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NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

SANTA FE, NEW MEXICO

Hearing Date MARCH 2, 2000 Time 8:15 A.M.

NAME	REPRESENTING	LOCATION
Rob Williams	Amerada Hess Corp	Monument, NM
Michael Condon	Gallegos Law Firm	Santa Fe
Ray Vaden	Chevron	Midland
Mark Wheeler	Nearburg Expl.	Midland
Jerry Elger	Nearburg Expl	Midland
William F. Carr	Campbell, Carr, Berge & Sheridan	Santa Fe
Tracy Love	Chevron	Midland
Greg Mummery	Chevron	Midland
CJ Affeld	Chevron	Midland
Steve Jordan } John Steuble }	McElvain	Santa Fe / Denver
Tom Jensen	McElvain	SF
James Bruce	—	SF

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

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

APPLICATION OF CHEVRON U.S.A. PRODUCTION COMPANY FOR APPROVAL TO CONVERT THE EMSU WELLS NOS. 210, 212, 222, 252 AND 258 TO INJECTION IN THE EUNICE MONUMENT SOUTH UNIT, LEA COUNTY, NEW MEXICO

CASE NO. 12,320

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MARK ASHLEY, Hearing Examiner

March 2nd, 2000

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MARK ASHLEY, Hearing Examiner, on Thursday, March 2nd, 2000, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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Examiner Hearing
CASE NO. 12,320

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A P P E A R A N C E S

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By: MICHAEL J. CONDON

* * *

WHEREUPON, the following proceedings were had at 8:25 a.m.:

EXAMINER ASHLEY: This hearing will come to order for Docket Number 07-00. Please note today's date, March 2nd, year 2000.

I'm Mark Ashley, appointed Hearing Examiner for today's cases.

Before we call the first case, I'd like to go over the docket and point out the continuances and dismissals.

(Off the record)

EXAMINER ASHLEY: At this time the Division calls Case 12,320.

MS. HEBERT: Application of Chevron U.S.A. Production Company for approval to convert the EMSU wells Nos. 210, 212, 222, 252 and 258 to injection in the Eunice Monument South Unit, Lea County, New Mexico.

EXAMINER ASHLEY: Call for appearances.

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr, Berge and Sheridan. We represent Chevron U.S.A. Production Company in this matter, and I have one, perhaps two witnesses.

MR. CONDON: Michael Condon with the Gallegos Law Firm here in Santa Fe on behalf of Doyle Hartman, Oil

Operator.

EXAMINER ASHLEY: Any additional appearances?

Will the witnesses please rise to be sworn in?

(Thereupon, the witnesses were sworn.)

EXAMINER ASHLEY: Mr. Carr?

MR. CARR: May it please the Examiner, at this time we call Tracy Love.

TRACY G. LOVE,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CARR:

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

A. Tracy Gene Love.

Q. Mr. Love, where do you reside?

A. Midland, Texas.

Q. By whom are you employed?

A. Chevron U.S.A. Production Company.

Q. And what is your position with Chevron?

A. Petroleum engineer.

Q. Have you previously testified before the New Mexico Oil Conservation Division?

A. No, sir.

Q. Would you summarize your educational background for Mr. Ashley?

A. I received a BS in petroleum engineering in 1995 from Texas A&M University.

Q. And since graduation, for whom have you worked?

A. I was a logging and perforating engineer for Halliburton Energy Services, and I've spent three and a half years as a petroleum engineer for Chevron U.S.A. in the New Mexico waterfloods group.

Q. Do your duties with Chevron include engineering work associated with the infill drilling program for the Eunice Monument South Grayburg Unit?

A. Yes, sir.

Q. Are you familiar with the Application filed in this case on behalf of Chevron?

A. Yes, sir.

MR. CARR: May it please the Examiner, at this time we would tender Mr. Love as an expert witness in petroleum engineering.

EXAMINER ASHLEY: Mr. Condon?

MR. CONDON: No objection.

EXAMINER ASHLEY: Mr. Love is so qualified.

Q. (By Mr. Carr) Mr. Love, would you refer to what has been marked as Chevron Exhibit Number 1? Using this exhibit, summarize what is sought with this Application.

A. Exhibit Number 1 is just a summary of what we propose. We're proposing to convert five wells to injection. We seek the application approval in the Eunice Monument South Unit within the unitized interval, and also within the unit boundary, and the wells are referenced below, and the location is also stated.

Q. You're proposing to add these wells to an existing waterflood project?

A. Yes, sir.

Q. What is the current status of the wells you propose to convert to injection?

A. These wells are currently shut in, awaiting approval for injection.

Q. And they're previously --

A. -- previously producing wells.

Q. Let's go to Exhibit Number 2. Would you identify this for Mr. Ashley, and then review the information on the exhibit?

A. Yes, this is a map, kind of an outline of the area of interest showing the outline of the Eunice Monument South Unit in green. The wells to be converted are green dots, existing production wells are red dots, existing injection wells are the black triangles, and the Hartman wells in the near vicinity are the red gas symbols.

Q. And they're indicated on the exhibit as the State A 4 and the State A 5; is that correct?

A. Yes, sir.

Q. In what interval are Mr. Hartman's wells completed?

A. They're in the Eumont interval, which consists of the Seven Rivers, the Queen and the Penrose.

Q. And what is the interval into which Chevron is proposing to inject?

A. It's the unitized interval of the Eunice Monument South Unit, which consists of the lower Penrose, Grayburg and upper San Andres.

Q. The exhibit also has traces for cross-sections which will be presented as subsequent exhibits; is that right?

A. Yes, sir.

Q. And this is a structure map?

A. Yes, it's a structure map.

Q. Is structure significant to the issues presented by this Application?

A. No, sir, it's relatively flat in this area.

Q. And you used this map because it was useful just for the purposes --

A. Yes, it's useful just as a reference map, kind gives an overview of the area.

Q. Let's go to Chevron Exhibit Number 3, which is entitled "EMSU Overview", and I'd ask you to refer to this and review the history of the Eunice Monument South Grayburg Unit.

A. The Eunice Monument South Unit was unitized in 1984 by Order R-7766. Injection began in 1986. Wells were on 40-acre spacing. Existing producers were converted to injection to form 80-acre fivespot patterns.

Today, most -- the majority of the flood remains on 80-acre fivespot patterns, but there have been 28 20-acre infill wells drilled to date. There has also been some other conversions to injection to form 40-acre fivespots. There's one pilot area.

Due to this infill drilling, this has created low fluid-in/fluid-out ratios in the areas of infill drilling and has lowered the reservoir pressure and thus created a need for increased reservoir injection support.

Q. And this conversion program, you've got 30 conversions that you're planning over the next four and five years; is that right?

A. Yes, sir.

Q. And the objective is to do what?

A. We have -- The infill drilling program that we're proposing a development plan is --

Q. Is the objective to actually go to 40-acre fivespot patterns?

A. Yes, sir, not on the entire flood but in the areas where we feel that 20-acre infills are needed to recover the reserves.

Q. And could you just summarize the reasons for the proposed conversion?

A. The main reason is, the EMSU is one of the few Grayburg floods still currently on 40-acre well spacing. The majority of the other Grayburg floods in the Permian Basin would be on 20-acre well spacing. This is a highly heterogeneous reservoir. Variability in porosity and permeability results in bypass reserves.

