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

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

APPLICATION OF HPPC, INC. FOR A LEASE PRESSURE MAINTENANCE PROJECT, LEA COUNTY, NEW MEXICO. CASE NO. 16455

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

November 15, 2018

Santa Fe, New Mexico

BEFORE: MICHAEL McMILLAN, CHIEF EXAMINER
PHILLIP GOETZE, TECHNICAL EXAMINER
KEITH W. HERRMANN, LEGAL EXAMINER

This matter came on for hearing before the New Mexico Oil Conservation Division, Michael McMillan, Chief Examiner, Phillip Goetze, Technical Examiner, and Keith W. Herrmann, Legal Examiner, on Thursday, November 15, 2018, at the New Mexico Energy, Minerals and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Third Floor Meeting Room, Santa Fe, New Mexico.

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EXHIBITS OFFERED AND ADMITTED

(10:32 a.m.)

EXAMINER McMILLAN: I'll call this hearing back to order.

The next case that's going to be heard is Case Number 16455, application of HPPC, Incorporated for a lease pressure maintenance project, Lea County, New Mexico.

Call for appearances.

MR. BRUCE: Mr. Examiner, Jim Bruce representing the Applicant. I have one witness.

EXAMINER McMILLAN: Are there any other appearances?

MS. MOSS: Katherine Moss with the New Mexico State Land Office.

EXAMINER McMILLAN: Okay. Do we have opening statements?

MR. BRUCE: No.

MS. MOSS: No.

EXAMINER McMILLAN: Please proceed.

And Phillip Goetze will be assisting in this case.

RAJAN PRASAD,

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

DIRECT EXAMINATION

BY MR. BRUCE:

**Q. Would you please state your name and city of residence?**

A. Rajan Prasad, Midland, Texas.

**Q. Could you spell your first and last name for the court reporter?**

A. R-A-J-A-N; last name, P, like Paul, R-A-S, like Sam, A-D, like David.

**Q. And who do you work for?**

A. I'm vice president of HPPC, Incorporated.

**Q. And have you previously testified before the Division?**

A. No, I have not.

**Q. Could you summarize your educational and employment background for the examiner?**

A. I have a Bachelor of Science from Texas Tech in chemical engineering, and I have a master's from University of Texas at Austin. And I have -- sorry.

**Q. And what are your degrees in?**

A. Bachelor of Science was in chemical engineering. Master's was in petroleum engineering.

**Q. And could you explain your employment background?**

A. Sure. I've primarily worked as a reservoir

engineer in waterflood studies and mainly assimilation engineering. I've worked for OXY and Era for about ten years, and then I joined HPPC in 2008 and have been with the company since then.

**Q. And what have your duties been at HPPC?**

A. I'm primarily management of operations for the company, which operates properties in Lea County and in Texas.

**Q. Do you analyze the reservoir properties for the companies -- excuse me -- the properties you operate?**

A. Yes. Yes. We have -- I do the in-house studies for the company as well.

**Q. So you've been doing that for something like 16 years?**

A. Yes. Yes.

**Q. And are you familiar with the engineering and operational matters related to this application?**

A. Yes, I am.

MR. BRUCE: Mr. Examiner, I tender Mr. Prasad as an expert reservoir engineer.

EXAMINER McMILLAN: Any objections? Any objections?

MS. MOSS: No objection. Sorry.

EXAMINER McMILLAN: So qualified.

**Q. (BY MR. BRUCE) Could you identify just briefly**

**what Exhibit 1 is?**

A. Exhibit 1 is a Form C-108, an application for authorization to inject. We want to convert the Lea State #1 into an injection well.

**Q. And let's go down to -- I've numbered the pages on this, for once in my life. Could you identify pages 4 and 5 and discuss the current state of the Lea #1 and the proposed completion of the well?**

A. The currently Lea State #1 is a producing well, and it was drilled in 1965 and has been producing since then as an oil and gas producer. So the proposal is to run in with IPC tubing and packer set at 100 feet above the perforations and circulate packer fluid in the casing annulus and complete this as an injection well.

**Q. Okay. And your injection will be into the Abo Formation?**

A. Correct.

**Q. And the wells that you say will benefit from this are obviously Abo wells also?**

A. It'll be the three updip Abo wells that we have producing on the lease.

**Q. Okay. What is the current producing rate of the #1?**

A. Currently, the well is making two barrels of oil a day and 70 barrels of water.

**Q. I'll ask some questions about that later.**

**Turning to page 6, does that list all of the wells within the area of review?**

A. Yes, sir, it is.

**Q. And there are a number of P&A'd wells, correct?**

A. Correct.

**Q. And starting with page 7, are those wellbore diagrams and other data on the P&A'd wells in the area of review?**

A. Yes, it is.

**Q. And looking at these PA'd wells, are they sufficiently plugged so there will be no -- they will not act as a conduit of the injection water to other zones?**

A. Yes, they are.

**Q. Turning to page 16, the Lea State lease, the 946 lease, occupies the northwest quarter of -- what is that? -- Section 2 and the northeast quarter of Section 3?**

A. Yes.

**Q. And HPPC owns that lease as to the Abo Formation, correct?**

A. That is correct.

**Q. And the injection well is in the southwest quarter-northwest quarter of Section 2?**

A. Yes, it is.

**Q. And what you hope to do is benefit the #2, 3 and 5 wells by injection of water into the Abo zone?**

A. Yeah. The Lea #1 is structurally in the downdip location to benefit these wells.

**Q. Okay.**

MR. BRUCE: Now, Mr. Examiner, for pressure maintenance projects, you're supposed to have a project area. As I read the regulations -- it's been a while since I've done one of these -- is that the project area would be the entire northwest of Section 2 and the east half-northwest quarter of Section 3, which is every quarter-quarter section that touches upon the 40 acres that the injection well is in. And I believe that's correct. I'll verify that for you. It's a technical deal, but it's required by the statute. That's all.

