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:

CASE NOS: 21130

APPLICATION OF TEXLAND PETROLEUM-HOBBS LLC
FOR APPROVAL OF A WATERFLOOD UNIT AGREEMENT,
AUTHORIZATION TO INJECT INTO THE MURPHY 1 WELL,
and TO QUALIFY FOR THE RECOVERED OIL TAX RATE,
LEA COUNTY, NEW MEXICO.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

MARCH 5, 2020

SANTA FE, NEW MEXICO

This matter came on for hearing before the New Mexico Oil Conservation Division, EXAMINERS FELICIA ORTH, KATHLEEN MURPHY, PHILLIP GOETZE and DYLAN COSS on Thursday, March 5, 2020, at the New Mexico Energy, Minerals, and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

Reported by: Irene Delgado, NMCCR 253
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I N D E X

W I T N E S S E S



E X H I B I T I N D E X

HEARING EXAMINER ORTH: Okay. We are back after the lunch break, and I would like to call Case Number 21130. This is Texland Petroleum for a well named Murphy, and we have a couple of appearances.

Would you like to start?

MS. LUCK: Good morning, Examiners, or good afternoon, Kaitlyn Luck with the Santa Fe office of Holland & Hart, and together with me is Adam Rankin with the Santa Fe Office of Holland & Hart on behalf of the applicant, Texland Petroleum-Hobbs LLC.

MS. ANTILLON: Andrea Antillon on behalf of the State Land Office. The State Land Office filed an entry of appearance in this case, but we were able to come to an agreement with the applicant, so I'm just entering my appearance today to ensure follow up on that.

HEARING EXAMINER ORTH: Thank you. Ms. Luck.

MS. LUCK: Today we will be calling four witnesses, if they may be sworn in.

HEARING EXAMINER ORTH: Are they all four here?

If each and every one of you would raise your right hand. Do you and each of you swear or affirm that the testimony you are about to give will be the truth, the whole truth, and nothing but the truth?

WITNESSES: (Collectively.) I do.

HEARING EXAMINER ORTH: Thank you was all four.

Please go ahead.

WILSON WOODS

(Sworn, testified as follows:)

DIRECT EXAMINATION

BY MS. LUCK:

**Q. Good afternoon. Please state your name for the record.**

A. My name is Wilson Woods.

**Q. By whom are you employed and in what capacity?**

A. I'm employed by Texland Petroleum, and I'm the vice president of land and legal.

**Q. Have you previously testified before the Division?**

A. Yes, I have.

**Q. And just briefly state your educational experience.**

A. I have a BA from the University of Texas at Austin, and a JD from Texas Tech University School of Law. I have been in practice for 13 years as an oil and gas attorney first with Harrison and Vogel in Ft. Worth, a private practice law firm. I have been with Texland for eight years running their land and legal work.

**Q. Are you familiar with the application filed in this case?**

A. Yes, I am.

**Q. Are you familiar with the status of the lands in the proposed area?**

A. Yes, I am.

**Q. Are you also familiar with the status of the lands in the half mile area of review around Texland's proposed injection?**

A. Yes.

**Q. Have you put forth efforts to obtain approval of the proposed waterflood unit?**

A. I did.

MS. LUCK: With that, I tender Mr. Woods as an expert witness in petroleum land matters.

HEARING EXAMINER ORTH: Do the Examiners have any questions about his qualifications?

EXAMINER GOETZE: I do not. Thank you.

HEARING EXAMINER ORTH: Thank you. So recognized.

BY MS. LUCK:

**Q. Can you turn to Exhibit Number 1 and identify what this is?**

A. This is a map of our Knowles Garrett unit area in Lea County, New Mexico.

**Q. And what is Texland seeking under this application?**

A. We are seeking four things today.

First we are seeking approval of the Knowles Garrett unit, which is planned to be a voluntary waterflood unit.

Second we are seeking authorization to inject into the Murphy Number 1 well located here on the map.

Third we are seeking authorization to convert future wells in the unit area to injection administratively without going to hearing.

And fourth we are asking for approval for EOR tax credit.

**Q. So you will be providing an overview of the unit agreement and the plan of operation, but other witnesses will be providing technical information about the waterflood operations and the request for authority to inject as well as the EOR tax credit?**

A. This is correct.

**Q. This is a voluntary waterflood unit; is that right?**

A. Yes, it is.

**Q. Comprised of 240 acres?**

A. Correct.

**Q. Is this only fee acreage?**

A. Yes, it is.

**Q. What is the unitized interval?**

A. The unitized interval is the stratigraphic equivalent of 100 feet above the top of the Drinkard Formation down to 100 feet below the base of the Drinkard Formation.

**Q. And turn to Texland Exhibit 2. Is this a copy of the unit agreement for the waterflood unit?**

A. Yes, it is.

**Q. This is a standard unit form?**

A. Yes.

**Q. It shows the character of the land?**

A. Yes, it does.

**Q. It provides for waterflooding?**

A. Yes.

**Q. And it also sets out the basis for participation in each of the parties?**

A. That's correct.

**Q. Let's identify in Texland Exhibit 2 where the unit agreement provides the formula for participation. I think it's in Section 1.11 and 5.1; is that correct?**

A. For tract participation?

**Q. Yes.**

A. Yes.

**Q. And then that is shown on Exhibit A?**

A. Correct.

**Q. And then a later witness will explain the different phases of the participation formula?**

A. That's correct.

**Q. So does this Exhibit A in the unit agreement identify the tracts in the unit area?**

A. Yes, it does.

**Q. And there are five tracts involved?**

A. That's correct.

**Q. And what lands do you seek to include in the unit?**

A. In Section 30 of Township 16 South, Range 38 East, we are seeking to include the SE/4 of the NW/4, and the S/2 of the NE/4. In Section 29, Township 16 South, Range 38 East, we are seeking to include the SW/4 of the NW/4, and the E/2 of the NW/4.

MS. LUCK: And just for clarification purposes, our application included a clerical error that misidentified it as being the SE/4 of the NW/4 of Section 29, that is in the SW/4 of the NW/4. And so we are asking that that be cleared up at this point by the proper identification of the land to be included in the unit.

BY MS. LUCK:

**Q. And also with our application, was notice provided with a map that showed the proposed unit area with the correct location?**

A. Yes, it was.

**Q. And it also had the Exhibit A that showed the**

**correct tract location?**

A. Yes.

**Q. And so what is Exhibit B to the unit agreement?**

A. It is another copy of the unit map.

**Q. Okay. And are there any overriding royalty interest owners in this unit?**

A. Yes, there are.

**Q. And how will they be treated under the unit agreement?**

A. They are being treated the same as the other working interest owners on a unit basis.

**Q. Let's turn to Texland Exhibit Number 3. Is this a copy of the unit operating agreement with all attachments?**

A. Yes, it is.

**Q. I would like to review a couple of the key provisions. This unit agreement outlines supervision and management of the unit.**

A. That's right.

**Q. It also defines the rights and duties of all parties?**

A. That's correct.

**Q. And it shows how investments and costs are to be shared?**

A. Yes.

**Q. It also establishes voting procedures for**

**decisions to be made by the working interest owners?**

A. Yes, it does.

**Q. And it sets forth the accounting procedures and shows how the costs will be paid?**

A. Correct.

**Q. Finally it contains other standard operating agreement provisions?**

A. Yes, that's right.

**Q. Turning to Texland Exhibit 4 A. Is this a list of the working interest owners within the unit area, and also showing their participation factors for the expenses in both Phases 1 and 2?**

A. Yes, it is.

**Q. It shows the expense breakdown by interest, and what percentage is currently committed to the unit?**

A. We are over 99 percent approved with working interest owners for this unit.

**Q. And turning to Texland Exhibit B, is this a list of all the owners in the unit area showing their participation factors for revenue?**

A. Yes.

**Q. And including both the royalty interest owners and the overrides?**

A. Yes.

**Q. In your opinion, is the allocation that's**

**proposed under this unit agreement fair, reasonable and protective of correlative rights?**

A. Yes, it is.

**Q. Are there any injection wells currently within the unit?**

A. There are not currently any injection wells within the unit, but we are seeking authority to convert the Murphy Number 1 well for injection. We're also seeking authorization to convert future wells to injection administratively without the need for a hearing.