Pattern tightening and realignment with the infill drilling and conversions to injection will augment the recovery of these bypass reserves and increase sweep efficiency, and in order to maintain the desirable fluid-in/fluid-out ratios and reduce the fill-up time to increase reservoir pressure, these conversions will be necessary.

Q. And the development plan for the unit is summarized on what has been marked as Chevron Exhibit Number 4; is that correct?

A. Yes, sir, infill drilling program, there's an ongoing one. This year we're drilling 12 wells the first half, and 13 the second half. Over the next four to five years, we're proposing to drilling to drill a hundred infill wells, and this will go from 40-acre well spacing down to 20-acre well spacing.

Along with this infill drilling program, we have a conversion program. There's around 80 conversions to injection over the next four to five years. These will be the existing producers and will reduce the 80-acre fivespot patterns to 40-acre fivespot patterns.

Q. When did Chevron first file its Application to add these five additional injection wells to this unit?

A. November the 11th, 1999.

Q. And what response did you receive to that Application?

A. I received a letter objection from Mr. Hartman, and we received this as -- you know, considered this an initial objection to Chevron's Application.

Q. And is a copy of Mr. Hartman's letter included in the exhibit packet and marked Chevron Exhibit Number 5?

A. Yes, sir.

Q. There were a number of items set forth on that exhibit that Mr. Hartman requested Chevron agree to and accept; is that right?

A. Yes.

Q. Has Chevron been able to do that?

A. No, we find these terms unacceptable.

Q. Let's go now to what in the exhibit packet has been marked as Chevron Exhibit Number 6, and I would ask you initially just to identify what this is.

A. This is just kind of a summarization of the C-108 Application filed.

Q. Now, the C-108 Application was actually filed as what has been marked as Chevron Exhibit 7; is that correct?

A. Yes, sir.

Q. This is an expansion of an existing project?

A. Yes, sir.

Q. As such, you're not required by the rules of the OCD to refile a complete C-108; is that correct?

A. No, sir, since this is an expansion, we just have to provide information on any new wells that have been drilled or any plugged and abandoned wells.

Q. And is that what is contained in this exhibit?

A. Yes, sir, and we have also included some additional wells.

Q. Why was that?

A. That was just to kind of be on the -- to make sure we were gathering all the data and make sure that injection was going to be within the unitized interval and no injection would be out of the unitized interval.

Q. Let's go to the plats that are contained in Chevron Exhibit Number 7. They're on pages 20 and 21 -- the pages are numbered -- and I would ask you first just to identify what they are and then review the information contained on those plats.

A. This is a well plat showing all the offset wells within the area of interest. And circled are the injection wells. It shows a half-mile-radius circle around the wells. These are the wells that are primarily concerned with the C-108.

Q. So you've got the areas of review shown for each of the injection wells?

A. Yes, sir, within a half-mile radius.

Q. This shows the lease ownership and wells in the area?

A. Yes, this shows the lease ownership, offset operators and the wells.

Q. What is the project area?

A. The original unit boundary, the Eunice Monument South Unit.

Q. So this is just a portion surrounding the five wells that are the subject of this case?

A. Yes, sir.

Q. And then what is the plat on page 21?

A. The next plat shows surface land owners in the same area.

Q. Did Chevron file with the original waterflood application all data on all wells which penetrate the injection zone within the areas of review, as required by OCD Form C-108?

A. Yes, sir.

Q. And that was in Case 8398?

A. (Nods)

Q. Exhibit 31?

A. Yes, sir.

Q. And that information would still be valid today?

A. Yes, sir.

Q. Is the data required by Form C-108 for any new wells drilled since the approval of the original application -- is all of that data set out on the enclosed well data sheets?

A. Yes, sir, any new drills are included in the C-108 packet.

Q. And so those individual sheets show the well types, the construction, date drilled, all of that information?

A. Yes, sir.

Q. Are there any plugged or abandoned wells within the area of review of any of the five proposed wells which are the subject of this hearing?

A. No, sir.

Q. Let's go to the schematic drawings of the proposed injection wells in the Exhibit 7 from pages 5 through 19, and I would ask you to just generally summarize the information set on that portion of this exhibit.

A. Pages 5 through 19 are the procedures to convert the well to injection and also shows the existing -- the current wellbore diagram and then the proposed wellbore diagram, showing the injection packer, the lined tubing, where the packer will be set and things of that nature, and showing how we will perform the mechanical integrity test to ensure that the backside is mechanically sound.

Q. So for each of these wells you've got a summary of the procedure --

A. Yes, a summary of procedure for --

Q. -- a data sheet showing the current completion, and a data sheet showing the proposed conversion?

A. Yes, sir.

Q. Will you be injecting through lined tubing?

A. Yes, sir.

Q. Will the annular space be filled with an inert fluid and the space equipped with a gauge to monitor the pressures required by the federal Underground Injection Control Program?

A. Yes, sir, backside will be loaded with corrosion-inhibiting fluid.

Q. Before we go through the rest of the C-108, let's go to what has been marked Chevron Exhibit Number 8. Would you just identify this, please?

A. Exhibit Number 8 is a table showing where the casing shoe is for these proposed conversions and then the amount of cement above the Grayburg to show that there's isolation, we've got cement integrity between the Grayburg and overlying strata.

Q. Now, into what formation are you going to be injecting?

A. It will be the unitized interval, which is the lower Penrose, Grayburg and upper San Andres.

Q. What are the approximate depths?

A. The Grayburg can range anywhere from 3500 to 3900.

Q. And that is the principal injection interval?

A. Yes, sir, the Grayburg is the primary injection interval.

Q. Are there other oil-productive zones in the immediate area?

A. Yes, sir.

Q. And what are they?

A. There's the Blinebry-Drinkard below us, and then there's also the Eumont interval, the Queen-Penrose above us.

Q. And Mr. Hartman's wells are completed in the Eumont?

A. Yes, sir.

Q. What is the source of the water that Chevron

proposes to inject in the subject well?
A. It will be Grayburg-produced water and makeup water from the San Andres.
Q. And what volumes are you proposing to inject?
A. Proposing -- Our average will be 750 barrels of water a day, the maximum will be 1500 barrels of water a day, injection pressure will average around 650 with a max at 700 p.s.i.
Q. Now, is this going to be a closed system?
A. Yes, sir, it's a closed system.
Q. Now, the original order approving the waterflood imposed a pressure limitation of .2 pound per foot of depth to the top of the injection interval. Is that pressure what is still being used for injection purposes in the unit?
A. Yes, sir.
Q. And will the maximum pressure of 750 pounds also be within that limitation?
A. Yes, sir.
Q. If you need to increase the pressure for any of these injection wells, how do you propose that be handled?
A. We propose to run step-rate tests to be witnessed by the OCD and any other parties interested, to increase injection pressure.
Q. What is the fracture pressure in this reservoir?

