STATE OF NEW MEXICO

ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

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

Application of Logos Operating, LLC,
for Authorization to Inject, for
Approval of an Enhanced Recovery
Pilot Project, and for an Exception
to the Project Area Formation
Provisions of NMAC 19.15.26.8,
San Juan County, New Mexico. CASE NO. 22155

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

THURSDAY, SEPTEMBER 9, 2021

SANTA FE, NEW MEXICO

This matter came on for hearing before the New Mexico Oil Conservation Division, William Brancard, Hearing Examiner, Baylen Lamkin, Technical Examiner, on Thursday, September 9, 2021, via Webex Teleconferencing Platform, hosted by the New Mexico Energy, Minerals and Natural Resources Department.

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(Time noted 5:06 p.m.)

EXAMINER BRANCARD: Okay. So let me see. I think we have Mr. Lamkin for Logos.

Mr. Hall, are you ready to roll? Who are your witnesses?

MR. HALL: We have four witnesses I'd like to get sworn in, and I'll call only three, maybe have the fourth, Vanessa Fields, available for questions should anybody have any questions. But I think can simply point out what she would say within the C-108, and expedite things for us.

EXAMINER BRANCARD: Thank you. And I think as with these kinds of applications, like the OXY one you heard before and the FAE you heard, you know our technical staff will sometimes want to sort of continue a dialogue with you after the hearing, all right. So they may ask for more information, may ask for clarification at that point, too. So we may be able to handle some of our questions that way.

MR. HALL: That's fine.

EXAMINER BRANCARD: So who do we have today? Who are your witnesses?

MR. HALL: Let's call at this time Marcia Brueggenjohann, Trevor Gates, Mr. Jeffus, and Vanessa Fields. If I could have had them all sworn in at this

time.

All right. Are you all there?

(Note: Whereupon the Witnesses for Logos Operating, LLC, were duly sworn.)

EXAMINER BRANCARD: Okay. I think I heard four yeses and I do's there. Thank you.

MR. HALL: Do you need entries of appearance? I think there were several attorneys.

EXAMINER BRANCARD: Oh, yes, we do have some parties here, don't we.

MR. HALL: I'm here on behalf of Logos II and Logos Resources II, LLC.

EXAMINER BRANCARD: Okay. And I think we have Hilcorp Energy.

MR. RANKIN: Mr. Examiner, Adam Rankin with the law firm of Holland and Hart appearing on behalf of Hilcorp.

EXAMINER BRANCARD: Thank you. And OCD?

MR. TREMAINE: Jesse Tremaine on behalf of the Oil Conservation Division. For your information, at this time OCD does not anticipate questions.

EXAMINER BRANCARD: Mr. Rankin, do you have any objection to this going forward?

MR. RANKIN: No objections to proceeding by affidavit.

EXAMINER BRANCARD: All right. You'll have questions for the witnesses, do you think?

MR. RANKIN: Yes, I suspect, I will.

EXAMINER BRANCARD: Okay. Excellent.

So, Mr. Hall, where are we going?

MR. HALL: Great. Marlene, if I might share the screen, please.

MS. SALVIDREZ: I did give you authority already.

MR. HALL: Okay. Can everyone see that?

EXAMINER BRANCARD: We do see it. We see the Logos logo.

MR. HALL Let me get back.

MARCIA BRUEGGENJOHANN,

duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HALL:

Q. Okay. Marcia, would you please state your full name and place of residence.

A. (Note: No response.)

Q. Marcia, do you hear me?

MS. SALVIDREZ: There is a Marcia as a participant. She is unmuted.

MS. BRUEGGENJOHANN: Can you hear me now?

Yes, I can hear you, Scott.

Q. Please state your full name.

A. It's Marcia Brueggenjohann.

Q. Would you spell your last name, please.

A. Yes. B-r-u-e-g-g-e-n-j-o-h-a-n-n.

Q. Marcia, where are you employed and in what capacity?

A. I'm employed by Logos Operating, LLC, and I'm the Vice President of Reservoir Engineering.

Q. And you have previously testified before the Division and had your credentials as an expert reservoir petroleum engineer accepted of record; is that correct?

A. Yes, that is.

Q. Would you just summarize what Logos seeks by its Application.

A. Logos is seeking an Order authorizing the injection of carbon dioxide into the Fruitland Coal Formation within the Basin Fruitland Coal Gas Pool in the Quinn No. 338S, which is located 1650 feet from the south line and 1,045 feet from the west line, which is Unit K in Section 7, Township 31 North, Range 8 West, in San Juan County.

