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NEW MEXICO OIL CONSERVATION DIVISION HEARING

DOCKET NO. 41-08, CASE NO. 14246

LORDSBURG, NEW MEXICO

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TRANSCRIPT OF PROCEEDINGS

On the 7TH day of APRIL 2009, this matter came on for HEARING before the HEARING EXAMINER, DAVID BROOKS.

The Oil Conservation Division appeared by Counsel of Record, MS. MIKAL ALTOMARE.

The Applicant, RASER POWER SYSTEMS, LLC, appeared by Counsel of Record, MS. OCEAN MUNDS-DRY, Law Office of Holland & Hart.

The Opposing Party, AMERICULTURE INCORPORATED, appeared by MR. DAMON SEAWRIGHT.

At which time, the following proceedings were had:

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TUESDAY, APRIL 7, 2009, 9:10 A.M.

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HEARING EXAMINER: Good morning, ladies and gentlemen. We'll call the hearing to order.

This is a special docket of the New Mexico Oil Conservation Division for the purpose of hearing a matter under the New Mexico Water Quality Act.

This is Case No. 14246, application of Raser Power System, LLC, for approval of a discharge permit pursuant to New Mexico Water Quality Act, Hidalgo County, New Mexico.

We'll call for appearances of counsel.

MS. MUNDS-DRY: Good morning, Mr. Hearing Examiner. Ocean Munds-Dry with the Law Firm of Holland & Hart here representing Raser Power System, LLC, this morning, and I have one witness.

MS. ALTOMARE: Mikal Altomare on behalf of the Oil Conservation Division, and I have one witness.

MR. SEAWRIGHT: Damon Seawright on behalf of AmeriCulture, and I have one witness.

HEARING EXAMINER: Any other appearances? Very good. Will the witnesses please

stand to be sworn.

Please state your names.

MR. HAYTER: Michael Hayter.

MR. CHAVEZ: Carl Chavez.

MR. WITCHER: James Witcher.

HEARING EXAMINER: Thank you.

Will the court reporter swear the witnesses.

(Witnesses sworn.)

HEARING EXAMINER: Okay. There is a sign-in sheet that was passed around. Is it around there somewhere? Does somebody have the sign-in sheet?

MAN IN AUDIENCE: I believe it's here, sir.

HEARING EXAMINER: Okay. If you could be sure that it gets around and everybody that's present has an opportunity to sign in.

Before we proceed with the formal part of the hearing, we would like to give an opportunity to any members of the public who might have to leave before the hearing is concluded. We'll give you another opportunity before the lunch and recess, but if there's anyone who would like to make a statement for the record before the formal

part of the hearing begins so that you will have the flexibility to leave whenever you want to, we will give you that opportunity at this time.

Is there any member of the public that wants to make a comment at this time?

Very good. Hearing none, we will then begin with the formal part of the hearing. The caption of this case is the Application of Raser Power System, LLC. However, I believe that that is not the actual applicant in this case.

Can you state, Ms. Munds-Dry, what entity is actually the applicant for the permit in this case?

MS. MUNDS-DRY: Mr. Hayter can explain that to remind the Hearing Examiner the relationship between Raser and Los Lobos, but Los Lobos, a renewable power LLC, is actually the applicant on the application.

HEARING EXAMINER: Okay. Very good. Thank you.

As the applicant, I assume you are the one who will start here. Do you want to make an opening statement?

MS. MUNDS DRY: No, sir. I don't believe we need to do that this morning. I can go

ahead and present my witness if you like.

HEARING EXAMINER: Ms. Altomare, do you want to make an opening statement at this time?

MS. ALTOMARE: I'll reserve. I wanted to make a brief introduction prior to presenting my witness.

HEARING EXAMINER: Okay.

Mr. Seawright. Go ahead.

MR. SEAWRIGHT: I'm Damon Seawright, president of AmeriCulture, a 13-year-old aquaculture company that grows fish on the property within a half mile of Raser's proposed power plant project.

We drink and bathe in and grow our fish in water that comes from a well less than 500 feet from where Raser proposes to inject copious quantities of chemicals into the groundwaters of the Animas.

Raser has chosen to do this despite the existence of wide-spread use of the air cooling in the geothermal power industry. I have a vested interest in the determination of this hearing because AmeriCulture grows fish in waters potentially in hydraulic connection with the contaminated water Raser proposes to inject.

Geothermal power generation can be done in an environmental benign fashion that protects the environment, protects correlative and water rights, does not result in the waste of geothermal resources, and does not threaten plant, animal, or human health and physiology.

We're opposed to Raser's proposed injection permit as currently submitted for the following reasons: At its essence, Raser's proposed injection permit includes two primary aspects, both of which have a potential to pollute groundwaters protected under the New Mexico Water Quality Act, and endanger plant, animal, and human health for those relying on regional waters for business and personal sustenance.

The first aspect which would be elaborated on by AmeriCulture's direct-case witness Jim Witcher, is that Raser proposed to inject of unknown quality and chemistry into an uncharacterized and unexplored geological stream.

As such, neither the production or the injection wells should be permitted as such, but rather is exploratory wells until such time that scientifically -- a scientifically credible case can be built with the production and injection

scheme will have limited impact on the New Mexico groundwaters and those that rely on it.

Second aspect is Raser plans to inject a cocktail of form, and in some cases, hazardous chemicals used to control algae, micro-organisms, and scaling into one of Hidalgo County's largely untouched water resources.

AmeriCulture's fish are grown in a mixture of cold groundwater and geothermal water, and, therefore, the injection of potentially hazardous chemicals in it is of grave concern to AmeriCulture. AmeriCulture even has a water well which production zone lies between 1,400 and 2,100 feet below ground level which overlaps the injection depth proposed by Raser.

Raser's very own hydrogeological consultant firm has reported to them that Raser's project will likely dramatically impair the water rights of surrounding businesses and persons as indicated by projected drawdown in regional wells.

This expectation is directly relevant to water quality in that it would demonstrate the direct connection between Raser's wells, and those of AmeriCulture and Burgett geothermal. This tissue containing certain of the cooling tower

chemicals may be regarded as adulterated by the Food & Drug Administration and, therefore, unsafe for human consumption.

As we've revealed in the initial hearing, no acute toxicity levels for the proposed chemicals have ever been determined for the fish that we grow, mild Tilapia, nor is the dispersal of degradation of at elevated temperatures or inter-reactivity of the proposed chemicals sufficiently well known to render as scientifically credible for their use.

Therefore, injected chemicals should be limited to those approved for potable water, and anti-scaling, anti-microbial, and algicidal chemicals listed in the application do not meet this description. This concern is particularly germane to the environmentally benign alternatives to cooling towers exist.

Based on an internal document from Raser's hydrologist, John Shomaker, Raser was informed that they could essentially lift AmeriCulture's water table by injecting into an intermediate zone below some of AmeriCulture's wells.

In order for this to work, the

injected water must be in hydraulic connection with our water. We draw water from the well less than 500 feet from one of the proposed injection wells that we drink and bathe in. If John Shomaker is correct, it is possible for those chemicals -- that those chemicals will migrate into our well.

We do not feel like being guinea pigs when environmentally benign cooling technologies exist.

HEARING EXAMINER: Thank you.

Are you going to be able to hear the witness if he sits over there on the other side of the screen?

THE REPORTER: It depends if he talks loud. If not, he can move where you are.

HEARING EXAMINER: If a witness is not -- I think as long as we're not using the projector --

Who's going to be using the projector? Mr. Witcher? Okay.

Are either of your witnesses going to be using it? Okay. As long as we're not using the projector, I think I will move over to that table so to allow the witness to be closer to the court reporter.

MS. ALTOMARE: Is Mr. Witcher going first?

HEARING EXAMINER: It would be the Applicant.

MS. ALTOMARE: Oh, you're right. I'm sorry. My bad.

HEARING EXAMINER: Okay. Ms. Munds-Dry, you may call your first witness.

MS. MUNDS-DRY: Thank you, Mr. Examiner.

MICHAEL HAYTER,

(Having been first duly sworn, testified as follows:)

DIRECT EXAMINATION BY MS. MUNDS-DRY

Q Would you please state your name for the record?

A Michael Hayter.

Q Mr. Hayter, where do you reside?

A I reside in Highland, Utah.

Q Who are you employed by?

A Raser Technologies.

Q What is your position with Raser?

A I'm the director of geothermal development.

Q Since it's been a while since we had our

last hearing, would you please explain to the Examiner the relationship between Raser and Los Lobos?

A Yes. Raser Technologies operates two business divisions; one is an electric motor technology business, and the other is a geothermal development and power business. Those have been separated into special purpose entities.

Specifically, within the power generation business, we have created Raser Power Systems as a wholly-owned subsidiary to then own and operate the various geothermal development projects, and the power plants that we have and will have operating.

Part of that reason is that these entities need to be able to take advantage of tax equity arrangements that make it necessary legally to structure them in that fashion.

Q Thank you. You previously testified at the December 2008 hearing for this application?

A Yes, I did.

Q And what is Raser seeking through this application?

A Raser is seeking the authorization permit to be able to drill the injection wells, the Class

V injection wells that are required for the geothermal power generation plant. Also, pending our drilling wells for production wells from the State -- excuse me -- from the New Mexico Oil Conservation Division.

Q Is it your understanding the focus of this hearing is for the discharge permit only?

A This is for the discharge permit, yes.

Q Mr. Hayter, do you recall at the conclusion of the last hearing in this matter, again, since it's been a while, just to remind of where we are at.

Mr. Brooks indicated that staff needed to complete its technical review before he could undertake the reporting and issuing of the permit?

A Yes.

Q At the conclusion of that hearing, did you contact the OCD?

A At the conclusion of the last hearing, we were in touch with the OCD on more than one occasion. We've been in touch on several occasions.

Q And was there a meeting that resulted from those contacts?

A Yes. We had a meeting on January 27th in

Santa Fe in which we met together with the OCD and with Mr. Seawright, and our various technical representatives.

Q I believe the Division will get into more detail about this, but what happened after that meeting? Can you give us a brief summary of what happened?

A Well, at that meeting we had the opportunity to each, again, state our case. In summary, what happened at the end of the meeting is that we agreed on a set of issues, and at that point, the Oil Conservation Division, I believe it was the chief of the Water Quality Bureau, introduced a draft of the permit with specific requirements that we would be held to in order to, I think, both protect the water quality, as well as give us a specific list of things that we needed to deal, which included the water monitoring plan, more information in detail around that, as well as specific water quality monitoring wells and other remedies, I guess, to make sure that the quality of the water to protect in the Animas Basin.

Q Have you had a chance to review that draft permit?

A Yes, we have.

Q Is Raser comfortable and willing to accept the conditions that have been set forth in that draft permit?

A We are.

Q If you can give, Mr. Hayter, the Examiner just an idea of, for the spring and summer, any time lines that you're up against, just to give an appreciation of our need and Raser's need to proceed in this matter as quickly as possible?

A Yes. I can appreciate -- we have experienced a delay of several months now, which is understandable given the need to look at all the issues that are involve here because they're important to the community and important to us as well.

But we are in a position now where every month that we delay the project becomes more expensive to the project. We have over $20 million dollars of equipment sitting on site, at the particular project site. We continue to invest in the expertise that's needed to be able to design and build this project.

We're anxious to move it along. It does cost us money to -- even though we're not able to do anything, we're spending money on a regular

basis to keep the project moving and keep it going forward.

I would also say we're anxious to bring some economic development and jobs to the community. We're in touch with several community leaders and with several of our neighbors, and found great support for the project.

I think in the current economic situation that we're all in, that it would be very useful to this community to have the jobs that can be created from the drilling, construction, and operation of this plant.

Q Mr. Hayter, you have other members of the Raser team with you today. I'd just like to give the opportunity to introduce those to the folks here.

A Okay. I will start of with Mr. Bob Giguiere, who is sitting in the back room -- in the back of the room with a blue shirt. I'll have him stand up. Mr. Giguiere is construction manager with Raser Technologies. He has the distinction of having built the first binary geothermal power plant in the U.S. in 1980 at Lakeview, Oregon. He has built other plants since then, and has been involved in that in the industry since the

beginning of 1980. Mr. Giguiere has been, at this point, selected to be a construction management -- or manager for this project. So he is well qualified to build this project.

We also have Mr. Ben Barker who is our vice president of resource management. Mr. Barker has a long history of over 30 years in the geothermal industry as well. He has been one of the chief engineers for the Geysers, which was the largest geothermal project and plant in the world. It produced, at one time, nearly 50 percent of the world's geothermal power.

He has a PhD from Stanford in -- you'll have to remind me, Ben -- in petroleum engineering, but has applied that petroleum engineering background to geothermal ever since. He's qualified. He's been involved in all phases of geothermal exploration, exploitation, and ongoing operations for over 30 years.

Q Mr. Hayter, if this application is approved and the discharge permit is issued, will these gentlemen be responsible in their various capacities on this project?

A Yes, they will.

Q Finally, in your opinion, Mr. Hayter, will

the discharge permit as proposed by the Division meet all water quality standards under the applicable regulations?

A We will meet all water quality standards, and we will meet all the additional requirements that we've been asked to meet in the permit draft.

MS. MUNDS-DRY: Thank you. That concludes my direct-examination of Mr. Hayter.

HEARING EXAMINER: Ms. Altomare.

MS. ALTOMARE: Thank you, Mr. Hearing Examiner.

CROSS EXAMINATION BY MS. ALTOMARE

Q Mr. Hayter, you had indicated that you had reviewed a draft permit that had been presented to you. I understand that there have been several renditions of that draft permit as the process has gone forward.

Have you had a chance to review the most recent version of that that was submitted to counsel on Friday?

A Yes, I have.

Q And you are familiar with the most recent additions and versions, I believe it's parts 20 and 21 that would be monitoring and sampling plan and conditions, it would be submitted as our exhibit,

OCD, during the course of this hearing?

A Yes, I have reviewed that.

Q And you are comfortable with all of the additional conditions that are being imposed of that particular version of the permit?

A Yes.

Q And you've indicated that you expect that you, Raser, will meet all water quality standards in the course of this project?

A That's correct.

Q And one of the things that is discussed in the permit conditions is that the effluent will be required to meet water quality standards prior to re-injection or prior to injection?

A Yes.

Q Does Raser understand that if for some reason in the course of the monitoring and sampling that takes place pursuant to this permit, the results indicate that water quality standards are not met, that Raser will be required to shut down the project and revisit the permit conditions?

A Yes.

Q That there will be additional modifications imposed, the permit will be revised, that the project will not go forward unless and

until water quality standards are met?

A Yes. I understand that, and we agree with those terms.

MS. ALTOMARE: I think that that's all the questions that I have for Mr. Hayter.

HEARING EXAMINER: Mr. Seawright.

CROSS EXAMINATION BY MR. SEAWRIGHT

Q Mr. Hayter, according to -- given Raser's 2008 losses of approximately $45 million, and their 2008 liabilities of approximately $150 million, and sales in 2008 of less than $200,000, how would Raser finance a costly environmental clean-up should your activities result in the contamination of our groundwater?

A Well, Raser has -- I'm not familiar with all the details, but we do have the requisite insurance for these types of projects. We are required, in fact, by the lenders in their due diligence process to have -- to have met all of the permits, to meet all of the state and federal regulations under which we operate or develop. So how we would finance those is the same answer in terms of how we're going to finance the growth of our company.

We have publically announced the

strategic relationship with Calleon (phonetically), which is a French investment bank, one of the larger investment banks, who is acting as our advisor in locating for us a strategic investment partner who will be purchasing 50 percent of our thermal project, which is a 238 megawatt project in central Utah.

Those proceeds will be used to -- will be deployed here at Lightning Dock, will be deployed at other projects, and we will keep on hand sufficient cash in order to move ahead with our projects. They are capital intensive, and we do have resources to fund the company going forward.

We also have in progress several pre-pay arrangements with other utilities that will provide capital to our company, and reduce the burden on us to find other sources of capital.

Q I understand that you can be creative in financing the project itself, but I was more interested in actual financing in clean-up after it's over.

Are you stating that you will maintain an insurance policy sufficient to --

A We have made all required insurance

policies to meet any kind of regulations and/or requirements that our lenders impose upon us for the financing of a project. Those typically include -- though I'm not familiar with the specific list of insurance policies that we have on this project or will have, but they typically include any types of insurances that will cover our risks and liabilities.

Q I understand. Okay. So you are willing to maintain an insurance policy that would finance for environmental clean-up should a contamination occur?

A Well, I don't know to specifically -- I'm not committing to a specific policy. I'm stating that we do maintain policies that do protect us as a company, as a publically-traded company, as well that provide that kind of liability protection.

I'm not qualified to give you the answer specifically as to what policy that would be or how we're maintaining it, and I just don't have that information at this point.

Q I'll ask it a different way. How is Raser, or its subsidiaries in this case, Los Lobos, how does Los Lobos reassure the citizens of New Mexico that if an environmental contamination

occurs, that it will be properly financed? How do you make that assurance?

A Well, we're under the same obligations, first of all, as a publically traded company. We're regularly audited. We provide those financial records to the public, we report to the SCC, we provide accounting for both our assets and liabilities.

This is a project, these are liabilities, and typical financial construction projects on power plants, and any type of project finance and long-term lending finance in operation of the power plant, there are policies of this issue that are put in place.

So we have insurance policies that are required to protect our liabilities, and the liabilities of the community would have in these kinds of situations. We'll have cash on hand as we bring that into the company for these projects.

Q Okay. This liability would include the --

A Sir, we're under obligation with the water quality permits, and under these various regulations in the state to maintain those standards. Yes, we do intend to fully enforce those permit requirements.

Q How would Raser mediate the situation of chemical residuals that were injected in the groundwater or found in the tissue of our fish?

MS. MUNDS-DRY: Objection, Mr. Examiner. I think we're getting outside the scope of this hearing. We're also getting outside the scope of my direct testimony.

HEARING EXAMINER: Okay. I will sustain the objection since it's outside the scope of direct testimony.

Q (BY MR. SEAWRIGHT) Is Raser willing to provide the Oil Conservation Division with the levels of the amount of chemicals acceptable to the Food & Drug Administration in fish tissue?

MS. MUNDS-DRY: Same objection, Mr. Examiner.

HEARING EXAMINER: Yes.

You may respond to the objection because I don't remember the --

MR. SEAWRIGHT: Well, I referenced the actual permit itself where there is in Section 20, the section that specifically outlines the determination of the water toxicity levels for these chemicals in our fish.

AmeriCulture contends that it's not

just the lethality of these issues, but, rather, the impact on the physiology and breeding, and, also, the salability of our fish. So I think this question is particularly germane.

HEARING EXAMINER: Well, I believe there was some general statements made in direct testimony to the effect that the chemicals -- the injected substances would not be harmful, therefore, I will overrule the objection.

Q (BY MR. SEAWRIGHT) Mr. Hayter, is Raser willing to provide the OCD with levels of the Nalco chemicals acceptable to the Food & Drug Administration for fish tissue?

A I don't think we have the levels. I don't think we have the levels of toxicity, nor have we determined what the levels were.

Q I understand. Would you be willing to investigate that and provide that information to --

A That's a part of this particular permit, actually, to provide a toxicity test.

Q Not toxicity. I'm actually referring to those levels -- I'm talking about sub-acute toxicity levels, and acceptable limits to the Food & Drug Administration that would allow us to sell our product as safe and wholesome to citizens of

the United States.

Those particular chemicals, would you be willing to provide the OCD with levels of those Nalco chemicals acceptable in the tissue of my fish?

A I don't know what those levels are.

Q I understand.

A I think that -- I believe, personally, that the FDA regulations are out of context in terms of what we're discussing here for water quality.

Q The purpose is -- even if the purpose of the water quality act is to protect human and animal health and safety, I believe it's particularly germane to -

MS. MUNDS-DRY: Objection. Argumentative.

HEARING EXAMINER: I was going to ask was that a question, or something just expressing an opinion? Do you have a question?

Q (BY MR. SEAWRIGHT) So you're not willing to provide -- to determine, if necessary, and provide to the OCD the --

A I'm not willing to commit to a particular set of regulations that I'm unfamiliar with

concerning the FDA. I simply can't commit to that at this point. I don't have any information about what those regulations are, I'm not familiar with them, and, in all honesty, I can't commit to that.

Q You are aware in the proposed permit you will be required to determine the acute toxicity levels for these Nalco chemicals in Tilapia?

A Yes, I'm aware of that.

Q So in light fashion, would you be willing to assume responsibility of reporting those levels that are determined to be acceptable to the FDA in fish tissue?

A We will report the results of the toxicity test to the OCD as required by the permit.

Q I'm not referring to the toxicity test, I'm referring to those levels determined by the FDA to be acceptable in fish tissue. It's a very simple question.

MS. MUNDS-DRY: Objection. It's asked and answered. He's asked him several times, and I think the witness has given him his best answer.

THE COURT: Sustained.

Q (BY MR. SEAWRIGHT) Would you please state all the reasons that you are aware of for the movement of one of the injection wells from its

initially southernly location of the proposed location on AmeriCulture's property?

A Yes. The first and foremost, in addition to the geology studies that we've worked out to try to determine initially what we know and don't know about the hydrology of the geothermal resource, in addition to that, we have hired Shomaker & Associates because they had a reputation in the state for being a very qualified organization.

We hired them to analyze what we know about the particular hydrology of the area because we were foreseeing the need to look at potential water impairment, as well as the geothermal issues and water quality of the State. So we were looking at both the requirements and responsibilities we have under the OCD, as well as under the State Engineer.

So upon performing that analysis and getting the results from Mr. Shomaker, one of the suggestions was an injection well in that location, in that vicinity, would provide some mitigation to possible impairment of wells on the AmeriCulture area. So that was the primary reason for moving that there.