A. It's .267 p.s.i. per foot.
Q. And how has that been determined?
A. It's been determined from previous fracture stimulation treatments performed on the Grayburg and also previous step-rate tests.
Q. Now, how does Chevron monitor pressure in the wells in the unit?
A. Injection rates and pressures are monitored by a SCADA system.
Q. And what is SCADA?
A. SCADA is an automated computer-aided system to gather pressure and rate data from transducers at injection headers.
Q. And will it be connected to each of these wells?
A. Yes, sir.
Q. And how often do you get a reading on the pressure and rate on each of these wells?
A. We can get a pressure and rate sample very 30 seconds.
Q. Every 30 seconds?
A. Yes, sir.
Q. And you would therefore know immediately if there was a pressure increase?
A. Yes.
Q. In this reservoir, what would cause a pressure

increase?

A. We could have scale, to scale off the wells, or we could have solids in the injection fluid to create a wellbore skin and thus increase injection pressure.

Q. And when you are -- through this SCADA system, if you become aware of a pressure increase, what do you do?

A. The plant operator will proceed to choke back the injection well or shut it in.

Q. Now, you're going to be injecting water from the Grayburg formation?

A. Grayburg and San Andres.

Q. And will the San Andres formation be as your makeup water? Is that what it would be?

A. Yes, sir.

Q. Do you have an analysis in Exhibit Number 7 of the injection fluid contained -- or that you're going to be using?

A. Yes, sir, it's on page 128.

Q. And that's in Exhibit 7?

A. Exhibit 7.

Q. Is the injection fluid going to be compatible with -- the makeup water from the San Andres going to be compatible with the fluid and the water in the --

A. Yes, sir, they're compatible.

Q. And on this page 128 in Exhibit 7, is that an analysis of the water in the injection zone?

A. Yes, it's an analysis of the Grayburg water and also of the San Andres water.

Q. Would you turn to page 138 of this exhibit and identify what that is? 130, I gave you the wrong number.

A. This is a summary of any freshwater aquifers in the area.

Q. And it gives a general summary of their depth and what they are; is that correct?

A. Yes, sir.

Q. Are there any fresh water wells in any of the areas of review?

A. Yes, sir, there's three.

Q. And was information on those wells submitted with the original application?

A. Yes, with the original application.

Q. Have you reviewed or examined available geologic and engineering data on this waterflood project?

A. Yes, we have.

Q. As a result of that review, have you found any evidence of open faults or other hydrologic connections between the injection interval and any underground source of drinking water?

A. No, sir.

Q. Would you go to page 138 and identify what that is?

A. This is the public notice that we published, public legal notice, in the *Hobbs Sun* to let people know that we were proposing to convert these wells to injection.

Q. And that is the notice, the legal notice, that went with the administrative application; is that right?

A. Yes, sir.

Q. Has notice of this Application and hearing also been provided in accordance with OCD rules?

A. Yes, sir, to all offset operators and surface land owners.

Q. Let's go now to what has been marked Chevron Exhibit Number 9. Would you identify that and review it for Mr. Ashley?

A. Exhibit Number 9 is a cross-section through the proposed injection wells showing the intervals into which water injection will be injected. And as you can see by the perforations and the casing shoe, all injection would be within the unitized interval.

Q. The unitized interval is what?

A. It's minus 100 subsea or the top of the Grayburg, whichever is higher.

Q. And then you've got the Grayburg broken into what? Five zones?

A. Yes, sir.

Q. And you can look at the perforations as shown on each of these logs, and those are the injection intervals?
A. Yes, sir.
Q. And these are each of the five wells that are the subject of today's hearing?
A. Yes, sir.
Q. Let's go, then, to Exhibit Number 10. Would you identify and review that?
A. Exhibit Number 10 is a north-south cross-section, as shown on the previous map, the structure map, of existing injection wells, and it's the same thing except that this one actually shows historical injection profiles. And as you can see, this indicates that all historical injection has been within the unitized interval.
Q. And a trace showing the actual line of cross-section is set forth on our Exhibit Number 2; is that right?
A. Yes, sir.
Q. Okay. Let's go now to Exhibit Number 11, your cross-section A-A'.
A. This is the same thing, except it's an east-west cross-section of offset injection wells in the area, showing the historical injection. As you can see, all the profiles indicate injection has been within the unitized interval.

Q. Mr. Love, let's go to Exhibit Number 12. Could you identify this and then explain what it shows?

A. For all the direct offset injectors to Mr. Hartman's wells, there's nine offset injectors. This is an average injector-centered pattern performance for those nine wells, showing injection rate, the average production allocated to those injectors, as well as the injection pressure. It also shows our fracture initiation pressure, and also we've got cumulative production, cumulative injection, and the voidage in the reservoir needed to achieve fill-up.

Q. And the voidage is set forth as a negative number; is that right?

A. Yes, sir, we have not reached fill-up. We still need to inject more fluids to achieve fill-up.

Q. And prior to -- What does that tell you about the Chevron project and proposal?

A. That it's hard for any injection to go out of zone, especially if you've never filled the original voidage.

Q. What about the average injection pressure? How does that compare to the fracture-initiation pressure?

A. It's always kept below fracture-initiation pressure.

Q. And what does that tell you about your proposal?

Where will the fluids go?

A. The fluids wills stay within the unitized interval.

Q. Let's go now to Exhibit Number 13. What is this?

A. This is just a graphical representation of each of the injector-centered patterns, showing the cumulative production in green and cumulative injection in blue. And again, it just shows that we have never achieved fill-up.

Q. So the difference between the blue and the green circle is --

A. -- our voidage.

Q. -- voidage that has not yet been filled up?

A. Yes, sir.

Q. If you were required to inject at an injection-to-withdrawal ratio of one, would you ever be able to achieve fill-up?

A. No, sir.

Q. And if you wound up in that situation, would you be able to maximize the effectiveness of the waterflood project?

A. No, sir.

Q. Now let's go to Exhibit Number 14. Would you identify that for the Examiner?

A. This is just another map view of the nine injection wells. This shows each individual well's injection history. The injection rate is in blue, injection pressure is in black, and fracture-initiation pressure is in red.

Q. So what we have on Exhibit 12 is an average injector pattern performance for this area?

A. Yes.

Q. And what we have on Exhibit 14 is information on each of the individual wells?

A. Yes, sir.

Q. And what it show is, the pressure has not gone over the fracture pressure in any of these wells?

A. Yes, sir.

Q. What is Chevon Exhibit Number 15?

A. 15 is another table indicating where the casing shoe is set and also the amount of cement above the Grayburg to show that there's adequate cement and casing to prevent the migration of fluids to overlying strata.

Q. And earlier we showed the cement and the casing conditions on the wells which you propose to convert, and this is the same information on the offsetting injectors that offset Mr. Hartman's properties?

A. Yes, sir, this is the existing injection wells.

Q. Let's go now to Chevron Exhibit 16. Would you identify and review that, please?

A. 16 is a table of all the offset Eumont wells in the area. It's showing the gas, oil and water rates, the perforation intervals, the fracture volume, the pounds of sand in the fracture stimulation, the estimated frac height and frac length and the estimated bottom of the fracture. Also it shows the top of our unit and then the estimated fracture height within the unit.

Q. Now, these wells are not all the wells in the unit?

A. No, sir, these are just in the direct area of concern.

Q. Now, if we go to Exhibit Number 17, how does that relate to the information shown on 16?

A. This is just another graphical representation showing gas rate in red and water rate in blue.

Q. And this is really a graphical representation of the information on 16?

A. Yes, just oil -- I mean, just gas and water rate.

Q. And so the gas is the red circle, and if the well has produced water, it is shown by the blue circle inside the red circle?