Logos is proposing to convert the subject well to a Class II injection well and utilize the injection of carbon dioxide between the depths of 2,675 feet and 3,008 feet subsurface to support enhanced

recovery operations in the pilot project study area within a half mile Area of Review of the wellbore, the Quinn 338S.

Q. All right. Let's go down to Exhibit 1 which is the C-108 itself, and I'll ask you: Did you participate in the preparation of the C-108?

A. I did. I participated in the preparation along with Lobos Resources geologist Trevor Gates and with the assistance of Vanessa Fields of Walsh Engineering.

Q. So if the hearing examiner wishes, can he refer to page 16 and find the locator map, the AOR map in there?

A. Yes.

Q. For the record, you need to answer verbally.

A. Yes.

Q. You need to answer verbally.

A. Yes.

Q. I'll take that as a yes.

A. Yes. I'm saying yes. I guess you can't hear me.

Q. Okay. Then if the examiner refers to page 17 he'll find the C-102, and that describes the acreage that's involved in this application today, correct?

A. Yes, that's correct.

Q. And page 5 is the wellbore schematic?

A. Yes, that is correct.

Q. And page 6 is a discussion of the injection volumes and rates, correct?

A. Yes.

Q. Tell us what the source of injection gas is going to be for this project.

A. The CO2 that Logos is going to use for this process will be stripped from the produced gas stream from Logos-operated wells. We plan to use the proprietary membrane technology to separate the CO2 from the produced gas stream.

The produced gas that we'll utilize and that will enter the membrane for separation will be post royalty and will be wholly owned by Logos Resources. The resulting gas that would be sent downhole will be approximately 65 percent CO2 and 35 percent methane, as this is the maximum separation capacity the membrane unit has at this time.

Q. Explain why you're targeting the Fruitland Coal.

A. The Fruitland Coal has been previously identified through numerous studies in the area as an ideal formation for the injection of CO2. This is because testing on the San Juan Fruitland Coal has demonstrated amounts that CO2 preferentially adsorbs on the coal compared to methane. In this case the Quinn 338S is capable of production, but in very small quantities and

cannot be produced economically, so the injection of CO2 in this wellbore will help prevent waste by utilizing the wellbore for an injection process.

Q. Right. Explain for the hearing examiner how the physical operation of the project will work.

A. Uhm, Logos is going to utilize the CO2 content that's currently being produced from our operated well from the Pump Canyon unit. The Co2 Will be removed from the produced gas stream utilizing the membrane technology, and this separation process will then deliver the CO2 stream which will be compressed downhole into the Quinn 338S.

The CO2 will be continuously pumped downhole, and will adsorb on the (inaudible) coal, potentially displacing methane in the reservoir which will potentially then be produced in offset ** Strickland coal wells which are just outside the Area of Review, which is one half mile -- a one-half mile radius from the Quinn 338S.

Q. Right. To be clear, is the purpose of this project to utilize the reservoir for the long-term storage of CO2?

A. No, that is not the intent.

Q. And would you confirm the Quinn 338S as an experimental well?

A. Yes, I would.

Q. Tell us what the ratio of injected gas to produced gas is expected to be.

A. The current compressor design for this facility has a maximum rate of approximately 250 mcf per day to be delivered downhole. To be clear, there is currently no frequent coal gas being produced within the 1/2 mile Area of Review, but if you look just outside the Area of Review within a few hundred feet, there are three frequent coal wells, two of which are producing at about 90 mcf a day and one that is producing 200 mcf per day.

Q. So does Logos expect to recover incremental reserves of coal methane that would others go unrecovered?

A. There's a strong potential to recover incremental reserves if enough CO2 is adsorbed down the reservoir. What's unknown at this time is how much CO2 has to be injected in order for this to be accomplished.

But any reserves that would be recovered would likely be unrecovered due to current operating conditions without this experimental process.

Q. And is it possible to quantify those incremental recoveries at this time?

A. Not at this time, as that would require advanced modeling software that Logos does not currently have.

During our proposed one-year pilot Logos

will collect data on all the wells within the Area of Review or just outside it. Subsequent to the pilot it's our plan to work with New Mexico Tech and the Petroleum Recovery & Research Center to model the results of the pilot and to gain a more exact prediction of the amount of potentially recoverable incremental reserves.

Additionally, this modeling might be used to predict the results of scaling up the pilot, and for an increased volume of CO2, and what that impact might be on the offset production.

Q. All right. Let me go to Exhibit 2.

Could you identify that, please, Exhibit 2.

A. Exhibit 2 is a letter from Dr. Robert Balch, with Petroleum Reserves Recovery Center at New Mexico Tech, received by Logos Resources on September 1st.

