagree about the science behind them, we understand the concerns are felt heavily by AmeriCulture.

We also heard the Commissioner talk about compromise yesterday. And with that, in the spirit of compromise, we are authorized to, in this proceeding, withdraw one of the four injection well applications, the application that is closest to the AmeriCulture facility, which is 63A-7. I would like to, at this time, hereby withdraw that application.

We will be submitting probably on Monday another application. We do still feel strongly that we need all four wells, but we will pull that well to the south further into the greenhouse area to keep it further away from the

AmeriCulture property. And I don't know exactly what that kettleman number would be, but it will be pulled further south to help provide more of a buffer for the AmeriCulture property. And I didn't get a chance to run that by Mr. Lakins and Mr. Seawright before the hearing, so I apologize, but that is what we felt was the right thing to do after hearing the concerns yesterday.

And with that, I did ask to recall a couple of witnesses. I would like to recall first Roger Bowers, who is the project geologist and the prior owner of the project.

CHAIRMAN CATANACH: Mr. Lakins?

MR. LAKINS: I sort of have a standing objection to anticipated testimony here. This is being presented as rebuttal. Rebuttal has always been in response to something new and unexpected that came up on our case. And rebuttal is not for the purpose of saying Let me tell you again why I am right and why he is wrong.

What I anticipate is that is what we are going to get, and so unless there is something that can be identified as what came up that was new and unexpected to which rebuttal is proper, I think that putting on witnesses to just say Let me tell

you again why I am right and why they are wrong is a waste of time and inappropriate.

CHAIRMAN CATANACH: Go ahead, Ms. Marks.

MS. MARKS: Two points here. I think to address Ms. Henrie's new application or the application that will be forthcoming, I did ask -- this hearing obviously went on for way longer than anticipated. I would ask that if the Commission, in any order, could make any findings or conclusions for this area so we are not putting on the same facts, the same testimony, the same conclusions and be before the Commission again for the same matters and waste everybody's time again. If we could consider this in the order, that would probably save everybody here a lot of time. I would just ask that the Commission consider that knowing that we have heard testimony in geothermal resource area.

And with respect to rebuttal, I think a lot of the witnesses did testify about matters that were not in the prehearing statement, so I would ask for a little bit of latitude to be considered by the Commission.

MS. HENRIE: Mr. Chairman, I will go ahead and before I ask a question, clarify where the question is coming from. In many cases it is to

correct testimony or to fill in gaps that the Commission has not heard, but have asked for.

MR. LAKINS: Correcting testimony is just changing what I said before. That is not rebuttal.

MS. HENRIE: I am correcting your witnesses' testimony.

MR. LAKINS: Once again, my witnesses' testimony was my witnesses' testimony. They don't get to correct it. That is not rebuttal. Just saying what they said was wrong is not rebuttal. It has to be something that came up, unexpected, new, not just I am going to correct what they said. That is basically saying Let me put my case on again when I bear the burden of proof. Let me put it on again or parts of it again when they have countered what I said in my case-in-chief. That's not rebuttal.

MR. ROGERS: May I? It is not our intention to address all the erroneous statements or all the erroneous factual matters that were pervade nor all the erroneous factual or legal errors with regard to legal pronouncements or so on. We are going to be focused, but it is important and we selected some particularly relevant and material presentations that were erroneous to address. It is classic rebuttal. That is rebuttal.

MR. LAKINS: That is closing. That is not rebuttal.

MR. BRANCARD: Rebuttal is a witness, closing is a lawyer.

Mr. Chairman, I think there is room for rebuttal. Obviously, the Commission does not want to have the whole case reheard again and we would like to keep this as specific and directed as possible. You know, we did not have prefiled direct testimony in this case, instead we had prehearing statements that made fairly general, statements about what witnesses were to testify to and we received a lot of detail from the witnesses, and in particular AmeriCulture witnesses. So I think it is appropriate to have some rebuttal testimony here. And I think keeping it focused on what you're actually rebutting as opposed to restating the original case, I think is -- that you can do in your closing statement.

MS. HENRIE: Fair enough.

CHAIRMAN CATANACH: Okay. Let's proceed on that, on that matter.

ROGER BOWERS,

after having been first duly sworn under oath, was questioned and testified as follows:

MS. HENRIE: Commissioners, we previously heard from Roger Bowers. He is the project geologist and he has been with this project for a number of years, as you have heard on prior testimony.

DIRECT EXAMINATION

BY MS. HENRIE:

Q. And, Roger, are you familiar with the temperatures of the Lightning Dock Geothermal wells?

A. Yes, I am.

Q. Will you please describe these temperatures --

MS. HENRIE: And, Mr. Chairman, Commissioners, this goes to the point, AmeriCulture said only two wells were above 250 degrees and we disagree with that. I would like to get the testimony on record.

MR. LAKINS: This should have been part of their case-in-chief. Standing objection.

CHAIRMAN CATANACH: We'll allow it. Go ahead.

Q. (By Ms. Henrie) Roger, will you please

describe the temperatures of the Lightning Dock wells?

A. The Lightning Dock wells that have been drilled over the years are all very, very hot except the ones way out on the fringe, but the well logs and temperature surveys are in OCD files. I can tell you that every well that Cyrq Energy has drilled, that Lightning Dock exceeds 250 degrees Fahrenheit.

MS. HENRIE: I would like the Commission to take administrative notice that those well log temperatures are in OCD files.

Q. (By Ms. Henrie) Next question. Roger, Lightning Dock Exhibit 14, which is the well logs Commissioner Blach is looking right in front of him, there was a statement by Mr. Witcher that those just reflected what the mudlogger threw out there. Do you know who prepared that exhibit?

A. Yes. I actually prepared that exhibit and I can tell you that the mudloggers that were hired for this job have been in the geothermal industry for more than 30 years and have expertise in volcanic rocks, and that is why they were contracted to sit on these wells.

I can further tell you that the

cuttings from all of the wells were shipped to the Energy and Geoscience Institute in Salt City, Utah, as part of the University of Utah Research Institute and the cuttings were studied by Dr. Joseph Moore. Not only were they examined under microscopes, but thin sections were made and petrographic analyses were made on these cuttings. So the interpretations or the lithologies that you see reflected on that cross section are the result of several studies.

Dr. Moore also confirmed that the mudloggers correctly identified the different types of igneous rocks, where they -- whether they are volcanics or intrusives. And so we have a lot of confidence in those pathology logs.

Now there are a couple of minor interpretations. The log for AmeriCulture state two. For graphical reasons on such a small scale cross section like this, there were three separate zones of the rhyolite that Mr. Witcher identified, and that log is taken from Mr. Witcher's logs. He identified three subareas of the rhyolite. I combined it into a single rhyolite for the graphics on that log. But all of the others are taken from the petrographic studies done by the Energy and Geoscience Institute.

Q. Thank you.

And my last question for Mr. Bowers, yesterday there were sort of floated a suggestion of why don't you just case all the wells down to 500 feet. And, again, for clarification Well 13-7, which is out to the west, already is proposed for minimum depth of 500 feet. The wells in the greenhouse area, the minimum depth was proposed 150 feet with perforations down to 1,500. If we case down to 500 feet, what would be the effect of that?

A. It is my opinion that it would be very detrimental and that is based on the fact that the Rosette wells in the greenhouse area encountered the fractured silicified volcanics, sometimes the shallow is liberty in 40 feet. There is very little alluvium in there and they had water production zones from as shallow as 50 feet. So to have to case to 500 feet would be very, very detrimental. You would be losing your fracture porosity that goes into the heart of the geothermal system.

MS. HENRIE: Mr. Chairman, with that I will pass the witness.

CHAIRMAN CATANACH: Mr. Lakins, do you have any questions?

CROSS-EXAMINATION

BY Mr. Lakins:

Q. Mr. Bowers, you said that all the wells that were drilled were hot, over 250. How many wells? What is the number?

A. I believe it is seven. These are the wells only that were drilled by Cyrq Energy since they purchased the property.

Q. Of those seven wells how many are productive wells?

A. That would depend on your definition of production.

Q. How many are in use?

A. Right now, I believe, one, two, three, four of them are.

Q. Can you give me production rates of the wells that are in use?

A. I am not aware of that information.

Q. Can you give me the injection rates of the Wells 53-7 and 55-7?

A. No, sir. I am not aware of that information.

MS. HENRIE: It's not, and Dr. Shomaker is going to address that.

Q. (By Mr. Lakins) Would you agree that the

wells that have been drilled other than 45-7 and 55-7 are not promising wells to be utilized in the project?

A. I would not agree with that statement.

Q. From a production standpoint?

A. I think there is potential in all of those wells.

Q. For use as injection and production in the existing wells?

A. Yes.

Q. Then why are you not using the existing wells?

A. That is not my determination, sir.

Q. Okay. So you have got seven wells that in your opinion are usable production or injection wells.

Is that correct?

A. Basically, yes.

MR. LAKINS: Thank you.

CHAIRMAN CATANACH: Ms. Marks, did you have any questions?

MS. MARKS: No questions.

EXAMINATION BY CHAIRMAN CATANACH

CHAIRMAN CATANACH: I just have one. Do we have any evidence as to the thickness of the

alluvium in this area, in the whole area? Do we have a map that shows that?

THE WITNESS: I don't have a map that shows it, but I can tell you that it ranges from 20 to 30 feet in the greenhouse area all the way out to probably 1,600 feet as you, especially as you go west, it gets thicker as you move towards the valley. So there is a broad range of thicknesses to the alluvium. It just depends where you are.

CHAIRMAN CATANACH: So given your knowledge of the thickness of the alluvium, are some of these injection wells going to actually inject into the alluvium?

THE WITNESS: Only on a very limited basis. And, of course, the one out -- 13-7 out to the west, it is being cased deeper so it would probably have some alluvium to take advantage of that. The ones in the greenhouse area, basically they are going right back into the main upwelling of the resource, which is in -- or the fractures in the shallow, which is the silicified volcanics.

CHAIRMAN CATANACH: And the wells in the greenhouse area are which ones again?

THE WITNESS: 76-7, which is down at the very south end very near Burgett's house and then

there is one off to the east.

CHAIRMAN CATANACH: So those two wells would probably not encounter alluvial injection?

THE WITNESS: Very limited, in my opinion because the alluvial is very thin. I can tell you the 76-7 based on the information we have with 150-foot casing would be through the alluvium, would case off the alluvium that is into the porosity and permeability of the silicified volcanics. That's based on the information that we have at nearby wells.

CHAIRMAN CATANACH: Okay.

EXAMINATION BY COMMISSIONER BALCH

COMMISSIONER BALCH: Good morning, Mr. Bowers.

THE WITNESS: Good morning.

COMMISSIONER BALCH: I was the one that threw out the 500-foot number. And that was -- my real intent was, is to make sure that you're cased through the shallow aquifer and a little bit below. So a more appropriate constraint might be to 50 feet below the base of the silicified sediments?

THE WITNESS: I think that would be very, very difficult. First of all, the wells in the greenhouse area when you look at the Rosette wells,

again, they only countered a few tens of feet of alluvium before they were in that silicified zone. So to have to case deeper than that you're -- you're in the heart of the upwelling of the geothermal fluid. I do not see that as a separate shallow aquifer. It is all coming up and so, you know, to put a footage limit on it like that, I think would be very wrong and very detrimental.

COMMISSIONER BALCH: You do understand the one thing that -- that we are supposed to do is protect shallow aquifers?

THE WITNESS: I understand that.