We also had been made aware of by you,

Mr. Seawright, that we had a joint operation agreement that had been signed in approximately 1997, I think it was, in which we were given the rights, or the owner of the assets at that point, which we became the assignee to have the right to drill wells on your property, in exchange for your right to use the geothermal fluids down to 1,000 feet.

Having received technical data and analysis and opinion that indicated we should put a well in the vicinity to deal with the water impairment issues, we decided -- and having the right to do so, we moved that well to that location.

MR. SEAWRIGHT: Your Honor, I have a question pertaining to what Mr. Hayter just mentioned. I have a document here that I would like to provide him so that he can --

HEARING EXAMINER: You may approach the witness.

Q (BY MR. SEAWRIGHT) I refer you to the second page of this document, Mr. Hayter. Beginning at the highlight on the first paragraph which reads:

"I'm planning to include in the OSE

application," the State Engineer application, "a provision to re-inject water, at a rate to be determined from monitoring results into an intermediate zone below AmeriCulture's completions, but above the geothermal production interval so as to maintain the heads in the former without introducing a water quality problem (since the head distribution will still result in downward flow, once the geothermal production is occurring.)"

Do you recognize this?

A I recall it now that you put it in front of me, yes.

Q Thank you. As we have brought out, given at the initial hearing, the discussion of in order for the proposed injection as stated in this e-mail to reduce the impairment upon water right, there must be hydraulic conductivity.

Are you concerned with that hydraulic conductivity?

A No, I'm not concerned with hydraulic conductivity. I think we have the opinion of the technical expert who is telling us that this is a plausible and feasible solution to two problems. One is how to maintain a reservoir, a geothermal reservoir, and the second is how do we both

maintain and operate a geothermal reservoir, and, also, mitigate any kind of water impairment issues which we are addressing in a different jurisdiction.

But as a project, we need to look at all the particular issues. So in this situation, we felt like we had a solution to both of those problems.

Q Do you understand that in order for this to work, that the water in AmeriCulture's wells must necessary be in connection with the waters that has been proposed --

A Well, what I understand is what Mr. Shomaker's e-mail says, which is that there is the opportunity to maintain the heads in the former without introducing a water quality problem because the head distribution will result in a downward flow.

I, obviously, defer to somebody who has got the education and experience in this area, educational background and experience to make these kinds of judgments, but I trust his judgment.

MS. ALTOMARE: Mr. Examiner, I'm going to object at this point. We're straying into geological issues in water quality and geothermal

issues. We're talking about applications to the Office of the State Examiner, not applications regarding injection and water quality issues. We're straying well outside the scope of the purpose of this hearing, the discharge permits.

MR. SEAWRIGHT: Your Honor, I believe that is quite relevant because this is a Water Quality Control Commission hearing, and hydraulic conductivity between the well that's being proposed and our wells, necessarily means that there is flow path between those two wells.

They are injecting water of unknown chemistry, contaminated chemicals, and there is a continuous flow path back to our well. It necessarily introduces the possibility of a contamination of our water, and, also, the potential for the elevation of chemical contaminates as set forth in Section 3108, title 20.

HEARING EXAMINER: I will overrule the objection. You did say something in your question about impairment of water rights, which, of course, is not an issue in this other than for this agency, the question for the State Engineer, but I will overrule the objection.

You may respond as you can.

THE WITNESS: Well, I think there's a couple of points that I want to make about this, and that is that we have been over this several times that the fully hydrology, the full geology of this system is not understood. Part of what we're requesting is the opportunity to understand that.

In exchange, we're willing to accept and agree to the specific requirements that are placed upon us, and the responsibilities we have to monitor these particular wells. As part of this monitoring plan, as I understand it, we have the obligation, and we will respect that.

In fact, we have and it's always been our plan to monitor your wells, Burgett's wells, and any other wells that are required in order to, first of all, take a baseline measurement of the particular water quality in the area.

Then as we go into a production phase, to be able to monitor that on -- a testing production phase, test the production flow and test the results of that, and then go into a production-operation stage where we then monitor that on an ongoing basis.

So I think we have a professional

opinion that says, number one, that that will not be a problem. Secondly, in order to mitigate any potential for a problem, we have a plan to take a baseline test, and then to continually monitor that and agree to, as stated by the OCD earlier, to shut down and remedy any problems that occur. Or I should say if that theoretically occurs because we don't have any proof that they would occur, and we don't have the data that supports that.

Q (BY MR. SEAWRIGHT) Is the -- to the best of your knowledge, is the well that's referenced in this e-mail one in the same as the northern most injection well?

A I believe so, yes.

Q Is it your understanding that the objective of -- that the overall production flow proposed by Raser involves the drawing of water from a yet to be characterized geothermal resource, and the return of that thermally depleted water back to that geothermal resource?

A Yes. In theory, that's always the goal is to try to re-inject the fluids in a way that they -- in this case, we have two issues to deal with. We want to have a regenerative affect on the resource, but we also want to have, if we can, take

care of any mitigating water impairment issues.

Q Are you aware that this states that the injection well that is referenced is to be placed in an intermediate zone below AmeriCulture's completions, but above the geothermal production interval?

A Well, as I stated, this is one of those situations where we have to try to find a solution to two problems with the same answer. So I think that this is our best shot at being able to solve two problems that are addressed.

I would also state that there is an order of priority in the wells. This is not the well we'll start with. This is not necessarily a well that we would even use. We may find that all of our injection is taken care of in one or two injection wells. But until we get into a more definitive testing environment, we won't be able to determine that yet.

Q You stated earlier in your testimony you would shut it in if these -- given that you said that you would shut in -- the project would be shut in provided these water quality standards would be exceeded.

Does that still hold true if the water

quality standards of our production wells are exceeded above standards or baseline in terms higher?

A I don't understand the question.

Q You stated earlier that the water quality guidelines of groundwater are exceeded, that you would shut in. Given that you said that, if the --

A If I could correct you. Given that that is what's being required of us, and we certainly agree to it, yes.

Q Okay. Given what is required that if you be shut in, provided the water quality standards are exceeded in your monitoring wells, if the water quality levels and the water contaminate levels in our production wells exceed the maximum contaminate level or baseline, whichever is higher, then does that still hold true?

A I think in the spirit of the -- in the letter of law, we would be required to shut down and investigate the reasons for any change in those wells. I would also state that we would intend to understand the impact of the productions wells you have as well on the resource.

I think there will be a mutual obligation to each other to understand the impact

of your production wells, together with the impact of our production wells and injection wells.

We have been, and will continue to be, cooperative in that sense with you to understand how the hydrology is affected by your production wells and our production wells.

Q Mr. Hayter, are you aware that there is a domestic well being used for human consumption and aquatic life within 500 feet of the proposed injection well?

A I was not aware initially of that. I'm aware now.

MR. SEAWRIGHT: Thank you. That's the end of my questioning.

HEARING EXAMINER: Thank you.

Mr. Hayter, I may be going over some things that we went over in the previous hearing. It's been a little time ago and I have forgotten things.

EXAMINATION BY HEARING EXAMINER

Q How many injection wells are there going to be proposed?

A We have proposed three injection wells.

Q How many production wells?

A We have proposed five. Five production

wells.

Q At the time of the previous hearing, there was some uncertainty of the location of the wells. Do I understand that the location of the wells has now been fixed?

A The location of the wells has been fixed at this point. Although, one of the requirements in a geothermal environment where you don't yet quite understand all of the implications of what's down below the ground, is that if we, in the process of drilling and testing, we find new information that we will adjust accordingly.

Whether it be information to our benefit or to our detriment, we will adjust our further drilling plan accordingly. It wouldn't make sense to continue with a specific drilling plan if we find something that would change our minds about what we would drill, how we would drill, or where we would drill afterwards.

Is it okay to defer to an expert on that for a moment?

Q Okay.

THE WITNESS: Mr. Barker -

HEARING EXAMINER: Well, he has to be called as a witness so I think --

THE WITNESS: That's fine. I think the statement stands that in a geothermal, we're presenting a plan. If at some point that plan needs to be adjusted, then we will work together through the regulatory process that exists to make the changes to that plan.

Q (BY HEARING EXAMINER) My understanding is the Division will be presenting a draft permit to the Examiner at this hearing?

A That is my understanding as well.

Q And you have reviewed the draft permit?

A We have reviewed it.

Q It's satisfactory to you?

A Yes, it is.

Q And the draft permit fixes the locations where the wells are to be drilled?

A That's correct. My understanding is that the production wells -- or excuse me -- the injection wells, if we intend to make any changes, we would then go through a similar process of advising the OCD of those requested changes, and then having that available for public comment or protest, and then we would go through a similar hearing. But at this point, they are fixed.

Q Now, the water that is being injected, is

that the water that has been produced from the geothermal -- produced from the geothermal production wells and heat has be extracted?

A The majority of that water is from the geothermal production wells. There will be a small amount of that water in the neighborhood, if I remember correctly, and I don't have this information in front of me, but it would be somewhere in the neighborhood of 2- to 400 gallons a minute of the cooling water, blow-down water that would be mixed with that, and then analyzed before it was injected to ensure that we aren't projecting any -- that the mixed geothermal and cooling fluid don't exceed the quality of the water that we extracted.

Q Don't exceed?

A Don't significantly change. That they're still within the regulatory, I guess, limits or limitations that we're under.

Q That they do not exceed Water Quality Control standards?

A Yes, that's what I'm trying to say.

Q Okay. What is the source of this cooling water?

A Those would be shallow groundwater wells

out to the west of the project.

Q In the same general vicinity?

A Approximately a mile-and-a-half to two miles out to the west I think is the current location.

Q Okay.

A Some distance out to the west.

Q Mr. Seawright asked you some questions about chemicals, a word that's often used in a very generalized sense. What will you be adding to the water?

A These would be a mixture of chemicals referred to as biocides and other treatments to keep the algae growth at a minimum, or to keep it from becoming a problem in the cooling tower, from inhibiting the cooling tower operations. I'm not sure.

I don't recall the specific mix of chemicals or additives to the fluids, but they're all fluids that are currently being used in other operations in New Mexico in cooling towers, or being discharged to effluent waters of New Mexico.

Q Have your experts advised you that these additives can be added to this water without causing groundwater to exceed what are New Mexico

water quality standards?

A Yes.

MS. MUNDS-DRY: Mr. Examiner, since it has been a while, you may recall that we had Jennifer Wright from Nalco testify at the last hearing. She went over each chemical and discussed that they would meet water quality standards.

HEARING EXAMINER: Thank you for refreshing my recollection. Unfortunately, due both to the hearing last week and to the fact that I attempted to locate a copy of the transcript yesterday morning, the Division administrator couldn't find it, which I hope will be remedied when I return.

I have not had a chance to review the transcript of the prior hearing.

MR. SEAWRIGHT: Mr. Hearing Examiner, during that same hearing I had asked Ms. Wright, and she could not provide an answer. What I did ask her is if she could be so certain that those chemicals met groundwater quality standards when there was no such standard exists for those chemicals.

HEARING EXAMINER: Well, I am certain that the transcript from the previous hearing will

be found and will be reviewed, and an order is issued in this hearing.

Thank you very much. That's all my questions.

MS. MUNDS-DRY: Mr. Examiner, I just have one question on redirect.

HEARING EXAMINER: Go ahead.

REDIRECT EXAMINATION BY MS. MUNDS-DRY

Q Mr. Hayter, Mr. Seawright asked you about -- particularly the well that you referred to that was in the Northern area closest to their facility?

A Yes.

Q You had testified earlier that you had reviewed the most recent draft permit that the Division will submit as an exhibit here shortly.

Is it your understanding that one condition in that permit will require not only baseline information be sought, but ongoing monitoring of the AmeriCulture and Burgett wells?

A Yes, that is correct.

Q And that's satisfactory to Raser?

A Yes, it is.

MS. MUNDS-DRY: Thank you. That's all I have.

HEARING EXAMINER: Do you want to

follow-up on Ms. Munds-Dry's questions?

MR. SEAWRIGHT: I have a question that results from the questions that you asked.

HEARING EXAMINER: Okay. Go ahead.

RECROSS EXAMINATION BY MR. SEAWRIGHT

Q You stated in your testimony that these chemicals will meet groundwater quality standards for New Mexico; is that true?

A It's my understanding the injection of these chemicals and the fluids that we'll be injecting are within the regulations.

Q Are you aware that at least that there are no standards for these chemicals for New Mexico?

A That there are no -- I'll have to ask you a clarification question. There are no specific standards for which chemicals?

Q Are you aware that in Title 20, which sets forth the groundwater quality standards for contaminates in maximum contaminate levels and toxic compound, that the Nalco chemicals are not on that list, therefore, there is no standard in the State of New Mexico?

My question is: Given that there are no standards for those, how can you be so certain that Nalco chemicals meet New Mexico water quality

standards when there are no standards?

A Well, I think, first of all, because they are currently -- they've currently been permitted for use in New Mexico with other operations, they are currently being used in New Mexico, they're currently being discharged as part of cooling water discharge, at least one existing, if not more existing operations.

MR. SEAWRIGHT: I don't have anything further.

HEARING EXAMINER: Very good. The witness may step down.

Oh, did you have another question, Ms. Altomare? Go ahead.

MS. ALTOMARE: Yes.

RECROSS EXAMINATION BY MS. ALTOMARE

Q Just to clarify, and I will go into this more with my witness. Regardless of hypothetical conjecture about whether or not the effluent meets WQCC standards, is it your understanding that the effluent will be tested prior to injection -

A Yes, the affluent --

Q -- to see whether or not it is safe for re-injection?

A It will be monitored before re-injection, yes.

Q I'm not sure if you know this or not. The Nalco chemicals, the -- what did you say this was? Is the biocide primarily a bromide?

A I honestly don't recall, but I think that's true.

Q In your review of the draft permit, do you recall seeing the groundwater, the monitoring program, and the suite of extra chemicals that were being --

A Yes. Yes, we'll be monitoring all injected fluids. We have been given a list of specific monitoring wells that we will drill, as well as existing wells that we will monitor, and we also have the suite and method of various chemicals and other, I guess, metals and chemistries to be monitored which include all of the chemicals that have been proposed by Nalco, as well as a suite of items that have been included as part of the regulatory.

Q So Raser will be testing for a bunch of specific chemicals that are known to be included within the Nalco --

A Yes, I can see that bromide is included in

that list.

MS. ALTOMARE: Thank you.

HEARING EXAMINER: Anything further?

MS. MUNDS-DRY: Nothing further.

HEARING EXAMINER: The witness may stand down.

HEARING EXAMINER: I believe that this was the only witness you planned to call, correct?

MS. MUNDS-DRY: Yes, Mr. Examiner. We listed several that we may call for rebuttal witnesses, but that concludes our direct case.

HEARING EXAMINER: Very good.

Ms. Altomare.

MS. ALTOMARE: Yes. I want to call one witness, Carl Chavez, and prior to that I just wanted to do a brief introduction.

The Oil Conservation Division sees this as really a very simple follow-up hearing, and wants to emphasize to the Hearing Examiner that this really has only to do with tying up loose ends, and wrapping up the remaining issues that were not able to be followed through on at the last hearing.

Just by way of bringing us up to speed, Raser, of course, submitted this

application, notice was issued pursuant to 3108, and the hearing was requested by Mr. Seawright in this case. Given that this is a new situation, I think that it's fabulous that a natural hearing has taken place because I think that this permit is actually going to be much more comprehensive and better for the hearing process having taken place.

A hearing did take place on December 1st, and at that time it was determined that there were significant other things that need to be discussed and contemplated to be included in this particular permit.

At that time the hearing was recessed, and the technical advisors, absent counsel, did convene to discuss what additional monitoring might need to be considered and included into this permit to address the cooling tower issue, and other issues that might be unique to this particular project not previously contemplated in such discharge permit processes.

We're now here at this hearing, and the single issue left is revising -- figuring out the last version of the draft permit, and whether or not the permit is ready to be accepted by the Hearing Examiner, and recommended for acceptance by

the secretary.

We will be presenting a revised permit draft. We did present that to all parties on Friday. We would like to advise the Hearing Examiner and the parties that there are a couple of remaining clerical errors and clarification-type corrections that we did discover over the weekend, and we would ask for leave to present a final red-light version by the end of business on Thursday to everybody. We apologize for that. There's been, as the Hearing Examiner is aware, a little bit of craziness going on at the OCD that left us a little bit harried getting this done.

As the parties will see on Thursday when we do present this, it is pretty much straight forward clarification and clerical-type things. But other than that, the substance of the draft permit as presented on Friday, and as we are presenting today as our exhibit, is the meat of what we are presenting for consideration by the Examiner today.

We are now confident after the hearing on the 1st of December and the subsequent meeting that occurred at the end of January, that the permit adequately addresses all of the water

quality issues involved in this project.

The bottom line is, that if what Raser has put forth as its expectations in this project is accurate, and the effluent actually meets the water quality standards as it claims, then the sampling of the monitoring called for by the permit should prove that up.

If the sampling of the monitoring results indicate that they don't indeed meet those water quality standards, then all operations will halt, we'll go back to square one, and we will revisit this permit application and either the project will be terminated, or the permit will be re-issued with significantly modifications to address the possibility of treatment or whatever needs to be done to make sure that contamination of water doesn't occur.

But the bottom line is that this permit is now structured to basically nip it in the bud, so to speak, any potential water contamination prior to it occurring because the testing happens before the injection, as well as downstream, so to speak, at the well sites.

We've got several safeguards going on. We've got a baseline-type testing going on ahead of

time, and then we've got several different monitoring wells set out integrating into the permit.

At this time, I'd like to call my witness, Carl Chavez, with the Oil Conservation Division.

We'd like to ask for a brief recess prior to him testifying.

HEARING EXAMINER: Okay. Well, it's a good time to take a recess anyway.

(Recess)

HEARING EXAMINER: Let us proceed then.

Ms. Altomare, you may proceed with examination of Mr. Chavez.

MS. ALTOMARE: Thank you, Mr. Examiner.

CARL CHAVEZ,

(Having been first duly sworn, testified as follows:)

DIRECT EXAMINATION BY MS. ALTOMARE:

Q Mr. Chavez, did you bring your two exhibits with you?

A Yes.

Q Great. I'd like to -- I think I've handed them out. I'd like to direct your attention to Exhibit No. 1.

Exhibit No. 1 and Exhibit No. 2, just to get these on the record, can you identify these for the record, please?

A You're asking me to identify them?

Q Yes.

A OCD Exhibit 1 is the meeting issues that were identified during the Tuesday, January 27th, 2009 meeting in Santa Fe with our technical expert, Mr. Glenn von Gonten and the various parties.

Q And the other side of that document?

A Includes the signatures of those persons that were present during that meeting.

Exhibit 2 is the discharge permit dated April 7, 2009, for this hearing.

Q The draft discharge permit?

A The most recent draft of the permit.

Q Mr. Chavez, by whom are you employed?

A The New Mexico Oil Conservation Division.

Q And what is your current position with the OCD?

A I'm an environmental engineer in the Environmental Bureau.

Q Have you previously been qualified as an expert in environmental engineering?

A I have.

Q Have you previously testified before the Oil Conservation Division or the Water Quality Control Commission?

A I have. I've actually served as a commissioner.

MS. ALTOMARE: I would move to have Mr. Chavez qualified as an expert in the field of environmental engineering.

MS. MUNDS-DRY: No objection.

MR. SEAWRIGHT: No objection.

HEARING EXAMINER: So qualified.

Q (BY MS. ALTOMARE) I'd like to first direct your attention to what you have just identified as OCD Exhibit No. 1. You had referenced this as the list of meeting issues stemming from the January 27th meeting that was conducted. I'd like to go over this in a little bit further detail.

Did you prepare this document?

A I did.

Q And did you circulate this document after you prepared it to the people who attended that meeting?

A I posted it on the website under OCD online under the permit as the January 27th meeting, 2009 meeting.

Q Okay. So it is a part of the public record of this file for this permit?

A It is. At the close of that meeting, these were the issues that were identified, and I was simply documenting those issues from the end of the meeting on January 27th.

Q Item number 1, can you explain for the Hearing Examiner what item number 1 indicates?

A Well, based on Mr. Jim Witcher's presentation at that meeting, we identified this as a Major Tectonic Inversion WNW fault. I believe Mr. Witcher had developed a model of the geology at the site.

Basically, AmeriCulture's position was there under 1B, based on the that geologic model in his presentation, that there was a gross lack of subsurface information in the project area.

Q Okay.

A And Los Lobos' position was is that, "We won't know until we drill and get more information whether that model perhaps has some merit or not."

Q What was the OCD's position with regard to the information presented by AmeriCulture and Raser, Los Lobos' response?

A Well, the OCD's position were primarily

water quality issues, making sure that when they do perform their drilling activities, that they're protecting the water resources surface and groundwater.

But as part of our discharge permit, we'd included water quality monitoring of those wells. In fact, it's inherent in the drilling of those wells that well logging and all types of geologic information will be incorporated into the information that they provide to us.

Q So the OCD didn't take a position as to whether or not the theory presented by Mr. Witcher was accurate, only that if there's exploration going on, it's done pursuant to a monitoring plan?

A Exactly. Our water quality monitoring will address any geo-chemical and water quality issues throughout that process.

Q Item number 2, can you explain what the notations next to number 2 indicate?

A Well, this was during Mr. Mike Hayter's presentation, and the segue into this one is that we were talking about the location of injection well 5107.

Los Lobos -- I think the point Los Lobos was trying to make for that is that wherever

they drill, for example, if they drill at 4507, that might be their preferred location to where they start out at.