Q. All right. So you reviewed the pilot project with Dr. Balch?

A. Yes. Logos' management team sat down recently with Dr. Balch to discuss our plans to inject the CO2 into the Quinn 338S.

Q. From your conversations with him, can you summarize his impressions of the project?

A. I can. Dr. Balch has really extensive knowledge of the Pump Canyon geology, petrophysics and reservoir characteristics, due to his participation in another CO2

project in the area. In the letter that he wrote, he felt that the Logos study would be very intriguing because it would provide necessary data to help understand the long-term effects of these lower-injection rates on offset production and on the reservoir.

Dr. Balch also felt that the study would provide adequate data for the PRRC to use to simulated what was going on in the reservoir and force the potential to simulate a scaled-up pilot in the future.

Finally, Dr Balch also said the Logos study, he felt, could ultimately add to carbon dioxide sequestration efforts in the basin, because the Fruitland coal gas that's produced typically has on the order of 20 to 25 percent volume of CO2. The idea that this could be captured, reinjected, and potentially bound by the reservoir provides the potential to ultimately reduce related regional CO2 emission by as much as 3 to 4 million tons per year if it's adopted by all the producers in the area.

Q. All right. So the hearing examiner can find the wellbore schematic for the Quinn 338S back within the C-108 at page 5 of that document, but would you just discuss the casing, what you know about it for the Quinn?

A. The well has 9 5/8-inch 36-pound J-55 casing that was set to 181 feet. During the cement job 11

barrels of cement were circulated to surface. The intermediate casing was set at a depth of 2,661 feet and it's 7-inch, 23-pound J-55.

During an estimate job 33 barrels of cement were circulated to surface. The wellbore was cement under reamed to 9 inches from the depth of 2,675 feet to to 3,008.

10 joints of 5 1/2-inch, 15 1/2-pound K-55 pre perforated liner were then hung at a depth of 2,605 feet to 3,008 feet with no cement.

Q. Does the well have an open-hole completion?

A. There is a liner in the well, and yes, it's an open-hole completion behind that.

Q. And will the CO2 be injected under pressure?

A. The CO2 will be compressed just enough to inject it down the tubing and into the wellbore.

Q. Do you expect to approach pressure anywhere near supercritical?

A. The pressure will not be anywhere nears supercritical pressure for CO2.

Q. Will the well have a check valve?

A. Yes. A check valve will be placed just to prevent backflow into the system.

Q. And what material will be used for the tubing?

A. We plan to use polylined tubing.

Q. Okay. Tell us what the average and maximum daily injection rates you're proposing and how you arrive at those rates.

A. So for the initial pilot project the average daily rate of injection will be 250 mcf per day, and that's simply the physical capacity of the equipment design.

For the application we also suggested potentially higher rates that were more along the lines of the ConocoPhillips injection study also in the Pump Canyon, which would be more of a maximum of 1,000 mcf per day. That's actually less than the Conoco study.

Q. All right. And what are the average in maximum injection pressures that you anticipate?

A. With the current compressor design we are expecting an average pressure of 200 psi; however, if additional equipment was put on location and utilized we would expect to see a maximum pressure of somewhere in the range of 800 to 1,000 psi.

Q. So, in any event, the volumes and pressures will keep you well below the fracture gradient?

A. Yes, that's correct.

Q. What period of time is needed to conduct the pilot study and collect meaningful data?

A. Well, when you're talking to reservoir engineers

they always want more data than less, but realistically a minimum of one year is optimum for collecting enough data to complete a reservoir model to understand the future viability of the project.

Q. Based on that, do you anticipate making a request to the Division in the future to approve increased rates in pressures?

A. It's possible. After the one-year pilot we'll evaluate the results and we'll look at the modeling that we plan to do with the Petroleum Recovery and Research Search Center, and based on what they predict the future behavior would be with increased injection volumes, we'll evaluate the economic viability of it and potentially ask for increased rates and pressures.

Q. Okay. Do we need to discuss the chemical analysis of injective gases? What are those percentages?

A. The injective gas should be approximately 65 percent carbon dioxide and 35 percent methane.

Q. Are there any compatibility issues between CO2 and the coal?

A. No compatibility issues are expected.

Q. Based on your view, are you satisfied that the conditions of the wells within the AOR are such that none of them will act as a conduit for fluids from the injection interval to fresh water aquifers?

A. The short answer is yes, I am. Logos does not have access to the two Mesaverde wellbores that are within the 1/2 mile Area of Review; however, it's not expected that this low pressure gas would be able to travel downwards over 1,000 feet into the Mesaverde Formation, so there's no anticipation that that would be a concern.