COMMISSIONER BALCH: I think if this were in an oil well, you would be three layers of casing and cement.

THE WITNESS: Right.

COMMISSIONER BALCH: Through any interval that may have fresh water remotely near it. Particularly as you go to the south side of the plume east and the west, you're getting into those areas where you are in the mixing zone of the shallow freshwater aquifer and the upwelling plume. So we do need to make sure that we do protect that zone. I think that also would go a long way to alleviate the concerns of AmeriCulture because you

are more -- you are providing more isolation between the injection and the shallow part of the plume.

THE WITNESS: I understand that. And my response is that in the greenhouse area where these injection wells are, you don't see the separate shallow aquifer. I mean the geothermal fluids are coming up basically to the surface.

COMMISSIONER BALCH: So really comes my next question, which is, maybe a little bit of location on some of those other seven wells and the depths of which you found the 250-degree water, 250 plus water.

THE WITNESS: I am not sure that I would be allowed to answer all of those questions, but I can show you the where the wells are.

COMMISSIONER BALCH: Okay.

THE WITNESS: Do we have any kind of a pointer that I could use?

All of the wells are not on this map. I don't know if we have the other map available. The first one that was drilled, well, of course, 55-7 right there (indicating), and those temperatures are -- have been on record for a long time. They exceeded 300 degrees Fahrenheit at depths of about 1,200 feet. That has been known for

a long time. There has been multiple temperature surveys.

Well 45-7 here (indicating), that is the current production well and that also exceeds 300, about 310 degrees Fahrenheit.

I can tell you that 53-7 and 63-7 both exceed 250 degrees Fahrenheit.

I can tell you 47-7 exceeds 250 degrees Fahrenheit. And I can tell you that 17-7, the latest well that was drilled, also exceeds 250 degrees Fahrenheit.

So when you look at those high temperatures it greatly increases the size of the resource.

COMMISSIONER BALCH: What are the TDs on those wells, do you know?

THE WITNESS: I can -- I don't have the exact numbers. 55-7 went to 7,001; 45-7 went to 2,900; 53-7 I believe went to 4,400; 63-7, I don't remember the specific depth on that. It went to about 3,000 feet or 3,400 feet. 47-7 again went to about 3,000 feet, but that is not a true vertical depth because that well was deviated horizontally to cross some structures.

COMMISSIONER BALCH: Deviated or turned

horizontal?

THE WITNESS: Turned.

COMMISSIONER BALCH: Turned horizontal?

THE WITNESS: It didn't go completely horizontal, but we did deviate it to...

COMMISSIONER BALCH: So your approximate TD was?

THE WITNESS: Approximate TD, I believe was probably about 3,200 feet. But, again, true vertical depth would probably be about 26, 2,700 feet. And then 17-7 went to I believe it was 6,200 feet.

COMMISSIONER BALCH: Thank you, Mr. Bowers.

EXAMINATION BY COMMISSIONER PADILLA

COMMISSIONER PADILLA: Just one quick clarification, Mr. Bowers. You said that UCH2 water production shallow, is 40 to 50 feet. That would be assumably underneath the alluvium in the greenhouse area that is coming from the silicified zone?

THE WITNESS: The information that we have is from Dale Burgett and the logs that were filed with the State engineer's office, and so there is not a lot of detail in them, but they did identify water zones. And some of those are as shallow as 50

feet and it appears to be near the contact between the alluvium and the silicified volcanic robs.

COMMISSIONER PADILLA: So I guess my follow up is probably -- you probably wouldn't have any information on it. I was wondering if you knew what the water characteristics were at that depth?

THE WITNESS: I do not.

COMMISSIONER PADILLA: We are talking about not two different zones and all of it being generated by the geothermal and I know you don't have any -- Lightning Dock doesn't have any information about TDS or fluoride levels?

THE WITNESS: That information I am not aware of. There could be. I have not been involved with water sampling. I can tell you from temperature logs that there is no indication of any separate shallow aquifer. The hot water comes almost well up to the top of the water table.

COMMISSIONER PADILLA: I think if we had some of those characteristics that would go along with his answering Dr. Balch's question about the different aquifers.

THE WITNESS: I am sorry, I don't have any of that information.

COMMISSIONER PADILLA: Sure.

THE WITNESS: That is something I have not been in involved with.

COMMISSIONER PADILLA: Thank you.

THE WITNESS: You're welcome.

CHAIRMAN CATANACH: Anything else from this witness?

MS. HENRIE: Nothing more for Mr. Bowers. In response to the questioning we would also like to call Monte Morrison who is the service vice president of operations.

We will let you step down.

MONTE MORRISON,

after having been first duly sworn under oath, was questioned and testified as follows:

THE REPORTER: If you would please take your seat and state your name for the record.

THE WITNESS: My name is Monte Morrison.

DIRECT EXAMINATION

BY MS. HENRIE:

Q. Mr. Morrison, I believe you just heard questions from Mr. Lakins about the wells, whether they are productive, whether they are expected to be productive. Can you please talk about the Lightning Dock wells that are in addition to Well 45-7 and Well 55-7?

A. Certainly.

MR. LAKINS: I will object. I have to raise a standing objection. This should have been part of the case-in-chief. This is not true rebuttal. This is now a follow-up to another witness' non-rebuttal, and he's not a geologist.

MS. HENRIE: He's the service vice president of operations.

CHAIRMAN CATANACH: Let's proceed.

A. So it is under my guise to manage the well field under the direction of Cyrq Energy. And so we currently are producing out of Well 45-7, as Ms. Henrie mentioned. We are primarily injecting into 55-7, but to answer the question into the other wells that have been drilled, Injection Well 53-7 and 63-7 have been put into injection and they have seen progressive increasing injection rates as of -- I have to clarify.

Today we are doing some maintenance onto this facility, so they are at zero today. But as of earlier in the week 53-7 had risen up to about 80 gallons a minute from being, you know, a very -- it was a lower injection rate. It has risen multiples up to about 80 gallons a minute.

63-7 has seen even a greater

improvement. It has risen from much lower injection rates to about 160 gallons per minute.

And then we currently are -- actually as of this week, we approved purchase orders to purchase piping to go out to 17-7 and we will be injecting into it within about six weeks of -- after delivery and installation of a pipeline to 17-7.

And the other well was 47-7. It shows promise. It has not yet been connected as an injector, but it is being used as a monitoring well.

Q. (By Ms. Henrie) Why are these wells showing improvements?

A. They are showing improvement based on -- well, on my history. As Mr. Lakins mentioned, I am certainly not a geologist, but I've managed well fields for over 30 years. And over time with many well fields with steady injection into them, they will improve. We have seen that at other facilities and we have seen this now on multiples of injection rates at 53 and 63-7. And it is more of a slow steady incremental improvement over time.

Q. So what is the company's plan? Does it intend to inject into these deep wells?

A. Certainly, we have a very strong distributed injection plan that will include the

four new wells that are being proposed but it certainly does also include the existing wells that are piped in 53 and 63-7. It will include 17-7 which will be piped in, in mid-November.

And the intent of the company, which is our intent in all of our facilities, is to distribute injection into a large area, geographic as well as a geologic area, in order to distribute that injection and to be able to have a broad and a wide distribution, a broad distribution and a deep distribution of injectate so that as the water returns to production it has time to reheat. That is the perfect scenario as far as an injection scheme that we have used elsewhere for many years.

Q. Does that wide distribution allow better well field management?

A. Certainly. We have the ability, through our valving. As these wells improve, we have the ability to distribute injection. At other sites we have the ability to raise and lower injection rates based on conditions at the production wells, conditions at the injection wells, and from the facility. So it does give us great operational flexibility.

MS. HENRIE: With that, Mr. Chairman, I

will pass the witness.

CHAIRMAN CATANACH: Any question Mr. Lakins?

MR. LAKINS: Yes, sir.

CROSS-EXAMINATION

BY MR. LAKINS:

Q. Your Well 55-7?

A. Yes, sir.

Q. What is the current rate of injection?

A. The rate injection today, as I mentioned, is zero. It typically takes the lion's share of the injectate as 53 and 63-7 are taking water. If we use them -- and I don't mean to be vague, but the production rates vary depending on how many operational units are in service at any given time. So if we take a nominal flow rate of, say, 1,800 gallons a minute of production, that is an injection rate of about 1,650 or so. I am doing math on the stand which Mr. -- Dr. Shomaker said not to do, so -- but in general it is about 90 percent based on the thermal density change.

Q. Okay.

A. I'm sorry, I will stop there.

Q. If you can give me an average number --

A. Absolutely.

Q. -- of GPM rate --
A. Yes.
Q. -- of injection into 55-7 will be real helpful.
A. An average rate of injection into 55-7 would be 1,500 to 1,600 gallons a minute at most.
Q. Okay.
A. As the --
Q. Okay. What is the pressure?
A. On 55-7 is about -- I would have to look at the logs, but it is about 55 or 60 PSI.
Q. All right. 53-7 you said it is currently injecting about 80, taking about 80?
A. When it is online, yes, sir?
Q. What is the pressure?
A. It is similar. It's a little bit lower. It is a much longer pipeline and a smaller pipeline, so with pressure drop out there it is probably in the order of 40 to 50 PSI.
Q. It's pressure, it is not gravity?
A. Both.
Q. How about 63-7? You say it is about 160 GPM right now?
A. When it is online, yes, sir.
Q. What is the pressure?

A. Similar.
Q. What is the highest pressure you ever had to put on that well?
A. Under operations?
Q. Yes.
A. It would be the 40 to 50 PSI, which is the outlet pressure of the plant. We do not have any additional pumping out to that site yet.
Q. Now you said 17-7?
A. Yes, sir.
Q. You plan to use that for injection in about six weeks?
A. That is our intent, yes.
Q. And do you agree it is about 6,200-foot depth, do you know?
A. I don't know, sir, I'm sorry.
Q. And 47-7 you indicated it shows promise. Why do you say that?
A. It is a -- it has shown promise during the drilling. That is what I have read through the drilling reports. It is being used as a monitoring well. It is our intent to pipe out to 17-7 first and in parallel with the drilling activities on the four new -- the three and then the one that we are going to submit on Monday. So it is a well that we

are anticipating will show promise. It is being used as an active monitoring well.

MR. LAKINS: Thank you.

CHAIRMAN CATANACH: Any questions, Ms. Marks?

MS. MARKS: Just one question.

CROSS-EXAMINATION

BY MS. MARKS:

Q. Discussion about the existing wells, there is injection in there and there is the new proposed application as part of the purpose of the geothermal research and this conservation act says the act is to encourage maximum economic recovery as part of the application, and the purpose of these applications to encourage maximum economic recovery of the geothermal resource and for your operations.

MR. LAKINS: I'm going to object to that. That is placing OCD's testimony into the record. This is not rebuttal. This is beyond the scope of his direct and this was part of the Applicant's case-in-chief.

MS. MARKS: He talked about why he is drilling the new wells.

MR. BRANCARD: This is rebuttal. I mean, so unless there is something that AmeriCulture

testified in opposition to that.

MS. MARKS: Just his testimony that he is talking about right now.

MR. LAKINS: That is beyond the scope of the questions that Lightning Dock and myself asked. And that is an inappropriate question at this point in this proceeding.

CHAIRMAN CATANACH: Okay. I will disallow it, then.

MS. MARKS: The testimony was just had just now during this witness' rebuttal, so I am a little confused.

MR. BRANCARD: The witness was testifying to factual matters about the wells. You're asking him to characterize their whole strategy here, which is a different.