**Q. (BY MR. BRUCE) As to the other wells -- producing wells in the area of review, are they properly drilled and completed so that they won't act as a conduit of fluids to other zones?**

A. Yes, they are.

**Q. And starting at page 20, you've got a well log. Page 22, does that show the injection interval?**

A. Yes, it does.

**Q. And, again, that is solely in the Abo zone?**

A. Correct.

**Q. And when you go to -- correction. Page 23, could you summarize your injection parameters and injection pressures?**

A. Yeah. We plan to use the least produced water, which is about 250 barrels a day, to inject in this well. Initially we expect the water to be taken on a vacuum and maximum pressure, we expect, is not more than 1,777 psi.

**Q. And that would correlate with the 0.2 psi per foot of depth --**

A. Yes.

**Q. -- as set forth in Division regulations?**

A. Yes.

**Q. Is there a proposed stimulation program for the injection well?**

A. If it needs it, we will use 15 percent HCL as the -- as a small acid job to clean up the perforations. We'll evaluate that once the well has been put on injection.

**Q. Okay. And as to the rest, there are -- turning to page 24, there is the water analysis, correct?**

A. Correct.

**Q. And since you're using produced water, there will be no problem between the injection water and the**

**formation water?**

A. Correct.

**Q. And there's also a water analysis for the potential makeup water, if you use it?**

A. Yes.

**Q. Okay. And going on to pages 35 through 37, did Mr. Ben Stone who prepared -- he prepared this application under your supervision, correct?**

A. That's correct.

**Q. Did he locate all of the parties who were entitled to notice?**

A. Yes, he did.

**Q. And is that shown on pages 36 and 37?**

A. Yes.

**Q. Moving on to Exhibit 1A, what is that?**

A. This is the water sample report from Cardinal Laboratories that tested the fresh water with the samples of wells that are within a half-mile from the produced injection well.

**Q. Okay. So you have a baseline of water quality at this point?**

A. Yes.

MR. BRUCE: Mr. Examiner, Exhibit 2 is my notice letter. I received green cards back from everybody except ConocoPhillips. The OCD -- excuse

me -- the post office website shows that ConocoPhillips did receive notice, but I never received a green card back. So at the end of this, we'll have to continue it to the next hearing.

EXAMINER McMILLAN: Okay.

**Q. (BY MR. BRUCE) But, Mr. Prasad, I believe that Mr. Stone sent out notice of the C-108 when he originally prepared it, correct?**

A. Yes.

**Q. And then I sent out notice.**

A. Yes.

**Q. Did you receive any objections from any of the working interest owners offsetting the injection well?**

A. No, we did not.

**Q. Not even a phone call?**

A. No, sir.

MS. MOSS: For the record, can I object at this time to proceeding on the basis of notice?

MR. BRUCE: For what reason?

MS. MOSS: If we don't -- if -- notice was not properly given.

MR. BRUCE: It was properly given. I just haven't gotten a green card back.

MS. MOSS: Is there something in the record that shows what you refer to on the post office website?

MR. BRUCE: I can get that to you. I didn't copy it, but there is a green card -- there is -- there is a white card, and you can track it through the post office website. I will get you that to show that everybody --

MS. MOSS: Okay. Thank you.

MR. BRUCE: -- and I'll send you the other six green cards.

MS. MOSS: Okay.

**Q. (BY MR. BRUCE) Have you conducted an engineering study on the benefits of this project?**

A. Yes, I have.

**Q. And is that Exhibit 3?**

A. Yes, it is.

**Q. Could you run through it and discuss the benefits of injection into the #1 well for the purpose of the other wells on your lease?**

A. Sure. So what we did was we created a mathematical model using geologic maps, log analysis, well test data, performance data. And we -- based on this data, the three-phase model was created, which was used to predict the recovery from converting Lea State 946 well to injection. And from the study, what we conclude is that there will be an incremental benefit of 60,000 barrels recovered by converting this well to

injection. This is -- you can see this is on page -- well, it's the --

MR. BRUCE: It's the first graph.

THE WITNESS: -- the fourth page of Exhibit 3.

And what I show here is the green line is the base case of continuing operations. This is the predicted recovery from that -- from just continuing with all four producing wells producing.

The red line is the effect of converting 946 Well #1 to injection. And the model predicts that we would gain an incremental of 60,000 barrels a day -- I mean 60,000 barrels of cumulative recovery from converting this well.

**Q. (BY MR. BRUCE) and based on the cost of converting that well and additional production, will this result in substantial increase in the recovery of reserves in the Abo Formation?**

A. Yes. It'll be not only -- it'll be economically beneficial as well.

**Q. And let me say this. You've already said that the #1 well is producing at two barrels a day. By converting that to injection, will that benefit the overall lease production?**

A. Yes. Yes, it will.

**Q. At this point are you disposing of water off-lease?**

A. Yes.

**Q. And this way you'll be able to dispose it in your own well. Will that substantially reduce the cost of water injection?**

A. Yes, sir. Yes.

**Q. And will the cost savings from water injection overcome that two barrels a day that is currently being produced from the #1 well?**

A. Yes. Yes.

So the structure map, which is in that Exhibit 3, shows that the #1 well is the -- is structurally the downdip-most well in this -- in this lease, so it would be in the best position to push oil updip towards the three producing wells, the #3, the #5 and the #2 well.

**Q. And what does the next chart show?**

A. The next map is an isopach that took all the data from any wells that penetrated the Abo, and as you can see, going southeast, the porosity pinches out as you go towards the southeast, and it becomes pretty much a high thickness in the middle of the lease.