The three operating coal wellbores that are just outside the Area of Review have been closely examined, the cement volumes and casing (inaudible) have been double checked. All three have good cement returns to surface, and routine acoustic shots have been done on these wells which have demonstrated there's no casing irregularity. I am confident there's no reason to be concerned about any of the wells in the vicinity behaving as a conduit to fresh water sources.

Q. Okay. Are you confident that injection operations through the interval proposed will not adversely affect productive or potentially productive (inaudible)?

A. CO2 injection into coal has been a widely accepted practice in the United States and has been safely practiced for more than 20 years. The injection of CO2 into a coal interval is the precise definition of enhanced coalbed methane recovery, and it is expected to prevent waste and not adversely affect the reservoir.

Q. Okay. Let's go down to -- this is Exhibit 8. What is Exhibit 8?

A. Exhibit 8 is a Cumulative Production Bubble Map of the wells in the area of the 338S.

Q. Let me try to rotate that for us.

Did you ask your geologist for this?

A. I did.

Q. How would you characterize the productivity of the Fruitland coal in this area, looking at this?

A. Generally speaking the parent wells in the area were drilled and cavitated and they are far more prolific than the infill wells that were drilled later which did not have enough reservoir pressure to be cavitated.

You can see this in the exhibit by the size of the bubble, which was made using public data. The cumulative production for the Quinn 338S No. 3 Logos Operated Treatment Coal Wells just outside the Area of Review are remarkably less than the surrounding wells. We believe there are incremental reserves that can be recovered there, and that the CO2 injection process may assist in the improved recovery of those reserves.

Q. All right. Do you know of any objections that Logos received pursuant to the Notice of application in this matter?

A. There were no objections to the application.

Q. And can this project be operated so the injected gas will remain contained within the injection formation?

A. Yes, in my opinion it can. The Fruitland Coal Formation has a much higher porosity and permeability than any of the other offset-type sand formations. There is no evidence from prior pilot projects that any other formation received the injective gas, and there are no known open faults in the area that would allow the injected gas to travel to those formations or to the surface.

Q. And in your opinion will injection operations pose any threat to correlative rights or the waste of hydrocarbon resources?

A. In my opinion there will be no impairment of correlative rights, and the injection operations are more likely to prevent waste than to cause it.

Q. In your opinion can the project be operated so that the public health and safety and the environment will be protected?

A. Yes.

Q. In your opinion will granting Logos' application promote the interest of conservation -- I think I have already asked that question.

A. Yes.

MR. HALL: Okay. You answered again.

That concludes my Direct of this witness, Mr. Examiner, and I would move the admission of Exhibits 1 and 2.

EXAMINER BRANCARD: Are there any objections to the admission of these exhibits?

Hearing none, they are so admitted.

Mr. Lamkin, questions for the witness?

EXAMINER LAMKIN: Is it preferable for me to ask questions of individual witnesses or wait till they all testify and suss out who the correct person to ask a question to would be, or...

MR. HALL: Either way is fine with us.

EXAMINER BRANCARD: Well, that's just too logical.

So, Mr. Hall, you already chewed up much of your half an hour. How much more testimony do you have?

MR. HALL: I have 33 minutes.

EXAMINER BRANCARD: I mean, what do you have? Two more witnesses?

MR. HALL: Well, if we go to 6:00. There are two more witnesses and they are much MORE brief than the engineer.

EXAMINER BRANCARD: All right. Can you wait, Mr. Lamkin?

EXAMINER LAMKIN: That's fine with me.

EXAMINER BRANCARD: All right. We may need to bring them back tomorrow. Is that okay with you, Mr. Hall, just for cross?

MR. HALL: Yes, it is.

EXAMINER BRANCARD: Let's try to get through your two other witnesses, then.

MR. HALL: At this time we would call Trevor Gates.

MR. GATES: Can you guys hear me okay?

MR. HALL: Are you with us, Mr. Gates?

There you are.

MR. GATES: Can you hear me?

MR. HALL: Yes.

TREVOR GATES,

duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HALL:

Q. For the record, state your name and place of residence.

A. Trevor Gates in Erie, Colorado.

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

A. Logos Operating, LLC, as a Senior Geologist.

Q. And have you previously testified before the Division and had your credentials as an expert geologist made a matter of record?