MS. MARKS: I apologize. Maybe it was Mr. Bowers, I guess that was asked. It was during rebuttal in general that the topic came up.

MR. LAKINS: Well, it didn't come up through this witness. That is an inappropriate question to this witness.

CHAIRMAN CATANACH: Okay. We will disallow the question. Do you have anything else, Ms. Marks?

MS. MARKS: That is fine.

EXAMINATION BY MS. GAULT

MS. GAULT: I would like to ask you, in spite of not being a geologist, are you the one that makes decisions where this inject -- I mean where you're going to drill the injections?

THE WITNESS: No, ma'am. I am part of the team, but I do not cite wells, not being a geologist. I anticipate wells when they are drilled, then I put them in operation and then I manage them, but I don't cite them and drill them.

MS. GAULT: And you did say that you are not abandoning the deep wells, the injection deep wells, you're just wanting to add more shallow wells is that my understanding?

THE WITNESS: Oh, yes. We are not abandoning 53 or 63-7. In fact, we're enhancing our well field by adding 17-7 in short weeks.

MS. GAULT: But I thought that our understanding was that the deep wells are not taking the water, so why are you -- how are you going to use them if they are not usable now? That is what -- I guess I am not asking it right but...

THE WITNESS: No, I think I understand and I will answer in that they are improving and this is

typical in that they -- the wells will improve over time. Some do, and these two are -- they are showing a dramatic increase in multiples from tens of GPM to 80 and 160. It is our expectation that will increase. It is our expectation that we will have, through the other wells, have additional injection capacity and then as our expansion continues that we would then, as I have testified prior, we would convert Injection Well 55-7 -- not convert, excuse me, we would revert back to a production well status for that well. It is permitted for both, and we would produce out of 55-7 and inject through the existing wells and the proposed and anticipated wells.

MS. GAULT: Okay. Can you explain to a layperson like me how something that is not functioning is going to improve? Is it because of more pressure or it depends on the fact that you are going to drill the shallow wells? What is the relationship between the shallow wells and the deep wells is the improvements of the deep wells depends on the shallow wells?

THE WITNESS: Yeah, that is the how question, ma'am, leaves my purview of expertise. I have witnessed it, I have managed it and I have -- I

have done it under the regulations of different states. How it physically occurs, I think I better leave to the geologists because that is not my area of expertise. I'm sorry I can't answer that for you.

MS. GAULT: Thank you.

EXAMINATION BY COMMISSIONER BALCH

COMMISSIONER BALCH: So 53-7 and 63-7 Mr. Bowers said were greater than 250 degrees.

THE WITNESS: Yes.

COMMISSIONER BALCH: And you are injecting the effluent from the power plant into those two wells and in addition to 55-7?

THE WITNESS: Yes, sir.

COMMISSIONER BALCH: Those effluents, I believe, are between 180 and 210 or 220?

THE WITNESS: Again, it varies, but yes, that is a range that is typical. It can be slightly lower and it is typically no hotter than about 220 for certain -- we do want to extract the heat.

COMMISSIONER BALCH: Right. Say Lightning Dock's interpretation about the size of the anomaly is incorrect.

THE WITNESS: Uh-huh.

COMMISSIONER BALCH: And you start to pump

and you hit the bottom of the well before you hit the end of the cone. What is Lightning Dock's or Cyrq's business plan in that case? I am sure you have a, you know, a fallback plan. Say you can't meet the water demand you need for your expansion.

THE WITNESS: Sure. Without delving into areas that are confidential in the productivity of 45-7, we do have great confidence in that well and from previous flow tests on 55-7 we are greatly confident in that one. I can say without getting into numbers that the numbers I have seen are very encouraging. And based on that and the fact that we are doing the distributed injection and requesting injection permits. I don't mean to be cagey, but we don't feel we are production limited. We do know that we want to distribute injection, both geologic depth as well as geographic area into a greater extent than 55-7 to expand, and I don't -- I hope I am not being evasive.

COMMISSIONER BALCH: No, I don't think you are being evasive. What I am trying to get at is if you can't make your water quota, what happens? Do you have a business plan for scaling back your expansion?

THE WITNESS: Based on the expect -- based

on the known production abilities of 45-7 and the test on 55-7, we feel confident our expansion to the levels that we have are in design right now and construction are adequate. If -- at any of -- and I will speak generally of Cyrq. If we had a lack of production, then we would then look at drilling a production well, requesting a permit and drilling a production well. That would be typical of any geothermal plant. That is a routine to have the need for that in 10 years or 20 years to increase production.

COMMISSIONER BALCH: Under direct testimony I believe you said that your goal was to reach equilibrium and not to deplete the resource but to maintain it ad infinitum.

THE WITNESS: Certainly. That would be -- for any given size resource, that is definitely my directive from our board and our management as well as my personal expectation on managing well fields. I do want to hit an area where we are in balance and our production and injection are in a good system approach.

COMMISSIONER BALCH: Say you're successful. This will probably be easier.

THE WITNESS: Uh-huh.

COMMISSIONER BALCH: You just mentioned you may need additional production wells. You may also need additional injection wells. So what we have presented today, we don't really have a rule in place that describes parameters for geothermal injection wells. So this rule or this order that we make today or tomorrow or whenever we finish deliberating is probably going to set the standard. Would it be beneficial to Lightning Dock to just have a set of parameters and be able to deal with this either administratively or at the OCD level?

THE WITNESS: I might not be understanding. I certainly want to address the first part of your question in that, you know, we do feel very comfortable in our production side. And in general, this is across our fleet through three states. We would, you know, if we are -- have an issue with production, that we would request that. If I could ask you Dr. Balch to restate the second half regarding the parameters. I don't want to misunderstand.

COMMISSIONER BALCH: A standard for injection well design.

THE WITNESS: Oh.

COMMISSIONER BALCH: That would avoid

having to come before us every time you want to drill an injection well.

THE WITNESS: Sure. It is a matter that, again, well design is not my area of expertise. I have managed many injection wells in many states and so that it is typical to have a criteria for injection wells that I have dealt with. And so I think I will leave well design to the drilling engineers and the geologists. I think I won't comment on that, out of my area.

COMMISSIONER BALCH: You have mentioned that you are not pumping, you're just using the outflow pressure of the plant to push water down the pipes and into the wells.

THE WITNESS: We don't have any pumps on the outlet of the plant.

COMMISSIONER BALCH: I might have caught an inference that you don't have those at this time. Is there a plan to put any of these wells under pressured injection at the wellhead?

THE WITNESS: At 53 and 63-7 there is, yes.

COMMISSIONER BALCH: Do you know what pressures those might be at?

THE WITNESS: Because of the depth I know

that it will be at a slightly increased pressure, but it will be well under the maximum injection pressure for those depths for certain. It is a small pump and I would assume -- I haven't done the flow curve calcs yet. It is an existing pump we had at other sites. I would assume 40 PSI or so, but that is not...

COMMISSIONER BALCH: So less than 100 as you noted in your four present applications total?

THE WITNESS: These wells are constructed very differently and so I am assuming, but I am not stating such.

COMMISSIONER BALCH: Thank you.

EXAMINATION BY COMMISSIONER PADILLA

COMMISSIONER PADILLA: I do have a couple of questions.

53-7 and 63-7 currently account for about 240 to 250 GPMs injection?

THE WITNESS: Correct.

COMMISSIONER PADILLA: And is it 55-7 that is the main injector now?

THE WITNESS: Yes, sir.

COMMISSIONER PADILLA: That was in the 1,500 to 1,600 range?

THE WITNESS: It takes the balance of the

remaining, yes.

COMMISSIONER PADILLA: Given your experience with other geothermal projects, that 12 to 15 percent number for the two combined wells is probably not optimal, correct?

THE WITNESS: Correct, yes.

COMMISSIONER PADILLA: Is that a big reason why you are seeking the additional wells so that --

THE WITNESS: Yes, and yes. It is an optimal. They were down in the less than 5 percent range several weeks ago and they have improved over time, so we anticipate that to continue. That has been my history.

And so, in order to convert 55-7 back to production, as I testified for before in September, it certainly is our intent to have not one well take the lion's share but to distribute it around the field in depth and breath in order to have a broader injection strategy. So yes, absolutely, sir, without talking too much, that is the case.

COMMISSIONER PADILLA: Sure. What would -- just -- this is out of curiosity. What would you like to see out of those two wells for

efficient well field management?

THE WITNESS: Well, currently if the round number production is 1,800, you know, I would like to see -- I typically -- we have four wells in production, I would like to see a distribution of approximately equal. But it is -- it is not always that easy. It depends on their injectivity index, it depends on their proximity to production and their proximity to another injection well. So it is -- I think simplistically it can be equally distributed, but practically it is managed well by well, field by field.

COMMISSIONER PADILLA: At those percentages would those be in the geothermal field, in general, would those be considered marginal injectors?

THE WITNESS: If they were at the -- 25 percent, which would be approximately 400 to 450, those would be considered -- in my field, in my experience they are fair as they improve.

55-7 is a terrific injector. It is not as good as others we have in our fleet, especially in Nevada. But, you know, if you -- we do have other wells across our fleet that are at the 400, 500 well GPM level that we inject into for

years and are very satisfied with that.

COMMISSIONER PADILLA: Okay. As far as the increases in those injection capabilities go being much more familiar with oilfield practices, in that business it usually -- any increase injectability usually involves chemical and mechanical treatments.

Does Lightning Dock do anything on that level to increase the injection?

THE WITNESS: We have elsewhere, certainly, and in my experience we have done it in other states. We have dealt with chemical improvement through acidification. We have done other areas, other things to improve. But honestly my best successes and the most economical successes have been slow steady injection at plant outlet pressures, that have improved injectate -- injection indices over time. I -- honestly I have not -- personally have not had the greatest success, but the geologists have much more experience than I do not on lots of other wells.

COMMISSIONER PADILLA: So there is a possibility that you would use chemical treatments on these two to get them to --

THE WITNESS: I would say within the

limits of the State of New Mexico regs, yeah, absolutely we would. I mean, we would look at additional conventional geothermal well enhancements in any of our sites.

COMMISSIONER PADILLA: Okay. Thank you.

EXAMINATION BY CHAIRMAN CATANACH

CHAIRMAN CATANACH: Just one. On the 45-7 well, what is the current producing rate?

THE WITNESS: The current producing rate when all four units are online is about 1,800 GPM, but that varies. It is on a variable frequency drive, so we have a great deal of flexibility. We can run it down even much lower and some higher.

CHAIRMAN CATANACH: So with the expansion are you going to increase the production on that well?

THE WITNESS: Yes, sir.

CHAIRMAN CATANACH: Do you know to what rate?

THE WITNESS: We would -- well, it sort of depends on pumping technologies, what is available out there. You know, my anticipation would be that we would attempt to get up above 26 to 2,800 GPM out of that well.

There are other wells in other states

that do in excess of that, but it is dependent on pumping technology.

CHAIRMAN CATANACH: Okay.

MS. GAULT: Mr. Chairman, can I just ask a question because of what Mr. Padilla...

FURTHER EXAMINATION BY MS. GAULT

MS. GAULT: I want to know are you going to enhance injections using something artificial chemically.

THE WITNESS: Not at this point, ma'am, no. It is not our -- you know, the future is open, but right now our intent is to continue the injection into 53 and 63-7 and monitor their progress very closely and continue that path.