**Q. Okay. So the porosity decreases, so there's really no purpose of flooding to the south of you is**

**what you're saying?**

A. No, sir. No.

**Q. And are the project costs set forth on the second to the last page of this exhibit?**

A. Yes, it is.

**Q. And it's not really an expensive project to do?**

A. No.

**Q. And obviously, the 60,000 extra barrels will pay for it?**

A. More than -- more than -- yeah. It will more than pay off.

**Q. Next let's move to Exhibit 4. The State Land Office objected to this application, correct?**

A. Yes.

**Q. And were you in touch with the State Land Office explaining what you're trying to do and hoping they withdraw their objection?**

A. Yes.

**Q. Could you run through this exhibit? And was this data provided to the State Land Office?**

A. Yes, it was.

So this is an analysis of the well, Lee #1, which originally, back in 1981, had been perforated in the Abo zone between -- the depths were 9,010 to 9,080 feet. And they had tested this zone on April 1st, 1981,

and it tested 100 percent water, which is consistent with our structure map of being -- where the structure plunges downdip. So you would expect primarily water from that well.

**Q. And let me explain. The Lea State 946 #1 is your well?**

A. Correct. Yes.

This is L-E-E #1.

**Q. But the Lee, L-E-E, #1 well is on State Land Office lands to the south of the -- of your injection well, south or southeast?**

A. Sorry. Say that again.

**Q. The Lee #1 --**

A. The L-E-E #1?

**Q. Yeah.**

A. Okay.

**Q. -- is not your well, but that is to the south --**

A. Yes. It's to the south. Yes.

**Q. -- of your project area?**

A. Correct.

**Q. So go ahead.**

A. So this zone -- you know, initially this well was perforated in the Abo zone, and then it was abandoned with a cast-iron bridge plug and cement on top

set at 8,760. So then this -- this Lee #1 was then perforated at 8,688 to 8,710 feet, which is in the Bone Spring and came in at 95 percent oil cut. So in conclusion, the Lee #1 is producing from the Bone Spring and not the Abo zone. And we have provided a log which would show where the Abo zone is located and where the Bone Spring is located. And so, therefore, there is absolutely no way, in our opinion, that oil could be pushed towards this Lee #1 for one reason that it's not producing from the same zone and it's structurally lower than the Lea State #1 well.

MR. BRUCE: Mr. Examiner, the cross section is the second page -- or not the cross section, the well logs.

THE WITNESS: The well logs. So let me explain this well log a little bit further. The log on the left-hand side is the L-E-A, the one that we're proposing converting. And the red rectangle is where the perforations are for the Lee #1, and then there is an Abo -- Abo line marker marking where the Abo top is.

And then the next two logs that are next to it, to the Lee #1. This is for the Lee #1, L-E-E #1, and it's showing where -- the red rectangle is showing where the current perforations are for this well. And the Bone Spring marker is also marked showing the top.

The reason we have two logs is that they didn't cover the entire depth interval. That's why we had to grab another log for the same well and put it on there.

**Q. (BY MR. BRUCE) So you're injecting into the Abo, which is below the Bone Spring?**

A. Correct.

**Q. And they are separated stratigraphically?**

A. Yes.

**Q. And so injecting water into the Abo will not affect the Lee, L-E-E, #1 well, which is producing from the Bone Spring?**

A. Correct.

**Q. And then the final page is a cross section again?**

A. This is a cross section of all the wells that are producing from the Abo, and then this also includes OXY's Lee #1, L-E-E #1, and it's just a cross section across all these wells.

**Q. Okay. So in your opinion, injecting into your #1 well will not affect any -- adversely affect any offset well to the south of your lease?**

A. Correct. It will all be pushed updip towards the three producing wells that are currently producing from Abo, and we will benefit -- all parties will

benefit from this increased revenue.

**Q. And is Exhibit 5 simply from the State Land Office website showing that the State -- the SLO owns not only your leased acreage but also the acreage to the south?**

A. Correct. Yes.

**Q. And, again, notice was given to all of the working interest owners of the state leases in the area of review, and none of them objected?**

A. Correct.

**Q. Were Exhibits 1 through 5 prepared by you or under your supervision?**

A. Yes, sir.

**Q. And in your opinion, will the granting of this application be in the interest of conservation and the prevention of waste?**

A. Yes.

MR. BRUCE: Mr. Examiner, I move the admission of Exhibits 1 through 5, HPPC exhibits.

MS. MOSS: I'm not going to object.

EXAMINER McMILLAN: Okay. Exhibits 1 through 5 may now be accepted as part of the record.

(HPPC, Inc. Exhibit Numbers 1 through 5 are offered and admitted into evidence.)

MR. BRUCE: I'm finished questioning this

witness.

EXAMINER McMILLAN: Cross?

MS. MOSS: I don't have any cross.

EXAMINER McMILLAN: Go ahead, Phil.

CROSS-EXAMINATION

BY EXAMINER GOETZE:

**Q. Okay. Where do we start? Let's go to Exhibit 3. In your picture of the simulation model, could you bring some clarity to what -- are these the well locations?**

A. The well locations, the W3 is the Lea State #3.

MR. BRUCE: In the northeast corner?

THE WITNESS: This is just simulating our lease. Yes, sir.

**Q. (BY EXAMINER GOETZE) So the four wells are on here. And what I am seeing with the color variation is what units?**

A. Oh, sorry. This is thickness. It's in feet.

**Q. For the simulation model?**

A. Yes.

**Q. Okay. So we're not looking at a pressure generation?**

A. Oh, no, no, no.

**Q. So essentially what you're doing is accentuating the isopach map.**

**And in defining the structure of the Abo, what was the pick for the top of the Abo? What stratigraphic horizon was chosen? Just the contact of the Abo -- Upper Abo, or does it use a bed?**

A. The -- it's -- as we indicated on the cross section -- are you asking the top of the Abo?

**Q. Yes, whatever this -- what is this tied to?**

A. Yeah, the top of the Abo.

**Q. Okay. And this is something that someone looked at and correlated?**

A. Yes, sir. Yes. Yes.

**Q. Okay. And since I can't read it, the contour interval is what, 20 feet? And I'm assuming this is sea level?**

A. Yes. Subsea depth, yes. Correct.

Yeah. The contour interval is like every --

**Q. It's okay. It's a quiz, isn't it?**

A. Yeah. It looks like it's every 200 feet, the major contours.

**Q. I would ask that be verified by someone who has better glasses or a better --**

A. We have this electronically. I can send you an email to that effect.

**Q. That would be nice.**

MR. BRUCE: I think the examiner's eyes might be worse than mine, which is pretty --

EXAMINER GOETZE: That's right. So is his brain.