A. Yes.

Q. All right. You're familiar with the application that has been filed in this case?

A. Yes, I am.

Q. And the lands that are the subject of the application?

A. Yes.

Q. Let us start with your overview of the Fruitland Formation geology in the area.

A. So the Fruitland Coal is a late crustaceous back-shore marsh deposited coal along the Picture Cliff shoreline of the western interior seaway. The location of this proposed test is within the Fruitland Coal Fairway, which is an area known for its high gas productivity and thick coal accumulations.

In the immediate area of this well there are multiple coal-bearing packages made up of numerous coal seams of various thicknesses. The adjacent projects, specifically that one to the south in Pump Canyon, these packages have been kind of referred to as the Upper, the Middle and the Lower. Here it's a bit trickier to do that just because some of the bigger packages are kind of split apart in the ground, which you will see in a-cross section later, but in general that better, thicker coals tend to be towards the bottom of the formation.

Within the 1/2 mile AOR the net coal thickness ranges from 45 to 65 feet with an average coal density of 1.63 grams per cc, which is based on an Oxnard Offset Log that I have digital data on.

Q. All right. Would you quickly identify Exhibit 3 for us, please?

A. Yes. So Exhibit 3 is just the type log of that 338S. It's actually the mud log for the well. The lithology track is kind of in the middle. You can see the part-black shading. Those are the coal intervals that the mud loggers noted as they went through them. They noted 47 feet of net coal in here, and there's also on the side in the pink, that's the perf interval of that pre perfed liner that was run, just so you can see what part of the wellbore is open to that liner.

Q. Have you examined all of the Fruitland coal penetrations within the 1/2 AOR of the Quinn well?

A. Yes, I have. There's only three within the 1/2-mile radius.

I would mention on this map, there's a map very similar, almost identical, in the C-108 that has the API numbers listed. This one just has the well numbers.

And in the cross-section that is shown, this is a slight error, but it's correct on the next two slides.

But, yeah, within that 1/2-mile AOR there is only three wells that penetrate the Fruitland, one of them being the 338S. The other two are the two Hilcorp Mesaverde wells.

Q. And you have been referring to Exhibit 4; is that correct?

A. Yes. Exhibit 4, yes.

Q. Okay. Have you identified all the fresh water aquifers in the AOR?

A. Yes. So looking in this area, the San Juan Formation would be at the surface down to a depth of 700 feet TBD. On the State website I found two water wells identified within a two-mile radius of the Quinn, not within the 1/2 mile AOR, and they were both drilled within the San Juan Formation to depths of 485 to 650 feet, and they were used for livestock watering.

The Ojo Alamo is another known aquifer. Nothing is drilled in this immediate area of that, but that has a bottom depth of about 1700 feet TBD, just for reference.

Q. When you evaluated the Fruitland for injection operations, what geologic criteria did you utilize?

A. Uhm, as Marcia had mentioned before, since this was kind of a known target, I mainly focused on just trying to map out the target itself as far as thickness of

the coal and the structure.

So I looked in the area. I mean, a lot of this area I don't have digital logs on, but I found a lot of good old mud logs where they, you know, have very good notes on the coal as they went through, and added up the net coal at the end of the interval. So I used that to map out in this exhibit here what -- you're looking at No. 6, I believe.

Q. Exhibit 5.

A. Exhibit 5, that's actually the isopach that I created from looking at these wells in the area. So you can see it's -- the net coal figures in the area is about 45 in the middle and kind of thickens down to the southeast, and kind of to the west about 65 feet.

Q. Let's look at Exhibit 6. Would you identify that, please. What does that show us?

A. So Exhibit 6 is a structure map in the area. I base this on the Pictured Cliffs, which is right at the base of the Fruitland Coal since it's a more steady pick to put a structure map on.

So as you can see, the general dip is about 1 degree down to the northeast. You can see a little bit of a structural nose, or high, coming through the center of the Unit, which I think is maybe why there was a little bit of thinning of the net coal in that similar area.

Q. Would you identify this exhibit, please, Exhibit 7.

A. So Exhibit 7 is that cross-section A to A-prime, which is generally going down dip. But the two lines on there, the lower line would be that Pictured Cliffs, and that's what that structure map is based on. The top line would be kind of that top hole pick, as noted on the mud logs.

And again, you can kind of see with these various mud logs and that black shading kind of how the coal is kind of -- sometimes they kind of come together and makes a bigger, thicker coal package and sometimes they kind of split apart, but overall the net coal thickness is somewhat consistent in the area.

Q. And just to authenticate this, did you prepare Exhibit A?

A. Yes, I did.

Q. Would you briefly discuss the permeability and porosity of the injection formation. Are those issues for us to consider?

A. Like I mentioned before, this area is the Fruitland Coal -- well the primary -- sorry, I'm losing my train of thought.