They will first drill and analyze the information, and if they need to, they'll step out and they might drill in a different location. They might decide to turn an injection well into a production well.

Our administrative process allows for that. They have to get approval through the OCD to change any location. I think what Mr. Hayter was trying to indicate is that they need some flexibility when they go in and do this project. Just because they've changed the location or convert an injection well to a production well, there's an administrative process that we have to allow that.

AmeriCulture's position was, again, there's not enough information to do anything. There is a problem with the State permitting these wells without water chemistry and formation depth information. Again, that's what this water quality permit is about. This discharge permit is today what we're addressing water quality monitoring issues we feel that are pertinent.

In the drilling of all these wells, there's going to be a data collection process and a verification process that needs to be approved by us anyway.

Q Item number 3 of the Mike Hayter presentation indicated by number 3, can you explain those notations?

A I think the key issue, again, here, and you're kind of hearing it throughout the first two items, was the water quality monitoring. We have to make sure that that was correct. My recollection is Los Lobos handed out a monitoring and sampling plan dated December 2008.

I think we all realized from the December 1st hearing that that was one of our issues too. We were trying to work out the water quality monitoring issues and never quite got resolved adequately.

So when we came to this meeting, there was a report handed out by Mr. Hayter, et al., and AmeriCulture is concerned about the water quality monitoring, as what is the OCD or was. The OCD's position is that we handed out our own rendition, our own draft of a discharge permit with water quality monitoring because we felt that we needed

some monitor wells out there, but it wasn't, you know.

So what we agreed to do in this meeting was to look at Raser's sampling and monitoring plan, and look at our monitoring plan, and try to make a better water quality monitoring program, and that's what we've done here today in our discharge permit.

Q Now, there's some discussion about the Nalco chemicals, specifically, that were testified about at the previous hearing.

Were those specific chemicals discussed or considered at the January meeting, and later in your -- in the monitoring plan?

A Yes. The discharge permit draft that I brought to the table included a provision for requesting aquatic toxicity testing be done. Specifically, for the aqua-culture facility that's nearby their proposed project area.

Q So let's turn to Exhibit 2, which is the proposed draft permit that the Oil Conservation Division is presenting to the Examiner's review and consideration today.

On page 7 at part 20, "Additional site specific conditions - water quality monitoring

program," part A addresses that aquatic toxicity testing that you're referencing?

A It does. Based on the December -- based on the December 1st, 2008, testimony of Nalco where they presented their chemicals at the mid-range and high range, we're requiring an aquatic toxicity test at the high range of those chemicals.

The OCD plans to use that aquatic toxicity test, the results of that, as a tool to help us to further assess the threat to aqua-culture and to wildlife in that area.

Q Tell us a little bit about the additional requirements imposed by the groundwater and surface water sampling monitoring requirements in part B of item 20?

A I think what I'd like to do for the rest of the presentation is kind of take everybody back to Appendix 1. This is water quality monitoring program for the facility. We've broken it up into five different tables for water quality monitoring. A groundwater monitoring program that includes eight monitor wells, and three nested wells throughout the facility area in downgradient.

We have a Table 2 that includes geothermal injection wells and production

development wells. All the development wells and injection wells that are being proposed, we're planning to monitor those on an annual basis.

Table 3 includes the water supply wells, and these were proposed in the Los Lobos' sampling and monitoring plan. You can see that these include some of the Burgett wells, AmeriCulture number 1 Federal on an annual sampling schedule.

Table 4 includes all of the holding ponds, drainage ditches, pits and ponds monitoring program. Since these pits are lined, we're primarily looking at metals and general chemistry, and we're only monitoring whenever there's fluid in them.

In addition to that, you might note that under Table 1, the monitor wells are basically located downgradient from each pit for reserve evaporation pond from each well. So we'll be monitoring the water table just immediately downgradient to those.

The last Table 5 is the cooling tower effluent monitoring program. It's the cooling tower effluent. There's one location where all the spent water is mixed with the boiling. The cooling

tower blowdown will be injected into the injection wells. It will be at that manifold that we'll be monitoring for metals and general chemistry.

Just to add further, we're proposing monitoring ports at all the injection wells for the first six months of monthly monitoring. We'll be monitoring the cooling tower blowdown water going to those injection wells. We'll be monitoring for the full suite of chemicals, not just metals. In general chemistry, we'll be monitoring for all the suites.

Q So the monitoring of the blowdown water will be done prior to the injection, prior to --

A For six months we'll be monitoring the injection at the -- the injected fluids at the injection wells, and then we'll be monitoring at the cooling tower blowdown manifold area before it goes to those injection wells.

Q How was it determined what specific chemicals would be tested for?

A Well, again, we looked at the sampling and monitoring plan provided by Raser. I conferred with our Senior Hydrologist Mr. Glenn von Gonten on all the analytical suites that we were looking at monitoring for.

We came up -- for example, if you look at Table 1, you'll notice that we're including all the volatile organic hydrocarbons, the semi-volatiles, all of the polycyclic aromatic hydrocarbons, total petroleum hydrocarbons for any organics that are present.

We're looking at dissolved metals because we realize that this is a -- it appears to be a gigantic underground source of drinking water. Therefore, we looked at the dissolved fraction of any metals in the water for ingestion.

You'll notice that we do include the bromide for many of those Nalco Chemicals. Some of these metals are a little bit esoteric, but they were proposed by Raser, such as lithium, rubidium tungsten, but we've also incorporated that into this monitoring plan along with mercury, general chemistry, uranium, because that's required under our 2103 Water Quality Control Commission regulations.

Q Again, what is the significance of testing for bromides in this situation?

A Many of the Nalco chemicals are bromide based.

Q Is that the biocide element?

A Yes. In addition to that, we're using the aquatic toxicity test as a tool. We're going to get that information back, and our permit is written to where we can make changes to this permit based on inspection and/or other requirements. So it's very flexible.

We get new information, we find out if we should be monitoring for other things. We will implement that almost immediately into the permit as a modification.

I guess you wanted me to --

Q Why is the list that's in Table 4 different than the list that's included in the other sheets? What's significant about that?

A As I mentioned earlier, these are holding ponds, drainage ditches, pits that are associated with the drilling of the development wells and injection wells. Because any discharge that would occur there would be occurring into a lined system. We're only concerned about metal and general chemistry, and we'll be monitoring for that downgradient.

Q Same thing with Table 5, cooling tower effluent, that list is also different. What is the distinction with that list?

A Similar to Table 4, metals and general chemistry will be monitored at the cooling tower effluent. That's the effluent before it goes to the injection wells.

The purpose for that is that we're trying to -- Raser is attempting to establish a correlation with metals and general chemistry and a Tresar monitoring system that they monitor on a daily basis, and monitor specific conductance, monitors temperature, and they want to be able to use that Tresar system after a certain amount of monitoring that would prove their case for correlation.

So that's what we're kind of monitoring for at the cooling tower effluent. I guess that's another reason that during the six months of monitoring at the injection well ports, why we're monitoring for the full suite of everything because we want to make sure anything that's going into the groundwater is going to meet our criteria.

Q And then back on Table 1, if you can discuss for us where you have listed the approximate well locations. Can you talk a little bit about where the monitoring wells are located,

and what the significance of that is?

A Well, as we look across the site and we see where these wells are being drilled, they're going to have lined-pond systems, evaporation ponds, reserve pits, and we want to make sure that we put a shallow monitor well downgradient within 100 feet of each of those locations, and try to get some upgradient coverage, upgradient of the greenhouses.

By doing that, we're just going to monitor the impacts. If we see through annual monitoring that we have problems at some of those pit areas, we might go back on to the site at other drill locations where there's evaporation ponds that require other shallow monitoring wells. This will tell us whether we have remediation or corrective action obligations during the operation for the systems.

Q Back under Section 20, I just want to back up and go to the beginning, how the water quality monitoring program is initiated.

A I think what we've done here is in Section 20 we attempt to address Table 1 and Tables 3 through 5. Then under Section 21, we attempt to address the production and injection wells through

monitoring.

Q Okay. Now, under B2 and B1, it looks like within six months of system startup, the operator Raser will be required to start submitting background and compliance reports and some -- pretty much at the onset, they're starting to --

A Actually, at the end of the six-month monitoring period, within 30 days of the end of that, we're looking at receiving a report that would document compliance with our criteria.

However, if at any time throughout that monitoring process they're exceeding the background or the Water Quality Control Commission Standards or talks of pollutants are present, they're required to shut down until we can figure out what's going on. So there's a couple of mechanisms for controlling their operation when they start up.

Q Can you explain what the background water quality conditions on how that's determined?

A Well, we're looking at this area on a pretty large-scale basis. If you were to look at the well locations, all development wells, all injection wells, we've got monitoring of the groundwater there, upgradient of the greenhouse,

we've got monitoring.

We're just trying to get a snapshot over an extensively large area. At the project upgradient and downgradient, we're trying to assess all of those analytical suites you see in the tables. The VOCs, SVOCs, we're trying to see -- I mean, we may see upgradient, we may see things from agriculture.

It may show up that we have a pesticide showing up upgradient of the greenhouse. That may be background from agriculture activity in the area.

Q I wanted to direct your attention to the very last page of the footnotes. Would you review the footnote information and the significance of those?

A Well, we certainly try to spell out what the acronyms are in the tables. Footnote 1 just indicates that before any system is started, we're going to take those background water quality monitoring at all those locations that I previously mentioned to see just what we're looking at there.

Number 2 is a footnote that deals with semi-annual groundwater monitoring. Whenever we go to semi-annual, there might be concerns about when

we sample during the year due to irrigation periods.

It's important to note that footnote 2, you won't find it in our tables right now, but it's reserved there in the event we have an anomalous concentration showing up, we might kick a well or wells into semi-annual at that point. So 2 is there reserved.

3 is the one-time sampling event with static water levels. We want to see what the groundwater flow direction is like regionally and locally before pumping begins under somewhat static conditions realizing there are some wells off in the background that are pumping, but we're trying to look at natural conditions.

Q So, again, that's a baseline background level for later comparison?

A Yes. And what happens after they start pumping, you know, there could be some localized effects from that, and we'll see that -- we should see that from our monitoring.

"Thereafter, monthly sampling for the six months with dynamic water level recording is required. After six months of monthly monitoring, the sampling shall be conducted at least annually."

All I want to say there is remember, before we start up, we're testing groundwater. Once we start that system up, that's when we begin testing the cooling tower effluent, and we start testing the sampling ports at the injection wells of that cooling tower effluent before it gets injected into the groundwater.

So we want to see just what that mixture -- if it meets our standards. It's not the groundwater, it's the effluent from the cooling tower going to the injection wells for six months.

Number 4, "Sample quarterly while in use," those deal with those pits.

"If organics are evident, sampling with analytical methods similar to monitored wells shall be implemented during the sampling event."

I think that if we brought any ditches that are online and there's fluid in there, we're going to want them to sample that and make sure there's nothing going into the groundwater and to the surface water avenues.

Number 5, "Daily for 10 business days at system startup; thereafter weekly for two months."

This deals with Table 5, the cooling

tower effluent. We want them to sample that daily for 10 business days, analyze it for metals and general chemistry.

"Thereafter weekly for two months, and thereafter based on established correlation with the 3D Tresar Control Monitoring System."

Once they can prove to us that that Tresar System, through specific conductivity, is correlative with metals and general chemistry, they will be allowed to monitor the Tresar System and cut back on the analytical monitoring.

Q Mr. Chavez, you, along with other OCD staff, prepared this draft permit?

A Yes.

Q And are you comfortable that it addresses the water quality issues at this site with this project?

A I'm very happy to say, "yes." It's a much more comprehensive final discharge permit that I believe it addresses the interest of all parties here, including the OCD.

Q And I think you heard me when I was doing the introduction mention that we had discovered some clerical and/or clarification corrections that need to be made that we would be submitting a red-

line version by the end of business Thursday. Are you going to be assisting me in that regard?

A Absolutely. And I think the main one is that issue on the six-month monitoring at the injection wells. It will be the cooling tower blowdown before it gets injected into the groundwater that we'll be looking at in that six-month report.

Q Are you also of the understanding that those are only clerical and/or clarification-type corrections, that there's nothing substantive compared to what we are submitting today?

A Yes.

MS. ALTOMARE: At this time I would move OCD Exhibits 1 and 2 into the record.

MS. MUNDS-DRY: No objection.

MR. SEAWRIGHT: No objection.

HEARING EXAMINER: 1 and 2 are admitted; OCD 1 and 2.

MS. ALTOMARE: At the risk of boring everyone to death, since everybody has the actual exhibit in front of them, I'm not going to belabor it and have Mr. Chavez read the actual text into the record.

I'll go ahead and ask the witness,

but, certainly, if there are further questions about the content of the permit, he's happy to answers questions.

HEARING EXAMINER: Ms. Munds-Dry.

MS. MUNDS-DRY: I have one question for Mr. Chavez.

CROSS EXAMINATION BY MS. MUNDS-DRY

Q You noted on page 26 the footnotes, at the end of your exhibit there is a note, actually, at the bottom dealing with phase-separated hydrocarbons?

A That's correct. If there's any presence of floating hydrocarbons that show up during the sampling, these should be checked once per month or whenever they're monitoring and recorded on a spreadsheet.

The data must be presented in table form listing all of the impacted wells, date inspected, the thickness of any product showing up in the well measured to the nearest 0.01 of a foot, and the amount of any product or water that was recovered from the well. They might bail it just to get an idea.

If there a lot there, or if they bail it for five minutes, it may bail down and there's

no product showing up, maybe a minor type of thing.

Certainly, if phase-separated hydrocarbons are floating on the groundwater are observed in the monitored well, then appropriate steps must be taken to recover those phase-separated hydrocarbons using the best available technology.

Now, it's important to mention that some of those wells belong to AmeriCulture, and they're responsible for those wells. The reason for monitoring those wells, we just want to see what's there. I mean, if there's nothing there and things are fine, it's going to be great.

If we've got free product showing up in one of those wells, then is that Raser's responsibility? I think not. Not from the onset of our initial monitoring.

Q Do you know, Mr. Chavez, as I just don't remember in this permit this -- what I'll call "a completion" is discussed anywhere else in the permit? I just wonder if this wouldn't be placed better somewhere in the permit, rather than in the note here. It seems to be a condition. Do you agree with that?

A Well, I think I just included it there,

but I can look and see if I have it elsewhere. To my recollection, that's the only spot under the footnotes that we have it.

Q Okay. That was the end of my questions. I was just wondering about that.

A I think it's common knowledge, though, if you're getting free product showing up, somebody has to be contacted, and there's a process for dealing with it. We can look at putting it up in the text of Section 20, for example.

MS. MUNDS-DRY: That's all the questions I have.

HEARING EXAMINER: Thank you.

Mr. Seawright.

CROSS EXAMINATION BY MR. SEAWRIGHT

Q Mr. Chavez, given that our primary geothermal production well which we denominate as State Geothermal well, given that that is the primary production well, why was that not included in Table 3, and is OCD willing to amend Table 3 to include that well?

A So you're saying that the AmeriCulture number 1 Federal, that's not -- you want to include that and your other well, the deep well in there, in the monitoring?

Q It's the well that itself. Yes, it's intermediate. It's intermediate, yes. It's the primary State geothermal resource well.

A Well, we can certainly consider it. I know that during the January 27th meeting you did -- I don't think that issue was raised at that time that you actually wanted that well monitored.

However, Raser handed out that sampling and monitoring plan. We could consider adding that, but we have to take a look at where it's located and how it would -- how it would play into our monitoring. It's possible that we could include it.

Q Wasn't the monitoring plan handed out toward the end of that meeting?

A Perhaps. Yeah, we would consider that. What's the name of the -- the official name of the well?

Q AmeriCulture State 1.

A What we can do is kind of go back to look at those locations on a plan because we do need to get a plan that shows all of the monitoring points. We might find that that well may be better -- a better well to monitor than another well. We'll look at it.

Q Thank you. I notice that as far as the analytical suite, it includes bromide, but does not include -- bromide is still bound up in the form of a compound. Are you able or willing to include that since it's native form --

A I think we have to wait until we get the results of the aquatic toxicity test and do some monitoring and decide what else we need to look at.

I think at that point where we understand based on a snapshot, a background, and we get an aquatic toxicity test back, we learn more about those chemicals, and I think we'll have a better idea of what compounds, if any, that we might want to incorporate into the monitoring scheme.

Q Given that bromide, the anion, bromide is being proposed as being part of the analytical suite, and also given that bromide is tied up in the form of a Nalco compound, which would presumably not be picked up by bromide analytical method, which would subsequent break up into bromide in the resource, are you going to add the compound bromide for that reason since it could ultimately become bromide --

A Well, we know bromides are very mobile,

kind of like chlorides. They're good indicators for monitoring downgradient. We are monitoring things like pH in the general chemistry so if there's something going on anomalous, we're going to see it in pH, TDS and stuff like that.

It might make us more cognizant of what's going on there, and are we detecting a chemical of concern. I don't want to commit to anything upfront. We need to do some monitoring first, get our aquatic toxicity test back, and see what else we would monitor for.

I would just ask you, what would you propose we monitor for based on your study of the Nalco chemicals?

Q Well, provided there is an analytical method to detect, bromide is bound up in the form of a compound. We would propose that that analytical method be added to the suite.

A It may include the full compound analyzing the --

Q The full compound that is not resolved, but actually in the form of bio-compound.

A We would have to assess that. That's a good -- maybe a good point.

Q The question regarding the monitoring

wells, you mentioned during your testimony that you would -- that samples are required provided the monitoring well as fluid. One of the designs of a monitoring well, one of the monitoring wells is designed to have a 15-foot screen, with 5 foot of screen above the water table.

Given that drawdown beyond that range of the screens likely to occur very quickly once production commences, how do you propose to still sample water from those monitoring locations?

A Well, if there's no static water level present, we may not be able to sample it at that location, and we would have to make a determination at that time on what we're going to do about it.

It may just be a simple installation of a deeper well in the vicinity of that well to make sure that we get down into the monitoring, where the water is present to sample.

Q Accordingly, would the OCD be willing to include in the permit application or the draft permit, a provision to accommodate that possibility so that the intent of the monitoring plan is still achieved even though pre-designed monitoring wells may go dry?

A I think it's inherent in our monitoring

program that if wells go dry, we have to probably drill another one there so I don't see a need for that at all.

Q I have a series of questions pertaining to Title 20 of the New Mexico Administrative Code.

Your Honor, I'd like permission to give Mr. Chavez and other counsel a copy of this?

HEARING EXAMINER: You may approach the witness for that purpose. I would add that there may be objections if you ask the witness about questions of law, and we'll rule on those when they arrive.

MS. ALTOMARE: I was actually going to insert a standing objection to these that it's going to ask for a legal conclusion or analysis.

HEARING EXAMINER: I think the objection will have to go to specific questions.

You may approach the witness, and counsel will provide copies as you indicated. Hopefully, you have a copy for me, also, as my regulations are out in my car, and I didn't bring them in.

Thank you, sir.

Q (BY MR. SEAWRIGHT) Mr. Chavez, given that Title 20 categorizes applications into new,

modified, or renewable applications, what do you consider this application to be?

A A new application.

Q This is a new. I would like to draw your attention to Section 3108, subsection B, which sets out the notice and requirements.

HEARING EXAMINER: What section is this?

MR. SEAWRIGHT: 3108, subsection B, page 16.

Q Was the notice recently run in the local newspaper and satisfied notification requirements set forth in Section 3108, subsection B?

MS. ALTOMARE: I'm sorry. The notice for what?

Q (BY MR. SEAWRIGHT) Was the recent notice published in our local paper done to satisfy --

A For this public hearing?

Q Yes.

A No, I don't think it dealt with 3108. I think it -- it deals with 3108, a separate provision, and I think it's 3108, it's either "K" or "L."

MS. ALTOMARE: Mr. Examiner, I'm going to object. He's asking for testimony about the

process, the administrative process under an interpretation of these regulations. He's asking that of a technical expert witness.

MR. SEAWRIGHT: Your Honor, I believe that this application is not properly noticed according to Section 3108, and my question is intended to reveal that.

MS. ALTOMARE: This witness wasn't responsible for issuing notice.

HEARING EXAMINER: You're certainly -- you're referring as to the facts, and not notification so I'm going to overrule the objection. I believe the witness has given an answer to the question anyway.

Q (BY MR. SEAWRIGHT) Are you aware, Mr. Chavez, that --

A 3108L, I believe, is the public notice process for this hearing. I believe it was complied with. We issued public notice before 30 days in a newspaper, a widespread newspaper, Albuquerque Journal, the local Hidalgo paper, on our website for this hearing under provision L.

Q So your understanding is that under B, which outlines various noticing requirements, that that is not --

A That's for the initial application that was submitted. We followed all of those to the best of my knowledge. We followed, at that time, for the initial administrative completeness for the draft permit that was issued and public notice at that time. We're not dealing with that under this hearing process, to my knowledge. We're dealing with subsection L, 30-day public notice.

Q Given our concern, let me understand this particular line of questioning, given that we believe that subsection B set forth the public notification requirements for this application, are you aware that no two foot by three-foot placard, which was required in section B, was ever posted for the new lot on the revised location --

A That's not my understanding at all. I believe I received some photos showing the locations where those signs were placed, and in compliance with 3108B provisions.

Q Are you aware that no signs were placed -- ever placed at the location of current --

A I can only tell you I recall receiving the photos from Raser or Los Lobos verifying that those signs were placed, and where they were placed.

Q Are you aware that the current locations

have never been posted in that manner?

A The current locations of the wells -

Q The current locations --

A -- were posted in the original public notice.

Q Yes.