**Q. (BY EXAMINER GOETZE) With this in mind, we have dedicated just -- we're going to keep this on the lease, which will essentially be the northwest quarter of 2 and only part of a lease on Lot 1 and the southeast of the northeast? So we're not going to have any migration off to the south?**

A. No, sir, because it's structurally dipping, and there are no pressure sinks to the south.

**Q. Okay. Are you aware of the presence of the Abo Reef in this area?**

A. The Abo Reef?

**Q. Yeah. It's a feature to the north. It's a change in the lithology, becoming more of a carbonate series, quite productive and also a good place to dump water. So I have concerns about your modeling here and its ability to stay on laterally.**

A. If you turn the page to the isopach, you can see that the reservoir does pinch out to the north and south.

**Q. Okay. And that's based upon correlation of logs in the area?**

A. Yeah. It's based on all these wells that have been, you know -- their well logs looked at for porosity and structure, depth.

**Q. So what do you think the life of this project will be?**

A. Oh, it'll -- I mean, based on the curve that I have presented in -- at least 30 years.

**Q. Okay.**

**CROSS-EXAMINATION**

BY EXAMINER McMILLAN:

**Q. Okay. The first thing is I want to see a base map of where your magical cross section is.**

A. Okay.

MR. BRUCE: I can get that to you.

**Q. (BY EXAMINER McMILLAN) And I'd like -- and what I expect to see when this case is continued is I want to see a structural and a stratigraphic cross section. I mean, you -- you are not an expert at -- you're not presented as an expert in geology, and you're trying to present the geologic testimony. I mean, that's clearly stated in the record. And you're not. So you will have -- you're going to have -- you're going to have to present a better geologic presentation. And one of them is going to be you're going to have to -- when you come back, you're going to have to make sure we can -- your**

**maps are legible. So plan on presenting that when this case is continued.**

A. Okay.

**Q. Using -- simply put, using a 200-foot contour is very vague. I want a smaller contour interval.**

A. Okay.

MR. BRUCE: We'll do that.

EXAMINER McMILLAN: You'll do that.

**Q. (BY EXAMINER McMILLAN) And my question is: Where is the analog to this?**

A. The analog water flood to this?

**Q. Yes, in this area.**

A. I can search nearby water floods in the Abo. I'm not sure -- I haven't -- I can research that.

**Q. Yeah, you will.**

A. Okay.

**Q. Yeah. And let's get some geologic testimony of the depositional environments of this.**

A. Okay.

**Q. Because everyone knows a productive facies is a back reef facies, and the reef is actually tight, from what I've seen in Texas. I've done a lot of work in the Abo, actually, in Texas. So you'll present that.**

A. Yes.

EXAMINER McMILLAN: Well, let's just make

it a point to bring a geologist back.

MR. BRUCE: Okay.

EXAMINER McMILLAN: And then with that, you should be able to better define whether or not your proposed injection will stay within the proposed unit area.

MR. BRUCE: Okay.

EXAMINER McMILLAN: Do you have any questions?

EXAMINER GOETZE: Can I throw one more --

EXAMINER McMILLAN: Absolutely.

RECROSS EXAMINATION

BY EXAMINER GOETZE:

**Q. The location of your water samples, could we either get a State Engineer's number for the version or a legal description other than the Windmill South?**

A. Yeah. We'll do that.

**Q. And just go ahead and spud, because we share these with other people, especially our Environmental Bureau, so they need to know where --**

A. Okay.

**Q. Thank you.**

MS. MOSS: I think it would be useful for us to present our case or at least a portion of it, although --

EXAMINER McMILLAN: You can present as much as you want.

MS. MOSS: Okay. Well, then we're going to do it. I anticipate problems.

(Ms. Khalsa and Mr. Holm sworn.)

MS. MOSS: The first witness we're going to call is Niranjan Khalsa, and here's her card, if you need it for spelling or other purposes.

NIRANJAN KHALSA,

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

DIRECT EXAMINATION

BY MS. MOSS:

**Q. Ms. Khalsa, have you testified before the OCD or the OCC before?**

A. No.

**Q. Could you please state your name for the record?**

A. Niranjan Khalsa.

EXAMINER McMILLAN: Excuse me. Could you please face the court reporter for the questions?

MR. HERRMANN: I think it might be easier for you to swap.

EXAMINER GOETZE: That's what happens when you get this change of venue.

EXAMINER McMILLAN: Please proceed.

MS. MOSS: Thank you.

**Q. (BY MS. MOSS) Would you be good enough to summarize your education?**

A. I have a bachelor's degree in geology from New Mexico Tech.

**Q. And after you graduated from New Mexico Tech, what was the first position that you held?**

A. I was a drill rig geologist for Strathmore Minerals, a uranium mining company. We were drilling water-monitoring wells in the San Juan Basin. I was a mud logger and core logger and wrote geologic reports and collected background information for NEIS, stuff like that.

**Q. And how did the degree that you received assist you in that position?**

A. Well, it was an essential part of having a background understanding of geology so that I could do my job as a mud logger, identifying rocks and helping design wells and overseeing drilling operations.