MS. GAULT: So if you would run again into these problems of injections that you cannot get the injection done, not with the deep, not with the shallow, then you will revert to the technology and you'll have to come in front of -- I mean, you will have to go to the OCD and then you will have to come again to the Commission unless -- you don't have to come to the Commission, I guess, if they approve it. But if I will object then you'll have to come to the Commission.

THE WITNESS: I will speak more of my

experience.

MS. GAULT: And when the soil and water conservation district will be notified that you are going to use this chemical techniques or whatever. See, we are not kept -- we were out of this picture until I read this notice coming that there is going to be a hearing. And we don't like to be in this position. And so we are trying to figure out how we can be informed in advance on any changes that you people are proposing, suggesting, before you even go to the OCD or when you go to them. Because we are responsible for the health of our water and soil. We don't want to stop your operation. We don't want to stop any other operation, but we need to know. So, I just want to be clear that when -- if you're going to run into more problems, his question is really kind of we want to be informed. Thank you.

CHAIRMAN CATANACH: Thank you. Anything else from this witness?

MS. HENRIE: Just maybe a follow-up question to try to clarify that point.

REDIRECT EXAMINATION

BY MS. HENRIE:

Q. Mr. Morrison, is this application currently before the Commission intended to allow

time to do what acid job fracking these other possibilities could do quickly? The idea to avoid that route by allowing time to open up the deep injection wells so that they can be used. Is that what is going on here?

A. Certainly.

MR. LAKINS: I'm going to object to that question as incredibly leading and placing Lightning Dock's testimony into the record through their attorney, not through the witness.

CHAIRMAN CATANACH: Okay. Go ahead, just answer the question.

A. It certainly is our intent based on our experience and our success and the cost of other more rapid treatments, it certainly has been my experience that this process allows that time. The new four injection wells will give us that adequate time and then we would be managing that well. That certainly is our intent.

CHAIRMAN CATANACH: Anything else?

MS. HENRIE: Nothing else of this witness.

CHAIRMAN CATANACH: This witness may be excused.

MS. HENRIE: Mr. Chairman, our last witness on rebuttal is Dr. John Shomaker.

JOHN SHOMAKER,
after having been first duly sworn under oath,
was questioned and testified as follows:
THE REPORTER: Thank you very much. If you would please take your seat and state your name for the record.
THE WITNESS: My name is John Shomaker.
DIRECT EXAMINATION
BY MS. HENRIE:
Q. Dr. Shomaker, the Commissioners have raised questions about the velocity of the flow in the valley fill aquifer. Have you calculated the velocity of the flow in the valley fill aquifer in the vicinity of the hot wells?
MR. LAKINS: The same objection. This is not rebuttal.
COMMISSIONER BALCH: This is an answer I want.
MR. LAKINS: Yes, sir. I have to object for the record.
A. Yes, I have.
Q. (By Ms. Henrie) Would you please describe?
A. Yes. I have taken the results from several groundwater flow models that have been done by Hawkins and Stevens and by the office of the

state engineer and using the transmissivity values for the shallow aquifer in the area within a mile or two down gradient from the hot wells and applying the hydraulic gradient, the slope of the water table that's in the Hawkins and Steven's report and also applying an effective porosity or specific yield that comes from a variety of sources going all the way back to Harold Reader's sole study in the basin and these groundwater flow models to calculate a tracer velocity and an average linear velocity, and that comes out to several tens to several hundreds of feet per year. There is a large range because to convert the transmissivity values that are in the models to hydraulic conductivities requires us to know the thickness of the aquifer and we don't have a very good grip on that. So there is a range of numbers, but they are all in that bracket between several tens and several hundreds of feet per year.

Q. And the next question. Dan Hand was a witness who testified a couple of days ago. He described Lightning Dock's production and injection volumes as 19,000 acre feet actually in excess of 19,000 acre feet. Do you know the actual volumes proposed by Lightning Dock?

MR. LAKINS: This is not -- this is beyond

Dr. Shomaker's prior testimony or his disclosed testimony or this is not an appropriate rebuttal question. He was not the witness to address any of those facts. He is basically saying Let me tell you why the prior witness was wrong, and that is what is happening with this question. That is inappropriate.

MS. HENRIE: That is rebuttal.

MR. BRANCARD: It's appropriate. Go ahead.

CHAIRMAN CATANACH: Go ahead.

Q. (By Ms. Henrie) To restate the question, do you know the actual volumes of production and injection proposed by Lightning Dock?

A. The 19,000 acre-foot figure that was mentioned in the question is equivalent to about just under 12,000 gallons per minute. And the highest number that I have heard for the circulating flow and the Cyrq project is 5,000 gallons per minute.

Q. And that is current production injection or is that the proposed injection?

A. It is my understanding that that is the proposed.

Q. Thank you.

Next question, Dr. Shomaker -- Mr. Morrison already testified to that, let me move on. The last question AmeriCulture's witnesses raised concerns that injection into shallower wells, and again these are wells that may be drilled to 1,500 feet but there is still the possibility of the shallow injection, that that injectate will flow laterally into the valley fill aquifer. What is your opinion of that?

MR. LAKINS: He already gave his opinion on that on my cross-examination of him. This is -- I am objecting to this line of -- which is not true rebuttal. He already gave that and had the opportunity to give that during their case-in-chief.

CHAIRMAN CATANACH: I would like to hear it.

Q. (By Ms. Henrie) Please.

A. I think the fact that we know that there is permeability through the fractures and we know that because there is hot water with elevated fluoride at the water table within the area of the geothermal system, we know that the permeability exists, and the process that Cyrq is carrying out and will continue to carry out increases the groundwater head or the pressure high in that system

and decreases it low in that system by creating the cone of depression around the producing well or wells. So we have increased the groundwater at differential between the upper part and the lower part of the system, and I think that means that the water we inject will go down.

The water that is being injected is also denser, and since it is at a lower temperature so, I think -- and in essence the system will continue to be a closed loop.

MS. HENRIE: Mr. Chairman, I pass the witness.

CHAIRMAN CATANACH: Mr. Lakins?

CROSS-EXAMINATION

BY MR. LAKINS:

Q. Do you recall your testimony from two years ago in 2013 about the permeability?

A. Not in any detail at all, Mr. Lakins.

Q. Do you recall that back in 2013 Lightning Dock presented evidence that there would not be flow between the injection intervals of 53-7 and 55-7 in the shallow alluvium and they were not connected? Do you recall that?

A. I don't recall that. I would have to look at my transcript.

MR. LAKINS: Thank you. Pass the witness.
CHAIRMAN CATANACH: Ms. Marks, any questions?
MS. MARKS: No.
CHAIRMAN CATANACH: Ms. Gault?
MS. GAULT: No questions.
EXAMINATION BY COMMISSIONER BALCH
COMMISSIONER BALCH: So we are really looking at something more like about 9,000 acre feet at production?
THE WITNESS: Yes, sir, we would be.
COMMISSIONER BALCH: Is it your opinion, or what is your opinion about the potential impact on that down gradient low from the injection activities at the, kind of the south end of the plume? Are we going to see an impact to the -- are we going to see a range to that rate of down gradient flow?
THE WITNESS: Down gradient flow will be at the north end of the geothermal system. I think there may be small changes. We do certainly expect -- we have, in fact, seen and will expect to see an increase in the -- or an increase in the elevation of groundwater head within the preexisting mound. And -- but I think that is the very force

that causes the water to move downward in the geothermal system.

I would not say that there would be no change in the outflow. I think there will be change in the mixing pattern, and I think there will be some change in the head distribution. And we hydrogeologists never say never so, there might be some change in the outflow.

COMMISSIONER BALCH: Thank you.

EXAMINATION BY COMMISSIONER PADILLA

COMMISSIONER PADILLA: Just one question.

I am just curious about that flow rate. Is that -- in your opinion, is that a fairly considerable flow rate or is that slow?

THE WITNESS: I think it would be a typical flow rate for the circumstances. The hydraulic gradient is not very steep and the hydraulic conductivity of the sediments in the valley fill aquifer, which is what I would be looking at, and the outflow plume is -- is high. It is not particularly low. It is moderate to high.

COMMISSIONER PADILLA: Would a flow rate like this be more or less susceptible to activities like those proposed in this hearing in your opinion?

THE WITNESS: I don't think that flow rate

will change measurably at all. I think the effects of the -- of the proposed actions will be very minor, very small, and also transitory.

COMMISSIONER PADILLA: Okay. Thank you.

EXAMINATION BY CHAIRMAN CATANACH

CHAIRMAN CATANACH: Dr. Shomaker, some of the injected fluid that is injected into these shallow wells, will -- a portion of that will go into the alluvium, correct?

THE WITNESS: I am not sure. I think probably Mr. Bowers has already addressed that point much better than I would be able to. I think the -- in the area of the greenhouses on the upthrown block of the walls along the -- as a result that we know of that is between the injection well and the production well. There is not very much alluvium. And the injection would be principally into fractured silicified deeper involvement or volcanics.

CHAIRMAN CATANACH: So it is your testimony that there is sufficient fractures from shallow injection down to the deeper interval to allow the water to be transmitted to those depths?

THE WITNESS: Yes, sir. That is correct.

CHAIRMAN CATANACH: Okay. I have nothing

further. Oh, I'm sorry, Mr. Brancard.

MR. BRANCARD: Just -- Michelle, do you have the exhibits from AmeriCulture?

EXAMINATION BY MR. BRANCARD

MR. BRANCARD: I am looking at Exhibit P.

THE WITNESS: P, sorry.

MR. BRANCARD: Okay. Your testimony discussed the increases in the water levels --

THE WITNESS: Yes, sir.

MR. BRANCARD: -- at the wells and there has been a lot of testimony about the mounding at these wells. I just want to just walk through this document just to see some of the...

MR. LAKINS: Mr. Brancard, are you at any chance at this?

MR. BRANCARD: So there is Figures 12 through 17 which sort of depict on a map, these are the increases in the water levels?

THE WITNESS: Yes, sir. They are the water level indicates in Figure 12, for example, they are the change in water level elevation and the shallow monitoring wells between early December of 2013 and January, 2000 -- or January 27th of 2014.

MR. BRANCARD: And then each figure afterwards adds another month or so, is that

correct, so 13 is February?

THE WITNESS: Yes, sir, that is correct.

MR. BRANCARD: 14 is March?

THE WITNESS: They culminate with June in Figure 17.

MR. BRANCARD: Okay. You testified that these levels sort of plateau at some point?

THE WITNESS: Yes, sir, I did. That was part of my testimony earlier in this hearing.

MR. BRANCARD: Okay. Following Figure 17, these are then the graphs that show these water levels on each of these wells?

THE WITNESS: Yes, they are. But these graphs end in the middle of 2014. There is much more recent information that I spoke of in this hearing.

MR. BRANCARD: Okay. I just want to clarify what we have -- what the Commission has in front of them to look at, and this is the only data that you have given us then on these water levels. Well, you haven't given us, actually it's AmeriCulture's exhibit.

THE WITNESS: Counsel reminds me that in Exhibit 3, the Applicant's Exhibit 3, there are hydrographs for Injection Well 55-7 and for

Production Well 45-7 that and these are plots that I discussed in my direct testimony. There is also a similar plot of water levels up to nearly -- well to early summer of 2015. And then there is also in that same exhibit a similar plot for the Deep Monitoring Well 47-7. And I also testified that the same time I was discussing these, that the water levels in the shallow monitoring wells, monitoring wells had also stabilized and have reached essentially steady state.

MR. BRANCARD: Thank you.