A. Yes, sir.

Q. You haven't put circles on this exhibit for all of the wells shown on Exhibit 16?

A. No, there's two wells that we added later in the area that didn't make it to this graph.

Q. But the data on the graph is accurate and this is just a --

A. Yes, sir.

Q. -- further explanation or depiction of that data?

A. Yes, sir.

Q. What is Exhibit Number 18?

A. This is just another map that labels the wells on the table.

Q. And again, this would show by name the wells that are set forth on the two preceding exhibits and show where they're actually located?

A. Yes, sir.

Q. Is Exhibit 19 an affidavit confirming that notice of today's hearing has been provided in accordance with OCD rules and regulations?

A. Yes, sir.

Q. In your opinion, will the granting of this Application and the conversion of these five wells to injection in the Eunice Monument South Unit be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes, sir.

Q. Were Exhibits 1 through 19 either prepared by you or compiled at your direction?

A. Yes, sir.

MR. CARR: May it please the Examiner, at this time I would move the admission into evidence of Chevron Exhibits 1 through 19.

EXAMINER ASHLEY: Exhibits 1 through 19 will be admitted as evidence.

MR. CARR: That concludes my direct examination of Mr. Love.

EXAMINER ASHLEY: Mr. Condon?

MR. CONDON: Thank you, Mr. Ashley.

CROSS-EXAMINATION

BY MR. CONDON:

Q. Mr. Love, let me call your attention to what I believe is marked in your packet as Exhibit 5, the letter that you received from Mr. Hartman.

A. Yes, sir.

Q. If you'd take a look at that. I believe -- I wrote down what you said about the letter. I believe you said that you found the terms unacceptable; is that correct?

A. Yes, sir.

Q. Okay. Would you just read for the record what point 1) on the first page of that letter asks that Chevron assure?

A. "The proposed additional EMSU injection will be kept, at all times, within Chevron's originally approved

EMSU water injection interval."

Q. Okay. Do you find that term to be unacceptable?

A. Yes, sir, when you have completions around you that may have actually hydraulically fractured down into our unitized interval, we have no control where the water goes if there have been fracture stimulations into our unit.

Q. Okay, and do you have any evidence that that has, in fact, happened?

A. We've modeled fractures to indicate that there has been some fracturing into the unitized interval.

Q. Okay, and what wells are those?

A. We've had several on that table.

Q. Okay, I'm sorry, which table are you referring to? Exhibit 16?

A. Yes, 16. We have 10 wells.

Q. Okay, and which ones are they?

A. The Chevron Bell Ramsay Number 8, the Chevron Graham Orcutt Number 4, the Conoco Meyer B-8 Number 6, the Doyle Hartman State A Number 4, the Doyle Hartman State A Number 5, the ARCO State G-1, the ARCO State G-4, the ARCO G Com Number 5, and then the ARCO State H Number 6.

Q. Okay, and you're saying that you have evidence that frac jobs on these wells may have caused communication with your interval?

A. Just by modeling the fracture data and the volumes pumped and the completion intervals, yes.

Q. Okay. And just tell me exactly what you did to model that.

A. I used an industry-standard fracture simulator, Myer Frac, to model these fractures and used service company data as far as stresses and rock properties to model these fractures. And then as far as the rates and volumes, I got those off of the OCD C-103 reports.

Q. Okay. And is there anything about the production characteristics of those wells that indicates to you that they are in communication with your unitized interval?

A. As far as our wells, we cannot really see the direct communication from the injection standpoint, since the majority of our injection is going into the middle and lower Grayburg. But historically there has been some, you know, injection into the upper Grayburg, and most of these fractures that have commuted are up in the upper Grayburg.

And as you can see, on some of these wells previously, before being fracture-stimulated or restimulated, the production was water-free. And then after these fracture stimulations, water production started.

Q. And when did the fracture stimulations take place?

A. Most of them were in the early 1990s, late 1980s.
Q. Okay, and that would have been after the waterflood had been operating for how long?
A. Oh, probably five to six years.
Q. Okay. Were each of the wells that you see evidence of communication in, were each and every one of those wells fracture-stimulated?
A. Yes, sir.
Q. Are there any wells in the vicinity, any gas-producing wells, that have not been fracture-stimulated, that you've seen evidence that they have begun to produce water since after the waterflood began operating?
A. No, sir.
Q. Okay. Did you look for that?
A. Yes.
Q. Okay, how did you go about looking for that?
A. I just looked in the direct, immediate area of concern, and then if there was no fracture stimulations, you know, you'd just look at production and see what they've done. And most of the ones that were left alone with the original acid jobs or the smaller fracture stimulations in the early 1950s, they produce no water.
Q. And in look at the fracture stimulations, did you check data that would show you at what level the operators first encountered water when they were doing their fracture

stimulations?

A. What do you mean by "what level"?

Q. At what level vertically, and at what point in the frac procedure did they encounter the water?

A. It just depends on which intervals they were complete and how low in the Penrose, how close they were getting to the top of the unitized interval. And then there were some that were quite large fracs and exhibited excessive height growth for the amount of pay that they were intending to frac.

Q. Well, I guess my question is, how did you determine that it was the fractures themselves that caused the communication and the water production, as opposed to the fractures actually coming into contact with water that was out of zone from your waterflood?

A. There's really no way to determine that, other than the wells were water-free production in the same interval, and they were producing water-free within the same interval they were already producing from, and then after the fracture stimulation treatment, then they started producing water.

Q. Okay. So on all of these wells, your records indicated that there was no water production prior to the fracture stimulations?

A. In the majority, yes.

Q. Okay. Well, were there some of the wells that actually had water production prior to the fracture stimulations?

A. Not to my knowledge.

Q. Did you look for that?

A. Yes, sir.

Q. Okay. And again, what data did you look at?

A. I used public access data from PI and *Dwight's* to get production data.

Q. That would have been gas production and water production?

A. Gas, water and oil production.

Q. All right. With respect to the point number 1) in Mr. Hartman's letter, you don't have any problem, do you, with the proposition that Chevron take whatever steps are necessary to keep its water with the approved injection level, do you?

A. No, number 1), Chevron will do its part to keep injection within an interval. You know, what goes on above us, we have no control over.

And if -- You know, we run injection profiles quite frequently to monitor where injection is going, to verify that it is within the injection interval.

Q. Let's look at number 2) in Mr. Hartman's letter. Would you read that?

A. "The proposed new EMSU injection wells have been properly cemented with adequate volumes of API sulfate-resistant cement and the individual injection well cement jobs demonstrate satisfactory bonding and pipe characteristics using a state-of-the-art 360-degree bond-pipe evaluation tools such as Schlumberger's USI..."

Q. Okay. And do you find that term to be unacceptable?

A. Yes, sir.

Q. Why?

A. Because we've already proven by the table that there's adequate cement and casing across this interval to ensure that no water migrates to overlying strata. Also, we run injection profiles to verify that there's no injection going behind pipe, using injection profiles and temperature surveys. So this is pretty much an unwarranted cost that we incur on our partners, and as prudent operators of a waterflood, we don't see it necessary to spend money that's not needed.