But -- what is it? The Fairway. Sorry. That was it.

It's the primary fairway of the Fruitland Coal, so it's got the thickest, most continuous accumulations of coal in it, and the coals are known to be very high porosity and permeability. All that's based in the cleats.

And in those mud logs that I read to you, the mud loggers generally noted that they did see a lot of cleating on coal cuttings. They did not see secondary mineralization on those cleat faces which would indicate a drop in permeable (phonetic) porosity.

Q. All right. Mr. Yates, have you examined the available geologic and engineering data for evidence of open faults or any other hydrologic connection between the injection zone and any source of underground drinking water?

A. Yes, I have.

Q. Are you satisfied that no fault or connections exist?

A. Yes, I am.

MR. HALL: That concludes my direct of Mr. Yates, and I would move the admission of Exhibits 3, 4, 5, 6, 7 and 8.

EXAMINER BRANCARD: Are there any objections to those exhibits being admitted?

Hearing none, they are so admitted.

Your next witness, Mr. Hall.

MR. HALL: At this time we would call Chris Jeffus. Mr. Jeffus, are you with us now?

MR. JEFFUS: Yes, Scott.

CHRISTOPHER JEFFUS,

duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HALL:

Q. Mr. Jeffus, would you state by whom you're employed and in what capacity.

A. I'm employed by Logos Operating, LLC, as Vice President of Land and Legal.

Q. Have you previously testified before the Division and had your credentials as an expert landman accepted as a matter of record? Is that correct?

A. I have.

Q. Let's go directly to Exhibit 9.

Would you identify that for us, please.

A. Exhibit 9 is a -- it's a map we acquired in making an acquisition of our Pump Canyon area, which is comprised of several federal leases. It defines each of those federal leases and then the communitized areas in that Pump Canyon area outlined in grey.

Q. Can you point out the communitized area that embraces the Quinn 338S. Is that apparent on there?

A. Yes. The Quinn 338S is in Section 7 of 31 North, 8 West, and the communitized area is approximately 330 acres in roughly the southwest corner of Section 7 and the west half of Section 18, and that's due to irregular sections, like (inaudible) 20 acres.

Q. Does Logos propose to have the pilot project conform with the boundaries of that communitized area?

A. We do.

Q. Is Logos requesting an exception to the project area formation provisions under Division Rule 19.15.25.8 for this particular pilot?

A. We are requesting exception for the pilot project.

Q. So under the existing rules if we were to build a pilot, under that rule we have to add cornering in the adjoining 320-acre spacing units?

A. We would. Under that section we would have to add the surrounding half sections.

Q. And that would leave you with a project area exceeding 2600 acres; is that right?

A. Correct.

Q. And why is Logos not proposing to form a Statutory Enhanced Recovery Unit at this time?

A. Logos is not requesting permission of a Statutory Enhanced Recovery Unit, because this project is

a pilot only, as Marcia discussed, for roughly a year. And the extent of the appropriate inclusion in a prospective unit outside of the current communitized area, if any lands are even appropriate for inclusion, it's not yet known what we should be including.

Q. Did you look at Section 70-7-4 of the statutory Unitization Act? It requires the Division to make a determination that the separate tracts, in this case within a 2600-acre project area, can best be developed and operated as a unit.

So the question is: Can either Logos or the Division make that determination at this time?

A. We cannot, and the Division can't for the pilot project, period.

Q. Going back to the leasehold map, if we look at the developed areas would all of those communitizations need to be superseded by the statutory unit, and the participation and ownership schedules altered?

A. Correct. All of the communitized areas within the 26-, roughly 2600-acre project area would need to be superseded and combined into a single unit. And that would be 30 -- two to three communitized areas. I'm sorry, three to four communitized areas within the Pump Canyon area.

Q. And is that warranted before the results of the

pilot project are known?

A. It's not warranted before the results of the pilot project are known.

Q. Now, for the duration of the pilot project, will costs be reallocated to the owners?

A. With the 330-acre unitized area in place, no -- costs would not be reallocated, except for Logos intends to bear 100 percent of the costs for the project.

Q. The royalty interests are not affected at all?

A. Royalty interests would not be affected in that situation.

Q. Right. Back to Exhibit 9. Is that a true and exact copy of the leasehold map maintained in the ordinary course of business by Logos?

A. It is.

MR. HALL: That concludes my Direct of this witness, Mr. Examiner. I'd move the admission of Exhibit 9. I would also move the admission of Exhibit 10, which is our Notice Affidavit.

This concludes our case on Direct.