A And we posted those in the original public notice from the original application. What we've come up since then is the fact that just because a well location changes, doesn't mean they're out of our regulations.

We have an administrative process for approving any location that they drill out, approving any well that they're going to drill before they drill it.

Relocation of wells, again, we touched on it earlier, we have an administrative process for that. So to the best of our knowledge, we published the locations that were provided to us by Los Lobos.

As part of that process, we realized that there may be some changes to those locations. So what I've tried to do in this public notice is to clarify there's an administrative process for that, to allow that.

Q Mr. Chavez, isn't it true that the flexibility that's built into the system, in order to change the locations of these various wells, comes into play after a permit has been approved?

A Absolutely. It's an ongoing process. Is there drilling and they decide when they drill their first well, they want to drill the next well, 40-1307 in a new location, they'll have to put forth a G103 sundry notice with a G101, G102 with the survey of the new location, and all the information that's required under our regulations, and must be approved by the OCD.

Q My last question on this subject is, so you're saying that the ability to change the location of the wells is admissible prior to the issuing of a permit, although the locations has not yet been posted according to the guidelines set forth in the --

A Well, what I'm telling you is, what we posted on the website and in the papers that we were required to indicate the locations of those wells at the time we posted it.

Q I understand.

A And what I'm telling you is that subsequent to that, there were issues raised with

relocations and flexibility of relocating some of those wells based on the nature of the geothermal exploration process.

I guess I'm just indicating that public notice was proposed for those well locations, and we do have a regulatory process for approving deviations to those locations so I don't understand the point you're trying to make.

HEARING EXAMINER: Okay. You need to move on.

MR. SEAWRIGHT: I'll move on.

HEARING EXAMINER: Go ahead.

Q (BY MR. SEAWRIGHT) Do you regard this application to be administratively complete?

A I do.

Q And when was that determination?

A I believe May 28th when we posted on the internet. In addition to deeming the application administratively complete, there's a process of receiving additional documents to shore up any technical issues and any other items needed moving forward in the permit process.

Q So, for the record, you do not believe that a re-determination of notice of administrative completeness should be required, although the well

locations were changed prior to the --

MS. ALTOMARE: Mr. Examiner, I'm going to object. This is beyond the scope of direct.

HEARING EXAMINER: I'll sustain that objection. Also, it's a question of what the witness believes is required is really not relevant. The question is what is required.

Q (BY MR. SEAWRIGHT) Mr. Chavez, the draft permit authorizes the operation of five production wells, production or developing wells. I just want to verify that this does not mean that by the issuance of this permit, that they are authorized to produce up to 12,000 gpm of hot water?

A Verify what, now? That they're not authorized?

Q Yes. If I may read you just the first sentence in the cover letter for the permit.

Pursuant to WQCC regulations, 20.6.2.3104 through 3114, and I'm going to skip over the parenthetical comments:

"The Oil Conservation Division hereby approves the discharge permit for three class V geothermal injection wells, and authorizes the operation of five production or development wells."

My question is: Does this mean that by

the issuance of this permit, that the -- Raser is permitted to produce from these wells, or is that a subsequent process?

A That's a subsequent process with various geothermal forms that are required to request permission of the department. Once they prove the resource is there, they log the geology, et cetera, and done the adequate testing to show that that high temperature geothermal reservoir in fact exist.

Q Thank you. I'd like to now draw your attention to the draft OCD permit. I'd like to refer you to section 13 on page 6 which reads:

"The owner/operator shall close all Class V wells that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic sanitary effluent wastes, unless it can be demonstrated that groundwater will not be impacted in the reasonably foreseeable future."

Mr. Chavez, based on this provision, isn't it a fact that the burden of proof of demonstrating that groundwater will not be impacted in the reasonably foreseeable future rests on Raser?

MS. ALTOMARE: I'm going to object.

He's asking for a legal conclusion.

HEARING EXAMINER: Yes. I think that question of burden of proof is a legal conclusion. Of course, Mr. Chavez drafted the permit so he would be entitled to construe what the permit says. So I'll overrule the objection.

THE WITNESS: Your question again?

Q (BY MR. SEAWRIGHT) Based on this provision, isn't it a fact that the burden of proof of demonstrating that groundwater will not be impacted in the reasonably foreseeable future rests on Raser?

A Yes.

Q Furthermore, based on this provision, isn't it true that if Raser fails to demonstrate that groundwater will not be impacted at the injection wells, would be closed?

A Not necessarily. You know, there's different types of treatment mechanisms. They could go for national pollutant discharge elimination system permit where they discharged the waters of the State, but they have to do treatment before they can discharge.

Likewise, they might have a different type of treatment system where they could treat the

water inline, and treat it to acceptable standards before they inject it into the injection wells. There's a modification process, then there's a termination process.

It's up to Raser to decide whether they want to terminate, or whether they want to treat and go for a minor modification to the permit to address that.

Q I'd like to next draw your attention to provision number 18 which reads regarding unauthorized discharges:

"The owner/operator shall not allow or cause water pollution, discharge, or release of any water contaminant that exceeds the WQCC standards listed in the section 20.6.2.3103."

What would happen if the groundwater quality standards as set forth in that section 3108, if you could just walk us through that process?

A Well, they're to notify us after they have had exceedances within a certain, I think, 72 hours. In some instances, 24 hours. But for the groundwater monitoring program, within 72 hours after having knowledge of an exceedance, they're to notify us of the problem so that we can determine

the magnitude of it, and what needs to be done in the way of abatement.

Not necessarily any exceedance is going to require abatement where you go out there and you start treating. But we certainly need to be notified so that we can assess what we need to do based on the toxicity of the pollutant, et cetera.

Yes, it may cause a shutdown in the system.

Q Isn't it a fact that the groundwater quality standard for fluoride is 1.6 milligrams per liter? That's found is section 3108 in title 20. 3103, rather.

HEARING EXAMINER: Groundwater quality standards for what?

MR. SEAWRIGHT: For fluoride. 3103, page 4.

HEARING EXAMINER: You're speaking "fluoride," not "chloride"?

MR. SEAWRIGHT: Fluoride.

HEARING EXAMINER: Thank you.

THE WITNESS: I'm just toggling over to 3103 just to clarify it. 1.6 milligram per liter.

Q (BY MR. SEAWRIGHT) Yes. Isn't it a fact

the groundwater quality standard with total dissolved solids is 1,000 milligrams per liter? This is found on page 13.

A That's correct.

Q Are you aware that AmeriCulture uses a well having both domestic and aqua-culture use permits that is a fluoride level of approximately 5.6 milligrams per liter as was mentioned in --

A I was not aware of that, but if it, in fact, is that, then that would be a background water quality issue, possibly.

Q I understand. The level today may be less than that since that level was taken several years ago.

Are you aware that that same well was previously measured and the solids level of approximately 1,000 milligrams per liter?

A I was not aware of that.

Q So the fluoride level of that well is in excess of the human health standard for fluoride, isn't it true that the baseline tends to be the allowable limit for further -- and further increases are prohibited?

A Not necessarily. We look at all background, all wells that are monitored for

fluoride in the area as part of assessing whether one anomaly at one location, you know. It's just not one well that exceeds, and, therefore, the new background limit is this. It may be an average of several wells to establish a background fluoride level over a regionally widespread area.

But it would certainly bring our attention to the fact that, you know, we have a level that exceeds our limit here, and it may be a background limit.

Q Doesn't the Title 20 state that if an existing background level exceeds the standard, the human health standard, that that now becomes the new standard and no further increase is permitted?

A Say that again?

Q Doesn't Title 20 specify that in the event the background level of a contaminant is higher than the maximum allowable level, no further increases are allowed?

A It would certainly depend on the toxicity of the compound or the element that we're talking about. If it's more -- if it's a chloride, more of an aesthetic water quality value, you know, it may have different connotations than trichloroethylene, for example, being a background. That probably

wouldn't be allowed. Any toxic chemical under the definition of WWW is not allowable.

All I would respond is that if it has anything to do with human toxicity, carcinogenic, then there might be concerns with that point. Otherwise, background would be established through multiple wells, and/or the use of localized.

Q Are you aware the fluoride content in the water that Raser referenced in its public notice contains nearly 10 million grams per liter of fluoride?

A I perused that list briefly during the -- looking over the application. I didn't pay a whole lot of attention to that yet because we have a provision for establishing background, and that's kind of where I'm more interested here. What is background? What are the fluoride limits at each location? So, I guess, no.

Q Are you aware that if that water were to mix with the water that you referenced from our Federal well, the 5.6 milligrams per liter, and the resulting level of fluoride drawn from that water to increase both basins, that would constitute a violation of WQCC --

A It possibly could once we establish

background and it exceeds that, then that's going to be a problem, possibly.

Q I'd like to refer, again, to the proposed permit. This is in provision 20, section B, subsection Roman numeral VIII, which reads:

"The owner/operator shall notify the Santa Fe OCD office within 72 hours of its determination that the concentration of the monitor well sample exceeds the greater of the standards specified in section 3103 or background."

A "Or if any toxic pollutant is present."

Q Am I correct that in my reading, that in the event that WQCC standards are exceeded, that OCD is merely to be notified, or are there consequences specified in this permit?

A I believe there are consequences for corrective action, you know, in the event of an exceedance. Again, once we're notified, that's what our determination is to be, whether there needs to be some type of abatement of groundwater under 20.6.2 NMAC.

Q I was unable to find those consequences. Would you direct us to those, please?

A Well, one section that I know kind of addresses that is section 3, the permit terms and

conditions. Pursuant to WQCC regulations, 3104:

"When a permit has been issued, the owner/operator must insure that all discharges will be consistent with the terms and conditions of the permit, abide by the rules and regulations."

Section 15 deals with spill reporting.

"Owner/operator shall report all unauthorized spills, leaks or releases, and shall conduct corrective actions pursuant to WQCC regulations, 20.6.2.1203."

Q What section are you reading from?

A Section 15, the spill reporting section. So therein is the key mention or reference to the corrective action that may possibly occur in the event of a -- what we consider a release.

Q In reference to both the paragraphs that you just referred us to, would you please read for us the specific language that would set forth the consequences beyond the simply not --

A "Spill reporting: Owner/operator shall" --

Q Where are you?

MS. ALTOMARE: Mr. Examiner, I'm going to object. I think he's asking for a legal conclusion. I think what he's actually referencing is Regulation 3109, subpart E. It's getting into

how this permit is interpreted, and relates to the regulations. One is actually a violation, actually. Once a violation occurs on the permit.

MR. SEAWRIGHT: Your Honor, there's conspicuous absence of any consequences other than simply notifying the OCD. If it's a toxic substance, there has been specifications that are set forth that it's to be shut in. I do not see any formal consequence other than notification requirement if WQCC regulations are violated.

HEARING EXAMINER: The witness prepared the exhibit, so he can testify to its contents. I'll overrule the objection.

THE WITNESS: I think it's inherent in our reporting and notification process that once we get that notification, we assess the urgency of the situation, and we implement either abatement, or corrective action under our regulations. It's inherent in the process.

We can certainly add language that would add what you're saying that "shall abate and/or," you know, stuff like that. We could do that.

Q Would you add language accordingly?

A Yes, we could consider adding that to

section 15 that deals specifically with the report.

Q The stipulation that I referenced in provision 20, this relates to the water supply wells, does it not, as well as the monitoring well?

A Section 20 deals with all of the wells with the exception of Table 2, the development wells and production wells that are listed under Table 2, and dealt with under Section 21. So it includes ditches and things like that, holding ponds.

Q In the event an abatement effort is required, who would finance that?

A That would be the responsibility of the owner/operator if, in fact, it's from their -- they are the source. I gave an instance where they might take a sample from AmeriCulture and they might find an anomalous hit there. They might have to report, "Hey, you've got free product in this well," and it may not be their responsibility. It may be us coming to you on that or some other well owner.

Q Provided an abatement effort as a result -- on the Raser production results, are you willing to include a provision in the permit that assures that the financial resources necessary to carry out

that abatement are imposed?

A I think that's inherent in the regulations. I'm not a lawyer, so that's out of my purview.

Q I'd like to refer you to Provision G.

A G of -- Provision G of what section?

Q It's -- I'm referring to the draft permit.

HEARING EXAMINER: Section 21?

MR. SEAWRIGHT: I apologize. Yes, that's correct.

HEARING EXAMINER: Page 13?

MR. SEAWRIGHT: Yes.

A This reads: "The owner/operator shall ensure that the operating surface injection and/or test pressure for each injection well measured at the wellhead shall be at a flow rate and pressure that will not adversely affect public health, the environment, and the correlative rights of any future geothermal operators in the high temperature geothermal reservoir."

Will the OCD consider the inclusion of the language in quotes, "or others having correlative rights," after the statement of correlative rights on line 4?

A After the statement "correlative rights"

on the fourth --

Q It's states: "Environment and the correlative rights of any future geothermal operators."

Will you consider after the end of the word "high temperature," to include "or others having correlative rights," given that AmeriCulture has a current State geothermal lease with the State of New Mexico?

A I think that's something that I would have to defer to legal counsel on.

Q Will AmeriCulture have access to the monitoring data?

A Absolutely. It will be on OCD online, all monitoring reports, all forms that are submitted. Everything associated with the project will be under GTHT 1, under OCD online where all the information is now.

Q I notice that the sampling frequency set forth in the monitoring plan, at least for water supply wells, is annual. Given that potentially agree that environmental consequences of an environmental contamination, the potential for abatement, will OCD consider more frequency for reporting for certain compounds, not for just the

suite, perhaps --

A I guess right now the answer is "no." Depending on what we see throughout this monitoring process, we may add, depending on what we think is going on there.

Right now, Raser is basically indicating based on their process that we're not going to exceed any of the water quality standards. The onus is on them to show us that, and they're certainly going to have to prove that. Once they prove that to us, then we're going to go to annual monitoring, and that's the need for quarterly, semi-annual.

Water only travels so fast, so annual is going to be more than adequate for that area, right now, based on our sampling protocol.

Q In the event -- if, as a result of AmeriCulture conducting analysis on its own water, supply well water, how would OCD respond if we were to provide you with the analytical data that showed that WQCC regulations were being exceeded within that interim time period?

A In one of your wells that's listed on our monitoring program?

Q That was a sample independently.

A You're welcome to sample that as frequently as you want. We would look at your data, and look over the quality assurance, quality control of your laboratory to make sure that it's being analyzed in accordance with EPA standards of protocol that are acceptable.

Q If those standards were to the satisfaction of OCD, would OCD be willing to include in the language of the permit a provision that would trigger a full analytical suite outside the normal time frequencies?

A I would say, no, right now. We'd have to assess the situation on a case-by-case basis. Right now we think we have an adequate monitoring program in place.

Q If I could refer you to provision O of the same section.

A Provision O of --

Q Page 15. It's on page 15, 21-O.

A Okay.

Q This provision basically spells out a bond for plugging and abandonment and financial assurances for shutting down the plant.

A For shutting down the what?

Q Shutting down the power plant. It says in

the last paragraph, and I read:

"If warranted, OCD may require additional financial assurance for closure of the power plant or facility."

Why, under a section denominated as "Financial Assurance," is there no specifications for Raser to cover financial costs of any abatement efforts?

A Well, the only other section that I think is applicable to this subsection O is 23, at the closure. Where with the last sentence of section 23 under "closure" we reiterate again:

"OCD may require additional financial assurance if surface water and groundwater is impacted pursuant to WQCC paragraph 11 of 3107."

Q Where is this?

A This is under Section 23 of closure, the last sentence.

HEARING EXAMINER: On page 17.

THE WITNESS: Page 17.

HEARING EXAMINER: Thank you.

THE WITNESS: Now, say your concern again, Mr. Seawright? We've got it kind of listed in a couple of places where we might -- we might require additional financial assurance if we see

that this facility, under operation, there's problems occurring that their best management practices aren't being followed, they're having releases, we're getting notifications and we see that, "Gee, this operator, we're concerned because they've had several discharges of salt water into the ditch."

So we may include an additional provision for additional financial assurance for closure making sure that everything is cleaned up. So that's what we're getting to there, I believe.

Q (BY MR. SEAWRIGHT) What provision in here prevents a decision simply being made in a boardroom that the cost of the abatement is too great, and that the client just simply closed and walked away from, and the potential contamination remains unresolved?

A Well, I think that's what this financial assurance is. We could opt to have a surface facility management bond issued on the entire facility. It just depends on how this project operates, I think.

A lot has to do with that on our decision to move forward with additional financial assurance request per closure of all aspects of the

facility so the State doesn't get stuck holding any bags.

Q I understand. Thank you. My questioning now turns to the aquatic testing set forth in Section 20.

HEARING EXAMINER: 20A?

MR. SEAWRIGHT: Yes, 20A.

Q You have a copy of the Title 20 that I provided?

A Yes.

Q We can look as well, and if you can turn to page 3 -- I'm sorry -- page 6 of Title 20.

HEARING EXAMINER: You're talking about the regulations here?

MR. SEAWRIGHT: Yes.

Q I'd like to refer you to Title 20 under the definition section on page 6, and I refer you to the definition triple A, "water contaminant" which reads:

"Water contaminant means any substance that could alter if discharged or spilled the physical, chemical, biological or radiological qualities of water."

Mr. Chavez, isn't it a fact that water contaminants includes substances that if

discharged, could alter the biological quality of the water based on this definition?

A Yes, I think that's fair to say.

Q Given that the definition of contaminants includes substances that affects the much broader biological properties of water, such as spectron (phonetically) physiology, general health, growth and reproduction, does the OCD intend to consider these parameters when contemplating approval of the permit application?

A I believe we have. We're requiring the aquatic toxicity test, and we're requiring the monitoring that we're requiring. And then we're going to monitor and see. You'll note, we also include that WWW definition provision, toxic pollutants, any detection of those.

Q Just walk me through the process here. Suppose that a chemical contamination of our water, as a result of Raser's activity occurs, and our fish stop breeding. What would happen in that case?

A I think we would have to certainly test your wells. We'd have to come to terms with our experts and our staff at our agency who may include not only the OCD, maybe include the New Mexico

Environment Departments assistance.

Any type of assessment that it could be related to the chemicals that may be added. If that -- if it's the chemicals by Nalco and/or some other operational issue at the facility.

Q Are you aware that in such a theoretical instance, that we would be out of business because our fish would not breed?

A That's the reason why we're going to the -- not the only reason through the steps of this permit, but that's one of the reasons we're requiring the aquatic toxicity testing and the monitoring that we are comprehensively across the site.

Q Are you aware that our primary concern, although we commend the OCD on the inclusion of aquatic toxicity testing, that other sub-lethal issues are a concern to AmeriCulture?

For instance, have you ever heard of skeletal fluorosis? It's a debilitating phenomenon found in Tilapia grown in waters containing fluoride levels as low as 9 milligrams per liter, the approximate fluoride level in the water referenced in the public notice?

A I'm not, but that's one of the parameters

that we may need to be concerned about depending on what we see from the aquatic toxicity testing and monitoring. Remember, it's not just specific chemicals that we're monitoring for.

As I indicated earlier, we're looking at general chemistry, any changes to pH that's emanating downgradient from the facility, we're going to be detecting.

We're going to have an early detection system, and if we feel that, again, based on monitoring the aquatic toxicity data, further evaluation of our monitoring program that we need to add certain chemicals to indicate that, "Gee, this is a biological -- having a biological migration, it's going to -- that could be responsible for your fish."

Q You're referring to sub-lethal affects here, then, because aquatic toxicity --

A I'm not going to go into all the sub-lethal, lethal, Food & Drug Administration. Nothing. What we have is what we have in our monitoring program, and we'll assess the situation at the time of monitoring.

Q Are you aware that aquatic toxicity testing deals only with killing fish, not other

things?

A Well, I do recall that Nalco had some other aquatic toxicity testing of other specimens, and they felt that was good enough, the fathead minnow, and stuff like that and other species.

In order to address your concerns, mainly the concerns of AmeriCulture, we've included the stipulation of an aquatic toxicity test, and that's where it's at now.

Q So you're saying --

A Sub-lethal, all of the things you're kind of mentioning there, I mean, it's kind of meaningless right now to me. I mean, until we start getting the data back and start researching the data and looking at our monitoring and seeing what we're dealing with here.

Q Are you aware that the results of the aquatic toxicity test will have no impact on whether or not in sub-lethal consideration our fish are considered safe and wholesome by the Food & Drug Administration?

A Well, we are monitoring our wells looking for general chemistry. We're looking for metals, anything that could potentially be deleterious to fish.

Q Walk me through this process if you would. Suppose that as a result of chemicals that are injected by Raser, the safety and wholesomeness of our fish are brought into question and are regarded as unsalable to the FDA. What would happen in that case?

And, is the OCD willing to, without referring to aquatic toxicity testing which has nothing to do with safety and wholesomeness, it has to deal with mortality, would the OCD be willing to consider a provision to protect the business that relies on the purity of this water in its current state?

A Our job is to protect surface and groundwater there, and that's what our program is intending to do. In the event the fish are killed at your place, I mean, there would have to be an investigation.

There could be numerous explanations for it. Maybe a worker who was daydreaming may have added too much chemical. Maybe somebody had ulterior motives.

We certainly look at all the environmental aspects of the facility based on our process, knowledge of the chemicals used there, all

the monitoring that we're doing, and try to assess that as part of the investigation.

I don't know what you're trying to -- what are you trying to get us to do? I mean, you have a fish kill. Do you want us to take ownership of that?

HEARING EXAMINER: Excuse me. The witness can't ask questions.

THE WITNESS: Oh, okay.

MS. ALTOMARE: I'm going to object at this point as going beyond the scope of the hearing. The goal is to address water quality issues within the confines of the Water Quality Control Commission regulations. I think we're straying beyond that.