**Q. And what pool covers the subject acreage?**

A. This is in the Garrett Drinkard pool or Pool Code 27130. It covers the Drinkard formation in the unit.

**Q. In your opinion, is the creation of the unit in the best interest of conservation and the prevention of waste and protection of correlative rights?**

A. Yes.

**Q. Did Texland provide notice of this hearing application to all mineral owners identified on Exhibit 4 A and 4 B?**

A. Yes, we did.

**Q. Let's talk a little bit more about Texland's request for authorization to inject. Is Exhibit 5 a copy Texland's C-108 application for the Number 3 well?**

A. Yes, it is.

**Q. And another witness is going to testify on the TexTexland application, but you are going to testify as to notice; is that right?**

A. Correct.

**Q. And you have previously testified that Texland is seeking authorization to convert the one well to injection for waterflood at this time, and authority to seek administrative approval without the need for hearing to convert future wells to injection?**

A. Yes.

**Q. And so Texland has notified parties entitled to notice within a half mile area of review, and not surrounding the proposed injection well, but around the entire unit area?**

A. That's correct.

**Q. And that was so that all parties that are entitled to notice as to future injection also have notice that Texland is requesting that the future wells be converted to injection administratively?**

A. Correct.

**Q. So on Exhibit 5, Page 10, is this map depicting the half mile area of review around the unit boundary that was provided notice?**

A. Yes.

**Q. And Texland also provided notice to the owner of**

**the surface on which the Murphy Number 1 well is located?**

A. That is correct.

**Q. Turning to Exhibit 6, the first page of Exhibit 6 is a map identifying the area that was provided notice of the request to convert future wells to injection administratively?**

A. That is correct.

**Q. And the second page is the parties within the half mile area of review that were provided notice?**

A. That is right. It's a multiple spreadsheet split out by section numbers reflecting who was given notice.

**Q. Okay. And all parties who were noticed are identified based on the title of the land and interest recorded in the records of the county and OCD operator records as of the time the application was filed?**

A. That is correct.

**Q. In your opinion, did Texland undertake a good-faith effort to correctly identify addresses for notice within the half mile area?**

A. Yes, we did.

**Q. To the best of your knowledge, are the addresses that you identified valid and correct?**

A. Yes, they are.

**Q. And is Texland Exhibit Number 7 an affidavit with the letter attached providing notice of this application and**

**hearing that was sent from our office?**

A. Yes, it is.

**Q. And is Texland Exhibit Number 8 a notice of publication identifying all parties by name?**

A. Yes, it is.

**Q. Were Texland Exhibits 1 through 4 and Exhibit 6 prepared by you or compiled under your direction and supervision?**

A. Yes, they were.

MS. LUCK: So with that, I would move the admission of Exhibits 1 through 4 and 6 through 8 which include the notice affidavit.

HEARING EXAMINER ORTH: Any objection.

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: Exhibits 1 through 4 and 6 through 8 are admitted.

(Exhibits 1-4 and 6-8 admitted.)

MS. LUCK: With that, I would pass the witness.

HEARING EXAMINER ORTH: Ms. Antillon, any questions?

MS. ANTILLON: No questions.

HEARING EXAMINER ORTH: Mr. Goetze, do you want to go first this time?

EXAMINER GOETZE: No. I don't have any questions.

HEARING EXAMINER ORTH: Ms. Murphy?

EXAMINER MURPHY: I just have a couple questions. Is Shelton -- you have it split into five 40 acres, right, for the section. And I'm talking Exhibit 4 A, at the top of that page, Goodding, Murphy, Stoval, Cook and Shelton, and Shelton is 80 acres; is that right?

THE WITNESS: That is right.

EXAMINER MURPHY: Okay. In the -- I'm sure you will talk about this more, you will convert the Murphy, but the future injectors, will those be existing, or you will drill new ones?

THE WITNESS: It's almost certainly going to be an existing well converted, yes.

EXAMINER MURPHY: Okay. No more questions, thanks.

HEARING EXAMINER ORTH: Thank you. Mr. Coss.

EXAMINER COSS: Good morning -- or good afternoon.

THE WITNESS: Good afternoon.

EXAMINER COSS: So my question is more of a curiosity, these tables are are impressive. How is something like that compiled? Is that something you do?

THE WITNESS: That's something I did in just an Excel spreadsheet.

EXAMINER COSS: And how does this work in reality, every one of these people gets a check at the end of the month?

THE WITNESS: Yes. Everyone is a revenue interest owner either on the working interest side or royalty interest side.

EXAMINER COSS: How do you compile all of that information?

THE WITNESS: It's all part of our accounting system. I pulled all of these into an Excel spreadsheet and calculated first the -- it's not on that one, but first the unit participation factors for phase one, phase two. And then each well has a separate tab in Excel that you apply the participation factor to get the unit revenue factor here.

EXAMINER COSS: Incredible. And so there is a lot of participating parties in this. Where is this well located, and what are all of these people's relationship.

THE WITNESS: On the working interest side. The working interest side it's kind of the way Texland works. Probably 85 percent of those people are Texland employees, former Texland employees or Texland ownership. Texland is merely an operator and the working interest is actually held by individuals within the company. Then we have outside partners that we work with for a portion of the interest.

EXAMINER COSS: So this is mostly Texland, but then subdivided among Texland employees?

THE WITNESS: That's right.

EXAMINER COSS: Okay, interesting. Well, I'm glad I clarified that then. The only other question I have or query, and I find it, seems like, behind Tab 3, and having to do with audits. It doesn't quite give me a page number in here. I see a lot of -- yeah, begins with direct charges, Section 2, half the way through behind Tab 3. Closer to Tab 4, really.

THE WITNESS: On the COPUS?

EXAMINER COSS: Direct charges.

THE WITNESS: Okay.

EXAMINER COSS: I see a bunch of text lines through scratched out. What went on there? Is this just kind of discussions in your contract?

THE WITNESS: It's discussions amongst partners as to what works for us, really, and this has been kind of our standard form for going on 30 years now.

EXAMINER COSS: Okay. And all of the material that's crossed out, is that anything -- why was it crossed out in these cases?

THE WITNESS: I honestly don't know. It's been that way for a long time before my, my tenure with Texland. Most of it, going through, is really just crossing out pieces that weren't selected, selections as you go through it.

EXAMINER COSS: Okay. That just caught my eye kind of not normal, just caught my eye.

MS. LUCK: Just to clarify, this is a COPUS form.

THE WITNESS: Yes, It's a base COPUS form.

MS. LUCK: So it's something that Texland made an agreement with the rest of the partners in this case?

THE WITNESS: That's right.

MS. LUCK: I think that should explain some of it.

EXAMINER COSS: Okay. Those are all my questions, thank you.

THE WITNESS: Okay.

HEARING EXAMINER ORTH: Any follow-up, Ms..

MS. LUCK: No follow-up, thank you.

EXAMINER MURPHY: I will try to look through the little list and find a relative.

THE WITNESS: It does seem like we have most of the state listed as a royalty interest owner. Keep digging.

HEARING EXAMINER ORTH: At one point I saw our former lieutenant governor, but that might have been on a notice page, not ownership page. Thank you very much.

THE WITNESS: Thank you very much.

MS. LUCK: Call my next witness, Bryan Lee.

BRYAN EDWARD LEE

(Sworn testified as follows:)

DIRECT EXAMINATION

BY MS. LUCK:

**Q. Good afternoon. Please state your full name for the record?**

A. Bryan Edward Lee.

**Q. By whom are you employed and in what capacity?**

A. Texland Petroleum LP, and I'm employed as vice president of exploration.

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

A. I have.

**Q. Will you briefly review your education experience?**

A. Yes, BS and MS from Oklahoma State University, and then I've got 40 years of experience as a petroleum geologist, 33 of it in the Permian Basin.

**Q. Okay. Thank you. Are you familiar with the application filed in this case?**

A. Yes.

**Q. Are you familiar with the status of the lands in the proposed unit area?**

A. Yes.

**Q. Have you conducted a study of the geology in the**

**area comprising the unit?**

A. Yes, I have.

MS. LUCK: With that, I would tender Mr. Lee as an expert petroleum geologist in the field.

HEARING EXAMINER ORTH: Any questions?

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: Questions on qualification?

(No audible response.)

HEARING EXAMINER ORTH: He is so recognized.