EXAMINER BRANCARD: Thank you.

Any objections to these exhibits? Hearing none, Exhibits 9 and 10 are admitted.

And that's all your exhibits, Mr. Hall? Have we covered them all?

MR. HALL: That's all. I would point out on Exhibit 10, it's my Notice Affidavit, it has Certified Mail that went out. We got tracking back on all pieces of mail except the Notice provided to Enduring Resources. However, they did receive it and they contacted us, they communicated with us, and provided us with a consent to the application. That's the very last document under cover sheet 2, Exhibit 10.

I will also point out one more thing. In the cover letter I got the date of hearing wrong. I said September 10th instead of September 9th, but each of those Notice letters included a copy of the Application, which says September 9th. We are virtually at September 9 now, so I think we are okay. September 10th, I'm sorry. So I think we are covered on Notice.

EXAMINER BRANCARD: Well, we may get there, anyway.

MR. HALL: So that's all I have.

EXAMINER BRANCARD: Thank you.

Mr. Lamkin, are you ready for some questions?

EXAMINER LAMKIN: Yeah, I can ask a couple of questions if you want.

EXAMINER BRANCARD: Please do.

EXAMINER LAMKIN: So I believe the first

question would be, perhaps, for Ms. Brueggenjohann.

MR. HALL: Yes, for Marcia.

CROSS EXAMINATION OF MARCIA BRUEGGENJOHANN

BY MR. LAMKIN:

Q. Yeah. Do you guys have any concerns with, or have you done any research into swelling, coalbed swelling from CO2 injection, and whether or not that is going to have any effect on the plume dispersion and the economics of the project?

A. We understand that one of the impacts of the CO2 adsorbing on coal is that there may be swelling. Typically it happens at much higher injection rates than what we plan to use on this pilot.

That was something we discussed with Dr. Balch, and he felt that there may be some benefit to utilizing lower rates, as it would slow down the swelling process over a much greater period of time.

So while there's a potential for it to happen as the CO2 adsorbs onto the coal, we expect that we won't see it for a greater period of time.

Q. Do you have any idea as to how long it would take to see CO2 breakthrough in your offset wells? Do you think you have any worries about that during the pilot project lifespan?

A. So there are a number of SPE papers that are

published on the study that was already done in Pump Canyon, in particular SPE 124002. And this is the study that Dr. Balch participated in with the Southwest Regional Partnership on carbon sequestration in addition to the Department of Energy and ConocoPhillips.

Their initial injection rates were 15 times the rates that Logos is proposing to use, and over the course of their study, which was greater than 15 months, they saw no breakthrough.

Q. Okay. How far away is your -- the nearest production well from the Quinn 338S that you guys are expecting to see a response from?

A. It's just about 1/2 a mile. So the production response is theoretical at this point in time.

Q. Okay. Can you -- and this may not be a question for you, but can you provide a proposed wellbore diagram to supplement your application packet? Because I think it has only the current one.

A. Yes, absolutely.

Q. And then in addition to that, can you also supply the calculations and the methodology that you guys used to determine the injection pressure of the CO2?

A. Yes.

Q. With regards to, like, keeping it under the .2 administrative.

A. It's essentially the limits of the equipment, but we can provide that.

Q. Okay. I think maybe -- I don't know if this would be a question for you or for Mr. Gates, but has the reservoir been sufficiently dewatered for you to not have any concern about the creation of carbonic acid and the effects that that might have on offset wellbores?

A. The short answer to that is yes. The wells, if you refer to Exhibit 8, the bubble map, those wells that have the large, significant cumulative production have done a great job of dewatering the reservoir, and the wells that have the small bubbles are not producing a significant amount of water.

Q. Okay.

A. I can provide you with the volumes, if necessary, or if you would like them.

Q. Yeah, if you could provide some, you know, justification for your reasoning, at least, that would be sufficient.

And then I think that I have a couple of questions for Mr. Gates, as well.

I think that's all the questions I have for Ms. Brueggenjohann. Thank you.

CROSS EXAMINATION OF TREVOR GATES.

BY EXAMINER LAMKIN:

Q. So can you give me a little bit of background on the geology of the Picture Cliffs Formation in terms of barrier to migration?

A. Yes. So the Picture Cliffs would be kind of shoreline, kind of like a beachfront sand, would be very tightly cemented. There's no -- since there's no, like, deap-seated faults in the area that they see passing through anything, I don't expect there to be any kind of passageway through there just because the permanent (phonetic) crossing would be so light in that tight-tight cemented sandstone.