CHAIRMAN CATANACH: This witness may be excused. Mr. Balch would like to ask Mr. Bowers one or two more questions.

(Whereupon witness was recalled.)

MS. HENRIE: Mr. Chair, my whole team is here so we are available for the Commissioners' questions.

THE REPORTER: State your name for the record.

THE WITNESS: Roger Bowers.

EXAMINATION BY COMMISSIONER BALCH

COMMISSIONER BALCH: I just want to get a little better handle on the shallow geology, particularly as it relates to the shallow part of

the aquifer away from the plume.

THE WITNESS: Okay.

COMMISSIONER BALCH: There appears to be alluvium in every well. There is no outcrop of any other lithified or sedimentary layers in the area?

THE WITNESS: That is correct. There is a layer of alluvium. There are no outcrops that I know of, but the drilling logs do show that that alluvial thickness varies greatly over the area.

COMMISSIONER BALCH: And the silicified sediments which are -- I guess I am really curious, I mean, you have talked to the Burgetts, you know about all of their shallow well drilling because you have looked at that as a part of your geologic study.

THE WITNESS: Yes, sir, I have.

COMMISSIONER BALCH: So these silicified sediments, they show up on all the wells that are presented to us. Do they show up on all of the wells, period? Are they a characteristic of the base of the shallow part of the aquifer?

THE WITNESS: I am trying to think if there is a well that they do not show up in, and offhand, I can't. They do show up in basically all the wells. It is just like Mr. Witcher explained,

there is this horse block in the greenhouse area. So obviously the volcanics start at a much shallower depth. But even when we get off to the side, we still see some of them. But as a general statement, yes, they extend over quite an area. It is just that the depth and the thickness.

COMMISSIONER BALCH: It looks like on Mr. Witcher's horse block they define the base of the shallow aquifer.

THE WITNESS: That is probably accurate.

COMMISSIONER BALCH: And when you are on the down drop part of the block like 45-7, 55 -- well, 55-7 also, it looks like you may have a little bit of alluvium below that as well.

THE WITNESS: Well, there is -- if I understand what you are referring to, yeah, they go through some silicified -- I just generally call them silicified volcanics. It is part of the Gila conglomerate as far as we know, thanks to Mr. Witcher. There are zones that are not fully silicified, so it is what has commonly been called this red rhyolite over the years. You get below that and not in all of the wells, but in some of the wells you do go back into some gravels that are not as silicified.

COMMISSIONER BALCH: Like in the State Number 2 it looks like there is some unspecified conglomerate below that silicified interval and in the 45-7 and the 55-7 you go back into alluvium.

THE WITNESS: Right. I don't know that I would exactly classify it as alluvium per se, but it is more unconsolidated volcanic plastic materials. You could call it less lithified conglomerate made up of the volcanic rocks and in those volcanic rocks you see the whole suite of types of volcanics, anthracites, rhyolites, everything from the Pyramid Mountains that has washed off.

COMMISSIONER BALCH: How would you characterize the permeability of those rocks compared to the silicified sediments?

THE WITNESS: It varies. There is some permeability in there. I would say the silicified volcanics in some instances probably have greater permeability because they have been silicified, they have been fractured, and so those fractures would stay open a little more; whereas, in the more unconsolidated or unlithified gravels you might have some clays that come into play there that would decrease the permeability to some extent.

COMMISSIONER BALCH: And would you -- so

where would you put -- if you were mapping the base of the groundwater aquifer, where would you put it, the shallow aquifer.

THE WITNESS: I don't see -- based on temperature studies, I don't see a very specific well-defined shallow aquifer and especially in the main upflow area. I mean, you just have this giant plume.

COMMISSIONER BALCH: Sure. I am talking about the area right outside of the upflow where you are in the mixing zone with the freshwater aquifer.

THE WITNESS: How would I characterize it?

COMMISSIONER BALCH: Well, where would you place it on your strap column?

THE WITNESS: Based on some gradient holes, I would put it still fairly shallow. I am not sure if I fully understand what your question is.

COMMISSIONER BALCH: I am trying to find a marker --

THE WITNESS: Okay.

COMMISSIONER BALCH: -- that would define roughly the base of the shallow aquifer.

THE WITNESS: And I would say that that would be very difficult to do because it does vary

that we see the thicknesses vary over the area enough that it -- I think it would be very difficult to just --

COMMISSIONER BALCH: I'm not looking for a set depth. I am looking for a marker. That is why I talked about the silicified sediment. Would that be a marker?

THE WITNESS: It would be a marker, yes.

COMMISSIONER BALCH: For the base of the shallow part of the aquifer?

THE WITNESS: As a general rule, I would agree with that.

COMMISSIONER BALCH: Outside of the upwell plume?

THE WITNESS: Right. Part of the problem we find there, in my opinion, would be the further out you get the less it's silicified some of those volcanics make.

COMMISSIONER BALCH: Sure. Because you don't have the influx of the geothermal water.

THE WITNESS: Of the geothermal, right, exactly.

COMMISSIONER BALCH: Thank you.

MS. GAULT: Mr. Chairman, can I ask another question because of his question?

CHAIRMAN CATANACH: Okay.

EXAMINATION BY MS. GAULT

MS. GAULT: Since the alluvium, you can't define where it is or the markers or whatever, where are you going to put the screens on the injection wells? How deep they would be, because what we are concerned, we want to know how it is affecting our shallow waters. So how deep the screens will be, how big they will be?

THE WITNESS: I cannot address how big they will be. That is up to the drilling engineers to design that.

MS. GAULT: But if they don't know where the markers and where they -- and if is not well defined, they will have to develop for each injection well?

THE WITNESS: Well, as a general rule the depths that we have picked are to make sure that we do hit those markers.

MS. GAULT: Okay.

THE WITNESS: Even though we don't know the exact depth to the given foot, the general well design is designed to make sure we do hit them.

MS. GAULT: And accordingly the screen.

THE WITNESS: Yes.

MS. GAULT: Okay. Thank you.
CHAIRMAN CATANACH: Anything further from this witness? This witness may be excused.
COMMISSIONER BALCH: Mr. Witcher is not available today?
MR. LAKINS: No, sir.
COMMISSIONER BALCH: Because I would ask him the same questions.
CHAIRMAN CATANACH: Are you done, Ms. Henrie?
MS. HENRIE: Yes, Mr. Chair, I am. I would like to ask for a break before we move into closing.
CHAIRMAN CATANACH: Who is going to give closing statements today?
MS. HENRIE: Pat and I are going to split our 30 minutes for Lightning Dock.
CHAIRMAN CATANACH: And, Mr. Lakins. Are you doing one, Ms. Marks?
MS. MARKS: Just a little statement.
MS. GAULT: I will give a little statement, too.
CHAIRMAN CATANACH: Okay. Let's take 10 minutes.
(A recess was taken.)

CHAIRMAN CATANACH: Let's go back on the record. At this time and I think that you guys have finished your cases and we are ready for closing. I think what we will to is we will let you go first, Ms. Henrie, and then Mr. Lakins and then the two other additional parties if you guys want to make statements. So you may proceed, Ms. Henrie.

MS. HENRIE: Thank you, Mr. Chairman. It is almost 10:15, and so we will be finished by 10:45. I am going to take part of the time and Pat is going speak to address you as well.

So on behalf of Lightning Dock Geothermal, we have submitted -- we originally submitted four injection well applications, we have withdrawn one, so we have three injection well applications in front of you.

The criteria for consideration was Exhibit A to our prehearing statement. It is in the geothermal regulations that is NMAC 19.14.93.8. There are some parts of that criteria that have to do with the form of the application. David Janney testified to confirm that the application was filed according to Sections A and B of that provision.

And Section C just says -- specifies the requirements include that the proposal is in the

interest of conservation, will prevent waste, protect correlative rights and that the well is properly cased, et cetera.

We have testified about conservation, about how this -- all of the water produced gets reinjected back into the resource. We have talked about waste that we think that this proposal well will not cause waste of the resource, in fact, it will help bring the resource to fruition.

We have also talked about correlative rights, and even under any theory of the usable resource, Lightning Dock is entitled to a good portion of that resource and to be allowed to produce from it. It is certainly a shared resource, both shallow and deep.

There were questions about the composition or how that resource looks, and I would like to direct the Commission's attention to a few things. One is our Exhibit 6 which is Circular 177. There are pocket parts that does have different fluoride values and TDS values for different wells in the valley.

There is also Lightning Dock Exhibit 2 which has constituents for the deep Well 45-7, so you can compare those.

I can also direct you to AmeriCulture's Exhibit P, which has a table. The second and the third columns of that table, it is called Summary of Alluvial Geothermal Groundwater Analytical Results. So Columns 2 and 3 are Burgett wells in the greenhouse area. One of those wells was expressly mapped in that same Exhibit P as G3S. It is down south of the greenhouses near Dale Burgett's house. That is the well where there was some very high fluoride. Just taking all of those numbers and kind of averaging them, I am just, again, looking at fluoride and TDS. In the deep well we are seeing in the deep wells a minimum of 12 parts per million, maximum 14 parts per million; that means about 12.5. Again, these are the deep wells.

For TDS we are seeing a minimum of 1,270 a maximum of 1,310. Again, a mean of about 1,298. That is the deep well. Compare that to the shallow wells in the greenhouse area, fluoride we are seeing a minimum of 1.3, maximum of 15.46, so an average of about nine. TDS we are seeing a minimum of 1,110, maximum of 2,010, so a mean of 1,526.

So what that shows is that the geothermal water, the deep water is actually higher

in fluoride but lower in TDS than the shallow groundwater, and that is important. I will get to that a little bit further in my closing.

Commissioners, I would submit to you that this is not a drinking water source. We put on testimony and evidence that in the area of the greenhouse where that water is hot, there is not a separate shallow groundwater. It is all connected and that connection goes all the way to the top of the water table. So where the water is hot when you drill into the ground and you experience hot water, that is part of the geothermal system; that has been our experts' opinion and that is in our testimony.

And that being said, I just want to put this out there because I feel like the Commission is headed down a path, so I wanted to give you a chance to think about this.

We feel strongly the top of the resource is defined by the water table, surface and temperature. We should not be restricted from injection from the water table to any depth. The highest permeability is at the top of the resource. And if the -- if the alluvium at the water table is hot, it is part of the resource. We feel strongly that we should not have to be limited to injection

that is below a certain point because that alluvium, that shallow alluvium where it is hot is part of the geothermal system. Its characteristics, we've already talked about it in terms of fluoride, in terms of TDS and it is different from, separate from the valley fill shallow groundwater that is used as a drinking water source.

Commissioners, we heard from AmeriCulture their concerns. We heard Mr. Witcher testify that he believes this resource is very small. It is limited to 2 megawatts. If that were true, we would be already belly up. This power plant has been operating for 20 months. We have not seen any change in the temperature. We have seen mounding, yes, we have seen some chemical change in our monitoring wells but the system is in equilibrium, has come back into equilibrium after power plant startup; that is again what we expect to see.

If we are wrong we are going to know it because the temperature will drop off slowly and that is how under -- you heard Mr. Morrison testify, we are looking for that. We are checking for that because that means we need to change how we manage our well field. We guard against that because that

is a signal to us you are doing something wrong. Maybe you produce less, maybe you put more flow into a different injection well, but that is how you look at the resource and understand whether it is being managed to the capacity of the resource. So, again, I would just submit to you that we are monitoring that and that is also going forward.