BY MS. LUCK:

**Q. What formation is Texland proposing to unitize?**

A. The Drinkard formation.

**Q. And what is the unitized interval?**

A. It -- it is the Drinkard interval. It's 100 feet from the top of the Drinkard to 100 feet below the Drinkard, and it's -- get to my place here.

**Q. Exhibit 9.**

A. Yes.

**Q. So is Texland Exhibit 9 a map identifying the location of the well used to create a type log that identifies the unitized interval?**

A. Yes. This a structure map that shows the structure on top of the main producing pay interval that is in the field currently and will be unitized. And just for future reference, too, the type log is shown there with the, with the red star, and then we will be looking at a cross section that goes across it from west to east, A to A prime.

**Q. And is Exhibit 10 a copy of the type log for that well?**

A. It is.

**Q. And can you tell us what the type log shows?**

A. Yes. So the top of the Drinkard is here in green, and the base of the Drinkard is here near the base of the log. The designations, the L2-4, L2-3, L2-2, those are all units that are productive within the Drinkard itself and ones that we correlate from a subsurface stand -- subsurface standing both in the well log and geophysically. And that's what the L things mean, those are surfaces that we met geophysically.

Also shown is an oil water contact for the field there kind of in the middle of the log in blue.

**Q. And has the reservoir which you propose to unitize been reasonably defined by development?**

A. It has.

**Q. So what are the target intervals within the waterflood?**

A. So they are dolomites that are deposited along a shelf margin, quite extensive in the sense of regionally but locally the local shoals come together to form accumulations that are essentially defined laterally by little inlets or title channels, that kind of thing, that cuts off the shoaling fabrics, and therefore gives you individual units. And those individual units have good continuity within a certain area, but bad continuity, if you will, over a very regional area.

**Q. So turning back to Texland Exhibit 9, this a structure map that shows that, what with you're explaining?**

A. Yes. So the structure map shows several things. It's basically shows that this, there is a shelf margin that runs east to west here, and so everything is going into the basin here. So it's deeper and deeper, and that's what the structure map shows.

And there is a couple of other things that -- that dash line there shows where the reservoir is tight. There is no more porosity present past that line. And the oil water contact is shown by that dashed line right there.

**Q. Going to Exhibit 11, what does this map show?**

A. This is an isopach, a net isopach of the unit from each of the wells and shows a strong east-west trend, facing the basin access. And it also shows -- that's in black, that's within the unitized area.

There are some red contours on the side from another show complex that continues on to the west that I have interpreted to be disconnected entirely from this portion of the reservoir.

**Q. So turning to Texland Exhibit 12, explain what this shows.**

A. Yes. So this is the W/E cross section that we saw earlier on the structure map. It shows again the intervals that we map, the L2-4, L2-3, L2-2, it shows how they progress across the wells.

It shows the thickness of the pay intervals, the red is the perforation. The main producing interval is actually the L2-2. We do get a contribution from the L2-3 as well. And there a minor smattering contribution from the L2-4 portion of it. And all of it is defined by the oil water contact that structurally control.

**Q. So in your opinion, is the formation consistent throughout the unit acreage?**

A. It is.

**Q. And can the portion of the pool which is included in the proposed area be efficiently and effectively operated under the unit plan of development.**

A. Yes.

**Q. Are there any faults, pinchouts or other geologic impediments that will prevent the area from being efficiently operated as a waterflood?**

A. No.

**Q. In your opinion, is this are a good candidate for**

**a waterflood?**

A. Yes, it is.

**Q. Could you explain a little bit more as to why, or have you covered all that?**

A. Well, I have covered the bulk of it, but in summary, there are good -- very-well controlled top and bottom units that will -- should waterflood nicely because of the good continuity. And it's part of a regional trend of production that extends 80 miles into Texas, so there is a great deal of analogous production from the same units and same depositional system to support the idea that we will have a successful waterflood.

**Q. And in your opinion, is the unit acreage justified from a geological standpoint?**

A. Yes.

**Q. And in your opinion, does the proposed injection present a risk to -- well, actually some other -- another witness will cover the fresh water issue, sorry.**

**In your opinion, will approval of this application be in the best interest of conservation and the prevention of waste, and the protection of correlative rights?**

A. Yes.

**Q. Were Texland Exhibits 9 through 12 prepared by you or compiled under your direction or supervision?**

A. They were.

MS. LUCK: So with that, I would move the admission of 9 through 12 into the record.

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: All right. Exhibits 9 through 12 are admitted.

(Exhibits 9 through 12 admitted.)

MS. LUCK: Thank you, and I pass the witness.

MS. ANTILLON: No questions.

HEARING EXAMINER ORTH: Mr. Goetze, any questions?

EXAMINER GOETZE: No questions for this witness.

HEARING EXAMINER ORTH: Ms. Murphy?

EXAMINER MURPHY: Thank you. It's very interesting, and I can see with the shoal that it would be laterally contained.

THE WITNESS: Uh-huh.

EXAMINER MURPHY: So the Murphy will be the first one that's injected.

THE WITNESS: Yes, ma'am.

EXAMINER MURPHY: That -- I'm not asking you to commit, but some of the others you are going to --

THE WITNESS: The V Cook could be the obvious next choice, and so we would convert that, assuming that things went well.

EXAMINER MURPHY: Where is that well?

THE WITNESS: So it would be the -- if you skip from the Murphy, you go east to the second well, and that's the V Cook, and that would be the next one that we would likely convert. Don't hold me to that.

EXAMINER MURPHY: I'm not. Would you expect it to go -- the water to move --

THE WITNESS: Yeah. So you would expect to see response in lateral wells in each direction from the two injectors.

EXAMINER MURPHY: And to the east and west?

THE WITNESS: Yes, ma'am.

EXAMINER MURPHY: And there is existing perfs in there, so you're not drilling any new wells.

THE WITNESS: That's correct.

EXAMINER MURPHY: Because they it would be uneconomical.

THE WITNESS: Yeah, I mean, if you just -- we don't know, of course, but depending on how it responds and so on, it's certainly the possibility of additional drilling, but we are not going to start there.

EXAMINER MURPHY: I have no more questions. Thank you.

HEARING EXAMINER ORTH: Mr. Coss.

EXAMINER COSS: Thank you. So following up on

Ms. Murphy's questions about the isopach map.
THE WITNESS: Yes.
EXAMINER COSS: Is this the isopach of all three the L2-4, L2-3, L2-2 interval?
THE WITNESS: Actually it's an isopach of the L2-3 and L2-2 intervals only. The L2-4, we consider that to be such a minor contributor that we don't expect it to have any real effect on anything we are doing. It's typically very impermeable, and the little bit of individual testing we have done on the L2-4 suggests the contributions are like tiny increments at best.
EXAMINER COSS: So this is pay thickness?
THE WITNESS: Yes, that's right.
EXAMINER COSS: So would you -- would you say that this kind of -- the shape that we see in this isopach, would they be depositionally controlled?
THE WITNESS: That really is correct. Even though you are lumping individual units, the good news here is we have a number of analogues where we had things we don't have here, which were extensive seismic data, lots of core data and so on. In those cases in these same exact units we can determine with really good success how those things individually fit together.
So they are going to always have that strike directed trend, and they are going to amalgamate in that

strike directed trend. They are very cut off as you go in a direction because they are prograding into the basin.

If you were to see a seismic line across that, you would see these big progradational units, and that's what we map. The L2-2, L2-3, L2-4, each one of those is a silt stone that comes across the top of each one of the packages that represents regressive part of the sequence.

So it forms a nice seal over each one of the units, but it also defines the packet that we are trying to map. So the maps you are looking at are actually a combination of our proprietary geophysical data and our subsurface data.

EXAMINER COSS: Perfect. You said these were geophysically maps. You mapped them on seismic, as well as logs.

THE WITNESS: That's right. We had some luck with that, too. You know, it's pretty difficult sometimes to get thicknesses, you know, from geophysical data from amplitude or other things. But in this case, I'm just saying regionally we have had good success with that.

EXAMINER COSS: How thick is that silt stone.

THE WITNESS: The silt stone itself, because it has such a strong reflection coefficient, even though it's not very thick, it often gives you a very nice reflector.

So sometimes we have had good reflectors off of things that were only five or six feet thick and still gives you a nice mappable unit and allows us to subdivide the things in a way that an awful lot of units that we work with simply can't be done.

So we our confidence in our ability to really map these things in detail and make predictions about what we are going to see next is a lot better than the average unit we play with, I would say.