**Q. How long did you hold that position?**

A. Two years.

**Q. And where did you go next?**

A. The State Land Office.

**Q. And what was the position you were hired for at**

**that time?**

A. I was originally hired to pick lands for lease sales, to do an analysis on different areas of the state to figure out petroleum reserves, trends and nominate lands for lease sales so that oil and gas companies could -- could lease them and produce hydrocarbons for the generation of revenue for the State Land Office.

**Q. And for how long did you do that?**

A. I did that for a year.

**Q. And then what was your next position?**

A. The current position that I have now. I'm a petroleum specialist supervisor. I do communitization agreements, saltwater disposal, easements, water easements. I do the mineral evaluations. I write geologic reports for lands exchanges, and I oversee a couple of engineering positions.

**Q. And is Mr. Holm one of the people that you oversee?**

A. Yes, he is.

MS. MOSS: I would like to tender Ms. Khalsa as an expert in geology.

EXAMINER McMILLAN: Any objections?

MR. BRUCE: No objection.

EXAMINER McMILLAN: So qualified.

**Q. (BY MS. MOSS) Okay. Ms. Khalsa, what I'd like**

**to ask you is how you became aware of this case?**

A. Anchor Holm sent an email with his concerns regarding the proposed pressure maintenance project, and he and I discussed it and decided that we had an objection to the project.

**Q. And at that time, did he show you any diagrams or --**

A. Correct.

**Q. Okay. And was this one of them (indicating)?**

A. That's right.

**Q. So I would just point to Exhibit 1, and I'm going to allow Mr. Holm to discuss this.**

**But is this the exhibit that he got to you?**

A. That's the exhibit. Yes.

**Q. And the two of you decided to proceed?**

A. Correct.

MS. MOSS: These are all the questions I have for Ms. Khalsa.

EXAMINER McMILLAN: Cross?

MR. BRUCE: None.

MS. MOSS: So now you move.

THE WITNESS: Okay.

MS. MOSS: I'd like to call Anchor Holm.

ANCHOR E. HOLM,

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

DIRECT EXAMINATION

BY MS. MOSS:

**Q. Mr. Holm, would you state your name for the record?**

A. Anchor E. Holm.

**Q. And would you tell us about your education?**

A. I'm a -- have a degree in geological engineering from the University of Arizona, and I've subsequently been registered as a professional petroleum engineer by the State of Texas back in 1976. I've worked both as a drilling engineer, a production engineer, a reservoir engineer and an evaluation engineer, as far as a petroleum engineering background is concerned, over the first 20 years of my career. It's been a very interesting career.

I've been at the State Land Office now for six years primarily doing review of information or applications as they come into the land office regarding protection and utilization of the resources of the State Mineral Trust. The majority of all my work has been subsurface.

**Q. And have you testified before the OCD before?**

A. Yes, I have.

**Q. And at that time, were you tendered an expert?**

A. Yes, I was.

**Q. Okay. Before we go --**

EXAMINER McMILLAN: So you want --

Any objections, Jim?

MR. BRUCE: No.

EXAMINER McMILLAN: So qualified.

MS. MOSS: Thank you.

**Q. (BY MS. MOSS) Now, have you reviewed the exhibits submitted by HPPC?**

A. Yes, I have.

**Q. Okay. And were you here listening to the testimony of Mr. Prasad?**

A. Yes, I did.

**Q. And when you heard the testimony today of Mr. Prasad, did you identify a problem with the well Mr. Prasad referred to?**

A. He referred to a well -- it's called the L-E-E, Lee #1 -- as being located south of the proposed area for the water injection maintenance -- pressure maintenance project. Based upon the OCD records and our records, that particular well is actually located due east of the proposed water injection well and to the southeast of the two of the three producing wells that

are on the lease, the 946 lease, I believe.

**Q. Now, for the record, are you looking at what we have submitted as Exhibit 1?**

A. Exhibit 1, and all the area in blue are wells that we own -- that we have direct interest in as far as minerals are concerned.

**Q. This is the map (indicating) which you heard Ms. Khalsa identify as the document you brought to her to show your concerns about this case. Can you just explain what you showed her for the record?**

A. Part of the process of reviewing a C-108 saltwater disposal application, which includes water pressure maintenance wells -- the process we go through is we first establish where the well is located and who owns them, who owns the minerals, who owns the surface and whether or not we have any data on those, how they historically have been completed, as well as produced. And I'm the one who wrote the markup on this as I was gathering the data from each individual well to better understand the facts of the situation.

**Q. And what did you conclude when you created this?**

A. I concluded that the L-E-E Well #1 was completed in three different times. The first time was what was called the Abo. The second time was in the Abo

Reef, and then the third time was recompletion back into the Abo. There was no discussion in the OCD records of it being Bone Spring. When I looked at the proposed water injection well, it was proposed as being Abo Reef, and it subsequently changed to Abo, and it was in the same perforated interval as the original perforations of the L-E-E #1. So they correlate depthwise.

I also looked at the other wells in the vicinity and determined that same type of information to see what was realistic, and I also had at my disposal the isopach map that was presented by the Applicant.

**Q. I'd like to point your attention to Exhibit Number 5. Was this something which we originally received from HPPC?**

A. We have received this from HPPC. Whether it was in the first group or the second email, I've forgotten which one that is. But we received both of them, and we reviewed both.

**Q. And pursuant to that review, what did you determine?**

A. Based upon this cross section, on the left-hand side, there is a well. It's called the Lea 946 #3, which is -- that's what I have marked as A?

EXAMINER McMILLAN: Yeah.

THE WITNESS: Correct. And it is located

northeast of the proposed injection well.

The one I have marked as B, the 946 #5, is more due north of the water injection well. C is a water injection well. D would be the well to the west, and it's the 946 #2. And it would west of the proposed water injection well. So this is an east-to-west cross section until you get to the Lee #1, L-E-E #1, well, which actually is closest to the A well, which is the Lea 946 #3.