Also, to the point of monitoring, the conditions of approval that were proposed by OCD with which we agree, those are in the record. They do require monitoring wells to be drilled, one for each injection well so there will be a monitoring well that is tied to that injection well to monitor what is going on in that injection well.

Commissioners, you have heard claims of damage here, yesterday, the day before, to a power plant that is in our opinion unfinanceble. It is hard to finance something that does not have a revenue stream. We consider that power plant to be speculative. I am just putting that on the record.

We have heard about a claim of harm, damage to well A444, that is the federal well that is at the end of the affluent from the fish tank. We heard that the claim of damage includes higher fluoride and higher TDS, but as I just told you the

geothermal water has a lower TDS. So, again, just putting out there the question whether it would be fish poop that is affecting the TDS in that well instead of our geothermal injection.

There is a claim that injecting at 150 degrees is problematic and yet in AmeriCulture's exhibits we have their injection well, which is Exhibit Q, the same depth 150 feet is the top of the injection going down to 490. So it is really hard to argue that we are doing anything different than what AmeriCulture proposed. It is a way to get the water back in the ground back into the geothermal system.

There is a claim that contracts don't apply. The Joint Facilities Operating Agreement. AmeriCulture's shareholders won't accept the mitigation tendered by Lightning Dock should harm happen. There was also a claim that Lightning Dock has no water rights, despite testimony from D.L. Sanders in Exhibit E, which AmeriCulture's Exhibit E of the Rosette water rights have been acquired by Lightning Dock. That is what Mr. Sanders testified to.

Lightning Dock is doing everything it can to implement a lease that was let in 1979 with

BLM. It is the intent of the federal government that this resource be developed, that it generate electricity, that it pay royalties. Those royalties get paid to not only the BLM but the state of Hidalgo County. It's been the intent of the federal government since 1979 that this resource be developed.

And, Commissioners, we are doing everything we can to develop them responsibly, properly and at a scale that we believe makes sense in is a sustainable, and meanwhile AmeriCulture has been doing everything they can to stop us. You heard testimony yesterday that after the discharge permit was issued in 2009 AmeriCulture stepped back and did nothing until 2013. Well, that is not correct, there are --

MR. LAKINS: Objection. That is arguing facts not in evidence.

MS. HENRIE: I will just show you, then. 2009, 2010.

MR. LAKINS: I have an objection.

MS. HENRIE: Multiple agencies.

MR. LAKINS: I have an objection.

MR. BRANCARD: Please argue the record.

MS. HENRIE: We have unclean hands, here,

and we also have a situation where I know we are going to be back in front of this agency. I know we are going to have to drill another production well or injection well at some point in time in the future. I really want to beg this Commission to please establish criteria, clarify your regulations about your procedures, about what is an acceptable protest, about what is acceptable as an application for a hearing, because, otherwise we are just going to be back Ground Hog Day spending our resources, spending the division's resources, spending your time hearing these arguments again and again.

With that, I will turn it over to Pat Rogers.

MR. ROGERS: Thank you. I would like to direct your attention to our proposed findings of fact and conclusions of law. If you will turn to the last two, it deals directly with this issue about the discretion that we believe the Commission currently enjoys. And I am looking specifically at the last two and requesting this in the order that the division director shall exercise discretion about whether a good cause exists to hear an objection to an injection well and hereinafter the division director shall exercise discretion about

whether good cause exists to grant an application for a hearing.

Particularly for an injection well that is going to be required, that is going to be in the area again for which -- which if you allow the simple, we object to this, which is basically what happened with AmeriCulture to trigger all of this stuff, we will be back here hearing the same matters, hearing the same thing again.

The important thing about this and the section, the section at issue is 19.14, 19.14.93.8C, and it provides In the event the form is not approved because of the objection from an effected geothermal lease owner or for other reason, the application will be set for public hearing if the Applicant so requests.

So we believe that the current discretion is with the Division to determine whether or not a hearing is required. And what this regulation can only be read is that if it is denied, then the Applicant has the due process right of requesting that. This is not designed to do anything except allow the Division that authority.

There is another way in the short-term to address this issue as well. Ms. Marks

mentioned and in her order it proposes that your order include a sufficient geographic area so that -- so that, again, through that order and through this proceeding the Division would have discretion. In other words, that your order encompass an area that allows that.

We are certainly amenable to what that might -- what that specific area might be. And it is important that you understand we are not saying, and certainly don't want to be construed to say, any injection location that we identify has to be approved, of course not. It has to be evaluated by the Division, the experts in charge of that, experts in charge of looking at those matters, and if they agree then it would be approved. If they don't agree then we have the right to go to the hearing.

So, certainly one area if you need a specific area would be Sections 5, 6, 7, 8, 17, and 18; Township 24 south; Range 19 west; and Sections 1, 12, 13; Township 25 south; Range 20 west. You have gotten the flavor of this. We are concerned that in large part this is a replay of the 2013 decision of this Commission and replays of earlier decisions as well. We believe there is a

way of addressing that for truly minor sorts of analysis.

The reason that this is important is because the geothermal resource is not confined to our great State of New Mexico. This company and all companies interested in geothermal development actually have to weigh the cost of administrative and regulatory processes. No other state requires this on an injection well. No other state puts the Applicant to this sort of test. This is a business that is heavily dependent upon the economics. And to allow an Applicant in this case, a competitor to hold that up for indefinite periods has the obvious intended impact on that competitor of slowing down, delaying or stopping or certainly future development. So what I am asking for is a common sense interpretation of your existing regulation. You requested that in the Findings 2 and 3, as well as Ms. Marks' suggestion which would address the current situation providing that an order encompass an area, a reasonable area that would allow that same application.

Thank you.

CHAIRMAN CATANACH: Thank you, Mr. Rogers, Ms. Henrie.

Mr. Lakins.

MR. LAKINS: Mr. Chairman, Commissioners. First I would like to thank the Commission for its attention and patience, and it's obvious the level of detail that this Commission is paying to this issue and the importance it is being placed on this issue.

And I think that Mr. Rogers makes a very, very good point and I think that plays off of Commissioner Balch's point about what can be done. And I submit that what has realistically arisen through this is the necessity for a rule-making proceeding. That if there is going to be some sort of across the board type of determination about wells, geothermal injection wells, within the State of New Mexico in any given spot, that that should be subject to a rule-making decision to establish some sort of criteria. That is my opinion on that.

Because if the approach is taken that this Commission says AmeriCulture is estopped and what the OCD proposed findings and conclusions also say is that AmeriCulture should be estopped from being able to bring any future protest, I submit that is a wholesale violation of due process.

The statutory scheme, as it exists is

there to provide protection for everybody's individual rights, for protection of the public water supply, for the protection of the State of New Mexico's interests.

And doing that totally -- taking that approach wholly guts due process and is wholly violative of the statutory scheme because every protest, every application involves a different set of facts. Now, I submit and I -- that -- and I agree that the law is well-established that the findings of the Commission are given collateral estoppel affect. That when this Commission says this is what we have decided about this particular issue, that is over with and done, and issue cannot be brought back, it cannot be relitigated. When there is specific findings to that, any party can be estopped from making that argument again because the Commission has already heard it.

That is the standard of law. But when there is a new issue and a new fact and a new possibility that does not comply with collateral estoppel, that is a new issue. That is different.

We greatly appreciate that Lightning Dock has acknowledged our concerns about the one close monitoring well, but that just kind of leads

into this whole issue and the problem presented to the Commission right now.

And I think that this matter cannot be incomplete by leaving out Mr. Dale Burgett. Mr. Burgett and his -- what he did that shows what hasn't been done here. Mr. Burgett was a surface estate owner. All of those Rosette buildings are part of his company. Now, Mr. Burgett passed away but his company still survives. They are not here today as a party, but they are the surface estate owner of that property. They also have rights to drill wells. Any new fee owner would have the right to do the same thing.

What Mr. Burgett had that we don't have, though, is knowledge. We heard he went out there and drilled all kinds of wells. I would not be surprised to learn that some of them were not permitted properly, but Mr. Burgett had knowledge. He knew that if you did something here, this happened over here. We don't have that level of information before the Commission right now.

We are lacking in information and the Commission is lacking in information.

What was presented was that Lightning Dock has information, they admitted. Mr. Janney

stated that there is monitoring well data that is not here. That the monitoring well data showed increases in the level of fluorides in the monitoring wells at one to 2 milligrams per liter. That is on -- in the transcript between pages 49 and 52 of the testimony.

He acknowledged that what has happened since production is the chemistry is changing. We don't have well logs. They are not here. And what Mr. Miller said as well was that there will be more changes to the chemistry. His contention is you can't contaminate what is already contaminated. That is not the way our law works.

The drinking water standards are very specific about background levels, and that an existing background level is the standard. They contend -- basically the letter from the OCD provides a 17-milligram trigger level. I submit that is inappropriate to use a 17-milligram trigger for a well that might have a three fluoride existing. I don't think that is right and I think that should be an issue before the Commission.

But we had a hearing before. We had a hearing two years ago. On that wall right over there where that television screen is now, we taped

up well logs. Those were well logs for 53-7 and 55-7. We looked at them back then. And the evidence that the Applicant plant put on at that time, which became embodied in the order from that case at paragraph 15 was that Los Lobos presented evidence that the geothermal fluid production zone in 53-7 and 55-7 is the same. The fluid flow in intervals occur in the same formations and -- and this is key -- are not directly connected to the alluvial aquifer at 400 feet below ground surface.

That was the evidence from before. If collateral estoppel applies this should apply, because what has happened now is a 180-degree shift in the Applicant's position. And what we have been told now is that there is so much permeability that we can increase our injection up to 8,000 acre-feet a year and there won't be any leakage into the shallow alluvial aquifer, there will be no effect on the shallow alluvial aquifer. That is wholly contradictory to the prior position taken and from the evidence that was presented at that time.

What we do know is that we have had impacts. We have had impacts on AmeriCulture's domestic well, the A444. That is permitted as a domestic well. There have been impacts on it. And

I submit that what AmeriCulture's concerns at the prior hearing were have been realized. We were concerned that the injection protocol that was proposed back then, put into effect back then, what we said was going to happen did, and the evidence shows it. Because there is mounding, there is groundwater mounding. There is raising of the water levels in the monitoring wells. There is changes in the chemistry of the monitoring wells. Those were our concerns two years ago; that has happened, the evidence shows that.

A big problem, I think is that there is no models here. There is insufficient data. We just heard Mister -- we just heard testimony this morning that the level of that alluvial varies. We didn't know what it is. We don't know what it is that their proposed well location 15-8, we don't know what it is at 67-7 and we didn't know at what it is at 13-7. I submit that a proper and prudent course that could be incorporated in how the Commission decision works out is that let's have some data first.

I think Commissioner Balch is exactly on the right track. We should case below an impermeable layer to ensure that shallow alluvial is

protected. It could be different at 15-8.8 from what it is at 13-7. But a layer, some zone, I think, is a really good way to look at it because it is the protection of that shallow groundwater that is at play here more than anything else.

We are really glad to hear that that 63A-7 was been withdrawn. That has been our biggest concern because fluoride injecting into that well would make it to a state well one, increase the fluoride, and based upon what Mr. Seawright said about what he needs for his tilapia fish, the level of fluoride in the water right now is just kind of at tolerable. If it exceeds a certain amount, we are out of business. The concern that we have over the 13-7 well is that it is not too far from our cold domestic supply well that we use now. If injection into 13-7 happens and it makes it to our domestic supply well, we loose our domestic supply. We are out of business. Those are the types of concerns that we have. This is not harassment and delay and intentional financial cost to Lightning Dock. These are legitimate concerns for our business.