EXAMINER COSS: Do you get to see the fluid content?

THE WITNESS: I wish we did, but no. If only.

EXAMINER COSS: Okay, perfect. Well -- and I guess some of my next questions, then, are partly for my own edification. You said these are dolomites?

THE WITNESS: Yes, sir.

EXAMINER COSS: Could you tell me a little bit about the dolomites? Is it early --

THE WITNESS: So these typically are -- they are definitely influenced by the exposure surfaces either within or without, although you don't develop cavernous porosity or anything like that. There is a big system behind these things in the shore direction, so magnesium rich fluids move down into the original carbonate, mostly in this case they are packstones.

So as those fluids migrate through, they give you a secondary dolomization across the whole thing. The end result of this is with these particular rocks, they are quite buggy, so the permeabilities are high even for the low porosity. For example, we use a three percent cutoff for the porosity cutoff here, which -- and max porosity is very typically not very better than 12 percent.

So, you know, just on the sort of average dolomite in the Permian Basin, this doesn't look much like pay, but because the holes are big and because the holes are nicely interconnected, the permeability is quite a lot better than you would expect from looking at a log.

So that's why the facies belt and where you are in the facies belt makes a tremendous difference on with whether it's pay or not pay.

That might not be completely the answer.

EXAMINER COSS: No, that's what I was looking for. Is that upper -- is the porosity in the L2-4 that upper interval then --

THE WITNESS: No, it's -- I'm sorry, go ahead.

EXAMINER COSS: -- controlled depositionally like that?

THE WITNESS: It is. In the L2-4 the reason that the porosity is so lacking here is because where the L2-4 would get good is where it progrades further out into the basin. And it does, in fact, like if we were to look at logs that were, say, out here further into the basin, they would have good porosity development in the L2-4, but they're wet. You are so far down the structure that they don't form individual traps here.

Now as you go further around the trend back to the east, then sometimes you get high enough on structures that the L2-4 part of the section becomes an important reservoir. But in New Mexico there is only one place I know of that it's a good reservoir, and it's unique circumstances.

EXAMINER COSS: So these intervals are regionally mappable then?

THE WITNESS: Yes, they are. And we have done that.

EXAMINER COSS: Interesting. Okay. And so I guess you did answer my question, if the porosity between 3 and 12 percent, what kind of permeability.

THE WITNESS: So typically ranges from about half a millidarcy up to about two or three millidarcies, so it's not really very high.

EXAMINER COSS: And that's enough?

THE WITNESS: That's plenty. I would say our typical rock we waterflood is probably two millidarcies or something. So this is right in our range.

EXAMINER COSS: Okay. Interesting. I assume they are water wet or oil wet?

THE WITNESS: Typically in here they really are oil wet. I believe that that's what most people would say, but we haven't done the research to verify that.

EXAMINER COSS: Thank you. Those are all my questions.

EXAMINER MURPHY: I still have one more question to follow up. So on that map over by the Cook, is that the inlet that --

THE WITNESS: Yes.

EXAMINER MURPHY: -- that you mentioned?

THE WITNESS: Uh-huh.

EXAMINER MURPHY: And that's a regressive?

THE WITNESS: So what happens is within those regressive intervals, you have a tendency to get pervasive channels that cut through, and they are held forward by time because once -- so the shoals are made of rocks that are much more resistant to compaction than the silt stones or shales otherwise.

So what happens is, once I build a shale complex -- I'm sorry -- a shoal complex, as it compacts into the subsurface, the edges, wherever they, the shoals are present, are going to stay high, the edges fall off low. So what that does is it tends to make whatever low spots are persistent through time.

So you can have these low, cut-off areas, then that's just the natural case -- character of them is they will persist through all the zones because each shoal has -- has, you know, helped you to do that, created that situation where you've got -- once, in other words, once you lay that fabric in, and you have some kind of an inlet or whatever that cuts the shoal development off, then it tends to be pervasive because of differential compaction.

EXAMINER MURPHY: So will that form somewhat of a barrier between the -- I think it's --

THE WITNESS: The Shelton and the Cook? Is that what you are asking?

EXAMINER MURPHY: The area in the Shelton -- between those --

THE WITNESS: I actually think the bigger potential barrier is the one between -- this map doesn't even show it well, but it's the better potential barrier is between the Shelton and the Knowles, the fed well to the east. And you only see that on the further --

EXAMINER MURPHY: Are the shoals, are they like limestones or bioherms?

THE WITNESS: So they are not bioherms, they are true shoals, but because they are out on the ramp a long ways -- I mean, these are like, don't -- you know, you don't think of things that you see near shore like you do in the Bahamas, these would be further out.

So these would be long, distal ramps that go out tens of miles even into the ocean. And so these shoals develop kind of on that shelf margin front before it drops off into really abyssal depths, so therefore the wave energy is not very high.

So about the best you can do is a packstone, and you get some grainstones -- as these things build up higher, you can get close enough to wave base that you can generate a few grainstones, but almost all the rocks are really packstones, and so they are muddier than the average would be.

And that's why instead of these really first class reservoirs like, you know, you have in lots of places, parts of the San Andres where you have shoals like you are talking about that have 25 percent porosity, that kind of thing, that just doesn't happen here, and that's because the rock quality is not very high to begin with.

So when diagenesis works it's way through there, you still don't have a high quality rock, but you have one that makes a decent reservoir. And literally hundreds of millions of barrels have been produced on the Texas side from these rocks, so they're quality, after fashion.

EXAMINER MURPHY: Thank you.

HEARING EXAMINER ORTH: All right. Any follow up?

MS. LUCK: No follow-up. No further questions.

HEARING EXAMINER ORTH: All right. Thank you very much.

MS. LUCK: With that, I would call my next witness, Mr. Steven Neuse.

HEARING EXAMINER ORTH: We can take a short break, five minutes.

(Recess taken.)

HEARING EXAMINER ORTH: All righty we are back after a short break.

STEVEN HENRY NEUSE

(Sworn, testified as follows:)

DIRECT EXAMINATION

BY MS. LUCK:

**Q. Please state your name for the record.**

A. My name is Steven Henry Neuse.

**Q. By whom are you employed and in what capacity?**

A. Employed by Texland Petroleum as vice president of reservoir engineering.

**Q. Have you previously testified before the Division?**

A. Yes, I have.

**Q. Could you briefly review your credentials?**

A. I graduated from Texas A & M University in 1977 with a BS in petroleum engineering, and after some postgraduate went to work as a consultant in Tulsa.

I worked, as a consultant, worked for Apache Corporation, and I ended up at Bass Enterprises where I worked for them for 26 years until I retired in 2017 when Bass Enterprises got out of the oil business, and then I went to work for Texland Petroleum.

**Q. And are you familiar with the application filed in this case?**

A. Yes.

**Q. Are you familiar with the engineering supporting the application?**

A. Yes, I am.

MS. LUCK: With that, I would tender Mr. Neuse as an expert in reservoir engineering.

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: Questions? No? He is so recognized.

BY MS. LUCK:

**Q. Did you conduct an analysis and come to a conclusion regarding the potential for conducting waterflood operations in the proposed unit area?**

A. Yes, I did.

**Q. And is it your opinion that the proposed unit is a good candidate for conducting a waterflood?**

A. Yes.

**Q. And you conducted an analysis and made calculations and came to your conclusions?**

A. Yes.

**Q. Turn to Exhibit 13. Is this a copy of the application filed in this case with all its attachment?**

A. Yes, it is.

**Q. And turning to Paragraph 9 of the application on Page 3, this is where Texland requests approval for the oil tax recovery rate; is that right?**

A. Yes, it is.

**Q. And then in the next paragraph, Paragraph 10, that described the project data.**

A. Yes.

**Q. And is that information still correct?**

A. There are two minor changes in Paragraph 10, Part A where it says, number of initial producing wells, since we are requesting that we only convert one injector to begin with with the option of creating another injector, this slide should be four producing wells.

Initially the plan is to end up with three producing wells in the final flood. And actually you are going to have to go to the next page. The other change is estimated injection commencement date of March 2020, that is not going to happen, obviously, and that will be changed based upon when we get approval of the unit.