**Q. (BY MS. MOSS) Let me interrupt you just for a second. Is what you're saying that what you've marked as E would better and for better understanding be placed over to the left of A?**

A. Yes, because then it would be a true east-to-west cross section instead of zigzag.

**Q. Please continue.**

A. Looking at the correlation which was prepared by HPPC, if you moved the well log of the Lee #1 to the same position but over on the left-hand side, it would show that it's completed in the same interval as the Lea 946 #3 and the Lea 946 #5 wells, which are the two closest updip wells to the proposed water injection well that they have modeled as showing that there are no hydraulic barriers between the perforations in the two wells to the north and the proposed water injection

well. So there is no vertical containment of any water to be injected there. Since these other two wells are also closer to the Lee, L-E-E, #1 well, we would anticipate that it would be in communication with the water injection well.

**Q. To further understand this project, did you then create Exhibits 2, 3 and 4?**

A. Yes, I did. I prepared those.

**Q. So looking at Number 2, how can this better inform the process that's occurring?**

A. Exhibit Number 2 is the production performance since 2004 of the Lee, L-E-E, #1. And the orange lines at the top are the gas-oil ratio, the GOR, and the red line is the MCF-per-month line. The black line is the barrels-of-oil-per-month line, all based on the same scale on the left-hand side. What this shows is that the gas-oil ratio is running between 2- and 3,000 to 1. This is on a well that has been producing for a very long period of time and is -- you would anticipate that if it were a volumetric reservoir separate, that it wouldn't have this high of a GOR. It would be deleted down lower. So there must be something else maintaining the reservoir pressure, thereby keeping the gas and solution for the GOR at 3,000 to 1.

**Q. Now moving to Exhibit 3.**

A. Exhibit Number 3 is the same graph prepared, but it's just for the Lea, L-E-A, 946 State #3 well. The orange lines in there are also in the 2- to 3,000 range, 2- to 4,000, about the same range as the L-E-E 1 GOR. The water and oil -- water production is significantly higher than in the Lee #1, but the oil and gas production are similar.

**Q. And now looking at Number 4 -- Exhibit 4.**

A. Exhibit Number 4 is the proposed water injection well, the Lea 946 State #1. It also has gas-oil ratios that bounce between 2,000 and 3,000, as much as 4,000 GOR. So it's roughly the same gas-oil ratio, which says it's in the same pressure environment as the Lee #1 well. It's also making some water. Whereas, the Lee #1 really didn't make much water at all but is making some.

**Q. Number 4 is L-E-A?**

A. Number 4 is L-E-A #1, the first exhibit. Number 2 -- Exhibit Number 2 is L-E-E.

MR. HERRMANN: Can we just refer to the Lee, L-E-E, #1 as the OXY well?

THE WITNESS: Yes, we can. That might be simpler. Yes. I do believe OXY is the operator of that lease.

**Q. (BY MS. MOSS) So having looked at Exhibits 5,**

**2, 3 and 4, what conclusion did you reach?**

A. The conclusion is that the OXY well, the Lee, L-E-E, #1, is likely completed in the same reservoir. But when you look at the vertical separation of the perforations in the OXY well from the Abo, that suggests that if there is water in the Abo beneath the perforations in the Lee, L-E-E, #1, the OXY well, that that is isolated because there is no water being produced at the Lee 1. So where is this more recent water coming from? It is probably coming from water that has migrated up through the system to the west and is now being produced at the OXY well.

**Q. If you look at Exhibit Number 7, this was an exhibit which we received from HPPC. Was there something within this exhibit, which is labeled "Executive Summary," that you were particularly interested in speaking about here today?**

A. Yes. In the Executive Summary, the fourth bullet item says, "The model predicts that remaining oil on the lease" -- that's the state lease -- "will be pushed from the Lea State 946 #1 well towards the three updip producing wells on the lease which are all located on State Lands...thereby improving recovery."

This statement demonstrates that even though the water injection well is completed low in the

Abo, it is going to be influencing the wells that are completed all the way up into the same interval as the OXY well. Therefore, there is nothing to impede any injected waters from eventually pushing oil to the Lee #1 well; that's OXY's.

**Q. Now, if you recall, was there a solution that you suggested which would have addressed the State Land Office's objection?**

A. We suggested that maybe a unit ought to be considered to bring that well in to the unit so that they would all benefit rather than have the trust -- the beneficiary of the State Land Trust to suffer loss.

**Q. This is my last question, but was there anything else in these exhibits, particularly Number 6, which we didn't look at, which you feel is important to highlight today?**

A. On Exhibit Number 6, it is the isopach map prepared by HPPC, and they show on that map that the -- what I have marked as E, which is the L-E-E #1, the OXY well, does have a position within the reservoir that's modeled. So, therefore, you would expect it to see benefit from that, and it would cause loss to the trust.

MS. MOSS: That's all the questions that I have.

EXAMINER McMILLAN: Cross?

MR. BRUCE: I think I prefer to bring Mr. Prasad back up and have him address these issues very briefly.

EXAMINER McMILLAN: Okay.

CROSS-EXAMINATION

BY EXAMINER McMILLAN:

**Q. My question is referring to Figure -- Figures 1 and 5. Going from -- okay. So I can figure out where the State -- I'm trying to understand where your cross section goes. I can figure out where the State Lea 946 3 is, the #5, the #1, the 946 #2. And where do you believe the OXY well is located?**

A. Well, referring to what we have as Exhibit 6, I have drawn a cross-section line of A, B, C, D and then E that might help to point out --

**Q. That's my question.**

A. Yeah. That is -- I have drawn the cross-section line for the data that was presented on Exhibit Number 5.

**Q. Okay. So your take on it is that the OXY well is -- it's due east of the proposed injection well?**

A. That's correct. And that matches the data that I have.

**Q. Okay. Well, that answers --**

A. Now, there are two wells to the south. The one

that's -- that is marked as zero -- in a zero dashed line for the edge of the reservoir, that's a shallow gas well which did not penetrate the Abo. What's called the -- I think it's the Superior State well, which is due south of the proposed water injection well, is a P&A'd well that was completed, but it early watered out, and they plugged that well. So there is no production to the south of the proposed water in injection well.