Q. Okay, so you've done injection profiles and temperature surveys on these wells?

A. Not the proposed ones. We'll have to wait till we actually inject water before we can do that.

Q. Okay. Which wells have you done injection profiles and temperature surveys on?

A. Every well in the unit.

Q. And do you have those results available for the Division?

A. I can bring those. I don't have them with me. There were several -- They've been run since the 1980s, and we try to run a profile every two to three years, and also if we perform any workover activity on the well.

Q. Did you review all of the test results from those injection profiles and --

A. Yes, sir, all the --

Q. -- temperature surveys?

A. -- the nine offset wells, I looked at all the injection profiles and the temperature surveys.

Q. The nine --

A. The nine offset wells to Mr. Hartman's.

Q. Okay, the nine -- What are they, all injection wells --

A. Yes, sir.

Q. -- that you looked at? All right.

And did any of those test results for those nine wells show any indication of water out of zone or water behind the pipe?

A. No, sir.

Q. Okay. Would you have any objection to providing us with copies of those data just for the nine offset wells that you've tested?

A. No, sir.

Q. Now, let me get back to your statement that -- where you say that you've already shown that the wells are adequately cemented. Or that's your testimony, correct?

A. Yes, sir.

Q. All right. Let me have you turn, just so I understand this, to page 6 of your Exhibit Number 7, which is the Current Well Data Sheet for the 210.

A. Yes, sir.

Q. Is the cement outlined in the little kind of dotted shaded areas?

A. Yes, sir, except it should extend all the way to the casing shoe.

Q. Okay. Well, what does this show, then?

A. This shows cement.

Q. But not down to the casing shoe?

A. Yeah, that's just a glitch by the technical assistant that prepared these from the original paper copies, from the well files.

Q. All right. Well, was the cement job, then, the original cement job that went all the way down to the casing shoe, or was this work that was done after the well was --

A. No, this is the original cement job performed on the well.

Q. Well, was this an open hole completion?

A. Below the casing shoe, yes, it was. Or no, wait, this one was cased all the way, and then it was deepened after the flood was put in.

Q. Okay. And was additional cement put in when the well was deepened?

A. No, sir. But as you can see, the table indicates we've got almost 3000 feet of cement above the Grayburg.

Q. Well, we'll get back to that in a second.

Now, if you'll turn to page 9 and look at the schematic for Well 212, where is the cement shown on that?

A. You can see that -- right here, 5 1/2", 17-pound casing set at 3798 with 100 sacks, and it shows you how much cement. And then on the table it shows calculated there, 600 feet above the Grayburg, cement.

Q. Okay, so that's not all the way to the surface then?

A. No, sir.

Q. So it's really only about 600 feet above the Grayburg?

A. Yes, sir.

Q. And then open the surface from there?

A. (Nods)

Q. I'm sorry, you have to say yes for the --

A. Yes, sir.
Q. Thanks.
All right. Then let's turn to Well 222, and I'm looking on page 12, the Current Well Data Sheet.
A. Uh-huh.
Q. Again, does the shaded area represent the cement condition of the well?
A. Well, it represents cement. It's not the exact condition, but if you read the insert it shows 175 sacks pumped and top of -- 1200 -- 1300 feet of cement above the Grayburg.
Q. Okay. So again, though -- I mean, this schematic is showing cement all the way to the surface. Are you telling me that that is not the actual condition of that well?
A. No, it's got fluid behind it, mud and drilling mud and such, but if you read the insert, it will tell you exactly what volume is pumped, and it's estimated top of cement.
Q. Right, but the estimated top of cement, there's -- what? Some -- How many feet would you say from the top of the cement to the surface, roughly?
A. Oh, probably 2000 feet.
Q. Then on page 15, Well 252, the Current Well Data Sheet, does the schematic in this one accurately represent

the condition of the cement in that well?

A. The insert tells you how much cement is there.

Q. Well, I guess my question is, if some of these wells don't have cement all the way up to the surface, why does the picture show -- or indicate that it does go all the way to the surface?

A. Probably the technical assistant who prepared them didn't exactly draw what is represented by the exact volumes pumped.

Q. So on Well 252, can you just give me an estimate for how much of that wellbore is open to the formations from the top of the cement to the surface?

A. None. Cement is within this surface casing.

Q. Okay. And then what about 258, which is on page 18?

A. This one's probably all the way to surface. It shows to be 3770 feet above the Grayburg, so it's almost to surface.

Q. That's about to the surface.

All right. Now, in your view, is an operator's obligations with respect to cementing of injection wells satisfied if the operator simply shows how much cement is there as opposed to showing the integrity of the cement?

A. Injection profiles will show the integrity of the cement, if there's any injection going up the casing cement annulus.

Q. Okay, and those are tests that you plan on performing --

A. -- on every injection well.

Q. -- after the wells are put on injection?

A. Yes.

Q. Do you have any objection to providing the Division and Mr. Hartman with the results of any of those injection profiles or temperature surveys on these wells after they're run?

A. No, sir.

Q. Have you done any tests to look at this point at the integrity of the cement in any of those wells?

A. Just pressure tests, to verify the casing is in good, sound shape. Other than the cement, the best way to do that is injection profile, because bond logs are left open to interpretation. They can miss channels, and if there's any channel behind the cement sheath, a bond log does you no good.

Q. Well, what does a bond log show you?

A. A bond log shows you the bond of cement to pipe. It doesn't show you the bond -- It will show you the bond of cement to formation if it's good. But if you have a channel or something, it's going to give you an overall picture, it's not going to give you a 360-degree view of formation to cement.

Q. Okay. Is there an industry standard as to when you do or do not run a cement bond log on a proposed injection well?

A. No, it's just whenever you feel it's warranted.

Q. When were these wells originally drilled?

A. Most of them were drilled in the 1930s.

Q. So we're talking about, for the most part, cement that's been sitting in the wellbore now for 65 years?

A. Yes, sir.

Q. Are there any problems that the industry has described about breakdown of cement in wells that have been out there for 65 years, that you're aware of?

A. There have been some cases, but to my knowledge in our flood we really don't have a problem with the older cement. We've actually had better bond in older wells than some of our new drills.

Q. So you would trust the older cement rather than --

A. I wouldn't say I'd trust it; I'd have to run an injection profile to verify it.

Q. Now, did you say that you had tested the wells to assure the integrity of the casing and tubing and packer?

A. Yes, it will be tested.

Q. Okay, again, those will be tested after the well comes on?

A. No, that will be tested before it's put on injection.

Q. All right. And you're planning on doing that pressure testing pursuant to Rule 704 of the Division rules?

A. Yes, sir.

Q. And again, would you have any objection to providing Mr. Hartman and the Division with copies of those test results?

A. No, it's public information. You can go to the OCD and get the tests.

Q. How did you determine the 750-p.s.i. maximum injection pressure?

A. That's the .2 p.s.i. per foot.

Q. And that's right at .2, correct? --

A. Yes, sir --

Q. -- for this area?

A. -- and that's below our fracture gradient.

Q. This water that you're using, do you calculate the injection gradient with -- assuming freshwater gradient or a saltwater gradient.