**Q. Thank you. And do you provide the information provided in the paragraph in the application today?**

A. Yes.

**Q. And let's review the proposed unit as being -- turning to Exhibit 14, could you identify on this map the existing wells and the status of the wells currently?**

A. The existing wells on Exhibit 14 are actually shown as the silver and green circles, and the original injection will be the Murphy well. This well averaged 28 MCF a day, 2.1 barrels of oil a day and seven barrels of water a day for the calendar year of 2019.

The other wells will be the initial producing wells in this unit. The Goodding well, which is the far western well, averages 3.3 MCF a day, three barrels of oil a day, and two barrels of water for calendar year 2019.

The Shelton well, which is the far eastern well, that averaged 3.4 MCF a day, 3.5 barrels of oil a day and one and a half barrels off water a day for calendar year 2019.

The Stoval well, which is in the middle of the proposed unit, averaged 8 MCF a day, 5 barrels of oil a day, and 8 barrels of water a day for calendar year 2019.

And the V Cook, which is currently planned as being the second injection well averaged 3 MCF a day, 2.6

barrels of oil a day, and 26 barrels of water a day for calendar year 2019.

All of these wells are pumping oil wells that are operated by Texland Petroleum. They were all completed in the Drinkard formation with hydraulic fractures.

**Q. Do Exhibits 15 A and 15 B provide a summary of the production history of the wells the in proposed unit area?**

A. Yes, they do.

**Q. Could you explain what the graph and the data shows?**

A. 15 A is a composite draft -- going to do that. 15 A is a composite draft of the five wells in the proposed unit area. The gold line here is the well count. You can see we started off in 2005, and by 2007 all of the wells were drilled and producing.

The green line with the squares is the oil production. The blue line with circles is the water production, and the red line with circles is the gas production. All of these are in units of either barrels of oil per day, MCF per day, barrels of water per day.

As you can see, by 2019, we were in the high teens as far as the oil production -- the field had declined from 100 barrels a day out of all five wells down to the 17 to 18 barrels of oil a day where we are now.

**Q. And so turning to 15 B, are these -- can you explain what this shows?**

A. 15 B is a tabulation of the cumulative production for all the wells that are in the proposed unit and also the wells that do not produce from the Drinkard in the proposed unit.

We have the date of first production. We have cumulative barrels of oil, cumulative barrels of water, total fluid produced in each wellbore, and the cumulative gas produced through each wellbore.

The three wells that are not productive, the Mary Lou Bargaley, the Lazarus ARV and the Austin Cook, two of those were actually dry and abandoned when they were originally drilled. And the Austin Cook briefly produced from the San Andres, and it made a total of 1200 barrels of oil and was plugged in 1961.

**Q. So to summarize, currently there are five producing wells in the area, but the Murphy will be converted to injection for the waterflood?**

A. Yes.

**Q. The other four wells will be producing wells in which you expect to see a response from the waterflood operations?**

A. That is correct. The Murphy will be set up as the first injector and then the V Cook is currently planned as the conversion to a second injector once the injection parameters have been established for the Drinkard formation on the Murphy well.

**Q. Turning to Exhibit 16, can you explain what the proposed waterflood pattern will be?**

A. Exhibit 16 is a map. It's basically a copy of Exhibit 15. The injection wells are marked in blue with a triangle around them, and what we are looking at doing is having a producer, injector, producer, injector, producer pattern, which is consistent with the linear nature of this reservoir. So we will basically bound each producer with an injector and provide pressure support and sweep.

**Q. Does Texland intend to use the existing wellbores to minimize investment costs and then provide economic valid enhanced recovery?**

A. That is correct.

**Q. Explain why you think this proposed unit is a good candidate for the waterflood operation.**

A. This proposed unit will extend the life of the oil production in this area. The wells, all the wells -- we will talk about this when we get into the economics -- all the wells are reaching their economic life limit because of operating costs. And what we need to do is find some way to utilize the wellbores to continue to recover oil from this area at an economic level and the waterflood should support that.

**Q. So let's turn to Exhibit Number 17. Are there any other waterfloods in the area that are analogous?**

A. There are no other waterfloods in New Mexico that are actually in the Drinkard formation in an analogous geologic setting. If you look, the Justice unit down here had some Drinkard waterfloods in it, but they are not the same geology -- geologic setting that we have here.

But as Mr. Lee said -- Mr. Lee testified to, this is the trend of the -- as we call it, Drinkard over here, and as it goes into Texas, Lower Clear Fork, and this is the Lower Clear Fork Drinkard production all along that trend.

In particular there are a lot of Clear Fork wells that produce, and they are probably part of a more aggregated flood of Lower Clear Fork and these have been successful floods.

We have two fields, the Suntura Field and the Linker Airport Field, which are listed as Lower Clear Fork only in Texas, and those have been successful floods. They are still under flood. One of them has nine wells in it, and the other one has about 20 wells in it, so they are a little bit bigger floods there. But you can see they are quite removed from where we are over here.

**Q. Thanks for that summary. Have you made calculations regarding the potential for secondary recovery**

**and economics of this project?**

A. Yes, I have.

**Q. Let's review the calculations. Turn to Exhibit 18. Explain what this shows.**

A. What we did is we took the geologic isopach and structure map that Bryan Lee had put together, and we built a numerical finite difference simulator to model that geologic interpretation, original oil in place, by the time we got through with the history match on the model was about 3.1 million barrels and original gas in place is about 2.2 BCF.

By projecting forward primary recovery of the model to an economic limit, we are estimating we are going to get 246,000 barrels of oil under primary, which is about 8 percent of the oil in place. And 258 million cubic feet, which is about 12 percent of the original gas in place.

The model is predicting current pressure at about 1000 psi. And this has been confirmed by fluid levels that we have actually seen in some shut-in wells when we did the work. So this is about the pressure that we've got. The original pressure was about 3200 pounds here. So we have seen significant depletion.

Then if we go to -- this is the history match that we did on the model. If we go to 19, you know, numerical modeling, we schedule in the production history, and then we have the model predict the other parameters, the water and the gas, and once we had a good history match that was consistent with the geology, we actually turned on the model to predict forward.

The green curve here is the primary prediction under current operations from the numerical model. By actually converting the Cook well and the Murphy well to injectors, we generated the blue curve, and the blue curve, you can see, will stabilize the production of the field once we have this period right here where we have a drop because we lost two producing wells.

And we can perpetuate this out for about 40 years economically, and that gives us our enhanced recovery. The peak on this is about 21 barrels a day, so it's not that much more than what we're producing right now, but we are only operating three wells as pumping wells instead of five wells as pumping wells which actually helps on the economic costs, and the production is flat.

**Q. So turning to Exhibit 20, explain what this exhibit shows.**

A. Exhibit 20 is a summary of the model forecast. The EUR for the field under waterflood down to an economic limit is going to be 467,000 barrels which will account for about 15 percent of the oil in place, and if we look at that, that generates a secondary to primary ratio of about

.97, then we are looking at the original primary of 246 when we subtract that off and then look at the secondary.

Average sustained injection is about 350 barrels of water per day per well, per injection well. So the max rate as I mentioned was 21 barrels of oil a day. The economic life of the waterflood was 39 years. The value of secondary reserves will generate after we deduct the investment costs and the operating costs $2.1 million incremental cash flow, and that's about a 12 percent rate of return. It's not as good as some projects, but it's a lot better than abandoning the field at this time.

**Q. So the increased production and the value of additional reserves and there will also be some additional increased costs; is that right?**

A. That is correct.

**Q. Could you explain a little bit more about that?**

A. The -- the operating costs, the current operating costs for the five wells is $15,000 per month. We operate five producing wells, five individual batteries, and a disposal well for this system.

The estimated operating cost for the secondary recovery project is approximately the same because we get to get rid of two of the producing wells, we are still operating the -- well, we take the disposal well, we are changing it around into a water supply well, so we haven't changed the well count or the operations on that.

And all of that comes up from our estimate as we are estimating we are still going to spend about $15,000 a month to operate this. The -- like I said, the stabilized life of the field will be about 39 years. And the investment cost for the facilities and the conversion and everything else will be about $475,000 which has been deducted from the, the cash flow to generate the $2.1 million.

**Q. And so what pricing did you use to calculate the value of the additional reserves?**

A. The pricing that I used in these economics was the December 2019 strip, and it's resulted in an average realized price of $48.23 a barrel over the life of the project, and at that time the strip is essentially flat.

