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 NO. 14128

APPLICATION OF CANO PETRO OF NEW MEXICO, INC. FOR WATERFLOOD PROJECT, CHAVES COUNTY, NEW MEXICO

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EXAMINER HEARING

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BEFORE: DAVID K. BROOKS, Legal Examiner
WILLIAM V. JONES, Technical Examiner
TERRY G. WARNELL, Technical Examiner

May 15, 2008

Santa Fe, New Mexico

This matter came for hearing before the New Mexico Oil Conservation Division, DAVID K. BROOKS, Legal Examiner, WILLIAM V. JONES, Technical Examiner, and TERRY G. WARNELL, Technical Examiner, on May 15, 2008, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South St. Francis Drive, Room 102, Santa Fe, New Mexico.

REPORTED BY: JOYCE D. CALVERT, P-03
Paul Baca Court Reporters
500 Fourth Street, NW, Suite 105
Albuquerque, New Mexico 87102

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Examiner Hearing
CASE NO. 14128

A P P E A R A N C E S

FOR THE APPLICANT:

Gary W. Larson, Esq.
ATTORNEY AT LAW
218 Montezuma
Santa Fe, New Mexico 87504

ALSO PRESENT:

Mr. Phillip Feiner, Esq.
General Counsel, Cano Petro

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MR. JONES: On the record. Let's call Case No. 14128. This is the Application of Cano Petro of New Mexico, Inc. for Waterflood Project, Chaves County, New Mexico.

Call for appearances.

MR. LARSON: Gary Larson for Applicant, Cano Petro, New Mexico. I have three witnesses with me. I also would like to acknowledge Phillip Feiner, who's the general counsel for Cano Petro who is not testifying.

MR. JONES: Okay. And I'm sorry. How do you say your name again?

MR. FEINER: Feiner, Phillip Feiner, F-e-i-n-e-r.

MR. JONES: Any other appearances? I think in the file we had a notice from --

MR. WARNELL: Landowner?

MR. JONES: Yeah.

MR. WARNELL: Preston Berry.

MR. JONES: Preston Berry, Buford Preston Berry, III, from Dallas. He said he would be attending the hearing.

MR. FEINER: He was here, and he left early.

MR. JONES: It was worthwhile to come, but it was not worthwhile to stay. I don't know if you guys were told you were going to be the last one on the docket or not.

MR. LARSON: I was not served with that as counsel.

MR. JONES: Oh, you were not?

MR. LARSON: Mr. Feiner had communications with Mr. Berry. He was here earlier, but he's no longer here.

MR. JONES: Okay. And I don't see anybody else in the file.

MR. BROOKS: Is Mr. Berry an attorney?

MR. FEINER: His father.

MR. BROOKS: I remember an attorney named Buford Berry in Dallas.

MR. FEINER: One and the same.

MR. BROOKS: But that was the father of this guy.

MR. FEINER: Yes, sir.

MR. BROOKS: I was going to say that was a long time ago, so that guy would be pretty old, you know.

MR. JONES: Mr. Brooks was a judge in Dallas for 12 years; is that right?

MR. BROOKS: Pardon me? Okay. Let us proceed.

MR. JONES: Okay. Let's have the witnesses all stand to be sworn. And please state your name.

MR. MCKINNEY: Patrick McKinney.

MR. AZIZI: Alexander Azizi.

MR. MASTERS: Keith Masters.

[Witnesses sworn.]

MR. JONES: Okay.

MR. LARSON: I first call Mr. McKinney.

PATRICK M. MCKINNEY

after having been first duly sworn under oath,

was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. LARSON:

Q. You've already stated your name for the record. Where do you reside, Mr. McKinney?

A. Forth Worth, Texas.

Q. And by whom are you employed?

A. Cano Petroleum.

Q. And what is your capacity with Cano Petroleum Company?

A. I'm Senior Vice President of Engineering and Operations.

Q. Could you briefly summarize your education and employment background for the Hearing Examiner?

A. I have a BS in petroleum engineering from the University of Wyoming. I also have a Master's in business administration from Pepperdine University. I've been a practicing engineer for 26 years. I've been able to work in the states of California, Texas, New Mexico, Colorado, Montana, North Dakota, and Wyoming. And I've practiced drilling, reservoir, and production engineering.

Q. Would it be fair to say that all 26 years of your professional experience has been in the oil and gas industry?

A. Yes.

Q. And have you ever testified before the Division before?

A. No.

Q. Have you ever testified before a regulatory agency that governs oil and gas operations?

A. Yes, the Montana Oil and Gas Commission.

Q. And were you qualified as an expert in that proceeding?

A. Yes, I was.

MR. LARSON: Mr. Hearing Examiner, based on Mr. McKinney's education and professional experience, I move that he be qualified as an expert petroleum engineer.

MR. JONES: Mr. McKinney is qualified as an expert petroleum engineer.

Q. (By Mr. Larson): And could you briefly fill the Hearing Examiner in on the history of Cano Petroleum?

A. Cano Petroleum is approximately four years old. It's a public company, listed on the America Stock Exchange. It has really been in existence a little longer than that. It's been a public company, though, for four years.

Q. And what is the relationship between Cano Petroleum and Cano Petro of New Mexico, which is the applicant in this case?

A. The applicant is a wholly owned subsidiary of

Cano Petroleum.

Q. When was Cano Petro formed?

A. In March of 2007.

Q. And is that the same time that Cano Petroleum acquired the leases in the Cato San Andres Unit that's the subject of the application?

A. Yes.

Q. And why did Cano Petroleum acquire the Cato Unit?

A. Well, the Cato Unit has an extensive history with potential for secondary recovery. It was already unitized. It had received a prior order for secondary recovery. And we believe the field is perhaps the largest San Andres field in the Permian Basin that's never been waterflooded.

Q. I'm sorry. I neglected to pass out exhibits. If you'll bear with me a moment.

Mr. McKinney, would you refer to Cano Petro Exhibit No. 1?

A. Yes.

Q. Thank you. Would you identify that for the record, please?

A. That is the order No. R-9029 for application for a waterflood project for the Cato Field.

Q. And does that order reference the approval of the creation of the Cato San Andres Unit?

A. Yes, it does.

Q. And you said it also approved a waterflood project within the unit?

A. Yes, it did.

Q. And do you have management responsibility for Cano Petro's operations in New Mexico?

A. Yes.

Q. And do you have the same title for the wholly-owned subsidiary of Cano Petroleum?

A. No. My title for the applicant is Vice President of Operations.

Q. And in that capacity, did you have management responsibility for application that's the subject of this proceeding?

A. Yes.

Q. Did you have occasion to hire a consultant to assist Cano Petro with the preparation of application?

A. Yes. Keith Masters of Masters Consulting.

Q. And did Mr. Masters work under your supervision and control?

A. Yes, he did.

Q. Did you have in-house geologists at Cano Petroleum in Fort Worth assist you with the preparation of the application?

A. Yes. We had two in-house geologists that had assisted us in the preparation.

Q. And did those geologists work under your supervision and control?

A. Yes, they did.

Q. The next exhibit I'll refer you to is No. 2, Cano Petro Exhibit No. 2. Could you identify this exhibit for the record?