HEARING EXAMINER: Well, I think I will sustain the objection for this reason: The only witness, to my understanding has been designated, is that the protestant is a geologist, and no one with toxicological expertise or expertise in Food & Drug Administration requirements has been designated.

If there are water pollutant concerns that need to be addressed by the OCD other than those that have been identified or have been

identified by the Water Quality Control Commission to promulgate standards, or those that are apparent from water usage in the vicinity, it seems to me that this specialized information would be the knowledge of the protestant.

It would be protestant's burden of bringing those to the hearing process. I'll sustain the objection.

Q (BY MR. SEAWRIGHT) Does the analytical suite which specifies pH include turbine oil that's commonly used?

A If it floats on groundwater. I mean, it would show up in a floating product, I presume. If it's missable and it mixes with groundwater, then I think we detect it in other ways through general chemistry monitoring pH, so forth; specific conductivity, TDS.

MR. SEAWRIGHT: I'm done with my questions. Thank you, Mr. Chavez.

HEARING EXAMINER: Redirect? Well, no. I guess I should -- I think I'm going to not ask any questions of this witness at this time because I have not had the opportunity to study this permit, although I've heard what's been said about it today. I really not fully grounded with its

requirements.

MS. ALTOMARE: I'd like to just clarify one point that I think might make things a little bit easier.

REDIRECT EXAMINATION BY MS. ALTOMARE

Q I'd like to draw your attention, Mr. Chavez, to section number 5, which is on the very first page of the actual permit modifications?

A Yes.

Q This section actually sets out the -- my understanding is that this section sets out for the entire permit, basically, what happens when a modification or a change needs to be made for any reason for the permit; is that right?

A That's one section that allows it. I know that we have a provision for inspections. We can do an inspection, and based on that inspection, we can immediately implement a new monitoring requirement. There's a lot of flexibility built into this permit to address day-by-day items.

Q Right. But specifically in this section, this section allows the Division Director -- it says:

"The Division Director may require a permit modification if any water quality standards

specified is being or will be exceeded or a toxic pollutant as defined by the regulations is present in groundwater."

In other words, if a violation of a permit is discovered, if something is recorded pursuant to this permit to the OCD as exceeding a standard that has been set by this permit, this would be the provision that we look at, one of the provisions that we look at, as to how to go forward with the modification of the permit?

A That's correct. Especially if it involves treatments and/or monitoring new elements or compounds. It may be a minor modification process to the permit.

Q So Mr. Seawright's question as to how -- what do we do once we get the information regarding reports from the operator as to an exceedance of a particular level of a monitoring well, for instance, this would be one of the sections that we would look at as to how to modify the permit?

A After we're notified under Section 15, that may be a consideration for us.

Q And in this particular section references several different regulations under the WQCC regs that set out the processes for modifications of the

permit?

A Absolutely. A good example, again, is if Raser can't meet those injection criteria standards, they might need to go to treatment, and the modification would allow that to occur while they're shut in conversing it.

Likewise, there's a provision for termination if Raser so chooses to terminate the permit at that point. So it's either modification or termination of the permit if we can't meet those water quality standards.

Q I just wanted to clarify with regard to how modifications take place if something comes back anomalous.

A There's an official process for it.

MS. ALTOMARE: That's all I have.

HEARING EXAMINER: Anything further, Ms. Munds-Dry?

MS. MUNDS-DRY: Nothing further.

MR. SEAWRIGHT: Can I ask, who are you going to contract with to do the aquatic toxicity testing?

THE WITNESS: It's not us, it's who is Raser going to contract.

HEARING EXAMINER: Okay. Is there any

member of the public who wants to make a comment?

MS. PETERSON: I would like to, sir.

HEARING EXAMINER: Please do.

MS. PETERSON: I'm Louise Peterson.

Mr. Seawright, I want to commend you if the water quality is wrong, I'm glad you brought these things forward.

If these meetings are to put a hurdle down so that we stop economic development in our area, then I'm very sad. Because two years ago the County backed you 100 percent in a project that you wished to do, and I would wish that you would pass this down to Raser, and let's try to get together and go forward.

Also, I would like Your Honor to know that the water in the area of this place, the people that have lived there forever, my father used to own part of that farm area. The water is not very palatable for drinking, and the fluoride is very high. The ranchers that live in that area all have brown teeth.

So I want you to know that this is not something that is a new thing, the fluoride content, and I thank you very much.

HEARING EXAMINER: Thank you.

MR. SEAWRIGHT: Under Commission rules, am I allowed to comment at this time?

HEARING EXAMINER: Since the witness was not giving sworn testimony but merely making comments, cross-examination is not permitted.

Any further public comments? Very good. Let us take a lunch recess until 12:45 then we'll proceed with the protestant's case.

MS. ALTOMARE: Is Mr. Chavez excused, or do you expect to have more questions for him?

HEARING EXAMINER: Pardon me?

MS. ALTOMARE: Is Mr. Chavez excused, or do you expect to have more questions of him?

HEARING EXAMINER: He will be excused at this time unless he is recalled by another party. He will be allowed to step down. He will not be excused.

MS. ALTOMARE: Thank you.

(Lunch recess.)

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HEARING EXAMINER: I believe everyone we need is here. Okay.

Ms. Altomare, is your presentation concluded?

MS. ALTOMARE: Yes.

HEARING EXAMINER: Okay. Mr. Seawright.

MR. SEAWRIGHT: I call Jim Witcher as a witness.

JAMES WITCHER,

(Having been first duly sworn, testified as follows:)

DIRECT EXAMINATION BY MR. SEAWRIGHT

HEARING EXAMINER: You may proceed.

THE WITNESS: Thank you. What I'd like to do is make a brief presentation that covers some of the stuff that has taken place at prior hearings and give you a few other comments that I have.

What I'd like to do is start off at this point to the geoscience deficiencies in this application. First of all, there's been no reservoir identified, so we don't know where this water is going to be injected.

We don't know the permeability of hydraulic properties of that water, where it's going to be injected, nor do we know anything about the chemistry of actual water that's going to be produced, and actual chemistry of water that's going to be injected.

Another thing that's key to this is just a very basic cross section of what the geology in the subsurface looks like. When you start looking at permeability issues and hydraulic conductivity, you need to know something about that to plan a monitor well.

If you don't know where the site your monitor well with respect to your injection wells and your production wells, then you can't account for either the drawdown or the rise of water levels that may take place.

For instance, today we heard that the monitor wells were gong to be sited where they have 10 feet below in the water table and 5 feet above. If these are sited in the wrong places, those monitor wells will disappear from view of your monitoring of that water table within hours after turning on those production wells, certainly, within 48 hours or a week. So you've lost the

ability to deal with that because there is no information here to develop a monitoring plan or an injection plan with the current application.

What I'd like to do is go through a summary here. One of the things that was brought up earlier is some of the results of the meeting that took place in Santa Fe. It's not the total picture. I didn't talk about just a particular structure for AmeriCulture. We didn't talk about a particular reservoir issue there. We have talked about several issues.

One that goes back that we do not know where this water is going to come from. It's been stated several times that production is going to be done out of the Horquilla limestone that is currently being produced by AmeriCulture and Burgett. Isotopically it's incompatible. Chemically it's incompatible. It has to flow through a rhyolite, and a rhyolite only.

So there's no understanding here of the sub-surface geology. So how can a disposable plan be put in place? How can a monitor plan be put in place when you don't even have a basic framework to work around?

Another thing that's happened is

several times it's come up that we don't know what we're talking about here in New Mexico because there's experts from out of state like GeothermEx. Well, none of these people have shown up on site to give testimony. They have written reports, but none of these reports have been put into play where we can evaluate and comment on them.

Current state of knowledge. The natural heat loss on this system is less than 10 Mwt. So when you're talking about a 20 MW power plant, that immediately brings that into real question. The up flow zone for this system is very small. It probably covers an area a little larger than a few acres in cross-sectional area from the surface.

We have talked about fluid chemistry. That big northwest fracture created some ground preparation. That's a young fault out there that reopened these fractures, and this is where your current geothermal system is.

Problems. One of the problems with this is that 12,000 gpm. I have yet to see a study that shows that this is anywhere close to being sustainable of 12,000 gpm over a small an area. When you're producing and injecting in the same

place, you're going to have thermal breakthrough. You're also going to have interference with a lot of other wells.

So what that results in is a degradation of water quality, chemical quality, and, also, temperature. I view temperature as a water quality issue when you are talking about a geothermal system and --

MS. ALTOMARE: I'm going to object at this point. Temperature is not considered to be a water quality issue. The things that are listed on here are not issues within the scope of this hearing or within the scope of the discharge permit process. They are things that should be considered for later processes.

There are administrative processes in place for consideration of geothermal rights, water rights. The issues that are being addressed here on this screen and by Mr. Witcher to the extent that his testimony deals with geothermal rights and geological issues, I would object to that.

HEARING EXAMINER: I acknowledge that the Geothermal Resources Act issues and anymore water rights issues are not before us in this proceeding, but subject to that, I'll overrule the

objection and allow the witness to testify as he sees fit.

MS. MUNDS-DRY: We'll let Mr. Witcher have some latitude in presenting here, but I, also, object to responding to things that took place at the last hearing. They have already had their opportunity to discuss these issues.

Now we seem to be re-treading back into those issues that we dealt with in that hearing, rather than focusing on the subject of this draft permit.

MR. SEAWRIGHT: Mr. Examiner, there's been a steady flow of references to the prior hearing.

MS. MUNDS-DRY: I want to make sure we are focused on this draft permit here which is the subject of this hearing.

HEARING EXAMINER: Overruled.

You may continue.

THE WITNESS: I think to continue with some thoughts that you had with the objections is this: How can a disposal plant be permitted when there is not a geologic framework identified to do this?

One of the ways that you can look at

this, also, is if you do not have a sub-surface knowledge of where your casing points are going to be, how do you design a well or monitor well or injection well to safely inject that fluid or produce that fluid?

You have to have solid fluid to place those casings points and nowhere to cement. This kind of knowledge is currently not known. The only way you get that is by drilling test holes. Then the process would be to go to a disposal permit.

I have some comments on draft permits. I think once that's identified up above, the earlier version that I saw was they were going to require your intermediate casing to be cemented back to the surface. That's not a necessary thing in a geothermal well, and that's not something that you really want to do.

For instance, if your surface casing is a 13-3/8ths casing and you run an intermediate casing strings of 9-5/8ths all the way back to the surface and cement back to the surface, you're not going to be able to put in a high production pump in that well because a high production pump is going to require a 13-3/8ths casing.

So what you do is you hang that 9-

5/8ths casing inside the 13-3/8ths casing and you hang it up sufficiently high enough, then you go back inside, cement it up, and you're in business again.

So I think that that was something that was necessarily necessary to be there. That's something that is certainly in Raser's paper, but I view that as a geothermal person as we all need to have that understood by OCD that that's not a good way -- a good requirement for a geothermal well.

The other thing is that I didn't see a requirement for a nested monitor well, or I didn't see how that was going to be designed. What I did see were wells that were designed to show 10 feet of shallow monitor wells, 10 feet below the static water table, and 5 feet above. That really doesn't address the deep issue of injection on the overall aquifer. It also presents a problem with the shallow monitor wells when you have drawdown that you end up losing access to samples of that aquifer.

I guess our concern is how can a disposal permit be approved when no definitive information exists on the reservoir? It seems to me it's applied on imaginary wells, and imaginary

reservoirs, and imaginary injection, and imaginary production. This information is not known.

With that, that concludes what I have to say.

Q (BY MR. SEAWRIGHT) Mr. Witcher, have you been tendered as a witness in prior hearings as an expert in geothermal hydrology of the Animas Basin?

A Yes, I have.

MR. SEAWRIGHT: I'd like to tender Jim Witcher as an expert in geothermal issues and hydrology related to Lightning Dock.

HEARING EXAMINER: I didn't hear you.

MR. SEAWRIGHT: I'd like to tender him as an expert.

HEARING EXAMINER: I understood that. You faded out at some point in terms of listing all the things he was an expert in.

MR. SEAWRIGHT: I would like to tender him as an expert in accordance with his prior tendering as an expert in geothermal issues and hydrology in Lightning Dock.

HEARING EXAMINER: Any objection?

MS. MUNDS-DRY: I don't remember how he was qualified the last time. I don't remember being specific to the Lightning Dock area. I guess

I wouldn't have a problem if it was in geothermal resources, but specific to this area, that's where I'm having a little trouble.

HEARING EXAMINER: Ms. Altomare.

MS. ALTOMARE: I have no objection to him being represented as an expert to whatever foundation was laid in the prior hearing. I don't recall.

MR. SEAWRIGHT: That's what we're asking.

HEARING EXAMINER: As I recall his testimony in the prior hearing, he testified to considerable expertise in geology of a general area. I don't know how specific it was, but I will accept him as an expert.

THE WITNESS: I do have prior review papers published on Lightning Dock area.

HEARING EXAMINER: I will accept him as an expert in geology in this area, and, also, geothermal issues.

You may continue.

Q (BY MR. SEAWRIGHT) Mr. Witcher, what are the key changes that you would make to proposed permit to address some of the issues that you've raised?

A I think rather than having a disposal permit permitted at this time, I would include permitting test wells and full evaluation of that. Then when that developed -- that information is developed, then seeing a permit for injection and disposal occurs after that.

I believe that a full accounting of information needs to be gathered on the deep sub-surface and on some of the shallow sub-surface before an adequate plan can be even developed.

In my experience with geothermal systems across New Mexico that aren't developed for direct use, there's two that I think of now that actually inject and dispose of geothermal fluids. The way they have done their permitting, they drill production wells and drill test wells and then permitted the injection.

I think specifically the operation in Radium Springs, and the NMSU geothermal system in Las Cruces when it was operating as a direct-use heating system, that's the way that permitting procedure occurred.

Q In your opinion, do you believe that their production objective would result in excessive overtake from geothermal resource? By that, I mean

would result in the extraction of thermal energy beyond the resources' ability to sustain --

MS. MUNDS-DRY: Objection. That has no relevance to this hearing.

HEARING EXAMINER: I believe that's a correct observation. You may respond if you want to, but Geothermal Resources Act issues are not involved in these proceedings, is my understanding.

MR. SEAWRIGHT: I would agree to that statement, but to the exception this evidence is proposed as a production injection, and where the production and injection cannot be considered independently with regard to water quality considerations.

HEARING EXAMINER: I'll sustain the objection.

Q (BY MR. SEAWRIGHT) Mr. Witcher, with regard to AmeriCulture's Federal well number 1, and the written text written by John Shomaker, Raser's hydrogeological expert, do you have any concerns with the injection of injecting from this power plant in a zone intermediate of the bottom of our production wells and the top of the geothermal reservoir?

A I do, and that's actually a part of that

-- there's two concerns: One, we don't know that there's a confining caprock at depths that we can stuff that fluid in where it wouldn't, at some point in a very short time, encounter production out of the state or the AmeriCulture Federal 1 well.

The other issue is that with 5,000 gpm injected into a well at 600 feet away from the AmeriCulture Federal well, 5,000 gpm with any reasonable range of transmissivity that's known in that area, the water is going to be flowing out of Federal well in a very short period of time.

The amount of water that's injected there, 5,000 gpm, is a lot, and a well nearby where the water table is only 80 to 100 feet deep, water levels from that injection at 5,000 gpm with any reasonable transmissivity is going to be very high.

So there's going to definitely be a chemical degradation.

Q So does the -- their proposal to inject at a location above potential confining caprock is of concern to you?

A Absolutely.

Q Should it be allowed?

A It should not be allowed at that location.

MR. SEAWRIGHT: That's the end of my questioning, but I would like to enter this power-point presentation as Exhibit 1.

HEARING EXAMINER: Do you have a hard copy?

MR. SEAWRIGHT: I do.

MS. ALTOMARE: I'd like to reassert my objection that this exhibit is not relevant to the scope of this hearing.

HEARING EXAMINER: Okay. Objection overruled. Exhibit A -- Exhibit No. 1 will be admitted.

MR. SEAWRIGHT: Thank you. I'm done with my direct.

HEARING EXAMINER: Very good. I guess Ms. Munds-Dry should be the next to question the witness.

You may question the witness.

CROSS EXAMINATION BY MS. MUNDS-DRY

Q Mr. Witcher, your recommendation that Raser be required to drill test wells before any production or injection wells, do I understand that correctly?

A My recommendation would be that test wells be drilled and then be tested before a disposal

permit be issued, and monitor wells be identified as to location and design.

Q You understand that in the conditions in the draft permit now requires extensive testing and monitoring before Raser is allowed to inject or produce?

A I understand that, but one of the problems with that is that if you don't have test information at sub-surface, you can't properly design a monitor test well.

For one, you don't know where your casing points are. The other, you don't know where to place your springs. You have to have some basic hydrogeologic information to be able to do that.

Q Isn't your argument a little bit chicken and the egg?

A No, it's not chicken and the egg. It's the other way around. It's that Raser is trying to create a chicken without laying an egg in terms of placing a monitor plan in place and a disposal permit in place.

I don't understand how you have a disposal plan when you don't even know what you're going to inject, and where you're going to inject it, and what's going to protect that injection from

the environment.

Q I don't know which slide it is, but you stated that geothermal is hydrostatic. Let me see if I can find this page. I don't recall. If you recall from your presentation where that was?

A The comment that was given stating geothermal from oil and gas, a typical oil and gas situation --

Q So were you distinguishing between oil and gas wells?

A Yes. Geothermal resources traditionally are close to hydrostatic in pressure. They may be even under pressure. The geysers in California are pressured. They may flow Artesian, but that pressure that's causing that flow is not great. It's not like you have thousands of PSI pushing out of the ground.

Q Are you aware that high pressure wellheads are used in many fields to control pressure?

A Those aren't used to control pressure. What those are used to control is steam pressure and that's what that is. It's steam pressure when this hot water comes up the borehole, then you get pressure. This is why you use blowout prevention equipment when you are drilling high temperature

wells.

It's not because that well has a formation pressure that is overpressured, it's because if it flashes to steam, then you have to have a way to control it. One of the ways that you do control it after it does flash into steam, is you have valves down there to control that and that's the way it works.

MS. MUNDS-DRY: No further questions for Mr. Witcher.

HEARING EXAMINER: Ms. Altomare.

CROSS EXAMINATION BY MS. ALTOMARE

Q Mr. Witcher, you have a list in the draft permit that you've itemized here in your presentation. Were some of these that you've itemized things that you noticed in previous drafts of the proposed permit?

A The well construction information that I have that is from the previous draft, because I was looking at the one passed out today and I didn't see that in three, but I prepared this ahead of time.

Q So some of these things have been addressed by the most recent version?

A The well construction issues in terms of

cementing and intermediate casing requirements, cementing and intermediate casing, certainly has been.

Q Those might be resolved by the most recent draft?

A Yes, but the monitor well issue in terms of screening and where they are placed and dealing with drawdown in the reservoir, it's still being able to monitor those. I don't see that that has.

Q Now, when you first noticed that on the previous draft, did you bring it to the attention of anybody in the OCD, Mr. Chavez or any of the other engineers who were working on it so that they could solve the glitches, correct the glitches or discuss them with Raser, possibly addressing them or expounding upon them in the permit language so that it could be written in a way that might be more amenable to all parties?

A I never received any of this information until late last week.

Q To your knowledge, did anybody from AmeriCulture contact --

A That's where I received this information.

Q Did anybody from AmeriCulture contact OCD and advise OCD that they were unhappy with any of

these things listed on your itemized glitches and draft permit page?

A No.

Q Are you an expert in discharge permits or permit writing of any kind?

A No, I don't do that.

Q Have you ever been called upon to review or consult for a discharge permit before?

A No.

Q Are you an expert in the Water Quality Act or the Water Quality Control Commission regulations?

A No.

Q You have recommended that the process in this case would be better served by drilling -- permitting testing wells first, and then moving on to a discharge permit process?

A That's correct.

Q Are you aware that that would require us to go outside of the process established by the Water Quality Control Commission regulations?

A I'm not aware of that.

Q That the regulations actually require discharge permit process, but they don't provide for anything in the way of such a test well --

MR. SEAWRIGHT: Objection. She's already established through cross-examination that he's not made any claim to be acting as an expert in that, and that he is being asked to make a legal opinion.

MS. ALTOMARE: He's recommending a process that doesn't exist. I want to clarify from him where he's getting that recommendation from.

MR. SEAWRIGHT: The deficiency is not his fault. The deficiency --

HEARING EXAMINER: Yes, I'll sustain the objection. I believe these are matters of argument.

Q (BY MS. ALTOMARE) Let me rephrase it. From where are you deriving the recommendation for the permitting of test wells first, and then moving into a discharge permit process? Is that something that you came up with, or something that you are drawing off of a body of law?

A Science and common sense. If you don't have the information, how can you come up with some sort of plan ahead of time?

Q Sir, you are not referencing a particular established process?

A No, I'm not. I'm not establishing that.

Q You recognize that in the way that the permit is structured, that the newest testing that is being called for requires the monitoring to be done prior to injection, not at the actual injection location deep in the earth, but prior to it being injected?

A I understand that, but you still have a problem, plus when you are drawing down on this aquifer, the way these monitor wells are designed, after a few hours you are no longer going to be able to collect a water sample to the water chemistry. I don't know if you follow what I'm saying.

Q I do. Put that aside. Would you agree it's more protective of the environment to test prior to the injection up at the time before you consider injecting it into the ground, than after it's already been injected and potentially diluted by whatever is down there?

A Now, I'm not following that at all. When you say, "injection at the top," what are you referring to?

