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 WARRIOR, INC.

CASE NO. 10347

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

July 25, 1991

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on July 25, 1991, at 11:10 a.m. at the Oil Conservation Division Conference Room, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Freda Donica, RPR, Certified Court Reporter No. 417, for the State of New Mexico.

FOR: OIL CONSERVATION DIVISION

BY: FREDA DONICA, RPR
Certified Court Reporter
CCR No. 417

# I N D E X

July 25, 1991
Examiner Hearing
CASE NO. 10347



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## E X H I B I T S

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A P P E A R A N C E S

FOR THE DIVISION: ROBERT G. STOVALL, ESQ.
General Counsel
Oil Conservation Commission
State Land Office Building
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

FOR THE APPLICANT: KELLAHIN, KELLAHIN & AUBREY
117 N. Guadalupe
Santa Fe, New Mexico
BY: THOMAS KELLAHIN, ESQ.

HEARING EXAMINER: Call next case, number 10347.

MR. STOVALL: Application of Warrior, Inc., for a waterflood pilot project, Lea County, New Mexico.

HEARING EXAMINER: Call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin, Kellahin & Aubrey, appearing on behalf of the applicant, and I have one witness to be sworn.

HEARING EXAMINER: Are there any other appearances in this matter? Will the witness please stand and be sworn?

(Witness sworn.)

HEARING EXAMINER: Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Examiner.

MOHAMAD YAIM MERCHANT

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Merchant, for the record, would you please state your name and occupation?

A. My name is Mohamad Yaim Merchant. I'm a petroleum engineer, practicing out of Hobbs, New Mexico. I operate Penroc Oil Corporation and Warrior, Incorporated.

Q. On prior occasions. Mr. Merchant, have you testified as a petroleum engineer before the division?

A. Yes, sir, I have.

Q. Were you the individual responsible on behalf of Warrior, Inc., to prepare the division Form C-108 that is part of the presentation today for approval of this waterflood project?

A. Yes, sir, I have prepared these.

Q. In addition, have you prepared the cross-section showing the geologic information for this waterflood project?

A. It was prepared under my supervision, yes.

Q. In addition, have you, as a petroleum engineer, made an assessment of the secondary recovery oil potential if this waterflood project is approved and made successful?

A. Yes, sir, I have.

MR. KELLAHIN: We tender Mr. Merchant as an expert petroleum engineer.

HEARING EXAMINER: Mr. Merchant is so qualified.

Q. (By Mr. Kellahin) Mr. Merchant, we need to orient the Examiner as to your project. And while I'll ask you to look at what is marked as page three of Exhibit Number 2, that's the plat showing the ownership -- I've given the Examiner a blown-up copy of that same page in which I have outlined in yellow the lease acreage involved in this project. Would you help orient the Examiner? Where is this project located in relation to any other waterflood projects

of this particular pool?

A. The project is located in the west half of Section 26 Township 20 South, Range 36 East, as well as the northeast corner of Section 27 of the same township and range, Lea County, New Mexico, which is located west of Monument Oil Center, New Mexico.

Q. Is this acreage you've just described part of the same base lease?

A. It is part of the same base federal lease, yes.

Q. You have not had to unitize or consolidate other leases into this project?

A. No, sir.

Q. Are there any other waterflood projects in the Eumont Oil and Gas Pool that are in this immediate vicinity?

A. Yes. At the moment we are being offset to the north in Section 23 and northeast Section 24 and east Section 25 by Chevron's Eunice Monument West Unit.

Q. Is that also a waterflood project of the same interval that you're seeking approval to flood?

A. It is the same interval in the Eumont, except in the case of Chevron, since they're a little bit higher in structure, they also want to flood the Grayburg. The Grayburg, in our case, is watered out.

Q. When we look at the display before the Examiner, you have indicated with a black arrow a concern well. What

was the purpose of indicating that well?

A. That well is the subject well which we plan to convert, if given approval, to water injection, called the Federal "D" Number 2.

Q. Why have you selected that well?

A. Because of the location -- location of the well within the acreage which should benefit the offsetting wells in each direction.

Q. Can you identify for the Examiner the wells in the Chevron project that are to be converted to injection wells in this interval?

A. Immediately to the north of Section 26, Section 23, wells number 6 and well number 9, again in Section 23, will be converted or are in the process of being converted to injection by Chevron, which should offset -- which should affect the well in Section 26 on Federal "D" Lease.

Q. Let me have you go to what is marked as Exhibit Number 1, which is the cross-section on the wall, and have you identify and describe the wells on the cross-section.