**Q. And in your opinion will this project be economical?**

A. Yes, it will.

**Q. And is unitized management reasonably necessary to increase the ultimate oil recovery in the area?**

A. Yes.

**Q. Can you explain a little bit more about that?**

A. As I mentioned, the current wells are essentially marginal at this time as far as economics, and they really have little remaining reserves. The remaining reserves are at this time about 21,000 barrels, and without implementation of the secondary recovery project, we will have to abandon these wells and they will have no more utility.

Unitization will allow consolidation of facilities which will lower operating costs, and consolidation is going to be required to conduct a successful secondary recovery project.

**Q. So will the value of the oil and gas recovered by unit operations exceed the unit cost for reasonable profit?**

A. Yes.

**Q. You mentioned the life of the project is approximately 39 years?**

A. That is correct.

**Q. Is this project technically feasible?**

A. Yes, it is.

**Q. Will waterflood operations result in recovery of more hydrocarbons than would be recovered solely by primary recovery?**

A. Yes, it will.

**Q. And will unitization benefit all of the interest owners?**

A. Yes, it will.

**Q. Is unitized management and operations reasonably necessary to effectively carry on enhanced recovery**

**operations?**

A. Yes.

**Q. In your opinion, is it prudent to implement a waterflood project in this area at this time?**

A. Yes. As I mentioned several times, the -- the time is running out on these wells.

**Q. So let's briefly turn to Exhibit 2 in the packet, and Exhibit A to the Exhibit 2. This is a participation formula for the unit agreement. Can you explain how this works?**

A. The participation formula was set up as a two phase formula to approximate the income that the tract owners currently have and to also then account for the response of the waterflood on an equitable basis. Actually Article 5, 5.1 describes in detail how the participation will work on this.

MR. RANKIN: I will get there. Here we go.

A. Here we go. As I said, this is two phase formula. Phase one is designed to try to keep the participants whole during a period which would approximate the remaining primary so that there should not be a major impact. And it actually has a tract participation formula -- percentage which is based upon 100 percent or 100 times 50 percent of Part A, which is the ratio of the estimated remaining primary reserves from the tract, to the total estimated remaining primary oil reserves in the unit area as of April 1, 2019. So you get a 50 percent participation based upon what your current income is. Okay. Or, I mean, what your remaining reserves are.

And then Part B is the ratio of the actual oil production attributable to the tract from January 1, 2019, through March 31 of 2019 to the total actual oil production in the unit area from January 1 of 2019.

So that's the other part of it, that's your current income. So you have part of the formula accounts for your remaining income from primary operations. The other part is the current income that you're getting. So Part A phase one then allows a participation, as I said, based upon remaining primary.

And as of April 1, 2019, that remaining primary we are estimating at 26,000 barrels of oil. Once the unit is formed and we recover 26,000 barrels of additional oil from the unit as of, you know, April 1 forward, then we would go to phase two, and phase two is designed to give everybody a credit for the way the waterflood will work and the actual sweep that we expect from the waterflood.

And phase two, if you will change the page, here we go, is set up so that you have a 10 percent participation based upon the ratio of the acreage of the tract to the total acreage of the unit. So this is based upon the acreage you contribute to the unit. Ten percent is tied to the ratio of the number of wells attributable to the tract, so the total number wells in the unit area. And in this particular case, it's everybody just contributing a single well, but if for some reason somebody had more in there, this would have a factor.

And then C is largest deal like 80 percent, and this is the ratio of the cumulative oil production as of April 1, 2019 from the tract to the total oil production from the unit area as of April 1, 2019.

And what this is accounting for is based upon this concept of a secondary to primary ratio that says that if we had a very good primary, then we are probably going to be contacting that same area with the waterflood, and we should get an equivalent secondary recovery on it.

So these are -- this is the standard that we have used in a lot of, a lot of other waterfloods, and it's normally accepted as a good, equitable distribution of the participation in the secondary recovery project.

**Q. So, in your opinion does this formula allocate production to separately owned tracts in the proposed unit on a fair, reasonable and equitable basis?**

A. Yes.

**Q. And in your opinion, has the unit area been so depleted that it's prudent to apply enhanced recovery**

**techniques to maximize oil recovery?**

A. Yes.

**Q. And in your opinion, is the waterflood operation premature at this time?**

A. No.

**Q. And once you commence operations and obtain a possible result, will you submit an application for certification of a positive production to the Division as the rules require?**

A. Yes.

**Q. You will also submit annual reporting on the status of the project as the recovery tax rules require?**

A. Yes.

**Q. Were Exhibits 13 through 20 prepared by you or compiled under your direct supervision?**

A. Yes.

MS. LUCK: So with that I would move the admission of Exhibits 13 through 20.

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: Exhibits 13 through 20 admitted.

(Exhibits 13 through 20 admitted.)

MS. LUCK: Thank you. I have no further questions.

MS. ANTILLON: No questions.

HEARING EXAMINER ORTH: Mr. Goetze?

EXAMINER GOETZE: Just one question. In your assessment of the reservoir -- we have a nice isopach presented in 11 -- is there the confidence that the Knowles 29 Federal will not have a response to this project, or is it something you are going to monitor?

THE WITNESS: We will monitor it because we also operate the Knowles. We will monitor that. One of the other reasons why we are asking for the ability to put in other injectors in the future, we have seen it in other waterfloods that if we get a much, much better response in what we are seeing, we may want to drill some additional wells, and we may want to do so many changes in the pattern which would optimize not only, you know, the wells in the unit, but if we want to incorporate other wells into the unit, so we will monitor the Knowles in detail.

EXAMINER GOETZE: Thank you. No further questions.

HEARING EXAMINER ORTH: Ms. Murphy?

EXAMINER MURPHY: My question is where is the Knowles?

EXAMINER GOETZE: 29.

THE WITNESS: The Knowles Federal is this one right here next to the Number 29.

MS. LUCK: I don't know if you can see it on the isopach.

THE WITNESS: If you go to the isopach map, it is that isolated accumulation that Mr. Lee talked about.

EXAMINER MURPHY: Where another --

MS. LUCK: Exhibit 14.

EXAMINER MURPHY: Where another little rivulet comes through?

THE WITNESS: Right.

HEARING EXAMINER ORTH: 14?

EXAMINER MURPHY: That's why I couldn't see it.

Here is my other question. So the tract participation factors that you were just going over, for example, this related to 15 B, there's a chart with the wells and how much they produced. For example, the Stoval, has produced the most oil, and then when you look at the tract participation factor, it's higher than the other ones. Is that related to it's produced more?

THE WITNESS: It is predominantly driven by, especially when you get into part -- phase two, it's predominantly driven by that cumulative production.

EXAMINER MURPHY: But over the whole unit, I mean, is that how you determine that it's spread evenly? The person that owns or has the interest in the Stoval, they don't get more?

THE WITNESS: They -- they will participate at a higher level -- let me go back to the actual table.

EXAMINER MURPHY: 15 B, I believe.

THE WITNESS: Yeah, I'm looking at the raw data that generated all of this. Yes, the, the Stoval, once again, by virtue of its larger cumulative production will have a higher revenue than the other wells under the phase two portion.

EXAMINER MURPHY: So that is related, the participation factor and the cumulative?

THE WITNESS: Yes, because under phase two, 80 percent, 80 percent of phase two is tied to the cumulative production of the well at the time of the unitization.

EXAMINER MURPHY: Okay. Where does the water come from that you will be injecting?

THE WITNESS: The water is going to actually -- if we can get back to a map.

EXAMINER GOETZE: Talk to your lawyer.

MR. RANKIN: I'm sorry, you want to see the --

THE WITNESS: Yeah.

MR. RANKIN: Which exhibit is it.

THE WITNESS: Yeah, right there. The White Number 1 well, the White Number 1 well is currently a water disposal well that we operate. And we -- the plan would be to turn this around as a water supply well and use that as supply water for the -- for these wells.

Once again, facilities and everything are in place -- this is why I'm saying, the operating costs, as you can see, by using, you know, all existing facilities and wells and everything else, we are able to keep this into a modest investment.  But we will turn him around, and once we start getting break-through on all the individual wells, then we will be recycling that water in the waterflood.

EXAMINER MURPHY:  How long do you expect for it to start filling up?

THE WITNESS:  The modeling -- and we can go back to Exhibit 19.  It actually takes about a year and a half to two years before we start seeing a response because we are down in pressure.  And then we'll  -- we will peak out about three or four years after that.