A. This is the area of application to initiate the first phase of the waterflood at the Cato Field.

Q. And who prepared this map?

A. Mr. Masters with Masters Consulting.

Q. And did he prepare the map under your supervision and control?

A. Yes, he did.

Q. And does the area shown with the red boundary fairly depict the project area that's described in the application?

A. Yes, it does.

Q. Are you personally familiar with the geology and the reservoir in the project area?

A. Yes, I am.

Q. And next, direct your attention to Cano Petro Exhibit No. 3. Would you briefly describe what this exhibit depicts?

A. This exhibit depicts the application area which is in the northeast corner of the unit. I guess that could be

a light red or a salmon color. I think it's the color of my tie, actually. But that depicts the application area for today, and the other colors depict the next phases of the project that are roughly staged out in one-year intervals.

So you can see that this is the first phase of a five-year project at the Cato Field. And it's our intent to develop this waterflood on 20-acre spacing as depicted with the infill wells, the circles that are on the map.

Q. What you've described as a salmon-colored area, is that the same project area depicted in Exhibit 2, which is the larger map?

A. Yes, it is.

Q. And who prepared this map that is Cano Petro Exhibit No. 3?

A. The Cano Petroleum did.

Q. Was that done under your supervision and control?

A. Yes, it was.

Q. Do you have management responsibility for Cano Petro's long-term planning for the Cato San Andres Unit?

A. Yes, I do.

Q. Is there anything you'd like to add in terms of the long-term planning that is depicted in these various shaded areas in Exhibit 3?

A. Yes. To date, we've drilled approximately 30 of the 20-acre infill wells in the application unit. And our plan

is to drill approximately 220 total 20-acre infill wells to develop this entire field.

Q. And does -- the project that's the subject of the application, have you estimated a time frame for completing that stage of the development?

A. For the application area, we have about 15 more wells to drill to finish out the first phase here. And our intent is to commence injection as soon as possible after we receive the order.

Q. Has Cano Petroleum estimated the oil production to date in the project area addressed in the application?

A. Yes. Through public records, it appears that the Cato Unit has -- through primary production, has produced approximately 16 million barrels of oil equivalent to date.

Q. And I direct your attention to Cano Petro Exhibit No. 4. Do you know who prepared this document?

A. Mr. Azizi prepared this document at Cano Petroleum.

Q. Will it be addressed in the course of his direct testimony?

A. Yes.

Q. And did he prepare that map under your supervision and control?

A. Yes, he did.

Q. Has Cano Petroleum conducted an assessment of the

oil in place in the project area addressed in the application?

A. Yes. We estimate that there's approximately between 2 million barrels and 3.5 million barrels of oil equivalent that are available for this 20-acre waterflood development in the applicant area.

Q. And that's the project area for this phase?

A. In the project areas.

Q. We'll refer to that as the first phase in the long-term development.

And has Cano Petroleum conducted a cost benefit analysis in relation to the first stage of the waterflood project?

A. Yes. We're estimating that it will cost approximately $35 million to develop this phase one area. That equates to roughly about $10 of BOE for the development costs for the reserves in question here.

Using preliminary economics -- and we use a lower price step of $60 oil and $7 gas. This project has a rate of return in excess of 50 percent at the lower oil prices.

Q. And this $35 million, does that include money spent to date, for instance, on the infill wells that you talked about?

A. Yes. It includes the infill wells that we've drilled to date. It does not include an approximate $15 million that we've spent to date to go in and reactivate the

field, as well as return wells to production and construction for new tank batteries. So we've made a significant investment already in advance of the waterflood.

Q. When Cano Petroleum acquired the Cato Unit, were there a number of inactive wells in the unit at that time?

A. Yes, there were.

Q. And did Cano Petroleum execute an Agreed Compliance Order that addressed these inactive wells?

A. Yes.

Q. And to your knowledge, has Cano Petro complied with its obligations under the Agreed Compliance Order?

A. Yes, we have.

Q. Do you know whether Cano Petroleum presently has more than five inactive wells that are not included in the Agreed Compliance Order?

A. No, we do not.

Q. Has Cano Petroleum provided financial assurance for the wells that are involved in the project addressed in the application?

A. Yes.

Q. And other than the ACO that you testified about regarding the inactive wells, is Cano Petro subject to a Division order requiring corrective action?

A. No.

Q. Has the Division ever assessed a civil penalty

either to Cano Petroleum or Cano Petro of New Mexico that remains unpaid?

A. No.

Q. Will Cano Petro of New Mexico be the sole operator of this waterflood project?

A. Yes, we will.

Q. And going forward, if the Division grants the application submitted by Cano Petro, would it be your request that Cano Petro be allowed to seek administrative approval for the next stages of waterflood activity in the unit?

A. Yes.

Q. And in your opinion, would the granting of the application serve the interests of conservation, preservation of waste, and protection of correlative rights?

A. Yes, it would.

MR. LARSON: That's all I have for Mr. McKinney.

EXAMINATION

BY MR. JONES:

Q. Okay, Mr. McKinney. So here we are in May and you've already been drilling, though. Did you start your rigs early this year?

A. Yes.

Q. You can go all winter in this area, can't you?

A. Yes, we can.

Q. Is this the extension of the Slaughter Field,

kind of? That whole trend that goes across --

A. It's been depicted as the Lovell and Slaughter Trend, yes. It has -- the wells to date have all been producing wells, so we've been able to produce them as well too in this development.

Q. And you're going with 40-acre 5-spots, 20-acre well spacing?

A. It's going to be 20-acre patterns, or 20-acre well spacing.

Q. 40-acre --

A. 5-spots, yes.

Q. They use chicken wire over in the Slaughter Field. You didn't want that? I guess not. And they also -- I noticed they use a lot of ~~hunter~~ 100 sand mesh for their treatments for their little acid jobs they use over there.

A. Right. We've tried some of that. This formation appears to be not as conducive to getting those off, so we've gone with more 20/40, light prop, light -- and light polymer jobs to crack these wells.

Q. Okay. So it's a short fracs that propped pretty good in the well bore?

A. Uh-huh.

Q. And --

MR. LARSON: Mr. McKinney. I'm sorry. You need to verbalize an answer for the court reporter.

THE WITNESS: Oh, I'm sorry.

Q. (By Mr. Jones): When I looked at your application, I thought, well -- and I read the previous one. I guess Catanach was the hearing officer back in '89, I think it was. And there were only four wells that were approved for injection as kind of a little pilot. Now, where were those four wells? Were they in this phase one of the project area?

A. The current area was actually in a prior Amoco Pilot that was started in 1974. And I believe in subsequent testimony here we'll identify those three prior areas.

Q. Okay. Yeah. I think this was Kelt.

A. Yes.

Q. Did you guys buy this from Kelt? Is that how Cano came up with it?

A. No. We purchased this property from Lothian, United Heritage Lothian.

Q. Oh, yeah. It's a wonderful opportunity out here. It looks like the porosities are kind of low in the San Andres, but you've got big -- like a P-1 and then you've got your P-2 and P-3. Are you guys going to talk about that later?

A. Yes, sir, we will.

Q. So you've got lots of potential, it looks like.

A. We're very excited about developing this field. It's not often you get a chance to go in and develop a field that's this large, this contiguous, that has never been

waterflooded, so we're very excited about the opportunity.