A. We use a -- almost a fresh. The chlorides in our Grayburg and San Andres are so low it's almost fresh water. It's a little greater than fresh water.

Q. So for purposes of your calculation, what did you use? .433?
A. .435 or -4, something like that.
Q. Now, the system that is set up, that you talked about earlier -- what, the SCADA system?
A. SCADA, yes.
Q. SCADA, S-C-A-D-A?
A. Uh-huh.
Q. All right. I believe there was a reference in one of the documents to a choke that is on these wells?
A. Choke on an injection header.
Q. And how does that operate?
A. It's a manual choke, because the automated ones are no longer functioning. Therefore, they have to be manually choked.
Q. All right. And if you could just describe for the Division, then, how is this system set up in terms of, in the event that there is pressure that exceeds 750 p.s.i. on any of these wells, what is kind of the fail-safe system that Chevron has in place to --
A. There's a SCADA terminal in the field office, and it will indicate when a well goes over such and such pressure, it will alert the plant operator, and he will proceed to pinch back the well or shut it in at the header.
Q. Okay, I'm sorry, how does the system alert the

plant operator?
A. It's just a computer screen. He goes in and checks it every day or two or three times a day.
Q. And how many wells does he check on that?
A. I think we have 140 injection wells.
Q. All right. And is -- I guess what I'm trying to get at is, aside from knowing that 750 is the limit -- correct? --
A. Uh-huh.
Q. -- I mean, that's what the plan operator should know --
A. Yes, sir.
Q. -- is that 750 is the limit, and if he sees a pressure reading over 750 on any of these wells, that he then does what?
A. He proceeds to that injection header and shuts that well in or chokes it back.
Q. Okay. And is there -- I mean, I guess what I'm trying to understand is, when he looks at that screen and he's got 140 wells showing, does a well that's registering a surface-injection pressure over 750, does it show up any differently on the screen than all of the wells that are showing up at or below 750?
A. No, it just shows the pressure.
Q. So I mean, there's no warning bell that goes off,

or the --

A. Not that --

Q. -- over 750 doesn't flash in red or something?

A. Not that I'm aware of. The SCADA technician might have installed an alarm, but I'm not aware of it. But from my knowledge, we have very good plant operators. They're on top of things, and they take care of the business at hand.

Q. Well, in connection with preparing for this hearing, did you go back and look at the pressure readings on the other wells that you have to determine if there were ever any circumstances where there was an increase in pressure over the 750 that either was or was not caught?

A. Yes, for short periods they would increase and then they would pinch them back.

Q. What was the average period of time between when the pressure would exceed 750 and the well was pinched back?

A. Probably two or three hours, maybe half a day. It just depends on what he's doing at that time.

Q. Right. I mean, he has other --

A. Other responsibilities, yes.

Q. -- responsibilities, besides just looking at that monitor?

A. Yes.

Q. Now, I believe you mentioned something in your direct testimony that you don't believe you've filled up the reservoir yet; is that correct?
A. No, sir.
Q. All right, and you've been pumping water in for how many years now?
A. Fifteen.
Q. Fifteen years. Have you done any injection-to-withdrawal-ratio calculations for the waterflood unit as a whole?
A. Yes, that's what I just presented.
Q. Okay. What is the injection-to-withdrawal ratio?
A. Right now, fieldwide, we're averaging about 1.1.
Q. 1.1 what?
A. The ratio, fluid in to fluid out.
Q. Barrels? It's measured in barrels?
A. Reservoir barrels to reservoir barrels.
Q. And the barrels in are measuring water?
A. Yes, sir.
Q. Are the barrels out measuring just water?
A. No, that's oil, gas and water.
Q. All right. What about -- Have you done any injection-to-withdrawal-ratio calculations just for water, to see if there's any water that you can't account for in terms of the injection?

A. Yes.

Q. Okay, and what do those show you?

A. They show in some areas that we're producing more water than we've put in. And that comes from the edge water to the west, there's an edge water encroachment to the west, and the wells on the west side exhibit more water influx than we put in.

Q. Okay, what about the rest of the waterflood area?

A. No, we produce most everything we inject.

Q. Okay, and that's always --

A. Except for on the west side where you have the edge water encroachment.

Q. Okay, and that's always been the case?

A. Yes, sir.

Q. All right.

A. Except for the start of the flood before the water broke through in some of those high-permeability streaks. We have a real bad problem with cycling water through those high-permeability streaks. They're like pipelines, and until those broke through we were -- you know, water production was lower.

But once the injection broke through, you're almost at one with your water in, water out, till you squeeze out of those high-permeability streaks.

Q. Let me go back, if I could. Let me ask you this.

Are there ways for an operator to calculate reservoir fill-up in a waterflood unit such as this?

A. Yes.

Q. And have you done those calculations?

A. Yes, sir. You allocate injection and production based on well pattern alignment.

Q. Okay, and can you just describe for me again where that is on your exhibit?

A. That would be display -- or Exhibit Number 13.

Q. Okay. Does Exhibit 13 show everything that you've done in that regard to try to determine the status of the reservoir with respect to fill-up?

A. It shows the cumulative injection and production for each injector-centered pattern and the allocated -- using the allocated production injection for that pattern.

Q. Okay. Well, I guess my question is, have you done any other calculations aside from what is shown in Exhibit 13 to give you an idea of reservoir fill-up at this point in time?

A. Yes, sir, there's been a full field simulation done on this field, and it shows we have still not reached fill-up.

Q. Okay, and where is that?

A. That is at Chevron Petroleum Technology Company.

Q. Is there any particular reason you didn't include that in the exhibit packet?

A. Didn't find it necessary, when you've got sound reservoir engineering principles right here.

Q. Let me go back to Mr. Hartman's letter, point 3), there at the bottom of the first page, where he asks that "The wellhead injection pressure for the proposed injection wells will always be kept at or below the NMOCD's maximum surface injection pressure limit of .2 p.s.i. per foot."

What is it that you find objectionable about that?

A. Currently we'll keep it at that level, but if we -- as reservoir pressure increases, injection rate decreases. Therefore you have to increase injection pressure to maintain the same injection rate.

Q. Okay, but you wouldn't increase the injection pressure without the approval of the Division?

A. No, sir, we'd use step-rate tests witnessed by the OCD to increase our injection pressure.

Q. All right. And then Number 4) in Mr. Hartman's letter asks that you assure that "The primary cement job for the proposed injection wells has not been compromised by nitro-glycerine stimulation or excessive acid treatments."

Do you find that objectionable?

A. Yes, because we really can't control what was done to these wells before they became in Chevron's possession. There are different operators that operated these wells before Chevron took possession.

But Chevron will do everything within its power to ensure the injection is going within the unitized interval. That's why we run injection profiles, monitor pressures and rates, to ensure the injection is within the right zones.

Q. Okay, well, whether you were operating the wells when acid treatments were performed or not, you are at this point proposing to utilize the wells as injection wells?

A. That's why we run injection profiles and monitor the rates and pressures, to verify everything is sound, run MIT to ensure that the casing is sound.

Q. Okay, all right. But did you go back and look at the well --

A. Yes, sir.

Q. -- files for these?

A. Yes, sir.

Q. All right. Was there anything in the well files for these wells that caused you any concern as an engineer in terms of proposing that --

A. No, there were no nitro treatments on any of these wells. And as far as excessive acid treatments, you're going to have to define "excessive".