A. The four wells on the cross-section go north to south, which is A-A', a Federal "D" 4, Number 2, Number 1 and Number 5. Cross-section, we show on the top the Yates and Seven Rivers, as well as the top of the Queen, which is our zone of interest for the waterflooding.

Q. What have you shown with the red vertical shading

on each of the logs?

A. The red vertical shading on each of the logs are the perforations which are currently open in each one of the wells in the Queen zone.

Q. When we look at the second log over from the left margin of the display, what is that a log of?

A. That is a log on the Federal "D" Number 2, the well which we will be converting to injection.

Q. Geologically, are you able to conclude that it is feasible and suitable to flood this particular formation within this portion of the lease?

A. Based on the cross-sections and based on what Chevron has done to the north as well as to the east, this is a similar reservoir, and we should not have any problems waterflooding it.

Q. In addition to the subject Number 2 well for which you're seeking approval, do you have any immediate plans in the foreseeable future to either convert additional producing wells or to drill new wells for injection purposes?

A. Within the next -- once approval is granted and we can work well number 2 to injection, we do plan to drill shortly, within the next three to four months after that, another new well in the center, center of southwest quarter of Section 26 as a new injection well.

Q. Are you asking the division examiner to put in the waterflood order an administrative procedure by which you can have a process to drill or convert for injection additional injection wells?

A. Yes, sir. I am.

Q. Have you as a reservoir engineer made an analysis of the potential for the secondary oil recovery that might be obtained from the lease?

A. Yes, we have. Direct your attention to Exhibit 3, which is a curve of primary as well as secondary recovery oil. And within the same exhibit on the following two pages is a computer run analysis of what we intend -- how we intend to recover additional reserves. The secondary primary ratio, .34, which is similar to the Chevron waterfloods to the north and east, has been utilized on this particular project. Based on that, we should recover 418,000 barrels of additional oil.

Q. When we look at the decline curve portion for the primary production, you show a decline rate of five percent per year. Upon what did you base that conclusion?

A. The primary rate is a historical rate going back the last 25 years. That's the rate that's been on it, is a five percent decline.

Q. Upon what do you base the conclusion that the secondary potential, once attained as projected on this

display, which shows to be late 1996, that it will subsequently decline at a ten percent per year rate?

A. Once again, we're relying on the area knowledge, going back to Chevron on the Eumont waterfloods to the north and to the east, and the most recent is Arrowhead Grayburg waterflood. The knowledge of the area.

Q. You're seeking approval to flood the Eumont Oil and Gas Pool within this particular lease area?

A. Yes.

Q. Is there any potential risk to gas production within the pool if this portion of the pool is approved for waterflood?

A. Currently there's no -- there are no gas wells being produced out of the Eumont gas zone within the area of interest.

Q. If your project is approved, do you anticipate any violation of correlative rights of any owners offsetting you?

A. No, sir, we are not.

Q. You should be in a position with this injector well that you will capture oil being pushed away from the injector before it leaves the lease?

A. That is correct. We should be able to capture the oil from the offsetting producers.

Q. Correspondingly, can you also conclude that you

are not putting at risk production offsetting you by utilizing this number 2 well as an injection well?

A. No, sir, we are not.

Q. Let me ask you to go back to Exhibit Number 2, which is the C-108. In compliance with the division rules for the preparation of the C-108, did you make an investigation to find all the well bore information for those wells within the half-mile radius of review?

A. Yes. We have reviewed the wells within the half-a-mile radius and none of the wells have been found which would affect adversely for us to convert the well number 2 to injection.

Q. Within that half mile radius of review, do you find any plugged and abandoned wells?

A. There are no plugged and abandoned wells within that half-mile radius.

Q. Looking at the well bore information and the casing and cementing program for the offsetting wells, do you find any instances where you, as a reservoir engineer, would conclude that there is any type of integrity weakness in any of those wells?

A. All the offsetting wells within the area of interest, within the half-mile radius, in particular, do have cement all the way across the pay zone, and in most cases, almost above the salt zone.

Q. Do you have any knowledge of the source of drinking water within this area, whether or not there are any shallow fresh water sands?

A. There are fresh water sands. The only well which exists is outside the half-mile radius east of our proposed injection well.

Q. Do you have any --

A. There's one well.

Q. Do you have any information as to what the depth is by which the water is produced from that well?

A. It's about 150 feet.

Q. Is it the practice of operators within the area of review to provide surface casing and cementing back to surface to isolate off any potential fresh water sands?

A. That is correct.

Q. Has that been done in your area?

A. That has been done.

Q. Division guidelines provide for a surface pressure limitation of .2 PSI per foot of depth. Are you aware of that guideline?