Q. Why didn't Kelt get busy and do it and expand this? It's just economics?

A. I think at the time, oil prices were obviously depressed when they came in with their application in '89, I believe. I really don't know why they didn't go forward. I know they had a bunch of international interest, the company did at the time. But they -- a lot of the background information in engineering that really convinced us to acquire this field was done by Kelt in that time period during the unitization and their waterflood. So there was a lot of information, engineering information, that showed this field had a lot of potential.

Q. Okay. I better touch on that. I'm sure Mr. Brooks will also. But we'll get started on it. The unit itself, do you have a landman here to talk about the unit itself? Or the unit itself is already created, and you're not changing any of the unitization parameters or anything?

A. That's correct. The unit currently has a unitization agreement that's in place, and we're very comfortable working within that existing unitization agreement.

Q. Okay. And you work with the owners of the unit? The other owners of the unit? Are you the only working interest owner in the unit?

A. We have an approximately 97 percent working

interest here, so there are, I believe, two other working interest owners in the field.

Q. And the royalty is mostly feds; is that right?

A. It's split. I don't want to misstate Phillip. I think it's a third BLM, maybe a third state, and it's almost a third fee.

Q. Okay. So the project itself, which you oversee the whole, the budgeting and the economics, you have to go justify it to your bosses, and --

A. Yes.

Q. -- you're spending quite a bit of money out here, and it looks like you're going to be able to just recycle produced water from all these infill wells into these wells? Are you going to produce freshwater also?

A. Well, currently, there's a number of these wells, especially on the eastern flank, that are more near oil and water contact. So it's our initial intention to use just produced water from the unit for waterflood injection. And then, as we expand, there may be a need for some makeup water. But we think during this first phase we should be fine.

Current water production out there now is around the 5- or 6000 barrel-per-day range which is being injected back into the existing permitted SWD wells. So we think we'll be okay as we start the project. And then we'll just have to gauge how much makeup water we may need.

Q. Okay. Because I noticed the other order allowed four injection wells. And then it also -- I noticed it kept several more wells as disposal wells, what they call water disposal wells. And, I guess there's no real -- that disposal was into the same zone, wasn't it?

A. Yes, it was.

Q. They're basically waterflood wells?

A. Uh-huh.

Q. Now, where were those located?

A. Should we refer to a future set of --

Q. Are you going to talk about that?

A. Yes, we will.

MR. JONES: Okay. I better just keep going here and let these other guys ask some questions, and we'll go on from there.

MR. WARNELL: I think I'll hold my questions for now.

MR. BROOKS: Well, Mr. Jones indicated that I would address the land issues. I think they're relatively straight forward, but this Exhibit 3 that you offered, is this outline on here, is this the actual unit that you are working with?

THE WITNESS: Yes, sir.

MR. BROOKS: And this is a voluntary unit?

THE WITNESS: I'm not certain on the order. I believe it was.

MR. JONES: It was statutory. It definitely had

participation parameters.

MR. BROOKS: Okay. Is that in evidence?

MR. LARSON: It's Exhibit No. 1.

MR. BROOKS: Okay. But this was just an order proving the unit -- the original waterflood project, right? Exhibit No. 1?

MR. JONES: There's actually a unitization order also that -- they did two orders exactly the same time.

MR. BROOKS: Well, that's a fairly usual procedure.

MR. JONES: I just had one, the same one that you just looked at.

MR. LARSON: Actually, Exhibit 1, it references the unitization orders.

MR. JONES: The unit order. I guess a big question is, is the unit order that was approved so far, is it still exactly what you consider the unit right now?

THE WITNESS: Yes.

MR. BROOKS: And what I was trying to get to was, is it a unit -- is it a voluntary unit, or is it a statutory unitization? And I had not looked at those documents. I don't know. But I gather your testimony is you don't know that, necessarily.

THE WITNESS: I do not know the answer to that question.

MR. BROOKS: That's all I can ask you, then. That's

my only question.

MR. JONES: I have it.

MR. BROOKS: The orders will speak for themselves.

MR. JONES: Yeah. We do have those.

MR. LARSON: Unless there's anything further, I'm finished with Mr. McKinney.

MR. JONES: Thank you.

MR. LARSON: Next, I'll call Mr. Azizi.

ALEXANDER AZIZI

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

DIRECT EXAMINATION

BY MR. LARSON:

Q. Will you state your full name for the record, please.

A. My name is Alexander Azizi-Arin.

Q. And where do you reside?

A. I reside in Fort Worth, Texas.

Q. And by whom are you employed, and what is your title?

A. I'm employed by Cano Petro of New Mexico, Incorporation, and I'm employed in the position of senior engineer.

Q. Could you summarize your educational and employment background for the Hearing Examiner?

A. Certainly. I have a Bachelor of Science in petroleum engineering from the University of Texas at Austin, and I joined Cano Petroleum around October of 2004.

Q. And then did you start working for Cano after you graduated from --

A. I did, yes.

Q. And have you previously testified before the Division?

A. I have not.

MR. LARSON: At this time, based on Mr. Azizi-Arin's education and professional experience, I move that he be qualified as an expert in petroleum engineering.

MR. JONES: How do you say your last name?

THE WITNESS: Azizi-Arin. Azizi is just fine.

MR. JONES: Mr. Azizi is qualified as an expert in petroleum engineering.

MR. LARSON: Thank you.

Q. (By Mr. Larson): Are you personally familiar with the application filed in this case on behalf of Cano Petro?

A. I am, yes.

Q. Are you familiar about the geologic matters addressed in the application?

A. Yes.

Q. Do you also have familiarity with the engineering

matters addressed in the application?

A. Yes, I do.

Q. And I'd refer to Cano Petro Exhibit No. 2. And did you assist Mr. Masters in preparing this map?

A. Yes, I did.

Q. And does it accurately reflect the project area that's addressed in the application?

A. It does.

Q. And does this exhibit depict the waterflood pattern that Cano Petro will employ?

A. It does, yes.

Q. Could you give us a brief description of that, please?

A. Certainly. We're looking at developing these on 40-acre 5-spot patterns. This map gives you an outline of the wells that we're requesting for approval for injection, where they're positioned within the project area and how we're going to be moving forward with the flood.

Q. I next refer you to Cano Petro Exhibit No. 5. And could you describe what Exhibit 5 depicts?

A. Exhibit No. 5 depicts the full Cato San Andres Unit. The symbols are quite busy, but in the -- just quickly, the large green circles are the 20-acre infill wells that we have drilled. Over the past approximately 6 to 12 months, we have drilled two 40-acre infills where there were no 40-acre

wells previously to further test the geologic boundaries of the unit.

Q. And who prepared this exhibit?

A. This was prepared by our geologic staff under my direction.

Q. I'm getting ahead a little bit, but you heard the Hearing Examiner's question about the wells approved and prior proceedings. Are those identified in this map?

A. They are. There were actually 11 wells, in my understanding, that were authorized for injection for the 1989 order. We currently have two injection wells in the immediate project area that are currently injecting under that order: Well 21, which is in the northwest quarter of Section 11, Township 8 South, 30 East; and also well 51, which is in the southeast quarter of the same section, number 11. Those are the only two wells that we currently have injecting at this time.