EXAMINER MURPHY:  I have no more questions.  Thank you.

HEARING EXAMINER ORTH:  Thank you.  Mr. Coss?

EXAMINER COSS:  So I guess I'm kind of curious again how this, the -- the apportioning of the percentage of wells and the payout goes.  How does some scheme like that play out over 40 years of the life of the field?

THE WITNESS:  It's not really a payout.  It's a  -- it's a reversion at a particular volume of  -- and this -- this is as good of a graft as anything.  What we have done is actually projected forward here that along this line, we are only going to recover, you know, an additional, as of now, 21,000 barrels. Okay.

So once we get to the point under this curve where we recover 21,000 barrels Which will probably occur a little bit later because we are down during this period, but once we get to a point along this curve where we recover 21,000 barrels, we will go to phase two of the participation formula. Okay.

So it's totally independent -- that's why I didn't want you to think of it as a payout, it's totally independent of investment costs or anything else like that. It is tied to a reservoir volume number. And if for some reason we have much greater response, then that reversion will occur sooner, so --

EXAMINER COSS: Interesting, thank you. And I was wondering, too, what happened to this field, is this the best time to start the waterflooding? What happens if you kind of -- it runs its natural course in this initial recovery and then waterflood begins later, or is the field damaged at that point or --

THE WITNESS: It's not really going to be damaged per se. The -- there you go. Right now some of these wells we would actually be shutting in at this time because they are in a situation where they are no longer economic.

And in the aggregate, referring to the run, all the, all the wells will basically be uneconomic by 2027. Okay? And we were going to be losing others in between, so if we put in the flood right now, we've got viable equipment on the wells, the -- we are able to lower, like I said, lower the overall operating costs, because for one thing we are going to be able to consolidate batteries, we are going to be able to run a much more efficient operation during this time period. And that's why and in the State of New Mexico, you are not going to want us to take some of these wells that are shut in now and leave them shut in for four years while we are waiting for everybody else to run their course, so this is very timely as the unit.

EXAMINER MURPHY: What is your definition for uneconomical for a well? Is there a barrel limit?

THE WITNESS: We actually take the operating costs that we are, that we are seeing. Some of these wells, if you notice the V Cook makes more water, so therefore, he's going to go uneconomic earlier than the others, so we actually take the expenditures that we've got.

And we also look at the failure rates on some of these things as far as the pumping units and things like that. And if we've got a well -- if we've got a well that has a failure on a pumping unit, and we look at the amount of capital it would take to invest in it, and we say, along that decline curve it's going to go uneconomic in three years, but it's going to take four years to pay out that capital investment, then that well has actually become uneconomic at that time just on the, you know, on the basis of I can't recover my capital. So it's hard to just call it a limit.

EXAMINER MURPHY: Okay.

EXAMINER COSS: I don't have any other questions thank you.

EXAMINER MURPHY: I don't either. Sorry to interrupt you.

EXAMINER COSS: You're okay.

HEARING EXAMINER ORTH: Any follow-up, Ms. Luck?

MS. LUCK: No further questions, thank you.

I will call our final witness, Clayton Scott.

CLAYTON SCOTT

(Sworn, testified as follows:)

DIRECT EXAMINATION

BY MS. LUCK:

**Q. Please state your name and by whom you are employed and the capacity?**

A. Clayton Scott, I'm employed by Texland Petroleum as a petroleum engineer.

**Q. Have you previously testified before the Division?**

A. I have.

**Q. And can you briefly state your credentials?**

A. Graduated from Texas A & M University with a degree in petroleum engineering in 2014. Went to work for Texland right out of college as a field engineer until 2016, and moved into our Ft. Worth office as an operations engineer and I fill that position today.

**Q. Are you familiar with the application filed in this case?**

A. I am.

**Q. Are you familiar with the engineering supporting this application?**

A. Yes.

**Q. Have you conducted an engineering study of the proposed injection well, it's designed operation and the wells within the half mile area of review?**

A. Yes.

MS. LUCK: And so with that, I would tender Mr. Scott as an expert witness in petroleum engineering.

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: Any questions? No.? So recognized.

BY MS. LUCK:

**Q. Thank you. What is the proposed injection zone?**

A. The proposed injection is in the Drinkard formation. The proposed injection interval in the Murphy

Number 1 is 8,212 field to 8,362 feet.

**Q. So turn to Exhibit Number 5, can you identify what this exhibit is?**

A. Exhibit 5 is the C-108 for authorization to inject into the Murphy Number 1.

**Q. And does Item 8 in the C-108 contain all the geologic information necessary for approval?**

A. Page 25 includes item Number 8, and yes, it does.

**Q. And has Texland given you available geologic data on the Drinkard formation?**

A. Yes.

**Q. In your opinion, will the target formation be able to accept the volume of injected produced water that Texland is proposing?**

A. Yes.

**Q. What formations act as a barrier for the injection?**

A. The top silt stone will act as an upper barrier, and anhydrite dolomites in the lower Drinkard will act as a lower barrier.

**Q. Are there any fresh water zones in the area?**

A. Yes. Fresh water is produced in this area from the Tertiary Ogallala aquifer. The productive interval is 50 to 150 feet. Other possible but currently unused come from the Triassic Santa Rosa, and it's from 280 feet down to the Permian Rustler formation at 2075 feet.

**Q. In your opinion, do the geologic barriers you identified protect these fresh water zones from injection that's proposed?**

A. Yes.

**Q. Are there fresh water wells within one mile of the proposed injection and have tests been done of the fresh water?**

A. Yes. Page 27 and Page 28 both include fresh water analysis from two wells used for agricultural production.

**Q. And do you have the particular locations for these wells that were sampled on Page 27 and 28?**

A. Yes. Page 27 is called the Stoval Water Well. It's located approximately 2/10s of a mile south of the Murphy Number 1.

The water analysis on Page 28 is from the -- it's called the Shelton Water Well, and it's located approximately 7/10s of a mile east of the Murphy Number 1.

**Q. And does Texland have the gps coordinates for these wells?**

A. We do.

**Q. Will Texland provide that to the Division upon request?**

A. Yes.

**Q. Will the produced -- will the proposed injection pose a threat to any underground sources of fresh water or drinking water in the area?**

A. No.

**Q. What will the source of injection fluid be?**

A. Source of injection will come from the San Andres formation Mr. Neuse talked about earlier. The White Number 1 disposal well is currently disposing in the San Andres interval, and we are planning on turning that around into a water supply well from the San Andres interval.

**Q. And have you prepared analysis of the water of the injection zone?**

A. Yes, Page 24 includes a water analysis from an analogous San Andres well. Since we are not currently producing the White Number 1, we didn't have a San Andres water analysis from it.

**Q. And have you also conducted an analysis of the water compatibility?**

A. Yes. Page 25 includes a San Andres and Drinkard water compatibility analysis, and it's -- the Drinkard sample is from the Stoval Number 1 located on Page 23. And then once we turn the White Number 1 water well into a supply well, we will redo this compatibility analysis.

**Q. And based on these analysis, do you expect any compatibility problems?**

A. Not at this time.

**Q. Turning to the area of review, let's talk about your analysis. Is Page 9 of Exhibit 5 a map depicting all wells within a two-mile radius of review?**

A. Yes. Page 9 includes a two-mile area of review.

**Q. And this is around the proposed injection well?**

A. This is around the unit boundary.

**Q. Okay. Is Page 10 a close-up of the half mile area radius of review that you have analyzed for wells?**

A. Yes, this is all -- this is the half mile radius around the proposed unit boundary.

**Q. And all the well data is tabulated on Page 11; is that right?**

A. That is correct.

**Q. And have any of those wells been P and A'd?**

A. Yes. Ten of those wells are P and A'd.

**Q. Okay. And do any of the P and A wells penetrate the injection interval?**

A. Yes. In Pages 12 through 21 include wellbore schematics of each one of the wells with the -- how the plugging was performed.