One thing you just heard a lot of test -- a little bit of closing and a lot of

testimony on is this joint facilities operating agreement, this contract. While I submit to you it is a red herring, for several reasons. One it hasn't arisen. The contemplated potential impairment isn't on the table under the JFOA.

Second, and as Mr. Seawright testified to yesterday, there has been a federal lawsuit filed light -- Los Lobos and Lightning Dock on June 26th filed a federal lawsuit. The case number for notice is 215-CV-547; I will provide a copy of the complaint. But Lightning Dock has asked a federal court to make a determination of the legality of the joint facilities operating agreement, the proposed power plant. So the issue that was talked about is not before this Commission, one, because it is speculative and moot at the moment. But, two, Lightning Dock has asked a federal court to make those determinations already. Those are aspects that this Commission then should not address.

But I think that Commissioner Padilla raised a really good point. I think he couldn't help but notice I was nodding my head and agreeing with him yesterday when he made that point about the water on that state lease that is AmeriCulture's

geothermal water right. And as Commissioner Padilla had asked Mr. Seawright, well, isn't that under the OCD? And that sort of a yes but answer because yes, the water rights are all under the OCD, period. However, there is really a dual jurisdiction issue here because the Commission has jurisdiction over the State's minerals. And I am going to cite you to the case of Rosette against United States, which is the case that D.L. Sanders and I were talking about. I happen to have been Dale Burgett's attorney at the time when this litigation was done. And the citation is 2007 Court of Appeals 136, which is a 2000 -- this was a case at the Court of Appeals. And three paragraphs, for Mr. Brancard's benefit, 46, 62, and 67, and what this case says in the fundamental aspect of this overlapping jurisdiction The Geothermal Resources Conservation Act protects geothermal resources by regulating wells and prohibiting waste. And this is in conjunction with the Geothermal Resources Act itself. And read in conjunction both acts apply to the development and conservation of State held geothermal resources.

The resources that are on that State land that Mr. Seawright has a permit to utilize are under this jurisdiction of the OCD -- OCC. And what

this case also states which is very, very important is that water is one medium from which heat can be obtained.

The Court was very clear to point out that the mineral interest is distinguished from the water. They are two entirely different things. So what is at issue here is the heat, not the water that is conveying the heat, but the heat, and hence the overlapping jurisdiction issue.

So it is the heat and the protection of the heat that we have the right to bring a concern to the Commission about. And that is what we said was that if that injection at 63A-7 happens and it cools this off, that degrades our mineral right that we have as protected under State law.

The burden that the Applicant bears includes a showing that the shallower groundwater will be protected. And we have a concern about well or proposed site 76-7, because what the evidence has shown -- and I want to point out the proximity between 67-7 as proposed and where Monitoring Well 5. Is this is on Rosette fee land. The data for Monitoring Well 5, which was in our Exhibit P but it is at Table 7, shows the fluoride level on that well at 1.3. That is below drinking water

standards, and injection the shallow alluvial that close with admittedly much higher fluoride level water and based upon the acknowledged, rather substantially, good permeability of the shallow alluvial and that well is at 55 to 85 feet are those wells, that would directly impact what is and potentially could be a drinking water source. That is -- that is good water. There is nothing that prohibits Rosette as a fee estate owner or any other fee estate owner that Rosette might sell to from sinking a well and getting good water. I think that what you have really learned through this is that there is a complex geology. I am not a geologist, but I can appreciate the complex uncertainty of what is underground.

And I think that is the big problem here. There is a complex geology that we really don't know exactly what every layer is and where it is at.

We are not here in any way, shape or form to try to stop progress, we support an operation happening and going to productivity. We have a concern of how the path has been proceeded upon by the proposals that have happened in the past. The proposed injections that we discussed two

years ago. These four very shallow level wells that would go into the alluvial, and I think our concern is even more greatly exacerbated by the testimony we have heard today and what we have heard before about seven wells that exist; some of them are improving, but the reason they want to put shallow is financial.

They told us their reason for shallow was cost or risk financially.

And financial risk to the company should not outweigh the law that says resources are protected.

What we submit is that there should be some sort of appropriate staged approach here to get it done and figure out how to get it done right.

If wellbores were sunk, if wells were sunk, we had logs and we knew what was where prior to completion, prior to determination of a depth or whatever so that we knew they weren't going into the shallow alluvium, something, but we are lacking information. We think that that type of information should be provided first, not after the fact, because what seems to have happened after the fact is that what they said two years ago is wrong.

We think there should be some sort of

approach of that nature that the geology of any given site concerning this is a complex area, should be evaluated appropriately, not let's hide the ball about what is going to get done.

And it is the same thing with the -- with the chemistry levels. We don't think there should be a blanket approach, particularly the 17 that is much higher than any other well in that area, but it should be more site specific. That if there is, you know, we find 13-7 has 1.5 fluoride water underneath it, then that shouldn't be allowed to go up to 12 much less 17. There needs to be a smarter approach. We think that the monitoring well, monitoring well data should be transparent. There -- when we had the hearing on my motion to vacate, their expert said that the underlying data is not trade secret. But we don't have it. It is being withheld as confidential. We think it would be important for that kind of data to be made available so that we all know what is going on, because that is our concern is we don't know what is going on. We are seeing changes. We hear there's changes. They acknowledge there is changes, but we don't know the extent of them. That is a concern for us. There should be transparency here.

I think really what this all evolves into is that this Commission has a very difficult task. This is not just these, now three wells, but what is the path to proceed in the future so that smart decision-making can be made in a better process than where we are at today.

And I submit that is a challenge, and I don't have an answer to that one.

But I don't think they should be hiding the football. I think that the approach that should be taken is more site specific and very fundamentally geared towards protecting the shallow groundwater to ensure, as well, that on any given area, because it is obvious from what I have seen and from what the data shows is that the water isn't the same at all over the place there. There are compartmentalized areas geologically and when you take the approach let's just look at the whole big picture thing and the whole thing and consider it one great big bowl of water and not recognize there are divisions with inside there, I think that is the wrong approach. I think that it needs to be recognized that due to the complex geology, due to the uncertain nature that a smarter approach that recognizes those variables should be adopted.

We believe that maybe a phased approach would be a good idea. Start with 13-7. They have got these other wells that they say are improving and going online, well, let's wrap it up maybe with some sort of oversight. Kind of put your money where your mouth is this time. Show us that what you are doing is actually protecting. I think that the intent embodied in the prior orders went to the statutory protections about casing off strata. That is in the statutes that geothermal resources and injection wells are supposed to case off strata. It is in the orders from before. Those types of provisions should be implemented here. Those types of provisions should be required in the future, and I think we have got to have more data to ensure that that does happen.

I think that the 13-7 when they are saying let's go 500, we believe that should be deeper, at a minimum. They have given us evidence there is much deeper wells out there. They talked about these this morning, the depth from three to six. And putting a 500 -- and opening of 500, though maybe it drills it to 15, we are still talking an opening of 500. It doesn't mean it should be deeper to bedrock, to an impermeable layer

something so that the injection wells that they want to drill just make sure that they protect the shallow alluvial and that we don't get contamination. We don't get our drinking water supplies, our well supplies, all of that altered to such an extent that we can't drink our water and we cannot operate our business.

I would like to address one point this 19,000 number, 9,000 number. The 19,000 acre-feet number came from a 2011 permit which Ms. Henrie talked about that was an application to the State engineer for over 19,000 acre-feet that they had applied for to use in this. But I think what is important to recognize is that they also said there is 9,000 acre-feet that is going to be the coproduction. That is a ton of water, and there can be a ton of impact on it. And we just are asking for assurance that our supplies, our geothermal resources are protected as well as that the law that exists is complied with, particularly the protection provided in the text, statutory that is seen for the public. Not just us, but there for the public. I am not going to read the statutes. The Commission knows what it says.

Thank you.

CHAIRMAN CATANACH: Thank you, Mr. Lakins.

Ms. Marks?

MS. MARKS: Mr. Chairman, once you told me to sit down in these proceedings, so I will sit down.

The purpose of the Geothermal Resources Conservation Act 71-5-2. If you will humor me, Section A says It is hereby found and determined that the people of the State of New Mexico have a direct and primary interest in the development of geothermal resources. And that the State should exercise its power and jurisdiction through its Oil Conservation Commission and Division to require that wells drilled in search of development of or incident to the production of geothermal resources be drilled, operated, maintained, and abandoned in such a manner as to safeguard life, health, property, natural resources and the public welfare and to encourage maximum economic recovery.

At Section B To these ends it is the intent of the Legislature and the power and jurisdiction of the Commission and the Division that is given by the Geothermal Resources Conservation Act shall be supplemental to the other powers and

jurisdiction given to the Commission and that the Division by the statutes of this State.

And I think the Commission really needs to consider the purpose of this Act, not commit waste and really develop this resource, like any other resource that the Commission regularly hears about. That is really important.

Commissioner Balch discussed that he thinks it is great that AmeriCulture uses the geothermal resource. And maybe the permit for injection, AmeriCulture may or may not use if they get all the paperwork, that would be fantastic as well. I looked at that permit. I didn't see a proposed monitoring plan or monitoring wells. Perhaps the Division should consider monitoring wells there too, we have discussed monitoring wells here. I think the Hidalgo Soils and Water Conservation District would certainly like monitoring well data there. The protection of the people in that area, it is important, and we need to develop the resource and protect, protect the water down there.

OCD did review the proposed -- or the applications. They developed conditions. They looked at a formula and the OCD did have an

opportunity, they filed a prehearing statement to present witnesses here, but this really wasn't needed. OCD did not need to present witnesses because the testimony was clear that the application should be approved. The calculations were good. We did not hear any evidence from AmeriCulture other than, well, we don't really like the calculations. We didn't hear any other formula, any other way to say why the fluoride level shouldn't be set at a certain level, we just didn't like -- we didn't like the calculations but we didn't hear any other way for the Commission to calculate a proposed level, other than well, look at the data, well, it wasn't higher than 15.34. We have to use a model that was presented in the evidence and no one modeled.

The Commission has heard lots of testimony over the past, five days. A lot of the matters are not really relevant here. They are good issues, but your job is actually quite simple. You may laugh, but are the statutes being followed? Are the regulations being followed? That is it. Other matters that have been raised here, they are administrative matters. The party can bring these matters on separate applications before the Commission and the Commission should review those

matters. But right now the Commission just needs to look at the evidence before it and are these applications good, are they good applications? Have they met the statutory requirements? Are they meeting the regulatory requirements? Are they complying with the purpose of the Act and will they -- and how are they safeguarding life, health and property? And I think the conditions submitted by the OCD are good conditions. And I don't think we should continuously come back before the Commission time and time begin to look at the same area, the same applications and approve permits, not orders, permits on these applications.

Thank you.

CHAIRMAN CATANACH: Thank you, Ms. Marks.

Did you want to say something?

MS. GAULT: Yes, please. I just want to say that when AmeriCulture will go into production of power, we will be informed, I hope. So, but I have a statement that I wrote. It is -- I just read it.

Thank you for granting the Hidalgo Soil and Water Conservation District and interview startups in this case.

My name is Maria Gault. I am a

supervisor in the district. I wasn't present at the first hearing, but I've read the entire testimony. Though I am not a geologist, nor a hydrologist, nor a hydro geochemist like the other supervisors on my board, I am charged with the protection conservation and wise use of the natural resources in our district as it relates to the health and safety of the local population.