Q Before you ever consider putting the fluid into the ground, would you agree that it is most protective of the environment to test those prior

to the injection into the ground than after it's already been exposed, after the environment has already been exposed to it? It's more protective?

A I would go along with that. Are you speaking like you have water samples out of production wells and understand what that chemistry is before you inject it? Then I would say absolutely. I can obtain that with the testing well.

Q But the fact that the monitoring plan established by the permit calls for the testing prior to injection, is a more protective measure than if it were calling for testing after it had already been injecting and monitoring of wells after the fact?

A Well, my thought on this is that how can you permit something to be disposed of when you didn't even know what that something is? So you need to have a test well, you need to have some sort of information to understand what you're going to be disposing. Coupled with that, you also need to understand where you're going to be putting that injecting.

Q One last clarification. Just for clarification purposes, do you recognize that this

is a discharge, not a disposal, and that there is a distinction? That this is a discharge of water into the ground, not a disposal, to be distinguished from a disposal of industrial waste?

A Discharge into the ground. I understand that's what is planned here with an injection well, yes.

MS. ALTOMARE: I think that's all I have.

EXAMINATION BY HEARING EXAMINER

Q Mr. Witcher, I just have a few questions. Your presentation today wasn't as complicated as the last one. You, of course, have developed a considerable expertise on geology of this as I understand it. I appreciated your testimony previously.

A I've been looking at it for 20-plus years off and on.

Q I understand that this is not legal, most of the areas that we deal with in OCD hearings is, and that it's not an oil and gas area; therefore, there hasn't been a lot of holes punched over this area as there have been in many parts of the state, correct?

A I would say that's correct, yes.

Q You said something about you needed to explore the shallow and the ditch structure. What depths are you talking about?

A There's several different ways that could be done, and, also, depthwise. The resources out of Lightning Dock, the current known resources, the currently used resources, that's fairly shallow depth.

Q That was my understanding, yes.

A I consider that to be anywhere from 1,500 to 2,000 feet to the surface. When you step off into Animas Valley into the west, the depth that you may encounter out there, if you are going to explore for something, go after a particular rock unit that may have some productivity, that could be thousands of feet, it could be 10,000 feet or even greater. It depends upon where the geothermal approach is.

Q How many test wells in your opinion would it take to adequately explore this, and for purposes of what they are trying to do with this permit?

A You know, a single test well located in the right place might tell everything they need to know.

Q Where would that be?

A That's -- I'm not Raser's consultants. I don't think it would take -- I don't think -- what I'm saying is, I don't think it would take eight test wells. One test well may tell everything that they need to know.

Q Okay. You went into this concern about the cementing the surface and cementing the casing of the surface. I gather from your response to Ms. Altomare's request, your concern has been addressed in that draft permit?

A Yes, that language was taken out of the permit.

Q You said something that you were concerned about injection into intermediate zone. What is the intermediate zone that you're talking about? As far as my notes, anyway.

A I think this reference to -- references back to the e-mail that Dr. Shomaker had sent to Jim Rosser of Raser. He was speaking of injecting into an intermediate zone, and I'm not sure exactly where that would be. I guess we'd have to ask Dr. Shomaker.

Q I was wondering what it was intermediate between, but I gather you don't know the answer to

that?

A I don't know the answer to that.

Q For somebody who doesn't know a lot about monitoring wells, can you tell me a little more in generic language, if you can, just exactly what's the problem with the monitoring wells? Did they not drill deep enough given the amount that the water table is going to go down from the production wells?

A May I draw a picture?

Q Please. That would be helpful.

A Land surface, monitor wells, screen interval, water table. It's simple for water a table. This is a screen interval monitoring well. This is the surface. A well is placed in the ground at some distance and that can vary.

When you pump in this well is, say, screened right here, when you start pumping that well, you get what is called a cone of depression. The water levels drop as the cone like this, and that's the concern is that when you start producing off of these wells, then you have this cone of depression that migrates out to where your monitor well is, and at 3- and 5,000 gpm production that we are talking about, this could be very rapid. In

fact, they can see the affect in a 10-foot drawdown out here, 1,000 feet away, depending upon what the aquifer properties are within 48 hours or less.

Then when that happens, you've completely lost the ability to sample for water chemistry out of this aquifer because this is now all up and the water is drained out of that so you have lost your storage.

Q How would you address that concern?

A Well, one way to address that concern would be to have these tested water wells that had been proposed by Raser in their original document that they presented in Santa Fe in January. You can actually have several zones depth screened. The way the nesting well would work is to have one borehole, and you'd have another monitor well running down beside it, and you screen it down here.

In the zone in between this area here within the borehole, you'd have routed out or sealed off with a mixture of cement or however it's specified to do that so that the water that's in this zone here is separated from the water in the shallow zone. If you did have drawdown, you'd still be able to get a sample so that can still be

done.

The other thing is one of the values of this also is that if you are taking a water level that's isolated from here, and a water level that's isolated from here, when you look at the water levels, the water levels in this well may be here, and the water level in this well may be here. That would tend to show an upward migration of water because the heads would be different.

In other words, this has pressure out that pushes it up the hole, and that's valuable information to have when you're out monitoring a situation.

HEARING EXAMINER: Okay. I believe that's all my questions, Mr. Witcher.

I'm sorry. Are you "Mr." or "Doctor"?

THE WITNESS: No, I'm "Mr."

HEARING EXAMINER: Okay. I wouldn't want to offend you by omitting the title if it applied.

Did the parties have follow up? I believe you should be first.

I'm sorry. You should be first since it's your witness, then we'll let the opposing parties proceed.

REDIRECT EXAMINATION BY MR. SEAWRIGHT

Q Given Ms. Altomare's line of questioning, she was trying to draw some sense of equivalency within the proposal of drilling the test wells before the permitting process, and monitoring would post permitting process.

Are there any concerns that you may have or are there any differences between those two? You may be measuring the same type of water than producing some of the same formations, but as far as the abilities for AmeriCulture's concerns and concern regarding water quality in general under a situation that is present permit and one that is post permit, does that concern you?

A Well, that's one issue that comes to mind automatically that's well construction materials. For instance, a very high salinity fluid that are very high chloride and very, very high saline types are encountered, and the wrong well materials are selected, you can have corrosion. It would happen very rapidly out there, which could create a problem down the road when you are injecting and producing.

If you know about that sort of thing ahead of time before you construct these wells, you

can design these wells to have materials that would sustain very high salinity and high temperature, and you don't run into a problem later on when you suddenly realize that your well is filled because your casing is corroded. So that's one issue that comes to mind.

Another issue that comes to mind is without some prior knowledge, then how does one have an idea of what to be looking for in the first place as to what can be deleterious coming out of that reservoir? If you don't know ahead of time, you may not be paying very much attention to it, and then that goes back to some other issues.

It just sounds -- to me, it just sound exploration, sound development to drill these holes, and go through this process, and go through your permitting with some methodology and follow some sense, rather than just stepping right in the middle of it and saying, "We're going to produce this amount of power," when we haven't even drilled any test holes, we haven't drilled any production wells, we haven't drilled any injection wells. That's the process that we are seeing here. It's literally the cart before the horse.

Q You also mentioned that it's possible that

our Federal well might actually go Artesian. Now, is that just a professional opinion, or is that based on analysis of any type?

A It has to do with assuming a transmissivity for the area, which I don't have a transmissivity, actual pumping test measurement, but just assuming one from previous work that's been done. Just doing a simple test model, and assuming that the aquifer would be somewhat confined.

It's the shallow aquifer in connection with the zone that's going to be produced. The water level in such a hole is going to rise pretty darn close to the surface, if not flow to the surface at some point.

Q What water quality issue might that result in a water quality concern?

A I would certainly allow transfer of whatever you're injecting into the ground more rapidly. Not zones around you.

MR. SEAWRIGHT: Thank you very much.

HEARING EXAMINER: Ms. Munds-Dry.

RECROSS EXAMINATION BY MS. MUNDS-DRY

Q Have you ever been a consultant to a successful power plant that produced electricity in

New Mexico?

A No, ma'am.

Q So you don't know if you even can get financing on one well for a project like this?

A I wouldn't even try to get financing without a test well, let's put it that way.

Q Do you know if you can successfully get financing on a test well with --

MR. SEAWRIGHT: I object to this line of questioning. He's a geothermal expert. He's not expected to be an expert in financing power plants in New Mexico, given that there are none.

MS. MUNDS-DRY: This goes to the suitability to his proposal.

HEARING EXAMINER: I'll sustain the objection. He already testified he doesn't have any experience with it, and it's outside his area of expertise. He wouldn't be allowed to give an opinion on it.

MS. MUNDS-DRY: Thank you. No further questions.

HEARING EXAMINER: Ms. Altomare.

RECROSS EXAMINATION BY MS. ALTOMARE

Q I'd like to direct your attention to page 7 of the draft permit, Section 20B(i).

"Groundwater and surface water monitoring requirements."

HEARING EXAMINER: I'm sorry. What paragraph was that?

MS. ALTOMARE: Page 7, Section 20, subpart B, (i). That paragraph requires that the "Owner/operator," Raser, "shall conduct all water quality monitoring using low-flow purging and sampling methods where monitor well screens do not exceed 15 feet with 5 feet of screen placed above the water table."

A That's what it says, yes.

Q So if there was a cone of depression due to the drawdown causing a monitoring well to run dry, for instance, you understand that that continuing obligation requires Raser to basically drill or amend their monitoring well so that they continue to be able to meet that monitoring obligation?

A Okay. Let's say that's true. Have you ever tried to go get a drill contractor? It may take you six months to get a drill contractor.

MS. ALTOMARE: I'm going to object because the witness is asking questions.

HEARING EXAMINER: Sustained.

Q (BY MS. ALTOMARE) The other thing I wanted to direct your attention to is page 20 of the end -- in the appendix of the draft permit.

The permit does, in fact, provide for nesting wells, does it not, on that table? Do you see the destinations for nested wells?

A Okay. What I don't see here is well construction information.

Q I think if you refer back to the provision that we were just reading, which is 20B(i). It references the groundwater monitoring program work plan that is supposed to be submitted as part of that plan, as part of the permit obligation is by Raser, which is the point in time that the well construction will be addressed.

Do you see that provision?

A Okay. I guess. Okay. What page was that?

Q 20B(i), page 7.

A Page 7. Okay.

Q It says, "The owner/operator shall submit a groundwater monitoring program work plan that includes a well installation and monitoring plan and a sampling and analysis plan"?

A Okay. I read that. What's the question?

Q Does that address what you're talking about, at that point in time Raser would be submitting a well installation and monitoring plan for the sampling and analysis?

A Well, I guess my question is: Who is going to review that and with regard to protection of AmeriCulture's interest?

MS. ALTOMARE: Again, I renew my objection to the witness posing questions to counsel.

HEARING EXAMINER: I will sustain the objection. I believe that was an unresponsive answer so you may continue.

MS. ALTOMARE: That's the only clarifications we needed to make.

HEARING EXAMINER: Any follow up, Mr. Seawright?

MR. SEAWRIGHT: Not with Jim. I do have another witness I'd like to call.

HEARING EXAMINER: Very good. The witness may step down.

Okay. You have another witness? You only identified Mr. Witcher.

MR. SEAWRIGHT: This is a continuation of the previous hearing.

HEARING EXAMINER: Okay.

MR. SEAWRIGHT: And this witness has been named by opposing counsel for --

HEARING EXAMINER: Who is the witness?

MR. SEAWRIGHT: The witness would be John Shomaker.

HEARING EXAMINER: Any objection?

MS. MUNDS-DRY: If we could have some clarification as to what the scope of his questioning is going to be? This is an unusual --

MS. ALTOMARE: I would object.

MS. MUNDS-DRY: I'm just concerned that we are going to get down into the hydrology given that Mr. Shomaker is a hydrologist. I don't want us to get down that road without having some better understanding that this is going to be limited to the scope of this hearing.

HEARING EXAMINER: Yes. Since you didn't designate this witness as your witness, I'm interested to know what you intend to examine him regarding?

MR. SEAWRIGHT: Well, since all the water quality issues that we are discussing today, he is their hydrogeological expert, and has -- although he wasn't personally present at the last

hearing, his representative, Roger Peery, was. And if this were the same hearing, I would be able to recall Mr. Peery, but since he's not here, his superior, John Shomaker, is. I feel that we should be able to recall him as a witness.

THE EXAMINER: I don't recall that you have named him as your witness in any of your pre-hearing statements.

MR. SEAWRIGHT: We didn't. That's just consistent with my understanding of the body of witnesses named by representative counsel in a court of law, we would be able to call to the witness stand witnesses named by the parties, and I'm under the assumption that that would be honored in a hearing like this.

MS. ALTOMARE: Mr. Hearing Examiner, I would object. I think it seems to me that we are straying beyond the scope of this hearing, and, in particular, this continuation of this hearing is to address the draft permit provision and --

HEARING EXAMINER: I'm going to sustain the objection. I don't think that you're entitled to call the witness as designated by the other side as your witness unless you designated him as your witness.

Anything further?

MR. SEAWRIGHT: No.

HEARING EXAMINER: Very good. Rebuttal?

MS. MUNDS-DRY: No, we have no rebuttal.

HEARING EXAMINER: Ms. Altomare, do you have rebuttal?

MS. ALTOMARE: No.

HEARING EXAMINER: Okay. Very good. Then we'll conclude the hearing at this point and unless --

MR. SEAWRIGHT: I do have a closing statement.

HEARING EXAMINER: Okay. We will allow closing statements. The evidence is closed.

Do you wish to make closing statements, Ms. Munds-Dry?

MS. MUNDS-DRY: Just briefly.

HEARING EXAMINER: Go ahead.

MS. MUNDS-DRY: Thank you. The Division has proposed a draft permit, has presented that into evidence here today based on input of the parties, including AmeriCulture, which Raser believes not only helps the Division meet its

duties under the Water Quality Control regulations, but also ensures compliance with those regulations by Raser on protecting the groundwater surface water.

Raser, as Mr. Hayter testified, addressed those concerns in the draft permit. I believe it's been stated that a draft permit provision where all issues that have been raised by the parties has been discussed an addressed.

AmeriCulture has not provided any evidence to you today that the permit is not protected, and will not be protective of all the Water Quality Control Commission standards, and other standards in the permit.

Based on the evidence here today, Raser believes we have shown you that this permit should be approved as it's been presented by the Division. Thank you.

HEARING EXAMINER: Ms. Altomare.

MS. ALTOMARE: Just briefly. A reminder that we would like to keep the record open until close of business on Thursday, at which time we will be submitting the updated red-line version of the revised permit draft for all parties and for the Hearing Examiner's review.

HEARING EXAMINER: That will be acceptable.

MS. ALTOMARE: Thank you.

MS. MUNDS-DRY: I'm sorry. The record will be open only for the purposes of re-submitting the red-line version, not for other purposes?

HEARING EXAMINER: There hasn't been any requests for any other supplementation in the record. We'll wait to conclude closing to see if anyone has any request for supplementation.

MS. MUNDS-DRY: Thank you.

MS. ALTOMARE: I would just like to emphasize that I think that this particular project is a really good example of the process working in New Mexico. It's a first-time project of its type, and I think that the process has served its purpose in that it has resulted in a permit that is much more comprehensive and protective of the environment than it would likely otherwise have been because we have had the input of the community.

However, we are confident that the end result is a permit that is now ready to be approved and implemented, and that the project is now ready to move forward. The legislature and the Water

Quality Control Commission does not provide statutes or regulations for such a procedure. We don't regulate those kinds of things. There's no provision for approving APDs for test wells or the like. The way that that is done is through the process that is established through this discharge permit. The permit has every kind of protective provision in there that we have been able to come up with, and addresses all of the concerns that have been presented.

We would encourage the Hearing Examiner to review the draft permit, and to recommend that it be accepted so that this project can go forward.

With that, I would close and, again, I will forward everything by the close of business Thursday.

HEARING EXAMINER: Mr. Seawright.

MR. SEAWRIGHT: I would first like to say that we, AmeriCulture, do very much appreciate the onus of this process with OCD, and appreciate the diligent effort that they have put forward in moving the examination of the potential project along.

I'd also like to say that what has

been proposed to the OCD by Raser as the production and injection plan has the potential to greatly exceed the thermal energy outlook of that has been properly planned and executed.

It includes injection of copious quantities of foreign chemicals into regional waters, as well as for drinking water proposing to pump massive quantities of water of unknown chemistry and quality into injection wells located in unsure hydrogeological settings for decades to come.

It is not based on sound geoscience given a lack of data, and according to Raser's only hydrogeological consulting firm, will likely have impairment. We have heard from Raser regarding the re-injection of thermally depleted water back into the ground as based primarily on modeling. Raser's models and speculations having made without drilling a single well.

The state of development of any deep geothermal resource at Lightning Dock is basically at the wildcat stage development with regard to the injection of copious quantities of foreign chemicals into one of Hidalgo's largely untouched water resources.

You've heard the age-old saying, "the solution to pollution is dilution." This out-of-sight, out-of-mind philosophy has no place within the environment, especially when human and animal health and physiology are at stake. The amplification of profit at the extent of environment and of people is unnecessary and inappropriate at this day and age.

It would appear that Raser is willing to take risks with contaminating our groundwater for the sake of profit. Given Raser's financial state, we are left holding the bill if major environmental contaminations occur.

We believe that the permit application should be denied. Raser should drill a series of exploratory wells to gather the technical information to assemble specific credible injection plans, and Raser should reapply for its production and injection wells based on this data.

We are being asked to possibly surrender our ability to produce safe and wholesome products or organic products so that Raser can be greater profit. There is air cooling available, which is environmentally benign technology which is used throughout the world.

Accordingly, we strongly recommend that the OCD issue only exploratory permits for both Raser's production and injection wells until sufficient data is gathered to make a scientifically result that the wells are appropriate, and that the waters are protected.

We further recommend that the Oil Conservation Division and Water Quality Control Commission either require Raser to use air technology alternative, the cooling tower technology, which is specifically deemed to be safe for potable drinking water, and demonstrated to be safe for Nile Tilapia.

HEARING EXAMINER: Thank you.

There's been a request that the record be held open for the purposes of submitting the accredited draft of -- a non-substantive corrective draft of the OCD Exhibit No. 2, the draft permit.

So the record will be held open throughout the close of business on Thursday, April 16th, for that purpose. Thursday of this week, until Thursday of next week.

MS. ALTOMARE: We should be able to get it to you Thursday this week, the 9th.

HEARING EXAMINER: Well, I don't know

if anybody is working this Friday, so I'll say through the close of business, April the 10th.

MS. ALTOMARE: Sounds good.

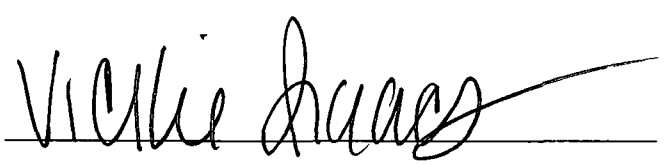
HEARING EXAMINER: Just to make sure to allow time here. Subject to that supplementation of the record, case number 14246 will be taken under advisement. This hearing will stand adjourned.

(End of requested testimony.)

STATE OF NEW MEXICO)
) ss
COUNTY OF DONA ANA)

I, VICKIE ISAACS, Court Reporter for the State of New Mexico, hereby certify that I transcribed, to the best of my ability, the proceedings taken on APRIL 7, 2009; that the pages numbered 1 through 163 inclusive, are a true and correct transcript of my stenographic notes, and were reduced to typewritten transcription through Computer-aided transcription; that on the date I transcribed these proceedings, I was a New Mexico Certified Court Reporter.

Dated at Las Cruces, New Mexico, this 11th day of MAY 2009.



Vickie Isaacs
New Mexico CCR No. 191
Certified Court Reporter

OCD Lightning Dock Geothermal (GTHT-1) Senior Hydrologist Meeting
OCD Conference Room (3rd Floor) Wendell Chino Bldg., Santa Fe, NM
Tuesday, January 27, 2009 (1:00 p.m. – 5:30 p.m.)

ATTENDEES:

AmeriCulture, Inc.
Los Lobos Renewable Power, L.L.C.
Oil Conservation Division

MEETING ISSUES

1) Jim Witcher (AmeriCulture, Inc.) Presentation: Major Tectonic Inversion WNW Fault
   a. Los Lobos: Don't know until we drill.
   b. AmeriCulture, Inc.: Gross lack of subsurface information in project area.
   c. OCD: Carl Chavez draft handout related to water quality monitoring #7 for the draft discharge permit requires sampling of all production and injection wells upon installation.

2) Mike Hayter (Los Lobos) Presentation: Location of injection well 51-07
   a. Los Lobos: Drill 45-07 to first analyze all data. Step out w/ next well. Will have drilling information to proceed forward. Production wells could become injection wells.
   b. AmeriCulture, Inc.: Not enough information to do anything. There is a problem with state permitting these wells without water chemistry and formation depth information.