In project area, we also have well 23, which is authorized for injection. And the current status of that well is that we're undergoing a work-over procedure to make the well suitable for injection.

Q. And would those be the only three wells that are addressed in the 1989 order that are in the project area of the current application?

A. That is correct.

Q. And the other eight wells are in the unit?

A. That is also correct.

Q. And I'm going to refer you back to Exhibit 2, just because it's a larger map. And can you describe for the record the property description of the project area that is the subject of this application?

A. Certainly. The project area is in Sections 2, 3, 10, 11, 12, 13, 14, and 15, of Township 8 South, Range 30 East.

Q. And we've touched on this already. And you might look at Exhibit No. 1, which is the 1989 order. Are you familiar with the Kelt waterflood that was approved --

A. Yes, I am.

Q. -- by the Division in 1989?

A. Yes, sir.

Q. And have you analyzed the history of the Kelt and other waterflood and pressure maintenance programs in what is now the boundary of the Cato Unit?

A. I have. Yes, I have.

Q. And I'll direct your attention to Exhibit No. 6. And could you describe what this map depicts?

A. Certainly. This map is separated by three colors, and they generally represent the area that the previous water injection orders were approved by the Division.

Q. And is -- the black boundary around the outside, is that the Cato Unit?

A. It is, that's correct.

Q. And at the top, you've identified various orders starting in 1968 up through 1977?

A. That is correct. I'd also like to add that it also references the 1989 order that was shown in Exhibit No. 1.

Q. Thank you. And could you identify who prepared this map?

A. It was prepared by the staff at Cano Petro under my direction.

Q. And could you advise the Hearing Examiner as to the current status of the Kelt waterflood project that was approved in 1989?

A. Certainly. It is our understanding that the Kelt project is still ongoing. We currently are injecting in four wells in the unit, two wells in the immediate project area.

Q. So it's fair to say you're significantly expanding on the previously approved waterflood?

A. That is correct.

Q. And I ask a similar question of Mr. McKinney. What is the time frame for the completion of this first phase of the long-term waterflood project?

A. Based on your current plans, we're looking at about a six to nine month time frame once we receive the approval for injection.

Q. And that would include the injection wells and

producing wells?

A. Yes, that is correct.

Q. And how many injection wells are included in the project addressed in the application?

A. There are 49 injection wells included in the project application.

Q. And can you tell the Hearing Examiner how many of those wells are conversions?

A. There will be 33 conversions.

Q. And how many new injection wells?

A. There will be 12 wells that will be drilled for the purpose of injection.

Q. And how many total producing wells will there be in the project addressed in this application?

A. If I can refer back to Exhibit 2, we have a breakdown there. It's approximately 59 producing wells in the immediate project area.

Q. And do you anticipate that the project addressing the application may require additional wells in the future?

A. It is, possible, yes. To elaborate, as we move forward with the drilling program and the current 5-spot patterns that we have in this application, we're going to receive more additional information about the reservoir, how it responds to the waterflood, and that may dictate further infill drilling or perhaps a different pattern alignment than what we

have now. But at this stage, we can't make -- it would be unfair to make any assumptions as to what that expansion would look like, if it is required.

Q. As far as you can say sitting here today, the total number of wells listed on Exhibit 2 is what you anticipate having as part of the project?

A. Yes.

Q. And are you personally familiar with the written notices that Cano Petro provided to affected persons as those persons are defined in the regulations?

A. Yes, I am.

Q. And were you responsible for providing notice to the affected persons?

A. Yes.

Q. And did you have any assistance in locating the identities and addresses for these people?

A. We did. We used the firm Continental Land out of Roswell, New Mexico, to find the affected persons that are outside the unit boundaries.

Q. I'll refer you now to Cano Petro Exhibit No. 7. Can you identify the documents that comprise this exhibit?

A. Yes. These are the letters to the persons affected by the waterflood application.

Q. Do they also include the certified mail receipts?

A. They do, yes.

Q. And have you previously submitted an affidavit into the record regarding these notice letters?

A. Yes, I have.

Q. And did Cano Petro also publish notice of the application?

A. Yes.

Q. And I'll refer you to Cano Petro Exhibit No. 8, and if you can identify that for the record.

A. Certainly. This is the affidavit as published in the Roswell Daily Record.

Q. And was this notice tendered to the Roswell Daily Record under your supervision and control?

A. It was, yes.

Q. And did you personally assist with the preparation of the geological portion of the application?

A. I did assist with it.

Q. Did you generally describe the geology of the formation?

A. Certainly. Generally speaking, the formation is the San Andres Formation. It is a dolomite, and it's part of the prolific San Andres trend in the Permian Basin in eastern New Mexico and Western Texas.

Q. I'm now going to refer you to Cano Petro Exhibit Nos. 9, 10, 11, and 12.

First, No. 9, could you describe this Chinese scroll

sort of document for the Hearing Examiner?

A. Certainly. This is what we consider a type log of the project area; in particular, is the open hole log from the Cato San Andres Unit, Well No. 545. As you can see through this document, it will outline the tops of the individual zones throughout the San Andres within the Cato Unit.

Q. Can you identify who prepared this exhibit?

A. Yes. It was prepared by the geologic staff at Cano Petro under my direction.

Q. Next, I'll direct your attention to Exhibit No. 10, also a large, oversized document. Can you identify this for the record?

A. Certainly. This is a cross section showing the zones of injection. Following the dip of the Cato Unit, the formation does slope slightly from the northwest to the southeast, and this is a depiction showing how the formation is contiguous as well as its slope.

Q. Now, direct your attention to the insert at the far right side of the exhibit. Does that show the boundary in the Cato Unit in that inset?

A. Yes, it does.

Q. And who prepared this exhibit?

A. Again, this was prepared by our geologic staff under my direction.

Q. Next, I'll direct your attention to Exhibit

No. 11. How is this exhibit different from Exhibit No. 10?

A. This is another cross section across the project area. The difference in this exhibit from Exhibit 10 is this is along the strike of the reservoir. And this, as you can see, there's little to no slope as you move from southwest to northeast. And this just, again, shows that the zones that we are proposing to inject in the project area is contiguous.

Q. And last, but not least, I'll refer you to Cano Petro Exhibit No. 12. Could you describe what this exhibit depicts?

A. Certainly. This is a cross section, travelling from the far southwest portion of the Cato Unit to the far northeast of the Cato Unit. And I draw your attention to the right-hand side of the document -- the exhibit, rather. It shows you the path from A to A-prime. Sorry. There's no label on this one. It's from southwest to the northeast of the cross section.

Q. And was this exhibit prepared by Cano Petro's in-house geologists under your supervision and control?

A. That's correct, it was.

Q. What is the estimated thickness of the unitized intervals of the San Andres Formation?

A. The unitized intervals in terms of net thickness, which is where the oil is produceable, it ranges anywhere between 30 and 80 feet of thickness, depending on the well and

the number of zones available in that well.

Q. And what is the depth?

A. The depth at the shallowest well in our project area, the depth to the top of the P-1, which is a most shallow San Andres zone, is about 3280 feet.