Q. Okay. And then so we've encountered issues in the Fruitland Coal in the past with being a zone for lost circulation. Have you, or perhaps Ms. Brueggenjohann even examined any of the offset wellbores to see if they had CBLs across the interval of interest?

A. I looked in the area. I did not see a CBL right through that zone in particular. Like looking at the two offset Hilcorp wells, looking at their intervals they tended to set intermediate casing just below the Fruitland probably for that very reason. They'd always noted that they got cement back to surface on that, and then did their subsequent drilling down deeper and also got cement back to surface. But I didn't see an actual CBL of that interval run. I saw notes to the agencies, "Do we need to

run a CBL?" but I never saw a follow-up, I couldn't find anything on OCD's website.

EXAMINER LAMKIN: Okay. I think -- I believe that might be my only couple of questions for you, then I had one question for Mr. Jeffuss, I believe.

CROSS-EXAMINATION OF CHRIS JEFFUS

BY EXAMINER LAMKIN:

Q. Would the requirement to form a unit change the economics for the project at all? Would it be, you know, determinative that it was uneconomical at that point to impose that stipulation?

A. I'm trying to recall the ownership in that area.

I don't think it would have any economic impacts, particularly because we intend to bear all of the costs for this project. It may have a slight difference in our ownership of working interest, because we own slightly less in a couple of these smaller leases in that area.

EXAMINER LAMKIN: Okay. I believe that's all the questions that I had off the top of my head, but just as in the previous cases, if you'd leave it up to us to be able to reach out for further clarification on issues or asking questions in the future, that would be great.

EXAMINER BRANCARD: Thank you.

And I guess I just have one question.

You mentioned that there would be a one-year duration for this project. Is that one year for injection and then wait to find out the results sometime after that? How would the timing on that work? Do we know what the results are?

MS. BRUEGGENJOHANN: Yes, one year for data collection with the hope to continue injection while we are modeling results. But it would probably take a month to two months of modeling work to have the results.

EXAMINER BRANCARD: You know, do you have clear standards about what you're looking for for results? You know, what's a go, what's a no-go?

MS. BRUEGGENJOHANN: Well, we do have an idea of what we would like to see, but it's at this point in time it's really -- depends, as you know, like everything else, on commodity pricing and the environment in which we are in. And things could change dramatically a year from now, so what I might say is economic today might not meet the same hurdles a year from now.

So we have some sideboards, if you will, on what we think is reasonable, but I don't think we've drawn a line in the sand about a go or a no-go.

EXAMINER BRANCARD: Okay. Thank you.

I guess Hilcorp, OCD, any questions?

MR. RANKIN: Mr. Examiner, just one point from

me, that we ask we be included in any correspondence and supplemental information provided by Logos to the Division.

EXAMINER BRANCARD: Okay. Thank you.

MR. TREMAINE: Nothing from the OCD.

EXAMINER BRANCARD: Thank you.

Mr. Lamkin, are we good? You had two questions that I saw, a proposed wellbore diagram and calculations for injection well pressure. Was there anything else?

EXAMINER LAMKIN: No, I'm sure that we will have some more follow-up questions at some point during the review process, but I can't think of any specific requests that we would need right away.

EXAMINER BRANCARD: Okay. Thank you.

And I guess we'll contact Mr. Hall. Is that correct, Mr. Hall?

MR. HALL: Yes. And it's been past practice for pilot projects is we anticipate coming back to the Division at some point and reopening the case and providing the results of the study to you at a hearing.

EXAMINER BRANCARD: Okay. If you have any proposed language you would like to see, let us know.

MR. HALL: Very good.

EXAMINER BRANCARD: Is that it for you, then?

MR. HALL: That's it. Thank you.

EXAMINER BRANCARD: Here we go. 58 minutes. 5:58. Excellent timing.

All right. Well, thank you everyone.

And as stated before, the OXY cases will be continued to tomorrow morning at 9:00 a.m., same channel. And there will be a continuance posted on the website for people to participate.

With that we'll take Case 22155 under advisement subject to further requests for information and clarification.

(Time noted 5:59 a.m.)

STATE OF NEW MEXICO)
: ss
COUNTY OF TAOS)

REPORTER'S CERTIFICATE

I, MARY THERESE MACFARLANE, New Mexico Reporter CCR No. 122, DO HEREBY CERTIFY that on Thursday, September 9, 2021, the proceedings in the above-captioned matter were taken before me; that I did report in stenographic shorthand the proceedings set forth herein, and the foregoing pages are a true and correct transcription to the best of my ability and control.

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

/s/ Mary Macfarlane

MARY THERESE MACFARLANE, CCR
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