**Q. Okay. So what about the well that's 2,310 from the north, 660 from the east? It looks like -- it says -- I'm looking at Figure 6. Is that where it says "45"? Right below D.**

A. Right below B?

**Q. No. D, as in dog.**

A. D, as in dog? That #45 well is one that I believe has been plugged.

**Q. Okay. And did they test the Abo in that well?**

A. I don't remember on that. I was focused on what they were doing. I don't remember looking at that particular well other than I think I did look at the production data on it.

**Q. And what did --**

A. And it early watered out.

**Q. Oh, it did water out in the Abo?**

A. Yes.

EXAMINER GOETZE: You've been thorough, but are you going to enter these exhibits into record?

MS. MOSS: I am going to enter the exhibits into record -- the entire notebook of exhibits into the record.

Did you want to ask questions?

EXAMINER GOETZE: No. I'm quite happy with what has been presented so far. Thank you.

MS. MOSS: Okay.

EXAMINER McMILLAN: Enter the exhibits.

MS. MOSS: I'd like to enter this notebook as -- do I enter them as a whole?

MR. BRUCE: Exhibits 1 through 7.

EXAMINER McMILLAN: Do you have any objections?

MR. BRUCE: No.

(Laughter.)

EXAMINER McMILLAN: Exhibits 1 through 7 may now be accepted as part of the record.

(State Land Office Exhibit Numbers 1 through 7 are offered and admitted into evidence.)

EXAMINER GOETZE: We just don't do "the whole notebook." Mr. Bruce puts numbers on it.

MS. MOSS: We have numbers, 1 through 7.

MR. HERRMANN: Mr. Bruce has asked that I provide the court reporter with my copy of the exhibits, so I have provided her with your exhibits as well.

MS. MOSS: Thank you.

MR. BRUCE: I have some redirect.

EXAMINER McMILLAN: Let's swap so --

RAJAN PRASAD,

after having been previously sworn under oath, was re-called, questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

**Q. Just a few things, Mr. Prasad. Looking at their Exhibit 1, on the white block, which is not state land, they're talking about the L-E-E #1, the OXY well, correct?**

A. Yes.

**Q. Looking at your -- at your Exhibit 3 and going to the picture of the simulation model --**

A. Now, that's the thickness. Yes.

**Q. Oh, thickness. Excuse me. Maybe they're all in here. Or just the -- the Abo structure. So what they're talking about is just to the east of the orange area. In the yellow area, they're talking about the well. Number one, is that substantially lower in the Abo than your injection well in your proposed producing**

**wells?**

A. Yes. So when you look at the -- the OXY well -- and these are in the OCD reports -- the first interval that they perforated was at 9,010 to 9,080. And if you look at Exhibit 4 and look at the second page of Exhibit 4, that is in what we are calling the Abo, you know, 9,010 to 9,088. And there was a test, as reported in OCD, of 100 percent water. And if you look at the gamma ray curve on this log and you look at the gamma ray curve on our 946 #1 well where the Abo is marked, above the Abo, there is a shift in the gamma ray log, which would indicate there is some barrier. That is -- by gamma ray, that is showing that there is a barrier.

Then a bridge plug was placed at 8,760 feet, and then the zone above that was perforated, and the OXY well came in at 95 percent oil cut. So it was a 5 percent water cut at the time of initial completion. So I believe that it's still producing at the same water cut.

And the fact that there is a barrier -- the barrier we're referring to is based on the gamma-ray log, which would separate the Abo zone from the Bone Spring zone.

**Q. But also what you're saying is that the initial**

**production from the OXY well was 100 percent water cut?**

A. Yes. And it was -- and if you look at the where the Abo is marked, it is structurally lower than the 946 #1 well.

**Q. So, again, you wouldn't expect any --**

A. It's possible to push -- yeah. It's impossible to push oil downdip.

So I think that, you know, looking at Exhibit 4, on the second page of it, we would have to examine, you know, where the OXY well was initially perforated, where the bridge plug was placed and where it's currently producing? I don't think we can take the -- the GOR and the production of it and simply compare it. We need to look at the logs to look at where our #1 well -- 946 #1 well is proposed to be injected and where they're currently producing.

**Q. Okay. So if the OXY well is downdip and it had 100 percent water cut --**

A. In the Abo.

**Q. -- in the Abo --**

A. Uh-huh.

**Q. -- are there going to be any reservoirs pushed off of state lands onto fee lands into that well?**

A. No, because the other three wells are acting as pressure sinks. So as long as you're producing those

wells, there is no way to cross-flow oil into another zone.

**Q. And they are basically strati- -- stratigraphically equal with the injection well?**

A. They're in the same zone as the injection well.

**Q. In the same zone?**

A. Yes.

**Q. And that's where the --**

A. They're updip from --

**Q. -- hydrocarbons are going to be pushed?**

A. Yes.

**Q. Not onto the fee land?**

A. It's impossible. And I can -- if there is belief that the Lee #1 is in the same zone, which, if you look at Exhibit 4, page 2, I don't see how that is possible -- if there is, we can put that in our simulation model to see what the effect would be. But I think from the log standpoint, it is impossible to see how that well is producing from the same zone as the Lea 946 well.

**Q. Thank you.**

EXAMINER McMILLAN: Are you finished?

MR. BRUCE: Yes.

THE WITNESS: With regard to that, yes.

MS. MOSS: So may I ask a question?

EXAMINER McMILLAN: It's cross. Yes.