Q. And that would be the P-1 marker depicted on Exhibit No. 9?

A. I believe that is correct.

Q. I'm going to have you go back to Cano Petro Exhibit No. 4. Do you have your exhibit in front of you?

A. Exhibit No. 4? I'm sorry.

Q. That's it. I believe you testified that you had researched the history of the waterflood and pressure maintenance projects for the unit?

A. I have, yes.

Q. And could you explain what these decline curves on Exhibit No. 4 depict?

A. Certainly. These decline curves are the cumulative monthly rate -- I'm sorry -- the cumulative daily rate average over the course of a month from the entire Cato Unit. In other words, production from all wells were summed together over the same time period.

And what you can see is, you can see -- actually see at the -- the first date on this graph in 1970 which we received as data from the public data house of IHS. There is

production from 1966 forward which is not depicted on this graph.

As this field was discovered, it was ruled under a proration schedule, and they were limited to a production rate of no more than 60 barrels a day of production. And if we did have that data on this graph, you would see that it remained flat under that proration schedule for about three years.

Once you hit about 1970, though, the decline rate of the field started to come in. And if you refer back to the previous orders -- the 1969, 1972 -- you actually begin to see a flattening of the oil rate decline around 1975 or 1976. Through my research of these projects, it showed that there was some waterflood pressure maintenance, some sort of an ~~arresting~~ assisting of the decline as a result of water injection.

We also see this again around the January 1980 to 1984 range. Again, you see this flattening of the decline curve. That is also representative of water injection assisting oil production.

Q. So would it be fair to say you've conducted a thorough analysis of production from the mid-1960s forward in the Cato Unit?

A. Yes.

Q. And based on your analysis, is it your opinion that the injection zone is contiguous?

A. It is, yes.

Q. And in your opinion, from a geologic standpoint, has the reservoir been reasonably defined by the previous development as indicated in Exhibit 4?

A. I believe it has, yes.

Q. And to your knowledge, are there any freshwater wells within one mile of any of the proposed injection wells?

A. Not to my knowledge.

Q. To your knowledge, are there any water-bearing strata within the project area?

A. It is my knowledge that we believe there is a Santa Rosa Formation which is approximately 1200 feet in depth.

Q. Are there any known faults within the project area?

A. No, there are not.

Q. And what is the source of the injection fluids for the proposed phase one of the waterflood project?

A. The source water will be produced water from the San Andres Formation.

Q. And as far as you can tell sitting here now, you will be able to complete the first phase of the project only using produced water?

A. Yes.

Q. And from a geologic standpoint, in your opinion, is the project area a good candidate for expansion of the water project initially permitted for Kelt?

A. It is. And just to elaborate on that further, I believe we have through the recent 20-acre infills and through this cross section you see, that we do have quality geologic continuity there, which suggests that the oil will be able to be pushed by water injections to the surrounding producing wells.

Q. In your opinion, what is the sustainability of the formation for a waterflood project?

A. I think it's sustainable. As Mr. McKinney referenced earlier during his testimony, there's an over 50 percent rate of return on our project at oil prices which were considerably lower than what the current market rate is.

Q. And in your opinion, would the granting of Cano Petro's application serve the interests of conservation, preservation of waste, and protection of correlative rights?

A. Yes.

MR. LARSON: That's all I have at this point.

MR. JONES: Okay. Thank you, Mr. Larson.

EXAMINATION

BY MR. JONES:

Q. So the decision to go down to 20-acre spacing on the wells, I saw in the last order that -- well, the last order that's set, the waterflood with the four wells, that there was one well that had been drilled to 20-acre, and they testified -- I think they did -- that it wasn't at that time

worth pursuing the 20-acre drilling in this unit. But things have changed?

A. I believe so. I think that with the oil price being what it is today as compared to 1989, I believe that there's -- it's more favorable to be down on 20-acre spacing.

The other advantage that I find is with the 20-acre spacing, you're reducing your time to response. And by accelerating that production, it does make the project look more attractive.

Q. What about your sweep, your article, and your -- is your sweep better at the closer spacing?

A. I believe it will be. You know, as this is a dolomite formation, we will -- there are some intervals within the same zone which are more permeable than others. So by having this tighter spacing, we may actually improve the overall recovery factor of the project.

Q. What kind of logs are you running on these wells that you're drilling?

A. We're running open hole triple combo logs, resistivity and porosity logs.

Q. We got a logging expert here, so -- from those logs that you are running, are you seeing total continuity, or are you picking up anything else that you didn't have with the 40-acre spacing?

A. You know, it's really -- I think it confirms to

us that the reservoir is quite contiguous. One of my personal opinions is when you lie down the logs from well to well on top of each other, it's quite startling how well they correlate given that it is a carbonate formation.

If you show the logs to someone who knew that carbonate is more heterogenous than sandstone is homogeneous, they could be confused that it was a sandstone, had they not had the proper training to tell that it was not.

Q. Is it dolomite?

A. Yes.

Q. Kind of a fractured dolomite? Is that the deal?

A. There may be some fracturing within the zones, yes.

Q. Is it more in the P-1 than down in the P-3? Or is it --

A. At this stage, I can't say for certain. We've recently taken a core, and we're having it analyzed to confirm where the -- what the fraction network looks like, if it's present and where it's most prevalent.

Q. What about any kind of FMI logs or --

A. We have run an FMI log. We've not yet --

Q. Processed it?

A. We've processed it. We just haven't analyzed it yet. We're awaiting results from the core data to be able to compare the FMI to the core data to get a true understanding of

what our rock looks like. And to elaborate further, the core was taken in the project area.

Q. It wasn't an oriented core or anything like that?

A. No, it's not.

Q. Now, the project area was chosen here instead of over on the northwest. I think it said something in the other order about the northwest having the P-3 present also. And it wasn't present in this other area. Is that true?

A. I would say that it's not. What we found in our research is that the northwest portion appears to be more gassy. We feel that a secondary gas cap may have actually evolved over time from the -- over the 40-plus years of production out there.

So we know that the area we're focusing in now is in the down dip structure. We have results from the floods that were done in the orange area in the exhibits that showed that the oil is recoverable there.

Q. Have you got a model set up for this project?

A. We're currently refining the model to incorporate the 20-acre infills.

Q. Is it a whole field model, or is it just a pattern model?

A. It's a pattern model.

Q. Okay.

A. As we take the open hole logs, we're getting a

better handle on what the thickness is. We're having our geologists review the area so we can get a better handle on the size of each pattern and incorporate that into the overall model of the project area.

Q. So your recovery efficiency, they said something about 80.8 of secondary to primary ratio? Do you still agree with that?

A. I do.

Q. There was a pretty good write-up in the previous testimony and application. I don't know if you guys still know any of those people, but they really studied it, I guess.

A. They have. And unfortunately, I have not been able to meet anyone from that company during that time of the project.

Q. I think the oil patch is like a blender. You just -- everybody's been mixed up, and no telling where anybody is at anymore of the original people.

I had another question, but maybe I'll think of it in a few minutes. But I guess one of the big things here is from an engineering viewpoint, do you see any of the original -- the parameters that were set up were -- there was a lot of parameters in that formula to set up this unit.