3) Mike Hayter Presentation: Water Quality Monitoring (WQM)
   a. Los Lobos: Hand out "Monitoring & Sample Plan" (December 2008)
   b. AmeriCulture, Inc.: Concerned about water quality monitoring.
   c. OCD: Carl Chavez handed out draft "Additional Requirements" for draft discharge permit that addresses WQM to attendees to consider. OCD will review

OCD EXHIBIT No. 1
Application of Raser Power System LLC
Case No. 14246
April 7, 2009

1/27/2009

LDG-1 Meeting (GTHT-1)

~~Name~~

Name	Company	ph	e-mail
Carl Chavez	OCD	505 476-3490	Carlj.Chavez@state.nm.us
D. Seawright	Americulture	505-670-5220	damon@vt.e.net
Michael Hayter	Raser	801-589-1872	mike.hayter@rasertech.com
JOHN SHOMAKER	RASER	505-345-3407	jshomaker@shomaker
JAMES WITCHER	AMERICULTURE	575-521-0146	JIMWITCHER@ZIANET.COM
John F Esquibel	Raser	602-758-7530	LaeChama@npg.cox.bb.com
GLENN VON GONTEN	OCD	505-476-3488	
Gary Seawright	Americulture	505-677-3739	glseawright@msn.com
W.V. Jones	OCD	505-476-3448	WILLIAM.V.JONES@State.NM.US
[illegible]	"		

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Joanna Prukop
Cabinet Secretary
Reese Fullerton
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

April 7, 2009

Mr. Steve Brown
Los Lobos Renewable Power, L.L.C.
5152 North Edgewood Drive, Suite 375
Provo, Utah 84604

RE: LOS LOBOS RENEWABLE POWER, L.L.C. - LIGHTNING DOCK GEOTHERMAL NO. 1 (HI-01) DISCHARGE PERMIT (GTHT-001) NE/4 SW/4 OF SECTION 7, TOWNSHIP 25 SOUTH, RANGE 19 WEST, NMPM, HIDALGO COUNTY, NEW MEXICO CLASS V INJECTION WELLS AND GEOTHERMAL PRODUCTION OR DEVELOPMENT WELLS, TOWNSHIP 25 SOUTH, RANGES 19 AND 20 WEST, NMPM, HIDALGO COUNTY, NEW MEXICO

Dear Mr. Brown:

Pursuant to the Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 through 20.6.2.3114 NMAC (*Permitting and Ground Water Standards*) and 20.6.2.5000 through 20.6.2.5299 NMAC (*Underground Injection Control*), the Oil Conservation Division (OCD) hereby approves the discharge permit for of three (3) Class V geothermal injection wells and authorizes the operation five (5) production or development wells for the Los Lobos Renewable Power, L.L.C. (**owner/operator**) for the above referenced site, contingent upon the conditions specified in the enclosed **Attachment 1 to the Discharge Permit**. The owner/operator geothermal power plant is located in the NE/4 SW/4 of Section 7, Township 25 South, Range 19 West, NMPM, Hidalgo County, New Mexico. The Class V geothermal injection wells and the production or development wells are located in Township 25 South, Ranges 19 and 20 West, NMPM, Hidalgo County, New Mexico.

Class V Injection Wells

Well 42-18 is located in the NE/4, NW/4 of Section 18 (1307 FNL and 2123 FWL)
Well 51-07 is located in the NW/4, NE/4 of Section 07 (169.2 FNL and 2406.9 FEL)
Well 53-12 is located in the SW/4, NE/4 of Section 12 (1574.8 FNL and 3350 FWL)

OCD Exhibit No. 2
Application of Raser Power System LLC
Case No. 14246
April 7, 2009

Geothermal Production or Development Wells

Well 13-07 is located in the SW/4, NW/4 of Section 7 (3781 FSL and 530 FWL)
Well 33-07 is located in the SE/4, NW/4 of Section 7 (3721 FSL and 1789 FWL)
Well 45-07 is located in the NE/4, SW/4 of Section 7 (2360 FSL and 2278 FWL)
Well 47-07 is located in the SE/4 SW/4 of Section 7 (1219 FSL and 2266 FWL)
Well 53-07 is located in the SW/4 NE/4 of Section 7 (3775 FSL and 3052 FWL)

Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the Oil Conservation Division (OCD) Santa Fe Office within 30 days of receipt of this letter including permit fees.**

Please be advised that approval of this permit does not relieve the owner/operator of responsibility should operations result in pollution of surface water, ground water or the environment. Nor does approval of the permit relieve the owner/operator of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If you have any questions, please contact Carl Chavez of my staff at (505-476-3491) or E-mail carlj.chavez@state.nm.us. On behalf of the staff of OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Daniel Sanchez
Underground Injection Control Director

DS/cc
Attachments - 1
xc: OCD District Office

ATTACHMENT 1
LIGHTNING DOCK GEOTHERMAL NO. 1 (HI-01) (GTHT-001)
DISCHARGE PERMIT APPROVAL CONDITIONS

1. **Payment of Discharge Plan Fees:** All discharge permits are subject to WQCC Regulations. Every billable facility that submits a discharge permit application will be assessed a filing fee of $100.00 plus a renewal flat fee (*see* WQCC Regulation 20.6.2.3114 NMAC). The Oil Conservation Division (OCD) has received the required $100.00 filing fee and the $1700.00 Class V Geothermal Well permit fee.

2. **Permit Expiration and Renewal:** Pursuant to WQCC Regulation Paragraph 4 of Subsection H of 20.6.2.3109 NMAC, this permit is valid for a period of five years. **This permit will expire on June 4, 2014** and an application for renewal should be submitted no later than 120 days before that expiration date. Pursuant to WQCC Regulation Subsection F of 20.6.2.3106 NMAC, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved. ***Expired permits are a violation of the Water Quality Act {Chapter 74, Article 6 NMSA 1978} and civil penalties may be assessed accordingly.***

3. **Permit Terms and Conditions:** Pursuant to WQCC Regulation 20.6.2.3104 NMAC, when a permit has been issued, the owner/operator must ensure that all discharges shall be consistent with the terms and conditions of the permit. In addition, all facilities shall abide by the applicable rules and regulations administered by OCD pursuant to the Geothermal Resources Conservation Act (71-5-1 through 71-5-24 NMSA) and the Geothermal Power regulations (19.14.1 through 19.14.132 NMAC).

4. **Owner/Operator Commitments:** The owner/operator shall abide by all commitments submitted in its May 12, 2008 discharge permit application, including attachments and subsequent amendments and these conditions for approval. Permit applications that reference previously approved plans on file with OCD shall be incorporated in this permit and the owner/operator shall abide by all previous commitments of such plans and these conditions for approval.

5. **Modifications:** WQCC Regulations Subsection C of 20.6.2.3107 NMAC, 20.6.2.3109 NMAC and Subsection I of 20.6.2.5101 NMAC addresses possible future modifications of a permit. The owner/operator (discharger) shall notify OCD of any facility expansion, production increase or process modification that would result in any significant modification in the discharge of water contaminants. The Division Director may require a permit modification if any water quality standard specified at WQCC Regulation 20.6.2.3103 NMAC is being or will be exceeded or if a toxic pollutant as defined in WQCC Regulation 20.6.2.7 NMAC is present in ground water at any place of withdrawal for present or reasonably foreseeable future use or that the Water Quality Standards for Interstate and Intrastate streams as specified in WQCC Regulation 20.6.4 NMAC (*Water Quality Standards for Interstate and Intrastate Streams*) are being or may be violated in surface water in New Mexico.

6. Waste Disposal and Storage: The owner/operator shall dispose of all wastes at an OCD-approved facility. Only geothermal RCRA-exempt wastes may be disposed of by injection in a Class II well. RCRA non-hazardous, non-exempt geothermal wastes may be disposed of at an OCD-approved facility upon proper waste determination pursuant to 40 CFR Part 261. Any waste stream that is not listed in the discharge permit application must be approved by OCD on a case-by-case basis.

A. Disposal Of Certain Non-Domestic Waste At Solid Waste Facilities: Pursuant to 19.15.35.8 NMAC disposal of certain non-domestic waste without notification to OCD is allowed at NMED permitted solid waste facilities if the waste stream has been identified in the discharge permit and existing process knowledge of the waste stream does not change.

B. Waste Storage: The owner/operator shall store all waste in an impermeable bermed area, except waste generated during emergency response operations for up to 72 hours. All waste storage areas shall be identified in the discharge permit application. Any waste storage area not identified in the permit shall be approved on a case-by-case basis only. The owner/operator shall not store geothermal waste on-site for more than 180 days unless approved by OCD.

7. Drum Storage: The owner/operator must store all drums, including empty drums, containing materials other than fresh water on an impermeable pad with curbing. The owner/operator must store empty drums on their sides with the bungs in place and lined up on a horizontal plane. The owner/operator must store chemicals in other containers, such as tote tanks, sacks or buckets on an impermeable pad with curbing.

8. Process, Maintenance and Yard Areas: The owner/operator shall either pave and curb or have some type of spill collection device incorporated into the design at all process, maintenance and yard areas which show evidence that water contaminants from releases, leaks and spills have reached the ground surface.

9. Above-Ground Tanks: The owner/operator shall ensure that all aboveground tanks have impermeable secondary containment (*e.g.,* liners and berms), which will contain a volume of at least one-third greater than the total volume of the largest tank or all interconnected tanks. The owner/operator shall retrofit all existing tanks before discharge permit renewal. Tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt from this condition.

10. Labeling: The owner/operator shall clearly label all tanks, drums and containers to identify their contents and other emergency notification information. The owner/operator may use a tank code numbering system, which is incorporated into their emergency response plans.

11. Below-Grade Tanks/Sumps and Pits/Ponds.

A. All below-grade tanks and sumps must be approved by OCD prior to installation and must incorporate secondary containment with leak detection into the design. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal. Owner/operator must test all existing below-grade tanks and sumps without secondary containment and leak detection annually, or as specified herein. For all systems that have secondary containment with leak detection, owner/operator shall perform a monthly inspection of the leak detection system to determine if the primary containment is leaking. Small sumps or depressions in secondary containment systems used to facilitate fluid removal are exempt from these requirements if fluids are removed within 72 hours.

B. All pits and ponds, including modifications and retrofits, shall be designed by a certified registered professional engineer and approved by OCD prior to installation. In general, all pits or ponds shall have approved hydrologic and geologic reports, location, foundation, liners and secondary containment with leak detection, monitoring and closure plans. All pits or ponds shall be designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health, safety and the environment for the foreseeable future. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal.

C. The owner/operator shall ensure that all exposed pits, including lined pits and open top tanks (8 feet in diameter or larger) shall be fenced, screened, netted or otherwise rendered non-hazardous to wildlife, including migratory birds. Where netting is not feasible, routine witnessing and/or discovery of dead wildlife and migratory birds shall be reported by the owner/operator to the appropriate wildlife agency with notification also provided to OCD in order to assess and enact measures to prevent the above from reoccurring.

D. The owner/operator shall maintain the results of tests and inspections at the facility covered by this discharge permit and available for OCD inspection. The owner/operator shall report the discovery of any system which is found to be leaking or has lost integrity to OCD within 15 days. The owner/operator may propose various methods for testing such as pressure testing to 3 pounds per square inch greater than normal operating pressure and/or visual inspection of cleaned tanks and/or sumps or other OCD-approved methods. The owner/operator shall notify OCD at least 72 hours prior to all testing.

12. Underground Process/Wastewater Lines:

A. The owner/operator shall test all underground process/wastewater pipelines at least once every five (5) years to demonstrate their mechanical integrity, except lines containing fresh water or fluids that are gases at atmospheric temperature and pressure. The owner/operator shall submit a comprehensive listing of process/wastewater pipelines to OCD within three months of the

date of the permit issuance. The owner/operator shall test pressure rated pipe by pressuring up to one and one-half times the normal operating pressure, if possible or for atmospheric drain systems, to 3 pounds per square inch greater than normal operating pressure and pressure held for a minimum of 30 minutes with no more than a 1% loss/gain in pressure. The owner/operator may use other methods for testing if approved by OCD.

B. The owner/operator shall maintain underground process and wastewater pipeline schematic diagrams or plans showing all drains, vents, risers, valves, underground piping, pipe type, rating, size and approximate location. All new underground piping must be approved by OCD prior to installation. The owner/operator shall report any leaks or loss of integrity to OCD within 15 days of discovery. The owner/operator shall maintain the results of all tests at the facility covered by this discharge permit and they shall be available for OCD inspection. The owner/operator shall notify OCD at least 72 hours prior to all testing.

13. Class V Wells: The owner/operator shall close all Class V wells (*e.g.*, septic systems, leach fields, dry wells, etc.) that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic sanitary effluent wastes, unless it can be demonstrated that ground water will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD-regulated facilities that inject sanitary effluent and non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic sanitary effluent waste only must be permitted by the New Mexico Environment Department (NMED).

14. Housekeeping: The owner/operator shall inspect all systems designed for spill collection/prevention and leak detection at least monthly to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices shall be emptied of fluids within 72 hours of discovery. The owner/operator shall maintain all records at the facility and available for OCD inspection.

15. Spill Reporting: The owner/operator shall report all unauthorized discharges, spills, leaks and releases and shall conduct corrective actions pursuant to WQCC Regulation 20.6.2.1203 NMAC and 19.15.29 NMAC. The owner/operator shall notify both OCD District Office and the Santa Fe Office within 24 hours and file a written report within 15 days. The owner/operator shall notify OCD of any fire, break, leak, spill or blowout occurring at any geothermal drilling, producing, transporting, treating, disposal or utilization facility in the State of New Mexico by the person operating or controlling the facility pursuant to 19.14.36.8 NMAC.

16. OCD Inspections: OCD may impose additional requirements on the facility and modify the permit conditions based on OCD inspections.

17. Storm Water: The owner/operator shall implement and maintain run-on and runoff plans and controls. The owner/operator shall not discharge any water contaminant that exceeds the WQCC standards specified in WQCC Regulations 20.6.2.3103 NMAC or 20.6.4 NMAC including

any oil sheen, in any storm water run-off. The owner/operator shall notify OCD within 24 hours of discovery of any releases and shall take immediate corrective action(s) to stop the discharge.

18. Unauthorized Discharges: The owner/operator shall not allow or cause water pollution, discharge or release of any water contaminant that exceeds the WQCC standards listed in 20.6.2.3103 NMAC (*Standards for Ground Water of 10,000 Mg/L TDS Concentration or Less)* or 20.6.4 NMAC (*Water Quality Standards for Interstate and Intrastate Streams*) unless specifically listed in the permit application and approved herein.

An unauthorized discharge is a violation of this permit.

19. Vadose Zone and Water Pollution: The owner/operator shall address any contamination through the discharge permit process or pursuant to WQCC 20.6.2.4000 through 20.6.2.4116 NMAC (*Prevention and Abatement of Water Pollution*). OCD may require the owner/operator to modify its permit for investigation, remediation, abatement and monitoring requirements for any vadose zone or water pollution. Failure to perform any required investigation, remediation, abatement or to submit subsequent reports will constitute a violation of the permit.

20. Additional Site Specific Conditions - Water Quality Monitoring Program: The owner/operator shall implement the following water quality monitoring programs.

A. Aquatic Toxicity Testing: Prior to the startup of geothermal operations, the owner/operator shall conduct an aquatic toxicity test (ATT) on the Tilapia fish species present at the AmeriCulture aquaculture facility located down-gradient from the owner/operators proposed Class V injection well locations with all NALCO cooling-tower chemical constituents. The chemicals used in the ATT shall consist of the high range application of all mixed Nalco chemicals proposed during the hearing on December 1, 2008, to determine the LD_{50} under a worse-case scenario. OCD will use the results of the ATT as a tool to help assess the threat to Aquaculture and wildlife near the facility.

B. Ground Water and Surface Water Sampling and Monitoring Requirements:

i. The owner/operator shall submit a ground water monitoring program work plan that includes a well installation and monitoring plan and a sampling and analysis plan for the monitor wells to the OCD Santa Fe Office for approval at least 6 months days before system startup. The owner/operator shall conduct all water quality monitoring using low-flow purging and sampling methods where monitor well screens do not exceed 15 feet with 5 feet of screen placed above the water table.

ii. The owner/operator shall submit a Background and Compliance Report to OCD within 6 months of system startup that includes the results of the initial sampling conducted in accordance with Permit Conditions 20 and

21 to determine background water quality conditions at the facility and compliance with WQCC 20.6.2.3103 NMAC and Subparagraph WW of 20.6.2.7 NMAC. The report shall specify all monitoring locations, including nested wells, hydrogeology, piezometric and/or potentiometric ground water flow direction, hydraulic gradient and water quality data from all monitoring locations and down-gradient locations from potential point sources at the facility (*i.e.*, cooling tower blow-down combined with spent production water at all Class V Well injection locations). The report shall note all exceedences of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected.

iii. The owner/operator shall implement the ground water monitoring program specified in the applicable Tables in Appendix 1. The owner/operator shall monitor static water levels from monitoring locations at least quarterly to assess ground water flow direction and hydraulic gradient at the facility.

iv. The owner/operator shall gauge and sample nested monitor well head elevations (accuracy to 0.01 ft.) recorded and sampled to establish the vertical hydrogeologic gradient(s) within the aquifer(s) or between reservoir(s) and to monitor for any potentially upwelling contamination to nearby down-gradient pumping domestic and commercial water supply wells.

v. The owner/operator shall comply with the Federal Underground Injection Control requirements for Class V Wells (40 CFR 144 subpart G) and Water Quality Control Commission (WQCC) 20.6.2 NMAC injection well construction standards to protect the Underground Source of Drinking Water (USDW). The owner/operator shall immediately shut down the system if the concentration of the injection fluids exceed the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.

vi. The owner/operator shall construct all monitor wells with at least 15 feet of screen with 10 feet of screen positioned below the water table (~ 60 – 70 feet bgs). The screen slot size must facilitate the collection of low turbidity samples. Low-flow ground water sampling may be used with stabilization monitoring for temperature, oxygen reduction potential (ORP) and dissolved oxygen (DO) prior to and during sample collection, if wells are constructed properly. Otherwise, the owner/operator shall purge the wells of three well volumes prior to sampling.

vii. The owner/operator shall triangulate seasonal piezometric surface flow across the facility, including surveying all well locations (TOC and ground elevations (Mean Sea Level) to the nearest 0.01 feet. The owner/operator shall measure static water levels at least quarterly for 2 years to determine ground water flow direction. The owner/operator shall submit plots of ground water flow direction with estimates of hydraulic gradients from quarterly monitoring.

viii. The owner/operator shall notify the Santa Fe OCD office within 72 hours of its determination that the concentration of the monitor well sample exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.

C. Water Supply Wells Monitoring Program:

i. The owner/operator shall sample all water supply wells in accordance with Table 3 of Appendix 1 prior to operator startup to establish background water quality conditions and thereafter at least annually to demonstrate that the water quality of the water supply wells does not exceed the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, and that no toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is present.

ii. The owner/operator shall determine the depth to water, ground elevation, and well elevation to an accuracy of 0.01 foot.

iii. The owner/operator shall notify the OCD Santa Fe office within 72 hours of its determination that the concentration of the ground water sample exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.

D. Holding Ponds, Drainage Ditches, Pits and Ponds Monitoring Program: The owner/operator shall sample the holding ponds, drainage ditches, pits and ponds in accordance with Table 4 of Appendix 1. The owner/operator shall notify the OCD Santa Fe office within 72 hours of its determination that the concentration of a water sample taken the unlined ditch exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected

E. Spent Produced Water and Cooling-Tower Blow-Down Water Monitoring Program:

i. The owner/operator shall submit a flow diagram to the OCD Santa Fe Office that depicts where the comingled spent produced water and cooling-tower blow-down water will be stored and tested before injection at least 30 days before system startup.

ii. The owner/operator shall sample and analyze the comingled spent produced water and cooling-tower blow-down water daily for 10 business days at system startup, weekly for two months; and thereafter the sampling frequency shall be based on correlation that the owner/operator established with the 3D Tresar Control Monitoring System in accordance with Table 5 of Appendix 1 to this discharge permit.

iii. The owner/operator shall inject comingled spent produced water and cooling-tower blow-down water only if it meets either the standards for ground water specified at Subparagraph WW of 20.6.2.7 NMAC and 20.6.2.3103 NMAC or the background concentration as established from the first sampling event. In-line sample ports or devices shall be installed at each injection well to ensure that the above requirement is met.

iv. The owner/operator shall not discharge untreated chemicals to storm water and/or "Waters of the State." Any discharge to a rip-rap area(s) is an illegal discharge. The owner/operator shall inform the OCD Santa Fe office within 72 hours of discovery of a discharge to a rip-rap basin. Discharges shall be routed to lined pits or evaporation pond areas whenever possible.

v. The owner/operator may only discharge into "Waters of the State" in accordance with a National Pollutant Discharge Elimination System (NPDES) Permit issued by EPA Region 6. The OCD must approve the discharge concurrently with EPA. The applicant must comply with all of the Federal NPDES monitoring, treatment, and reporting requirements specified in its NPDES permit.

F. Annual Water Quality Monitoring Program Report: The owner/operator shall submit an Annual Water Quality Monitoring Program Report by January 31 of each year. The report shall include the following information:

i. Cover sheet marked as "Annual Water Quality Monitoring Program Report, name of owner/operator, Discharge Permit Number, API number(s) of well(s), date of report and the name of the person submitting report.

ii. Comprehensive summary of all water quality monitoring data.

iii. Summary charts and tables depicting the constituents that have ever exceeded the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected.

iv. Description and reason for any remedial or work on well(s), ponds, ditches, *etc.*

v. A copies of the chemical analyses in accordance with Permit Condition 20.

vi. A copy of any leaks and spills reports submitted in accordance with Permit Condition 15 above.

vii. A "Miscellaneous" section to include any other issues that should be brought to OCD's attention.

viii. Discharge Permit Signatory Requirements pursuant to WQCC Regulation Subsection G of 20.6.2.5101 NMAC.