CROSS-EXAMINATION

BY MS. MOSS:

**Q. So if you look at your exhibit, the exhibit that we call Number 5, are you able to reach the same conclusion or do you come to a similar conclusion by looking at what we've called A, so State Lea 946 #3 and State Lea 946 #5?**

A. And your -- repeat -- please repeat your question. What is your -- these two wells -- what is the question with regards to these two wells?

**Q. My understanding is that you took Exhibits 3, 4 and 5 and claimed that they either did not show different zones or --**

A. I'm saying that the 946 #1 well, where we had proposed to put this well on injection, the zone that we plan to inject in is not in the same zone as the OXY well.

**Q. Can you say the same thing about the wells that are identified by us as A and B --**

A. I don't -- I don't plan on making those injection wells. I mean, the -- I guess --

**Q. I can ask. What were the purposes of including these in the cross section? I'm just going to take a step back.**

A. The A and B well?

**Q. Yes.**

A. It was just to show how the Abo zone is tied across the producing wells, but our intention is to inject water in the 946 #1 well. If you look at Exhibit 4, page 2, you know, these are putting the 946 1 well next to the OXY well. There is clearly a barrier that separates the Abo zone from the zone that the OXY well is producing from. I'm talking about our Exhibit 4.

**Q. I know. I know. I'm just giving my expert a minute to see if that is sufficient.**

A. It's hard to see on this cross section because it's not zoomed in.

**Q. Do you see the same vertical separation in A and B as you do in C?**

A. Yes. The Abo zone that is in the #3, the #5 and the #2 --

MR. BRUCE: 946.

THE WITNESS: -- 946, the gamma ray logs are showing the same character as the #1 well.

**Q. (BY MS. MOSS) If instead of asking you to compare C to A and B, I ask you to compare the barriers in E to A and B, would you still come to the conclusion that there are sufficient barriers?**

A. Yes, I would. I would have to -- you know, I

think it would be better if we put a zoomed-in log, but -- to demonstrate that, but we're looking at -- we're looking at the Lea 946 #1 as the proposed injection well.

Is the concern that the oil will cross-flow in these other wells, the A and B, to somehow get to the OXY #1 well?

**Q. Well, the concern clearly is that the project you propose is going to push reserves away from the State Land Office.**

A. I don't see how because -- I mean, that's what I've been trying to say, is that the Lea 946 #1 well -- you can clearly see that the perforated interval of that well -- this is a barrier that separates that zone from the upper zones.

MS. MOSS: Okay. If I'm not wrong, I think what we've reached is that when there are more detailed records that come in the next time, this will be clearer.

CROSS-EXAMINATION

BY EXAMINER McMILLAN:

**Q. Okay. Who's kidding who? It's nearly impossible to tell lithologies when you're dealing with dolomites because, remember, dolomites are formed by a dolitizing fluid replacing the lime.**

A. Yes.

**Q. It's blatantly obvious. Everybody knows that. And you can't -- it's extremely difficult to use a gamma ray as a barrier. You need a geologist to get in here and -- I've seen productive facies in dolomites with a very high gamma ray -- allow me to finish.**

A. Sorry. Sorry.

**Q. -- that has a very high -- the gamma ray is very hot, and it's a dolomite. And you think it's a barrier, and it's highly productive. So you're going to have to bring a geologist back here for your geologic presentation. Simply put, your geologic presentation is insufficient.**

A. How about the fact that -- I'm sorry.

**Q. Go ahead.**

MR. BRUCE: We're going to, Mr. Examiner.

THE WITNESS: How about the fact that the OXY well was tested at 100 percent water in that Abo zone and then put a bridge plug and then perforate in that upper zone and it came in at 95 percent oil?

**Q. (BY EXAMINER McMILLAN) But, you know --**

A. That would separate --

**Q. As I stated earlier, you are not an expert in geology, and you're attempting to make geologic**

**assumptions, which you are not an expert on. Therefore, when you come back, you're going to bring a geologist.**

A. Sure. Yeah. That's no problem. I'm just basing it on the well test.

**Q. Okay. But then I disagree with you trying to use a gamma ray in a dolomite, which is extremely difficult, as a barrier.**

EXAMINER McMILLAN: Any objections to that?

MS. MOSS: No.

MR. BRUCE: No.

EXAMINER McMILLAN: Okay. Do you have anything else?

EXAMINER GOETZE: No. It's been very exciting so far.

(Laughter.)

MS. MOSS: I think it's still incumbent upon me to ask --

EXAMINER McMILLAN: Please proceed.

MS. MOSS: -- just to ask that you determine that this project should not be granted.

EXAMINER McMILLAN: You know what, the case has to be continued. And there is additional information expected from the Applicant, and this case has to be continued until the 10th. It cannot be taken under advisement or anything of that nature until there

is more testimony, and certainly you will have the opportunity to cross.

MR. BRUCE: Ask that the case be continued.

EXAMINER McMILLAN: Okay. This case shall -- Case 16455 shall be continued until January 10th.

Let's come back at 1:15. Let's do it this way, let's do your notice cases.

(Case Number 16455 concludes, 11:45 a.m.)

(Recess, 11:47 a.m. to 1:15 p.m.)

STATE OF NEW MEXICO

COUNTY OF BERNALILLO

CERTIFICATE OF COURT REPORTER

I, MARY C. HANKINS, Certified Court Reporter, New Mexico Certified Court Reporter No. 20, and Registered Professional Reporter, do hereby certify that I reported the foregoing proceedings in stenographic shorthand and that the foregoing pages are a true and correct transcript of those proceedings that were reduced to printed form by me to the best of my ability.

I FURTHER CERTIFY that the Reporter's Record of the proceedings truly and accurately reflects the exhibits, if any, offered by the respective parties.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case and that I have no interest in the final disposition of this case.

DATED THIS 18th day of December 2018.

MARY C. HANKINS, CCR, RPR
Certified Court Reporter
New Mexico CCR No. 20
Date of CCR Expiration: 12/31/2018
Paul Baca Professional Court Reporters