Q. Okay, you just don't know what that means?
A. No, you're going to have to tell me what "excessive" means. I mean, "excessive" to you might be different than what it is to me. The acid treatments that I read were volumes that I thought were within reason.
Q. Okay. Well, I guess that brings me to a question.
After you received this letter dated November 15, 1999, from Mr. Hartman, did you make any attempt to communicate with him or provide him with any of the information that he --
A. Yes, sir, I called him.
Q. Okay.
A. And he was pretty terse with me and said, you know, I don't believe your injection profiles, and if you don't agree to these then I guess we'll just to go hearing.
Q. Well, what injection profiles did you provide?
A. I just told him we'd run injection profiles to verify where our injection was going. And he said, I don't believe those.
Q. Okay, and which injection profiles were you referring to?
A. The ones that we've ran since the start of the flood.
Q. Okay, so you were referring to the unitwide

profiles?

A. Or just the ones in the direct offsets.

Q. All right. And I think on number 5) you've explained that you don't agree to an injection-withdrawal ratio of one because you don't believe the reservoir has been filled up yet?

A. No, sir.

Q. Okay, now let me just have you read number 6) for the record, if you would, out loud.

A. "The proposed new injection wells do not exhibit injection profiles that indicate a large volume (or percentage) of injection is exiting the wellbore at the upper part of the injection interval."

Q. All right. Do you have any problem with that request?

A. Yes, because if that zone at the top needs to be filled up to increase reservoir pressure, that's where the water's going to go. If there's a high-permeability streak, a thief zone there, that's where the water's going to go.

And until we run an injection profile and verify if that zone's been swept or not, we're not going to squeeze out of it till we know it's been swept.

Q. Well, which zone are you referring to? Are you referring to a zone that is within your injection interval?

A. Yes.

Q. Okay. Well, don't you read number 6) as just asking that you show evidence that the water you're injecting is not exiting the injection interval?

A. Yes, that's why -- That kind of relates back to the first one, you know, if there's cement integrity. That's why we run injection profiles, to verify the injection within the unitized interval.

Q. Okay, but it's your proposal and your intent to try to keep your injected water within the authorized injection zone?

A. Yes, sir.

Q. And you realize that that is part of the responsibility of a waterflood operator?

A. Yes, sir.

Q. All right. And then just so I'm clear on this, why are you proposing to use these wells for injection wells, as opposed to drilling new wells, new injection wells?

A. Cost.

Q. Okay, so that decision is based on cost?

A. Yes, sir. If you start drilling new wells, your economics don't make the project viable.

MR. CONDON: That's all the questions I have.

MR. CARR: Mr. Ashley?

EXAMINER ASHLEY: Mr. Carr?

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Love, if we look at Mr. Hartman's letter, the third paragraph reads, "However, Doyle Hartman is not opposed to additional injection wells being added to the EMSU waterflood project providing that Chevron can make a satisfactory showing that its proposed additional injection wells can be installed and operated in accordance with the following set of industry-accepted injection practices and standards..."

Do you see that?

A. Yes, sir.

Q. My question to you is, are the points set out in Hartman's letter 1) through 6), in your opinion, industry-accepted practices and standards?

A. No, sir.

Q. Will Chevron make every effort to assure that the proposed additional injection wells are installed and operated so as all injection fluids will stay in the unitized interval?

A. Yes, sir.

MR. CARR: That's all I have.

EXAMINER ASHLEY: Mr. Condon?

MR. CONDON: Nothing further.

EXAMINATION

BY EXAMINER ASHLEY:

Q. Mr. Love, in Mr. Hartman's letter, point number 1), he talks about keeping injection within the injection interval. And you say it will be kept in the injection interval, or it will not be kept in the injection interval?

A. We'll do our best to keep it in the injection interval. There's some things we can't control, such as casing leaks and whatnot, but that's why we monitor the wells the way we do, to ensure when something goes wrong we can fix the problem and get injection back into the right area.

Q. Okay, "interval" being the unitized area?

A. Yes, sir.

Q. Has that happened in any wells out there?

A. Not that I'm aware of.

Q. And what unit do Mr. Hartman's wells produce from?

A. The Eumont, which is the Queen, Seven Rivers and Penrose.

Q. Seven Rivers, Queen and Penrose; is that what you said?

A. Yes, sir.

Q. So his wells are essentially producing just from the zones right on top of your unitized interval?

A. Yes, sir. And then part of the unitized interval does consist of the lower Penrose.

Q. Okay, part of your unitized interval?

A. Yes, sir.

Q. Okay. Now, he also makes a comment on page 2 in number A) that there's water production in these wells that were originally nonproductive of water. Does that seem unusual?

A. No, sir, with the fracture stimulation, the size of the treatment he put on it and the interval he had to complete it, it doesn't surprise me.

Q. So do you think that the water is the result of his fracture stimulation --

A. Yes, sir.

Q. -- on his wells, that he frac'd down into the unitized interval?

A. (Nods)

MR. CARR: Tracy, you have to answer the question.

THE WITNESS: Oh, yes, sir.

Q. (By Examiner Ashley) Do all of the wells that you're proposing to convert have at least 500 cement above the top of the unitized interval?

A. Yes, sir.

Q. In Exhibit 17 where you show the map with the water rates and gas rates --

A. Yes, sir.

Q. -- and the circles drawn there, is that essentially --

A. Those are current, or the latest rates within PI and *Dwight's*.

Q. Okay. Are Mr. Hartman's wells on this map?

A. Yes, sir.

Q. Which ones are those?

A. Should be the two in the center.

Q. The one that had both water rates and gas rates?

A. Yes, sir.

Q. Okay. Now, these circles essentially represent drainage radius?

A. No, these are just -- They vary on the amount of gas rate. They're just -- the bigger the circle, the higher the gas rate.

Q. Okay. Is that the same thing on Exhibit 13?

A. No, that's showing a reservoir, the cumulative production and cumulative injection. But the size of the circle varies with the volume.

Q. On 13 too?

A. Yes, sir.

Q. Okay. Now, the injection-to-withdrawal rate you say is currently 1.1?

A. 1.1, on average for the entire field.

Q. Is that what it will continue at?

A. Between 1.1 and 1.2.

Q. And then once you achieve fill-up, will that --

A. Probably back it back down to 1.

Q. Okay. How much time do you think it will be before there is fill-up?

A. At the current rate, it will probably 10 to 15 years, and it just -- We've got an ongoing conformance program to try to shut off some of those high-permeability streaks to and divert the water into the unswept zones. And as we progress with that, that will decrease our fill-up time.

Q. Now, as far as filling up the upper part of the injection interval, I know Mr. Hartman did not want that to occur, did not want the injection to reach that upper limit; is that correct?

A. He just doesn't want the injection going in the upper part of the interval, which, you know, in some areas of the waterflood, that's a target area. It contains oil that we need to put injection into.

Q. Could there be any problems associated with that?

A. No, because usually the sands on top of the Grayburg and the sandstones within the Penrose, they have high porosity but extremely low permeability and act as vertical barriers to water, to fluid flow.