21. Class V Injection Wells and Geothermal Production or Development Wells:

A. Well Identification:

i. **Class V Injection Wells:**

Well No. 42-18 (API No. 30-023-20018)
Well No. 51-07 (API No. 30-023-20020)
Well No. 53-12 (API No. 30-023-20019)

ii. **Geothermal Production or Development Wells:**

Well No. 13-07 (API No. 30-023-20013)
Well No. 33-07 (API No. 30-023-20014)
Well No. 45-07 (API No. 30-023-20015)
Well No. 47-07 (API No. 30-023-20016)
Well No. 53-07 (API No. 30-023-20017)

B. Well Casing and Cementing Requirements:

i. The owner/operator shall ensure that all casing and cementing meets or exceeds the requirements of 19.14.27.8 NMAC (*Casing and Cementing Requirements*). Conductor pipe shall be run to a minimum depth of 100 feet.

ii. Surface casing shall be to a depth of at least 100 feet greater than the deepest fresh water well within one-half mile from the well location.

iii. Intermediate strings shall be cemented solid to surface.

iv. Production casing shall either be cemented solid to the surface or lapped into intermediate casing, if run. If production casing is lapped into an intermediate string, the casing overlap shall be at least 50 feet. The lap shall be cemented solid and it shall be pressure tested to ensure integrity.

C. Formation Fracturing Fluids: The owner/operator shall ensure that all fluids used in the fracturing of formations shall not harm human health, wildlife and the environment. The owner/operator shall ensure that all fluids used to fracture shall be swabbed back, collected and properly disposed.

D. Class V Injection Wells and Geothermal Production/Development Wells Monitoring Program:

i. The owner/operator shall sample all injection and production/development wells prior to operator startup in accordance with Table 2 of Appendix 1 to establish background water quality conditions.

ii. The owner/operator shall sample all injection wells monthly for the first six months with dynamic water level (DWL) recordings in accordance with Table 2 of Appendix 1 to demonstrate that the injection fluid meets the standards specified in WQCC 20.6.2.3103 NMAC or background, and that no toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected.

iii. If after the first six months the owner/operator demonstrates that the well being injected meets the standards specified in WQCC 20.6.2.3103 NMAC or background, and that no toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, has been detected, then the owner/operator shall sample annually in accordance with the other annual monitoring events.

iv. The owner/operator shall determine the depth to water, ground elevation, and well elevation to an accuracy of 0.01 foot. The owner/operator shall

notify the OCD Santa Fe office within 72 hours of its determination that the concentration of the ground water sample exceeds the greater of the standards specified in WQCC 20.6.2.3103 NMAC or background, or if any toxic pollutant, as defined in WQCC Subparagraph WW of 20.6.2.7 NMAC, is detected.

E. Well Workover Operations: The owner/operator shall obtain OCD's approval prior to performing remedial work, pressure test or any other work. The owner/operator shall request approval on form G-101 *"Application Permit to Drill, Deepen or Plug Back - Geothermal Resources Well"* pursuant to 19.14.52 NMAC, with copies provided to both the OCD Artesia District II Office and the Santa Fe Office.

F. Production/Injection Method: The production/injection method that the owner/operator shall follow is as follows: High temperature (250 – 300 °F) geothermal water shall be brought to surface from the Horquilla Formation or geothermal reservoir at approximately 3,400 feet below ground level by five (5) production or development wells (approximately 3,000 gpm per well). Hot water shall be routed in parallel and in series through 50 binary cycle (self-contained heat exchanger, evaporator and condenser) power generation units. Condensed produced or effluent water (approximately 225 °F) shall be routed to a lined evaporation pond(s) prior to injection (approximately 75 psig per well) via three (3) Class V geothermal wells into the geothermal reservoir.

G. Well Pressure Limits: The owner/operator shall ensure that the operating surface injection and/or test pressure for each injection well measured at the wellhead shall be at a flow rate and pressure that will not adversely affect public health, the environment and the correlative rights of any future geothermal operators in the high temperature geothermal reservoir. The owner/operator shall have working pressure limiting devices or controls to prevent overpressure. The owner/operator shall report any pressure that causes damage to the system to OCD within 24 hours of discovery.

H. Mechanical Integrity Testing: At least once every five years and after any well work over, the geothermal reservoir will be isolated from the casing or tubing annuals and the casing pressure tested at a minimum of 600 psig for 30 minutes. A passing test shall be within +/- 10% of the starting test pressure. All pressure tests must be performed in accordance with the testing schedule shown below and witnessed by OCD staff unless otherwise approved.

The owner/operator shall conduct a thirty (30) minute casing pressure test at a minimum of 600 psig (set packer above casing shoe to isolate formation from casing) at least once in CY 2009 and at least once in CY 2013.

Testing Schedule:

CY 2009: 30 minute casing pressure test at a minimum of 600 psig (set packer above casing shoe to isolate formation from casing), and

CY 2013: 30 minute casing pressure test at a minimum of 600 psig (set packer above casing shoe to isolate formation from casing)

I. Capacity/Reservoir Configuration and Subsidence Survey: The owner/operator shall provide information on the size and extent of the geothermal reservoir and geologic/engineering data demonstrating that continued geothermal extraction will not cause surface subsidence, collapse or damage to property or become a threat to public health and the environment. This information shall be supplied to OCD in each annual reports. OCD may require the owner/operator to perform additional well surveys, tests, etc. A subsidence monitoring program is required in the annual reports and shall include well top-of-casing and ground elevation modern surveying (Accuracy: 0.01 ft.) on an annual basis in order to demonstrate that there are no subsidence issues. If the owner/operator cannot demonstrate the integrity of the system to the satisfaction of OCD, then OCD may require the owner/operator to shut-down, close the site and properly plug and abandoned the wells. ***The owner/operator shall report any subsidence to the OCD Santa Fe office within 24 hours of discovery.***

J. Production/Injection Volumes: After placing a geothermal well on production, the owner/operator shall file in duplicate a monthly production report form G-108, with the OCD Santa Fe office by the 20th day of each month and also with the annual reports. The owner/operator shall also document the production from each well and each lease during the preceding calendar month.

K. Analysis of Injection and Geothermal Reservoir Fluids: After placing any well on injection or disposal in a geothermal resources field or area, the owner/operator shall file in duplicate a monthly injection report, form G-110, with the OCD Santa Fe office by the 20th day of each month and also with the annual reports. The owner/operator shall specify the zone or formation into which injection is being made, the volume injected, the average temperature of the injected fluid and the average injection pressure at the wellhead.

L. Area of Review (AOR): The owner/operator shall report within 24 hours of discovery of any new wells, conduits or any other device that penetrates or may penetrate the injection zone within one-quarter mile from its Class V Geothermal Injection Well(s).

M. Annual Geothermal Temperature and Pressure Tests: The owner/operator shall test its production or development wells at least annually and submit the results to the OCD

Santa Fe office on form G-111 within 30 days of the completion of the test. The owner/operator shall record the flowing temperatures and flowing pressure tests at the wellhead for a minimum of 72 hours of continuous flow at normal producing rates. The owner/operator shall then shut in the well for 24 hours and record the shut-in pressures at the wellhead. The owner/operator shall submit the results of these tests in duplicate to the OCD Santa Fe office.

N. Loss of Mechanical Integrity: The owner/operator shall report to the OCD Santa Fe Office within 24 hours of its discovery of any failure of the casing, tubing or packer or movement of fluids outside of the injection zone. The owner/operator shall cease operations until proper repairs are made and the owner/operator receives OCD approval to re-start injection operations.

O. Bonding or Financial Assurance:

i. Class V Geothermal Injection Wells: The owner/operator shall maintain at a minimum a cash bond (*i.e.*, Assignment of Cash Collateral Deposit or Multi-Well Cash Financial Assurance Bond Geothermal Injection) in the amount of $50,000.00 to restore the site and/or plug and abandon wells, pursuant to OCD rules and regulations.

ii. Production or Development Wells: The owner/operator shall maintain at a minimum a cash bond (*i.e.*, $10,000.00 Multi-Well (4 wells) and/or $5,000.00 (1 well) Geothermal Plugging Bonds).

If warranted, OCD may require additional financial assurance for closure of the power plant or facility (see Permit Condition 23 below).

P. Annual Geothermal Well Report:

The owner/operator shall submit an Annual Geothermal Well Report by January 31 of each year. The report shall include the following information:

i. Cover sheet marked as "Annual Geothermal Well Report, name of owner/operator, Discharge Permit Number, API number(s) of well(s), date of report and the name of the person submitting report.

ii. Comprehensive summary of all geothermal well operations, including description and reason for any remedial or work on the well(s). The owner/operator shall include a copy of the form G-101 that it submitted to the OCD Santa Fe office.

iii. Production and injection volumes in accordance with Permit Condition 21.J, including a running total to be carried over each year. The

owner/operator shall report the total mass produced, dry steam produced, flow rates, temperatures and pressures, average injection pressures, temperatures, *etc.*

iv. A copy of the chemical analyses in accordance with Permit Condition 21.K.

v. A copy of any mechanical integrity test chart, including the type of test, (*i.e.*, EPA 5-Year casing test), date, time, *etc.*, in accordance with Permit Conditions 21.H.

vi. A copy of the annual subsidence survey data results in accordance with Permit Condition 21.I.

vii. Brief explanation describing deviations from normal production methods.

viii. A copy of any leaks and spills reports submitted in accordance with Permit Condition 15 above.

ix. A copy of analytical data results from groundwater monitoring including the QA/QC Laboratory Summary.

x. An updated Area of Review (AOR) summary (WQCC Regulation 20.6.2 NMAC) when any new wells are drilled within 1/4 mile of any UIC Class V Injection Well.

xi. A "Miscellaneous" section to include any other issues that should be brought to the OCD's attention.

xii. Discharge Permit Signatory Requirements pursuant to WQCC Regulation Subsection G of 20.6.2.5101 NMAC.

22. Transfer of Discharge Permit: Pursuant to WQCC Regulation Subsection H of 20.6.2.5101 NMAC, the owner/operator and new owner/operator shall provide written notice of any transfer of the permit. Both parties shall sign the notice 30 days prior to any transfer of ownership, control or possession of a facility with an approved discharge permit. In addition, the purchaser shall include a written commitment to comply with the terms and conditions of the previously approved discharge permit. OCD will not transfer brine well operations until proper bonding or financial assurance is in place and approved by the OCD. OCD reserves the right to require a modification of the permit during transfer.

23. Closure: The owner/operator shall notify OCD when operations of the facility are to be discontinued for a period in excess of six months. Prior to closure of the facility, the

owner/operator shall submit for OCD approval, a closure plan including a completed C-103 form for plugging and abandonment of the well(s). Closure and waste disposal shall be in accordance with the statutes, rules and regulations in effect at the time of closure. OCD may require additional financial assurance if surface water and/or ground water is impacted pursuant to WQCC Regulation Paragraph (11) of Subsection A of 20.6.2.3107 NMAC.

24. Certification: Los Lobos Renewable Power, L.L.C. (Owner/Operator), by the officer whose signature appears below, accepts this permit and agrees to comply with all submitted commitments, including these terms and conditions contained here. **Owner/Operator** further acknowledges that OCD may, for good cause shown, as necessary to protect fresh water, public health, safety and the environment, change the conditions and requirements of this permit administratively.

Conditions accepted by: *"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment."*

_____
Company Name - print name above

_____
Company Representative - print name

_____
Company Representative - signature

Title_____

APPENDIX 1
WATER QUALITY MONITORING PROGRAM

Table 1
Ground Water Monitoring Program

ID*	Frequency	Media	Analytical Suite/Method	Approximate Well location
MW-1 [1]	Annual	GW	Analyze for dissolved fraction of all 20.6.2.3103 NMAC Constituents	Shallow MW (water table) located ~100' downgradient (North) of Class V IW 42-18 and associated pits (OCD)
MW-3 [1]	Annual	GW	VOCs (8260B)	Shallow MW (water table) located ~100' downgradient (North) of Class V IW 51-07 and associated pits (OCD)
MW-2 [1]	Annual	GW	SVOCs (8270C)	Shallow MW (water table) located ~100' downgradient (North) of Class V IW 53-12 and associated pits (OCD)
MW-4 [1]	Annual	GW	PAHs (8310)	Shallow MW located ~1500' (Northwest) of DW 45-07 directly downgradient from facility (OCD)
MW-5 [1]	Annual	GW	TPH (418.1)	Shallow MW (water table) located ~1000' upgradient (South) of the nursery greenhouses 3 & 4 to monitor background (OCD)
MW-6 [1]	Annual	GW	Metals - dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods)	Shallow MW (water table) located ~100' downgradient (North) of DW 53-07 and associated pits (OCD)
MW-7 [1]	Annual	GW	Mercury (7470A/7471A)	Shallow MW (water table) located ~100' downgradient (North) of DW 13-07 and associated pits (OCD)
			General Chemistry (Methods specified at 40 CFR 136.3)	
			Uranium (6010B/6020), Radioactivity (E903/E904)	
			Radon (by EPA Method or method approved by OCD)	

ID*	Frequency	Media	Analytical Suite/Method	Approximate Well location
MW-8 [1]	Annual	GW		Shallow MW (water table) located ~100' downgradient (North) of DW 33-07 and associated pits (OCD)
NW-1 [1]	Annual	GW		Similar to monitoring & sampling plan from Los Lobos.
NW-2 [1]	Annual	GW		Similar to monitoring & sampling plan from Los Lobos.
NW-3 [1]	Annual	GW		Similar to monitoring & sampling plan from Los Lobos.

Table 2
Geothermal Injection Wells and
Production/Development Wells Monitoring Program

ID*	Frequency	Media	Analytical Suite/Method	Approximate Well Location
DW 13-07[3]	Annual	GW	Analyze for dissolved fraction of all 20.6.2.3103 NMAC Constituents VOCs (8260B) SVOCs (8270C) PAHs (8310) TPH (418.1) Metals - dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods) Mercury (7470A/7471A) General Chemistry (Methods specified at 40 CFR 136.3) Uranium (6010B/6020), Radioactivity (E903/E904) Radon (by EPA Method or method approved by OCD)	As Proposed in Application
DW 33-07[3]	Annual	GW		
DW 45-07[3]	Annual	GW		
DW 47-07[3]	Annual	GW		
DW 53-07[3]	Annual	GW		
IW 42-18[3]	Annual	GW		
IW 51-07[3]	Annual	GW		
IW 53-12[3]	Annual	GW		

Table 3
Water Supply Wells Monitoring Program

ID*	Frequency	Media	Analytical Suite/Method	Approximate Location
TG 52-07 [1]	Annual	GW	Analyze for dissolved fraction of all 20.6.2.3103 NMAC Constituents VOCs (8260B) SVOCs (8270C) PAHs (8310) TPH (418.1) Metals - dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods) Mercury (7470A/7471A) General Chemistry (Methods specified at 40 CFR 136.3) Uranium (6010B/6020), Radioactivity (E903/E904) Radon (by EPA Method or method approved by OCD)	Similar to monitoring & sampling plan from Los Lobos.
Americulture No. 1 Federal [1]	Annual	GW		
McCants No. 1 State [1]	Annual	GW		
Burgett No. 1 State [1]	Annual	GW		
Burgett Greenhouse No. 2 [1]	Annual	GW		

Table 4
Holding Ponds, Drainage Ditches, Pits and Ponds Monitoring Program

ID*	Frequency	Media	Analytical Suite/Method	Approximate Location
GH Holding Pond No. 1	Quarterly[4]	SW	Metals- dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods) General Chemistry (Methods specified at 40 CFR 136.3	Similar to monitoring & sampling plan from Los Lobos.
GW Holding Pond No. 2	Quarterly[4]	SW		
Drainage Ditch No. 1 (East)	Quarterly[4]	SW		
Retention Pond No. 1	Quarterly[4]	SW		
Bermed Canal No. 1	Quarterly[4]	SW		
Pit Associated with Well 13-07	Within 30 days of use	SW		
Pit Associated with DW 33-07	Within 30 days of use	SW		
Pit Associated with DW 45-07	Within 30 days of use	SW		
Pit Associated with DW 47-07	Within 30 days of use	SW		
Pit Associated with DW 53-07	Within 30 days of use	SW		
Pit Associated with IW 42-18	Within 30 days of use	SW		

ID*	Frequency	Media	Analytical Suite/Method	Approximate Location
Pit Associated with IW 51-07	Within 30 days of use	SW		
Pit Associated with IW 53-12	Within 30 days of use	SW		

Table 5
Cooling Tower Effluent Monitoring Program

ID*	Frequency	Media	Analytical Suite/Method	Approximate Location
Cooling Tower Effluent	Daily [5]	Effluent	Metals - dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods) General Chemistry (Methods specified at 40 CFR 136.3	Similar to monitoring & sampling plan from Los Lobos.

DW: Development/Production Well
DWL: Dynamic Water Level
GH: Greenhouse
GW: Ground Water
IW: Injection Well
MSL: Mean Sea-Level
MW: Monitor Well
NW: Nested Well
SW: Surface Water
SWL: Static Water Level
* Quarterly Static Water Level (SWL): MSL to nearest 0.01 feet prior to sampling event

1. Monitor wells must be installed in advance of system startup and sampled.
2 Semi-Annual groundwater monitoring event must be completed no more than 30 days prior to the start of the irrigation season but no later than April 30 of each year. Monitoring must be conducted no later than 30 days after the conclusion of the irrigation season but no later than November 15 of each year.
3 One time sampling event with static water level (SWL) mean sea-level (0.01 ft. accuracy) measurements in advance of system start-up. Thereafter, monthly sampling for the first six months with dynamic water level (DWL) recording is required. After six months of monthly monitoring, the sampling shall be conducted at least annually.
4 Sample quarterly while in use. If organics are evident, sampling with analytical methods similar to MWs shall be implemented during the sampling event.
5. Daily for 10 business days at system startup; thereafter weekly for two months; thereafter based on establishing correlation with the 3D Tresar Control Monitoring System.

Note: All wells with phase-separated hydrocarbons (PSHs) must be checked at a minimum of once per month and recorded on a spreadsheet. The data must be presented in table form listing all of the impacted wells, date inspected, product thickness measured to 0.01 of a foot, and amount of product/water recovered. If PSHs are observed in a monitoring well, then appropriate steps must be taken to recover the PSHs using the best available technology.

Geoscience Deficiency in Application

Raser has presented no coherent geologic model or hard evidence (actual real measured data) that scientifically defines:

- Reservoir rock or location.
  - ➢A shifting story.
- Reservoir permeability or storage characteristics.
  - ➢No wells have been drilled and pump tested.
- A confining rock unit over the production or injection zone that could act to shield and isolate injected fluids.
  - ➢No test wells have been drilled to evaluate.
- Actual water chemistry to be produced and injected.
  - ➢No test wells have been drilled and sampled.
- A cross section of reservoir/injection targets based upon actual drilling or geophysical interpretation.

Damon Seawright, President
AmeriCulture, Inc.
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Exhibit 1

OCD Hearing History Summary

- Raser has presented no actual data to support interpretations and well design in the disposal permit.
- AmeriCulture has presented a geologic model with actual borehole, geochemical, and geophysical data that refutes several claims in the disposal permit.
  - Production from Horquilla Limestone will be poor water quality (>3,000 TDS).
  - Size of resource is very small.
  - Location of up flow zone is <u>not</u> on a northeast striking and hidden B & R fault.
- Raser has quoted geothermal experts or their reports and has failed to produce those experts for testimony or their reports for review and critic.
  - GeothermEx.
  - Lightning Dock Geothermal and their consultants.

Current State of Knowledge

- Natural heat loss is less that 10 MWt.
- Up flow zone is very small and is located in the horst block beneath Burgett Greenhouses and near the ring fracture zone of the Muir caldera of the Pyramid Mountains.
- Fluid chemistry of current geothermal production is the result of flow path and chemical equilibrium in rhyolite.
- Fracture ground preparation is facilitated by a major NW striking and long-lived first order structure in the crust.
- Stress associated with a late Pleistocene fault tip has locally reopened fractures of older bedrock ground preparation.

Problems

- Reservoir is not sustainable at 12,000 gpm production and injection over such a small resource.
  - ➢ Violates correlative geothermal rights of adjacent direct-use operators who have State Geothermal Leases.
  - ➢ Ground subsidence is likely.
  - ➢ Currently used shallow geothermal outflow plume will be destroyed.
  - ➢ Adjacent water rights holders will be impacted in both water quality and amount of fresh water in storage.
- The Raser project is geotechnically unsuitable for disposal permit with current state of exploration and resource characterization and proposed rates of production and injection.

Glitches in Draft Permit

- Intermediate and production casing strings should not be cemented back to surface.
  - Only need to cement to casing hanger inside larger casing string.
  - Geothermal wells require a large diameter surface casing string for pump equipment.
  - Geothermal wells are not oil and gas wells with high pressure – geothermal is hydrostatic.
- Add AmeriCulture 1 State to Table 3.
- No description of the required "nested monitor well."
  - The screen requirement does not describe a nested monitor well configuration.

Recommendations

- Permit test wells only.
- Deny disposal application as it is premature and not supported with tangible geologic information.
  - Where is the reservoir?
  - What are the confining rock units?
  - What is the reservoir fluid chemistry?
  - What is the reservoir storage and permeability?
  - What are the rock units best for casing points to insure long-term injection well integrity?
- Require submission of injection well (disposal) permit request and production well permit request after test drilling and reservoir information is compiled and a complete hydrogeologic analysis with real data is available.

BOTTOM LINE

- How can a disposal permit be approved when no definitive information exists to even design an injection program or field?

  - What is injected water quality? Unknown because production wells have not been drilled and chemically tested.
  - What is the injection zone? None identified because test wells have not been drilled.
  - Will zone take 12,000 gpm without impacting local environment? Unknown as pump tests of a potential injection zone have not been performed to determine permeability and storage.
  - What casing program should be instituted for injection wells? Competent or capping formations at depth are unknown.
  - Where should injection wells be sited? There is not enough information available to site injection wells.