A. Yes, I'm aware of that.

Q. What is your anticipated maximum pressure that you would utilize on the surface for this project?

A. Approximately 750 PSI on surface at the height of the injection.

Q. And is that within the .2 PSI per foot of depth guideline?

A. It is .2 PSI guideline. Based on that, it would be about 761 PSI.

Q. Should you desire or need a pressure increase over that, you would run the appropriate step rate test to determine the fractured nature of the reservoir?

A. That is correct.

Q. Do you have an estimate or a projection for the Examiner as to the amount of water to be disposed of into this injector?

A. Initially, we are utilizing this one injection well, well number 2. We are hoping to inject between two to 250 barrels a day, maybe as high as 350 barrels a day. Currently, a problem is getting additional water, and we're working on that.

Q. Do your producing wells in this formation produce also water?

A. Yes, sir. They're producing an average of 130 barrels a day.

Q. So this water that's produced on the lease would be utilized as part of the injection water for the injection well?

A. That is correct.

Q. Do you have an anticipated source for the makeup

water to supply the difference for the waterflood project?

A. We are currently in discussions with Rice Engineering, and if that don't materialize, then we'll be contacting Chevron to the north to get additional water.

Q. Will the makeup water be water that is compatible with the formation water and with the formation?

A. Yes, sir, it will be. It will either produce water from the same formation or it will be coming out of the Lower San Andres.

Q. In your investigation, do you find any geologic evidence that there's any faulting or other hydrologic connections between this formation and any shallow fresh water sands?

A. No, sir.

Q. Let's turn now to Exhibit Number 2 and to page ten of that exhibit. Describe for the Examiner the current status of the number two well, and then describe for him how you're going to complete it for injection purposes.

A. The current status of the well is perforated from 3804 to 3964, as shown on the left-hand side schematic on page ten, Exhibit 10. We are currently producing the well. It's averaging two barrels a day. Immediately after approval of the project, we intend to convert the well to injection by running a seven-inch, either nickel-coated or plastic-coated packer with 2-7/8ths rise line tubing, which,

by the way, has already been purchased. It's waiting on approval.

Q. Will you fill the annular space between the tubing and the casing?

A. The annular space will be filled with packer fluid or corrosion inhabited water.

Q. Will you have a way to monitor the pressure on that space at the surface?

A. Yes, sir. We'll have 500 pounds on the annulus, which will be monitored at all times.

Q. When we look at the Exhibit Number 2, direct our attention to that portion of the exhibit that provides the tabulation for the Examiner of the well bore data for the wells within the area of review.

A. There are several of them. Offsetting the Federal "D" Number 2 we find the Chevron well to the north on page 12.

Q. And then we continue all the way through page 23? And that will be a compilation of that data?

A. I believe that is correct. Let me go through it. Yes. Page number 23 will complete the tabulation of all the offsetting wells within the half-a-mile radius.

Q. When we turn to page 24, what is represented on that page?

A. On that page is the names and addresses of the

surface owner as well as the offset operators who have been notified by certified mail of our intent.

Q. Have you received any objection from either the surface owner or any of the offsetting operators to your application?

A. We haven't had no objection from either one of them.

MR. KELLAHIN: Mr. Examiner, Exhibit Number 4 is my certificate that we have mailed certified mail notifications of this hearing today to all those parties shown on Mr. Merchant's exhibit. It's also repeated on page 25 of Exhibit Number 2.

That concludes my examination of Mr. Merchant. We would move the introduction of Exhibits 1 through 4.

HEARING EXAMINER: Exhibits 1 through 4 will be admitted into evidence.

Mr. Merchant, in looking at your map of this area and in your outlined proposed waterflood area, of the wells shown, how many of them are Eumont oil producers?

THE WITNESS: Within that half-a-mile radius?

HEARING EXAMINER: Yeah, and within the -- in your lease.

THE WITNESS: They all are.

HEARING EXAMINER: In this area, what is the base of the Eumont pool?

THE WITNESS: You're asking in terms of footage or what?

HEARING EXAMINER: What is defined as the base of the Eumont pool by OCD records or footage?

THE WITNESS: The base of the Eumont pool is from top of the Yates all the way to the top of the Grayburg. That's all included as the Eumont pool.

HEARING EXAMINER: And you will be just injecting water into the Queen?

THE WITNESS: We'll be injecting water into the Queen only because that's all that's opened right now perforation wise, and we're not going to add any more perforations.