After reading and hearing the testimony in this case, I have the following observations, and these are layperson observations. The Lightning Dock witnesses were unable to agree upon a definition of closed loop, the bounding of the geothermal system, why the current injection wells are not functioning, or how injecting to the alluvial strata is going to affect our water.

Perhaps the geothermal or the reservoir or several reservoirs are smaller than they hoped and the deep injection drilling has missed it.

There -- and this is very troubling, that none of these scientists were involved in choosing the sites for the proposed shallow injection wells. The scientists do agree, however, that there will be chemical changes in the shallow

waters after injection. Some water will travel literally in the alluvium and the plume might grow faster. But we are told that we shouldn't worry since the water is already contaminated, so the message to the locals from Lightning Dock is don't blame us if your water is even more toxic. Drink at your own risk. If you develop mental and skeletal fluorosis, we are not liable.

The Commission should be aware that water mining in the lower animus basin has increased in recent years. Ranchers and farmers on their own with NRC's -- or with NRC's help are drilling wells for livestock and irrigation. Much of the irrigated land is now planted with pecan trees which demands a lot of water. This will bring attention to the relationship or lack thereof between the OCD and the State engineer, each claiming regulatory power on the same substance and responsibility for water quality is left unclaimed.

Also troubling is the revelation that with regard to discharge, Lightning Dock is operating on a verbal agreement they've attached to an expired permit. The adage that a verbal contract isn't worth the paper it's printed on here applies. Thus it is our position that the current agreement

with Lightning Dock is insufficient and will not guarantee the health and safety of our people.

We are not opposed to experiments in renewal energy, but the original agreement called for the cold water to be injected into the deep strata and not into the alluvium. Lightning Dock should be held to the terms of that agreement as much as possible.

Thank you.

CHAIRMAN CATANACH: Are there any other statements at this time? Is there anything further?

MS. HENRIE: Mr. Chairman, we took about 15 of our 30 minutes, so I would like to just say, if you will allow, a couple more things.

You heard testimony from Dr. Shomaker that --

MR. LAKINS: Is this normal procedure?

MR. BRANCARD: They want to reserve something --

MR. LAKINS: That wasn't reserved in the beginning at all or talked about?

MR. BRANCARD: You should have informed the Commission that you were going to reserve time.

MS. HENRIE: We were allowed 30 minutes and we didn't use all of it.

MR. BRANCARD: I know. You should have indicated to the Commission that was our plan. What is the Commission's preference here?

MR. ROGERS: It will be brief.

CHAIRMAN CATANACH: You're the lawyer.

MR. BRANCARD: It's your procedure, though.

(Discussion off the record.)

CHAIRMAN CATANACH: I think we are actually done.

MR. BRANCARD: We do appreciate everyone not only staying within time limits, but the remarks.

CHAIRMAN CATANACH: So at this point, Counselor, our normal procedure would be, do we need to vote to go into executive session?

MR. BRANCARD: But I think -- I know I have heard from folks wanting to know sort of what the plan of the Commission is for the rest of the day here.

MS. MARKS: Just one procedural matter. We are supposed to take a picture of the map and I was going make it an exhibit. Do you want me to do that now, print it and then bring it down?

MR. LAKINS: I would be happy just getting

an e-mail.

MR. BRANCARD: Are you going to leave these here for now?

MS. MARKS: Whatever pleases the Commission. I don't care.

MR. LAKINS: Whatever you prefer to do is okay by me.

MR. BRANCARD: You should take a picture of it, that is fine. But the question is are you going to leave these maps here?

MS. HENRIE: I was planning to, yes. They have been living in my office for a while. I am happy to give them to you.

MS. MARKS: I don't know what number it is as an exhibit, but whatever it is as an exhibit.

MR. ROGERS: To speed your deliberations, would it be helpful to have the parties e-mail to you their findings of fact and conclusions so that you perhaps can proceed more quickly? I am sure Mr. Lakins can do that. I am sure that we can do that as well, and the Division, and I think that may assist you in your endeavor.

MR. BRANCARD: Yes. I was frankly assuming you would have but...

MR. ROGERS: We did, I think.

MS. HENRIE: They were in PDF. We will get you Word.

MR. BRANCARD: E-mail them in Word, that will be helpful toward drafting a final order.

CHAIRMAN CATANACH: So, I believe you were going to give a description of the process.

MR. BRANCARD: Well, it is up to the Commission whether you want to go into deliberation for a while and ask the parties to come back at a certain point or -- I mean, I am assuming we won't be done before lunch.

COMMISSIONER BALCH: I think we hope to deliberate today, but we may end up continuing deliberation on another day so I wouldn't skip lunch.

MR. BRANCARD: But I know folks have places to go and whether they want to hang around here. I just thought do you want to give them sort of a timeframe for folks to come back at some point or we can contact you.

COMMISSIONER BALCH: That's probably better. I think it will take a good amount of time.

MS. HENRIE: What our team really needs is a decision, not necessarily articulated into an order. I realize it takes time to do all of that,

but we were hoping for a decision today.

MR. BRANCARD: Well, the Commission's normal practice is to deliberate and then when they have a tentative decision, go back on the record and announce that decision and then there is a process for finalizing the order that comes out of that. So if the Commission can arrive at a decision today, they will try to have -- inform everyone when they will come back into session and announce that.

COMMISSIONER BALCH: Even if the parties are not here it will still go on to the record so...

CHAIRMAN CATANACH: Do you want to set a time for, maybe to have another announcement to go forward on where we stand? I mean, at what point we are --

COMMISSIONER PADILLA: I would say before the end of the day we have to say something one way or other but...

MR. BRANCARD: Maybe by 3:00 we can send an e-mail out just sort of letting people know when the Commission will be coming back or not, and by then you may be pretty tired of each other.

CHAIRMAN CATANACH: If we don't reach a decision, I guess we will have to figure out when we can meet, again.

MR. BRANCARD: You can just call a special meeting in a few days. I mean, it is a continuation, so you can just call a special meeting to deliberate again because that will be the only item on your agenda. So it will be really easy to schedule a continued meeting to discuss this.

MR. LAKINS: Mr. Chairman, I have a question. If the Commission, as an example, is going to come back at 3:00 and give an announcement of some sort is it possible to attend by phone? Is there -- is that logistically possible? Is there a speakerphone that is in this room type of thing?

MR. BRANCARD: I was intending on sending out an e-mail to everybody announcing the Commission will come back in within 15 minutes or something, but we can do that. I think that is possible Mr. Lakins.

MR. LAKINS: The reason I ask, sir, is I am in Albuquerque. My office is in Albuquerque and for me to get back to work at my office and then get back up to here, well, you can see my dilemma.

MR. BRANCARD: We will get a phone here. If you will give us your number.

CHAIRMAN CATANACH: You will send out an e-mail to let everyone know?

MR. BRANCARD: Yeah, by 2:00 or 3:00, okay?

COMMISSIONER BALCH: I make a motion that we go into executive session.

COMMISSIONER PADILLA: I will second that motion.

CHAIRMAN CATANACH: All in favor.

COMMISSIONER BALCH: Aye.

COMMISSIONER PADILLA: Aye.

CHAIRMAN CATANACH: Aye.

(A recess was taken.)

COMMISSIONER BALCH: I will make a motion to go back on the record.

COMMISSIONER PADILLA: Second.

CHAIRMAN CATANACH: All in favor.

COMMISSIONER BALCH: Aye.

COMMISSIONER PADILLA: Aye.

CHAIRMAN CATANACH: I would just like to announce that during the executive session the only thing that was discussed was the case at hand. And at this point I would turn it over to Mr. Brancard who will announce some of the decisions that were made today.

MR. BRANCARD: Okay. Thank you. Mr. Chairman, we are here today on an application of

Lightning Dock Geothermal for approval of injection wells 13-7, 76-7, and 15-8 under the Geothermal Resources Conservation Act and the rules adopted under that Act. The Commission has considered the testimony, the applications, all of the exhibits provided by the parties and thanks all the parties for their contributions today. A lot of interesting issues that have been brought up and it required a fair amount of discussion by the Commission.

The Commission today concludes that approval of the three injection wells subject to the following conditions will prevent waste, protect correlative rights and prevent damages to geothermal resources and to usable underground water supplies.

The conditions: Intermediate casing in the three injection wells shall go to 150 feet below the base of the shallow aquifer which is indicated by the bottom of the silicified sediment layer and --

COMMISSIONER BALCH: Conglomerate I think is what the geologists have been calling it.

MR. BRANCARD: Right. And it's indicated as silicified sediment on Exhibit 14C, I believe.

Further conditions: The Commission shall provide more specific conditions of approval

based on the OCD conditions that were submitted and will tailor the conditions that are currently provided in Exhibit A of R13675B.

In addition to that, these conditions require a water quality sampling. Any water quality data that is required to be submitted to the State shall be public.

There was a discussion of a fourth injection well by Lightning Dock Geothermal. They have withdrawn the fourth application for Lightning Dock Geothermal 63A-7. The Commission hereby authorizes, based on the testimony that the Division may administratively approve a fourth injection well consistent with the specifications of this order so long as such well is south of current Lightning Dock Geothermal Well 55-7 inside of Section 7.

In addition, finally, any further applications for action on geothermal injection wells consistent with this order shall be subject to Division approval and does not require Commission approval, provided that the Commission reserves jurisdiction over any approvals for wells in the northeast quarter of Section 7, which based on the testimony is the location of the hottest area of geothermal resources indicated by Exhibit 13.

Mr. Chairman, that is all I have. Did you have anything further?

CHAIRMAN CATANACH: Commissioners, did you have anything that you would like to add or clarification on any of that?

COMMISSIONER BALCH: No.

COMMISSIONER PADILLA: No.

CHAIRMAN CATANACH: Okay. We don't.

MR. BRANCARD: Mr. Chairman, the parties have submitted draft orders and findings. I can work off of those draft orders and findings and prepare an order for the Commission based on what you have decided today.

CHAIRMAN CATANACH: Mr. Brancard, do we want to leave the record open so that we can review the draft order to make sure that everything we want is included?

MR. BRANCARD: Absolutely. I will prepare a draft order, hopefully within the next week or so, send it out to the Commissioners. You can either then meet, have it approved at the next meeting or if you want to direct the Chair to sign it, you could do so, also.

CHAIRMAN CATANACH: Okay. Anything further? So I guess we will just dismiss for now

but leave the record open pending review of the draft order.

MR. BRANCARD: Yes.

CHAIRMAN CATANACH: Okay. Then this hearing is adjourned.

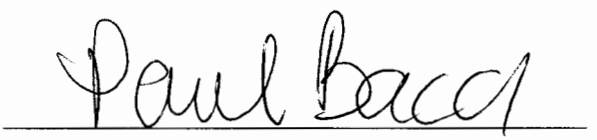
(Hearing adjourned at 2:37 p.m.)

STATE OF NEW MEXICO)
) SS.
COUNTY OF BERNALILLO)

REPORTER'S CERTIFICATE

I, PAUL BACA, New Mexico Reporter CCR No. 112, DO HEREBY CERTIFY that on Friday, October 9, 2015, the proceedings in the above-captioned matter were taken before me, that I did report in stenographic shorthand the proceedings set forth herein, and the foregoing pages are a true and correct transcription to the best of my ability and control.

I FURTHER CERTIFY that I am neither employed by nor related to nor contracted with (unless excepted by the rules) any of the parties or attorneys in this case, and that I have no interest whatsoever in the final disposition of this case in any court.



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