Q. If you were in the process of injecting these wells, if you were filling up an upper zone, would you know if there was anything that went out of zone?

A. Injection profiles, we would, you know, if it was near the wellbore. But usually what happens, when one zone fills up, it will divert to a lower zone that has not filled up, that's at a lower pressure.

Q. What do you propose to do if any of these wells do -- injection profiles show that water is getting out of zone?

A. Probably perform a polymer or cement squeeze to divert the injection to the target interval.

Q. Okay.

A. Or run an isolation assembly of some sort to get below the next sand barrier.

Q. Mr. Condon asked for some information from Chevron. I can't remember what it all was. He wanted --

A. -- injection profiles.

EXAMINER ASHLEY: Once there is injection. Was there anything else, Mr. Condon?

MR. CONDON: Yes, sir, let me just give a kind of an overview that I think encompasses everything.

The test results when you test the casing and tubing and packer in these wells, the injection profiles and temperature surveys for the nine already-operating injection wells, and then injection profiles and any temperature surveys you run on the five wells that are being proposed in today's proceeding.

I would like to add one other request, if I could, Mr. Ashley. One thing that occurred to me as you were asking Mr. Love those questions.

Would you have any objection to providing us with the backup data, the Myer Frac profile that you contend shows that fracture stimulations on some of these gas wells went out of zone and may have caused communication with your unitized interval? Would you have any objection to providing that data to us so we can review that?

THE WITNESS: No.

MR. CONDON: Okay. This is the first time that this issue has come up that I'm aware of in this case, and I'd like to have an opportunity to have our people look at that and comment on it.

I mean, it seems to me that we've got testimony now that there does seem to be communication between the unitized interval and the gas-producing interval, and the question is what the cause of that communication is. So I'd like an opportunity to take a look at the background data that you're basing your conclusion on and perhaps have a brief period of time after we receive that to leave the record open for, you know, additional comment.

MR. CARR: We're opposed to leaving the record open, we're opposed to continuing this matter. We've been attempting to get these injection wells approved now since November. There have been notice, there have been attempts to talk to Mr. Hartman, there are opportunities to acquire information prior to hearing. That was not done.

We'll be happy to provide the information and they can look at it, but we think the time has come to take the case under advisement.

EXAMINER ASHLEY: I'm confused. You're talking -- You want additional frac data?

MR. CONDON: What I want is, Mr. Love testified today here that he has seen evidence and he's run fracture profiles on some of the gas wells in the area, which indicate to him that those frac jobs on the gas wells may have caused communication with the unitized interval that's producing the water and that that is the cause of water production in gas wells in the area.

What I'd like to see is the data that shows that, the test results, you know, the model results, so that we can review that to see if there's any indication that that is, in fact, true.

I mean, you know, obviously we can go through the process of closing the record and then, you know, doing an appeal to the Commission, but I think it makes more sense to do it here. I mean, there may or may not be an objection or a continuing problem. I won't know, you know, until our people have an opportunity to look at that.

EXAMINER ASHLEY: Now, when I asked him about the communication, I was referring in particular to Hartman's wells, the State A Number 4 and 5. Those are wells that Hartman fractured; is that correct?

MR. CONDON: That's correct.

EXAMINER ASHLEY: So wouldn't you have access to that data from Mr. Hartman?

MR. CONDON: I do. I have access to his data, which does not, you know, indicate that that frac caused communication with the unitized interval and is the cause of the water production.

That's why I'm saying, this is the first time today that we've heard that it's Chevron's position that it's the frac jobs that the gas operators are performing on their gas wells that are causing communication and causing the production of water, and I'd just like to see --

Q. (By Examiner Ashley) But does Chevron have that -- You didn't frac in the gas, though, did they? You frac'd in the lower unitized interval?

A. Are you referring to the Chevron Eumont wells or the Grayburg wells?

Q. I'm referring to the Grayburg wells.

A. No, we have not frac'd any of these injection wells.

EXAMINER ASHLEY: And you're talking about Eumont gas wells?

MR. CONDON: Yes, what Mr. Love testified to is that he ran some profiles on the frac jobs that were run on the gas wells and that the results of his profiles indicated fracs going out of zone and causing communication with the unitized interval, and I'd just like to see that.

Q. (By Examiner Ashley) Can you elaborate on that?

A. Sir?

Q. He said you ran some fracture profiles --

A. Yeah, I did some fracture modeling to see where the height growth had gone, based on the volumes pumped and the rates.

Q. And what did they show?

A. And some of them showed excessive height growth into the unitized interval. And I used the same model on all of them, just to be fair.

But you know, fracture modeling, it's subject to interpretation, so you can come up with some different scenarios. But the one I modeled showed excessive height growth with the amount of volume pumped by Mr. Hartman.

EXAMINER ASHLEY: Mr. Carr?

MR. CARR: It's my understanding that the information that was utilized is basically public information. And I would also suggest that, you know, to delay this hearing so an operator who's used a very large frac on his wells can run a fracture profile now is sort of surprising.

I would suspect if you did that, that's the kind of thing you'd want to do when you started fracturing these wells with large fracs, if you're right on top of another operator's waterflood project.

MR. CONDON: Well, Mr. Ashley, all I'm asking for is, there's been testimony today from Mr. Love about what those tests showed, and he's given opinion testimony today on his interpretation of those profiles that he ran, and I'm just asking for the backup so that we can have access to the information that he had and see if we're in agreement or disagreement with those opinions.

EXAMINER ASHLEY: Is this information that was available to Hartman before this hearing?

MR. CONDON: Well, the public data, you know, that was the basis is available, yes, I mean, in terms of the -- You know, obviously we know what the size of the frac it.

EXAMINER ASHLEY: What else did you request? Was the first thing test results or --

THE WITNESS: MIT tests.

EXAMINER ASHLEY: Okay, all right. And then the injection profile and temperature surveys for the nine surrounding injection wells?

MR. CONDON: Correct.

THE WITNESS: And then --

EXAMINER ASHLEY: And then the same information for the five proposed wells, once --

THE WITNESS: Once we put them on injection.

EXAMINER ASHLEY: Yes, okay. And then the additional frac data which you were just referring to?

MR. CONDON: Correct, the profiling data.

Q. (By Examiner Ashley) Does Chevron have a problem providing the first three, the MITs and the injection profiles for the nine and for the five proposed wells?

A. No, sir.

EXAMINER ASHLEY: Okay. Well, I'll let you all work that out as far as the first three.

MR. CARR: We're certainly willing to provide the data, Mr. Ashley.

EXAMINER ASHLEY: Okay.

MR. CARR: And we're provide -- to identify the backup information that we utilized and put into the Myer computer simulator to project fracs. We just believe the time has come to close the record.

EXAMINER ASHLEY: Does anybody have anything else further in this case?

MR. CONDON: No, sir.

EXAMINER ASHLEY: As far as the additional frac data, I'm not going to leave the record open for that. That is public information. If not complete public information, there's enough information that Hartman had a chance to review that and then request that prior to this time.

So there being nothing further in this case, Case 12,320 will be taken under advisement.

Thank you.

(Thereupon, these proceedings were concluded at 9:48 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 12320, heard by me on 3-2 2000

, Examiner

Oil Conservation Division

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL March 3rd, 2000.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 2002