A. Right.

Q. Did you look at those? Do you disagree with any of those? Do you think everybody's getting a fair shake?

A. You know, without -- I don't recall exactly how the unit was set up. But from my recollection, I think it was done fairly responsibly. At the time -- my understanding is when the unit was formed, there were a lot of leases within the proposed unit that were not producing at the time of the unit, and I think that in order to gain acceptance of the pooling, they had to appropriately allow for those who have active leases, active wells, to receive a majority of the participation until the waterflood really got going. And once it got going and it was reverted back to the second phase and the third phase of the unit agreement and what not, I think that it would be fair.

Q. Okay. The limits on your vertical, your top and your bottom limit, sometimes on the queen waterfloods it gets to be a question about whether they left out something. And, you know, we have to be careful because somebody will go in and perforate something above where they unitized. And it looks like here, at least, your top is pretty well defined, isn't it?

A. Right.

Q. But the bottom, are you convinced that you're okay on the bottom? You didn't want to deepen the unit itself, and then maybe you would have to maybe relook at the participation parameters?

A. I think our intention is to flood the San Andres Formation.

Q. Okay. So that's the way the unit is defined, as the San Andres?

A. That's my understanding.

Q. Okay. What about the type log? Was there a type log? I didn't see it in the -- are you familiar with what they would have used as a type log?

A. I'm not familiar with the type log as per unit.

Q. I'm not sure I saw it in there, either. The pressure out there, what pressures do you have out there now, and what was the original pressure?

A. In terms of bottom hole pressure, the original pressure was around 1118 psi. Today we're seeing bottom hole pressures somewhere 150 psi.

Q. 150?

A. Yes. It's quite depleted.

Q. So you're way below your -- what's your bubble point?

A. It was right at around the bubble point. It's about 1118.

Q. Okay. So it immediately started creating a cap, maybe. And if you wanted to ever put this on CO2 injection, you'd have to boost your pressure back up, wouldn't you?

A. We probably will through the waterflood.

Q. Okay. And in how long a time will you reach fill-up on this area?

A. My calculations when we did it on 40-acre spacing, we were looking at about 16 months time to fill up. Without having done the engineering work, I would have to estimate between eight and ten months fill-up now that we're on the 20-acre patterns as opposed to 80-acre patterns.

Q. Very quick.

A. That was one of the advantages of drilling the infill wells.

Q. You guys are pretty aggressive out here. You're ready to get started as soon as possible. What about your surface facilities for your injection? Is that all going in the same time you're drilling the wells?

A. No. We'll be putting in the injection facilities, you know, once we're able to receive approval for injection.

Q. I don't know if Mr. Masters is going to talk about the C-108. Is that what he's going to talk about?

A. Yes.

Q. And the pressures, the limit pressures?

A. Yes.

Q. Okay.

MR. WARNELL: I just -- I'm not going to ask a bunch of questions about the logs. We will get a chance to look at them.

Mr. Azizi, I do have a question. You testified that

your core is being analyzed.

THE WITNESS: Yes.

MR. WARNELL: I was wondering what kind of core you ran. Was that a full core, top to bottom?

THE WITNESS: We ran it through. I believe we recovered approximately 180 feet of the San Andres core.

MR. WARNELL: And which well was that?

THE WITNESS: It was in the Cato San Andres Unit Well No. 50.

MR. WARNELL: Okay. That's all I have right now.

MR. BROOKS: No questions.

Q. (By Mr. Jones): Well, I guess one more is, as far as going from this space to the next to the next, you got these every year. So you probably want -- you're requesting this amendment to this waterflood project to also include provision for administrative expansion; is that right?

A. We would appreciate the consideration.

Q. And I would just make a comment that you should probably get that in like 60 days before you want to get started on the injection on the new wells in the next year, just to make sure we're okay on everything.

A. Okay.

Q. I don't think that's probably delayed this year maybe because of me and some instances, but I think switching to a 20-acre drilling and the gear-up. It was really useful

for you guys to come in. I really appreciate it.

A. Thank you.

Q. Thank you very much.

MR. LARSON: And at this point, I move the admission of Cano Petro Exhibit Nos. 1 through 12.

MR. JONES: Exhibits 1 through 12 will be admitted.

MR. LARSON: And I'd like to note for the record that two of the sets of the exhibits also included a CD of each of the exhibits.

MR. JONES: Okay.

KEITH B. MASTERS

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

DIRECT EXAMINATION

BY MR. LARSON:

Q. Good afternoon, Mr. Masters.

A. Hello.

Q. Could you state your full name for the record, please.

A. Keith Brian Masters.

Q. And where do you reside?

A. Austin, Texas.

Q. And what is the name of your business?

A. Masters Consulting, LLC.

Q. And can you briefly summarize your educational

and professional experience?

A. Sure. I have a Bachelor's of Science in petroleum engineering from the University of Texas, which I obtained in December of 1980. I have a Master's of Engineering in petroleum engineering from Tulane University, which I obtained in 1985, and I have an MBA from St. Edward's University which I finished in 2002.

Immediately upon receiving my BS, I went to work for Chevron in New Orleans, Louisiana. I ended up working for Chevron there and in Midland, Texas. During my time with Chevron, I helped various drilling production and reservoir engineering in management positions. I worked for Chevron for about nine years.

I left them to join a consulting firm in Austin, Texas, Don Ray George & Associates. I worked for that firm for approximately 17 years and have recently started my own firm.

Q. And are you a registered professional engineer?

A. In Texas, yes.

Q. And you're currently in good standing?

A. Yes, sir.

Q. And for what purpose did Cano Petro of New Mexico retain Master's Consulting?

A. To help them compile the C-108 application for this phase of the waterflood project.

Q. And to come in and testify today?

A. Well, I guess it grew into that, yes, sir.

Q. Have you testified before this Division previously?

A. I have not.

Q. Have you ever testified before an administrative agency that regulates oil and gas activities?

A. Yes, the Railroad Commission of Texas and the Conservation Commission in Louisiana.

Q. Have you ever testified in state or federal court in litigation involving oil and gas matters?

A. Yes, both in Oklahoma and Texas.

Q. And in those other jurisdictions, were you qualified as an expert witness?

A. Yes, sir.

MR. LARSON: Based on Mr. Masters' qualification and experience, I move that he be qualified as an expert in petroleum engineering.

MR. JONES: I remember Mr. Masters from Austin before. He definitely qualifies as an expert in petroleum engineering.

MR. LARSON: Thank you.

Q. (By Mr. Larson): And you testified you were retained by Cano Petro of New Mexico for purposes of the application. Did you actually prepare the application that was submitted?

A. Yes. I was responsible for actually compiling the application with assistance from Cano personnel and submitted it to you, who then filed it with the Commission -- with the Division.

Q. And did you work with Mr. McKinney in preparing the application?

A. Yes.

Q. Any other personnel at Cano Petro?

A. Probably several others, but mainly Mr. Azizi would be the other primary contact.

Q. And are you familiar with the geologic matters that are addressed in the application?

A. Yes, sir.

Q. And are you also familiar with the engineering matters --

A. Yes, sir.

Q. -- addressed in the application?

A. Yes.

Q. I refer you to Cano Exhibit No. 2. This is the map, I believe, you prepared of the project area; is that correct?

A. Yes, sir.

Q. As you sit here today, does it accurately depict the project area that's addressed in the application?

A. Yes.

Q. And did you also prepare a project map that was attached and submitted with the application?

A. I did.

Q. And what's the difference between the project map that is attached to the application and Hearing Exhibit 2?

A. Well, they were both prepared from the same base map, which I obtained from Tobin. Both have been annotated from that point forward based upon research of the Division's records from its online database, et cetera.