HEARING EXAMINER: The Eumont pool is an associated pool with 400 -- I'm sorry 640-acre gas spacing and 40-acre oil spacing; is that correct?

THE WITNESS: That's correct.

HEARING EXAMINER: You are in the oil zone?

THE WITNESS: Yes.

HEARING EXAMINER: Generally, the Queen is oil producing; is that correct, in this area?

THE WITNESS: Generally, it is oil producing from about 3,738 hundred feet down, as you can see on the cross-section.

HEARING EXAMINER: What are the average producing rates on the wells within your lease?

THE WITNESS: The best quoted is five barrels a day.

HEARING EXAMINER: All classified as stripper.

THE WITNESS: Yes, sir.

HEARING EXAMINER: You mentioned your water source would be reinjection and made up with water either from Chevron. Will this be fresh water or reinjection also?

THE WITNESS: The produced water will be produced, of course, off the Federal "D" Lease. We'll utilize that, and the water which we are trying to acquire either from Rice Engineering or Chevron. In the case of Rice, it's all produced water from the Eumont. In the case of Chevron, it will be the water from the Lower San Andres. I understand that they are in the process of drilling some makeup water wells to the Lower San Andres.

HEARING EXAMINER: So you do not plan to utilize any fresh water in yours.

THE WITNESS: We do not plan to do that, no.

HEARING EXAMINER: I believe you mentioned in your testimony that the Chevron flood has Queen injection also? Or is it primary Grayburg?

THE WITNESS: No, it has Queen injection also. They are deepening some of their wells to include the top of the Grayburg. And as you go from Chevron leases back to the southwest, as you can see in the cross-section also, as you go from well number four back to the south to well number

five, you have a steep dropoff in the reservoir. It starts falling off rather rapidly.

HEARING EXAMINER: And the San Andres water is compatible with the water that you'll be reinjecting.

THE WITNESS: That is correct. We will, by the way, regardless whether it's produced water from our lease or produced water from Rice Engineering or the makeup water from the lower San Andres from Chevron, we will be filtering the water to improve the water quality over injection water.

HEARING EXAMINER: Is that through a membrane of some kind?

THE WITNESS: Yeah, through a membrane, a membrane filter system.

HEARING EXAMINER: On page ten of your Exhibit Number 2, that's your proposed completion on this well, or recompletion, I should say, you show your tubing to be 2-7/8ths Rice line tubing. Is that a plastic-coated or cement-coated line?

THE WITNESS: It's cement-coated line.

HEARING EXAMINER: Rice is the process?

THE WITNESS: Rice Engineering is the process.

HEARING EXAMINER: Or applicator.

THE WITNESS: Applicator, manufacturer.

HEARING EXAMINER: They do it.

THE WITNESS: They do it.

HEARING EXAMINER: What's your proposed packer setting depth?

THE WITNESS: Approximately 100 feet, 75 to 100 feet above the top.

HEARING EXAMINER: And your maximum pressure again?

THE WITNESS: 750 PSI.

HEARING EXAMINER: That's well under the .2 PSI per foot?

THE WITNESS: That's about 11 PSI under, yes. We expect the well to be on vacuum for a while.

HEARING EXAMINER: So no stimulation will be necessary?

THE WITNESS: No stimulation would be necessary.

HEARING EXAMINER: Have these perforations gone under stimulation whenever they were initially --

THE WITNESS: They were acidized and fracked, yes.

HEARING EXAMINER: I have no other questions of Mr. Merchant. Are there any other questions of the witness?

MR. STOVALL: No.

MR. KELLAHIN: No, sir.

HEARING EXAMINER: You may be excused.

Anything further in this case, Mr. Kellahin?

MR. KELLAHIN: No, sir.

HEARING EXAMINER: Does anybody else have anything further in case 10347? If not, this case will be taken

under advisement.

(The foregoing hearing was adjourned at the approximate hour of 11:34 a.m.)

STATE OF NEW MEXICO )
:
COUNTY OF SANTA FE )

I, FREDA DONICA, RPR, a Certified Court Reporter, DO HEREBY CERTIFY that I stenographically reported these proceedings before the Oil Conservation Division; and that the foregoing is a true, complete and accurate transcript of the proceedings of said hearing as appears from my stenographic notes so taken and transcribed under my personal supervision.

I FURTHER CERTIFY that I am not related to nor employed by any of the parties hereto, and have no interest in the outcome hereof.

DATED at Santa Fe, New Mexico, this 16th day of September, 1991.

Freda Donica
Certified Court Reporter
CCR No. 417

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10341 heard by me on 25 July 1991.

, Examiner
Oil Conservation Division