**Q. So just to confirm, the wells are on Page 11, and each of those wells have a wellbore schematic included in the C-108?**

A. Yes, the P and A wells do.

**Q. Thank you. In your opinion are there any wells within the half mile area of review that may act as a conduit for fluid out of the injection well?**

A. No.

**Q. Do any of them present a problem of any kind for the operation and injection of produced water into the proposed well?**

A. No.

**Q. Relating to the Murphy Number 1 well, is all of the well data and operation information required by the C-108 included in this application?**

A. Yes.

**Q. So turning to Page 7 of Exhibit 5, review the well injection plan.**

A. So the current set up on the Murphy Number 1 is a three string casing design, short surface casing, 388 feet, intermediate string set at 4480 feet, and 5 1/2 production casing string set down at 8,746 feet. It's currently set up with a rod pump design of 2 7/8 tubing.

**Q. So did you also prepare a wellbore schematic of what it will look like as an injection well?**

A. Yes.

**Q. So we will turn to Page 8 for that.**

A. This includes the same casing design, cement circulated on the surface casing and intermediate casing string, production casing top and was calculated at 2750 feet within the intermediate casing.

The tubing design is 2 3/8 tubing string with a plastic coating internally, and we will have an arrowset packers around 8,112 feet above the current perforated interval.

**Q. So turning to Page 22 of the C-108, can you explain the proposed operational rate of the well?**

A. So proposed average daily rate is 300 barrels a day per proposed injection well, with a maximum daily rate of 750 barrels a day. The average injection pressure we are expecting to see is 1500 hundred psi, with a maximum injection pressure of 1642. That's based on the .2 psi per foot down to the top perf.

**Q. And can you -- the injection without it exceeding the maximum surface injection pressure?**

A. Yes.

**Q. In your opinion, is the casing design and cement plan protective of fresh water sources in the area and correlative rights?**

A. Yes.

**Q. How will Texland ensure the integrity of the wellbore?**

A. After we run a packer and before we begin injection, we will do a mechanical integrity test. We will pump packer fluid to prevent corrosion over time and monitor the tubing pressure in the tubing anulus and the production and the anulus pressure as well.

**Q. And is this wellbore construction sufficient to isolate injection in the proposed interval?**

A. Yes. The surface and intermediate strings both circulated cement to surface, and the production casing string, cement is calculated to tie into the intermediate casing string.

**Q. And is there a plan to stimulate the well during --**

A. Not at this time. When we go in to convert the Murphy Number 1, if we run into scale deposition through the perforations, we will mechanically remove it with a bit and a bailer typically, and then pump a small acid stimulation to clean it up.

**Q. Okay. And I also just want to refer to Page Number 29 and confirm that this is a geologic statement that's required and has been submitted by Texland as a part of its C-108.**

A. That is correct, and it's signed by Mr. Lee.

**Q. Okay, thank you. So in your opinion, is the granting of this application in the best interest of conservation of resources, protection against waste, and protection of correlative rights?**

A. Yes.

**Q. Was Exhibit 5 prepared by you or compiled under your direction and supervision?**

A. Yes.

**Q. So with that I would move the admission of Exhibit 5.**

MS. ANTILLON: No objection.

HEARING EXAMINER ORTH: Exhibit 5 is admitted.

(Exhibit 5 admitted.)

MS. LUCK: I have no further questions for this witness.

HEARING EXAMINER ORTH: Thank you. Mr. Goetze?

EXAMINER GOETZE: One question. In your area of review wells, did you take a look at those to at least minimally assess to make sure that they are protective of underground sources of drinking water?

THE WITNESS: Yes, sir.

EXAMINER GOETZE: That's the only question.

EXAMINER MURPHY: So White SWD, would that be above ground pipes over to the Murphy?

THE WITNESS: It will be below ground level pipes to the Murphy. There are -- there is farming in the area.

EXAMINER MURPHY: Oh. And the White, is it an older SWD?

THE WITNESS: It's been, I think around 2007 is when it was converted to -- I may be wrong on that number. It was initially a Drinkard well and then was later converted to a San Andres SWD.

EXAMINER MURPHY: And so the water that was put into it was from the surrounding wells?

THE WITNESS: Yes. From the surrounding Drinkard wells.

EXAMINER MURPHY: So was the TDS less than that, because if you are talking that water out, you have already put in water that is from surrounding wells.

THE WITNESS: I haven't sampled the White Number 1 specifically. Our plan was to wait until we got it on production to sample because right now we are putting in Drinkard water, which is, you know, similar to what the Page 25, I believe, had the Stoval water analysis on it.

So we expect to see, once we start the White Number 1, I would expect the water to be very similar to all the Drinkard water for a while.

EXAMINER MURPHY: True, I understand. No more questions.

THE WITNESS: Yes, ma'am. Thank you.

HEARING EXAMINER ORTH: Mr. Coss.

EXAMINER COSS: Good afternoon. Thanks for your testimony. My question is in reference to the diagram, the San Andres Drinkard water compatibility diagram that you have on Page 25.

THE WITNESS: Yes, sir.

EXAMINER COSS: I was just hoping you could walk me through that a little bit and tell me what it means.

THE WITNESS: In most cases, in some of our Texas floods we commingle San Andres and Drinkard or Clear Fork waters, and in most cases, on a scaling index side, anything below one is a very low scaling possibility.

And so on this chart here, the prescaling index are the solid lines with the scale amount. The solid index are the dashed lines on the Y axis on the right side.

So the highest calcium carbonate which has the highest scaling index of around .68 or so at 100 percent San Andres water from the analogous water sample we took.

EXAMINER COSS: Could you tell me what that means, it's pre S-O-L prescaling index in the calcium carbonate, what does that translate into?

THE WITNESS: I don't know if I could go into much detail beyond that. I worked with our chemical contractors when we did this. I don't -- you know, other than the fact that they take the samples and mix them together at certain, you know, certain concentrations -- you know, in this case, they did it by percent San Andres water. But beyond it being below one on the scaling index, that's as far I can go. I can follow up with a more detailed e-mail if you would like.

EXAMINER COSS: Yeah. That would be -- I haven't seen this diagram. This is probably just my own lack of exposure to it, but it seems useful to me.

THE WITNESS: Yes, sir.

EXAMINER COSS: More than one bad, and negative numbers, do you think that would indicate like a lack of scaling or removal of material?

THE WITNESS: Not removal, but a lack of scaling tendency.

EXAMINER COSS: Okay, perfect. I will be on the lookout for that e-mail.

MS. LUCK: I just want to clarify what you are asking for to be submitted. So just background data supporting the analysis?

EXAMINER COSS: Well, the background data supporting the analysis and some sort of user guide to it, you know, kind of a description of it or analysis.

Ms. LUCK: Okay. Thank you.

EXAMINER MURPHY: I just have one quick question.

THE WITNESS: Yes, ma'am.

EXAMINER MURPHY: Why is it named the Knowles Garrett? I know there are two wells in there, but they are not even in the unit.

THE WITNESS: It's in the Garrett field, so that's where the Garrett portion came from, and it was --

EXAMINER MURPHY: The Drinkard.

THE WITNESS: Yes, ma'am. And it was the Knowles prospect when Texland originally started working in the area, from my understanding.

EXAMINER MURPHY: Okay. Thank you.

HEARING EXAMINER ORTH: Okay. Any follow-up.

MS. LUCK: No further questions. Thank you.

HEARING EXAMINER ORTH: All right. Thank you very much.

MS. LUCK: And with that, we have no further evidence for the Division. So if there are no further questions, we ask that it be taken under advisement.

EXAMINER GOETZE: May I ask one question while the attorneys are present. State Land Office negotiated certain requirements to these applications. Can we be made aware of what we should be looking for and make sure it's included or --

MS. ANTILLON: The State Land Office had concerns that a 40-acre section, which was not included in this application might be stranded. It's our understanding now, and the agreement that we have come to is that that 40-acre section will be included in their waterflood project, which I believe they are revising the application, and you should be seeing that shortly. So you won't see, you won't see that for a little bit.

EXAMINER GOETZE: So another unit is coming up, and you are going to address it in that. Okay, thank you. Nothing else.

HEARING EXAMINER ORTH: All right. Thank you. Thank you, Ms. Luck. So the packet is accepted and the matter will be taken under advisement.

MS. LUCK: Thank you.

HEARING EXAMINER ORTH: Is there any reason not to adjourn?

(Taken under advisement.)

STATE OF NEW MEXICO
COUNTY OF BERNALILLO

REPORTER'S CERTIFICATE

I, IRENE DELGADO, New Mexico Certified Court Reporter, CCR 253, 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 of attorneys in this case and that I have no interest in the final disposition of this case.

Dated this 5th day of March 2020.

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