The primary difference is the purpose of the map. The purpose of the map filed with the C-108 application was to identify the area of review and to show an area two miles around the proposed injection wells pursuant to the instructions on the C-108.

The purpose of Exhibit 2 was to outline a project area and to graphically illustrate the patterns that would be involved in the waterflood.

Q. And in preparing the exhibit that's attached to the application that you said includes the area of review, did you identify all wells and leases within two miles of the proposed injection wells?

A. Yes.

Q. And to your knowledge, are all those wells indicated on Exhibit 2?

A. Yes. I think we found a few wells that were on

the Tobin map that we had to go back and look for in the Division's records, and we may have found one or two in the Division's records that weren't on the Tobin map. By cross-checking from those two data sources, I believe we have as complete a version of this area as one could generate.

Q. Would it be fair to say that you identified all wells of public record within a half-mile radius of each of the proposed injection wells?

A. Yes.

Q. And could you, if asked by the Hearing Examiner, identify the type of construction, location, and other specifics about those wells?

A. Yes. In fact, the information for -- that type of information for each of those wells was submitted with the C-108 application in tabular format.

Q. And in your opinion, does the application contain the information required by the Division for each of the wells in the area of review?

A. I believe it does, yes.

Q. And I believe you heard Mr. Azizi's testimony about the number of wells that Cano Petro intends to utilize for injection.

A. Yes, sir.

Q. Do you agree with his total number?

A. Yes. The total -- there may have been some

confusion in the testimony with regards to the number of currently permitted wells within the application area. I believe there are four currently permitted wells. But with that exception, I would agree.

Q. You agree with the total number of injections?

A. The total number, yes.

Q. And could you give us a general description of the injection wells that are included in the application?

A. Well, there are two main categories: Wells to be converted to injection; and wells to be drilled for injection purposes.

As far as a description goes, the wells to be converted to injection were drilled over a period of some 20, 25 years by various operators. But generally, they have surface casings set from anywhere from 250 feet to 500 feet and cement circulated to surface, behind the surface casing.

Generally, they're drilled to a depth of 3000 to 3500 feet, mostly in the 3300-foot range. Production casing has been set to total depth in all cases except for one. I recall one open hole completion.

The amount of cement pumped behind the production string varied over time and by operator, for the most part, in my opinion, well more than adequate. There was one well that only 100 sacks was pumped, apparently, and a second well, there were over 200 sacks pumped. After that, you get into the 250

and 275, and many of the wells had 500 to 800 sacks pumped.

In the case of the wells with the least amount of the cement pumped, using very conservative calculation parameters of a cement yield of 1.18 cubic feet per sack and a wash-out factor of 20 percent, I still calculate a cement column of roughly 800 feet. In the other wells where more cement was pumped, by calculation, that's what I relied upon. You get cement tops calculating even nearer the surface.

I might add there are a number of temperature surveys run in various wells in the unit, and those can be used to kind of tie into cement tops. In addition, there are a few CBLs. All this information is provided in the tabulation.

(CBLs)

As to the other category of injection wells and new wells to be drilled, generally they'll have 8 5/8-inch surface casing set at 500 feet and cement to surface. And generally, they'll have 5 1/2-inch production casing that will also be cemented to surface.

I might add with regard to the wells being converted to injection, it is my understanding that it is Cano's plan to run a 3 1/2-inch string of casing -- new string of casing inside each of the wells to be converted to injection and to cement that string to surface, therefore affording another layer of protection in those wells.

Q. And who conveyed the information to you about the construction of the injection wells?

A. Well, the historic information I obtained from the records of the Division. The information regarding the plans going forward were obtained from Cano, probably primarily Mr. Azizi.

Q. And in preparing the application, did you analyze any plugged and abandoned wells within the project area that's addressed in application?

A. Yes. There were 12. I have studies, the plugging records for each of them, and in fact, there is a well bore schematic in the C-108 application package for each of those wells. And all appeared to be reasonably and properly plugged so as to prevent migration of injected fluids from the San Andres zone into some other unwanted zone.

Q. Based on your analysis, would you anticipate any remediate work needing to be done on the wells within the project area?

A. There are none, in my opinion, that would require any.

Q. Did you also review available data for any plugged and abandoned wells in the area of review, area of review going two miles out from the injection wells?

A. I'm sorry. I went to sleep on you there.

Q. Well, it's the middle of the afternoon.

We've talked about the area of the review being the two mile area stepping out from the injection wells. Did you

analyze plugged and abandoned wells in that area as well?

A. No. That was limited to my area of review.

Q. Does the application identify and provide depths of any oil and gas zones underlying or overlaying the proposed injection zone?

A. It doesn't identify any. I'm not aware of any, having done the research that I've done. Any productive well within the area that I've studied was produced from the San Andres. There are no other known producing intervals in this immediate area.

Q. So there's no intervals to identify in the application?

A. Correct.

Q. And to your knowledge, does Cano Petro propose to re-enter any wells?

A. I don't think there are any plans to re-enter any plugged and abandoned wells. There may be some re-entries of wells that have been temporarily abandoned to place them on production.

Q. Can you briefly describe the name, model, and setting depth of type of packer or other assembly to be used?

A. Yes. They will be Baker AD1 packers. They'll all be set within 100 feet of the top perforations.

Q. What's the tubing size?

A. Well, it'll be 2 1/16 in the conversion wells and

2 3/8 in the new wells.

Q. And how about the depth, the packer setting depth?

A. Again, within 100 feet of the top perforation.

Q. And all that information in terms of the packing, is that addressed in the application?

A. Yes, it is.

Q. And to your knowledge, what is going to be the composition of the injection fluid?

A. Produced San Andres water.

Q. And what is the proposed average daily rate and volume of produced water to be injected?

A. Proposed average rate on a per well basis will be 500 barrels per day, which would equate with the 49 proposed injection wells to about 24,500 barrels a day on a project basis.

Q. And what are the maximum daily rates and volumes?

A. For purposes of this application, we have asked for authority to go up to 1000 barrels a day per well, which would be 49,000 barrels a day on a project basis.

Q. And will the system be open or closed?

A. Closed.

Q. And what is the proposed average injection pressure?

A. The average is somewhat of a guess at this point,

but 500 pounds, I think, is what we indicated on the application.

Q. And was the maximum pressure indicated in the application?

A. We've asked for the maximum that we understand is typically viewed as appropriate by the Division, and that is 650 pounds in this case, which was determined by applying a .20 psi per foot factor to the shallowest depth of injection in the area which was approximately 3200 feet, 650 pounds.

Q. And does Cano Petro plan to inject perfs into a zone that is productive of oil and gas within a mile of a proposed well?

A. No. The only anticipated injection operations would be within the project area for purposes of waterflooding, and that would be into the San Andres.

Q. In preparing the application, did you review well logs that were available to you for wells within the project area?

A. I reviewed a few logs. Mainly, we determined what logs were available on the Division's website and discovered, I think, four logs that might have been available were indeed not. And as a supplement to our application, I believe two well logs on two of those wells had been submitted, and we're not able to locate logs on the other two.

Q. But you made a reasonably diligent search for

those logs?

A. Yes.

Q. Can you briefly describe the formation water in the proposed injection zone?

A. Well, it's saltwater, fairly salty, as I understand it. I don't know that I can add a lot to that.

Q. To your knowledge, are there any freshwater wells within a mile of any of the proposed injection wells?

A. No. I specifically inquired about that, and the Cano personnel have conducted a ground survey and have not located any such wells.

Q. And in your opinion, will the approval of the application that you prepared and submitted on behalf of Cano Petro serve the interests of conservation, prevention of waste, and protection of correlative rights?

A. Yes.

MR. LARSON: That's all I have at this time.

MR. JONES: Okay.

EXAMINATION

BY MR. JONES:

Q. Mr. Masters, the logs available -- so some of these wells that were going to be converted to existing wells, there was no logs on the website; is that right? But you sent them already to the Hobbs District office.

A. We actually probably did not send them to the

Hobbs District. They were submitted in paper form as a supplement to the application.

Q. They're in here, though?

A. They should be.

Q. So I can send them to Hobbs.

A. I don't know whether they're necessarily wells that will be converted to injection. I'd have to check. They may be producers. But we checked to see whether there was a log available for every well in the application area.

Q. Okay.

A. And four were not available. And I'm not sure what category to put those wells in.

Q. Okay. That saves me from having to check. The pressure limits, do you guys need more pressure than that?

A. We anticipate that we may. I think the plans of Cano, as I understand them, are once they get up and running, to run some step rate tests and to analyze that. They feel comfortable they will not exceed the frac radiant at the requested pressure. And we, in fact, believe, based upon treating pressures and things of that nature -- and I'm relying on the work of Cano here -- that the frac radiant is substantially higher than what we are requesting.

But since the operation is not really up and running yet, we weren't in a position to run a sufficient number of step rate tests to make a presentation in that regard at this

hearing.

Q. Okay. You can do the representative group around the project area later and send that in and ask for the whole project area to be boosted up. I'm sure you'll be worried about all that swept gas for awhile. You'll have to control that somehow with your pumps and everything.

MR. WARNELL: What grading are you using right now?

THE WITNESS: Point 2. Well, from the surface, yeah.

Q. (By Mr. Jones): And 150 pounds pressure in the completed reservoir is probably good to start that way. At least, without knowing anything personally about the reservoir, I'd say that.

It looks like they're running induction logs and lateralo logs. It's kind of a combination out there. So the San Andres (Salina) must be pretty bad, you know, or maybe some areas are more fresh than others up the hole, maybe, or something. I don't know.

MR. WARNELL: That or maybe their drilling program, Whatever kind of drilling fluid they use.

A. There were a number of different operators that developed this unit originally, and it could have just been, you know, individual tastes as well.

Q. (By Mr. Jones): The one I saw was in the same well, induction/lateral log combination deal. It was kind of unusual. I had never seen that before.

This CD, does it have all your area review wells on it?

A. I think it probably has it in PDF format. I can provide it to you in an Excel format.

Q. Do you have it in an Excel format?

A. Not with me, but --

Q. No, no. That's fine.

A. -- but yes. That's how it was prepared.

Q. That brings up another point. This landowner that was going to show up, you haven't heard anything from him about any concerns -- Mr. Masters, did you hear anything from him when you --

A. Since you asked, I'll tell you what I know, but I'd probably rather defer to the Cano people on that.

I think that there were some discussions about the interpretation of the surface agreement that was in place, and I think that has been resolved.

Q. As long as they were noticed.

You guys can deal with the surface. It looks like you got pretty good cement casing out here compared to a lot of waterfloods we look at that are being geared up in recent memory here. What is your most suspicious well out there?

A. Well, I don't know that I looked at it that way. I suppose one way of doing that would be to zero in as I did on my testimony on those that had the least amount of cement

pumped. But, of course, the whole geometry and the casing size enters into that as well.

And even in those that had the smallest volumes pumped, there was clearly a substantial cement column calculated. My calculations are based on very conservative factors. Most of the cement pumped in these wells had extenders in it. Typically, they might have some cement as a tail slurry, but I'm sure the yield was considerably higher than what I assumed in doing my calculations. So I feel pretty comfortable that even in the worst wells that there's an adequate amount of cement behind the casing.

Q. Okay. I think that's about all I had. I can't believe the freshwater is not there in this area. I think recently they've got a pipeline in from way south, about 10 miles south or something, that brings good water into it. It's been a problem for the ranchers out there, I know.

The other zones, is there no deep wells out here that have tested the Glorieta?

A. I don't recall anything in my area of review anything past the San Andres. My tabulation would show that. It's been a while since I prepared it, but I do not recall any that were even drilled deeper.

Q. And the Queen is not here?

A. I saw no evidence that it was completed in any wells. So I would assume not.

Q. But it's been a long time ago that they developed this San Andres. Of course, they would have seen it.

A. I would have thought so. Yes, sir.

MR. JONES: Terry, do you have any questions?

MR. WARNELL: No, I have no questions.

MR. BROOKS: No questions.

MR. JONES: We don't have any more questions, I guess.

MR. LARSON: I appreciate that. Can I ask your indulgence for a five-minute break while we've got all these gentlemen here from Texas and see if there's anything they want to follow up with?

From my perspective, I think we're there, but I would like to confer for a couple of minutes.

[Recess taken from 3:53 p.m. to 4:00 p.m., and testimony continued as follows:]

MR. JONES: Okay. Let's go back on the record. And I guess I forgot to mention about the business of the EOR tax. I know it's -- right now, the way the Legislature is, I don't think you guys advertised that in here, and I didn't see it in the previous --

MR. BROOKS: They filed an application for it, didn't they?

MR. JONES: So, in other words, they don't have to fill out. There is some findings that we have to do for that.

But it's $30 a barrel now. That's the way the Legislature has it. But in the future, keep that in mind, because they may raise it, you know.

MR. LARSON: I wanted to thank the Hearing Examiner for the opportunity to confer with my witnesses. We've agreed we have nothing more to put on, and we close our case at this time.

MR. JONES: Okay.

MR. BROOKS: Thank you.

MR. WARNELL: Thank you.

MR. JONES: With that, we'll take Case No. 14128 under advisement. I promise we'll get this out as soon as possible.

[Hearing concluded.]

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____.

_____, Examiner
Oil Conservation Division

REPORTER'S CERTIFICATE

I, JOYCE D. CALVERT, Provisional Court Reporter for the State of New Mexico, 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 and was reduced to printed form under my direct supervision.

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

JOYCE D. CALVERT
New Mexico P-03
License Expires: 7/31/08

STATE OF NEW MEXICO)
)
COUNTY OF BERNALILLO)

I, JOYCE D. CALVERT, a New Mexico Provisional Reporter, working under the direction and direct supervision of Paul Baca, New Mexico CCR License Number 112, hereby certify that I reported the attached proceedings; that pages numbered 1-63 inclusive, are a true and correct transcript of my stenographic notes. On the date I reported these proceedings, I was the holder of Provisional License Number P-03.

Dated at Albuquerque, New Mexico, 15th day of May, 2008.

Joyce D. Calvert
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