STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

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March 25, 1982

Mr. Thomas Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Re: CASE NO. 7466
ORDER NO. R-6906-A

Applicant:

Conoco Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

CASE NO. 7466
Order No. R-6906-A

APPLICATION OF CONOCO INC. FOR A WATERFLOOD PROJECT, LEA COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE DIVISION:

It appearing to the Division that Order No. R-6906, dated February 15, 1982, does not correctly state the intended order of the Division.

IT IS THEREFORE ORDERED:

(1) That the list of Conoco's injection wells as found in Order (1) on page 2 of Order No. R-6906 is hereby corrected to read in its entirety as follows:

"CONOCO INC.

Warren Unit Well No. 13, Unit O, Section 33
Warren Unit Well No. 14, Unit P, Section 34
Warren Unit Well No. 17, Unit I, Section 33
Warren Unit Well No. 20, Unit G, Section 34
Warren Unit Well No. 16, Unit O, Section 33
Warren Unit Well No. 75, Unit K, Section 34
Warren Unit Well No. 45, Unit I, Section 33
Warren B-3 Well No. 15, Unit O, Section 4"

(2) That this order shall be effective nunc pro tunc as of February 15, 1982.

DONE at Santa Fe, New Mexico, on this 25th day of March, 1982.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
20 January 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Conoco, Inc., for a waterflood project, Lea County, New Mexico. CASE 7466

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
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I N D E X

E X H I B I T S

E X H I B I T S

MR. STAMETS: The hearing will please come to order.

We'll call at this time Case 7466.

MR. PEARCE: Application of Conoco, Inc., for a waterflood project, Lea County, New Mexico.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, appearing on behalf of the Applicant, and I have one witness.

(Witness sworn.)

JERRY HOOVER

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. Jerry Hoover. I'm employed by Conoco as a reservoir engineer.

Q. Mr. Hoover, have you previously testified before the Oil Conservation Division as a petroleum engineer?

A. Yes, I have.

Q. And have your qualifications been accepted and made a matter of record?

A. Yes, they have.

Q. Mr. Hoover, pursuant to your employment as a petroleum engineer, have you made a study of the fact surrounding this particular application?

A. Yes, I have.

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

MR. STAMETS: He is considered qualified.

Q. Mr. Hoover, let me direct your attention to what we've marked as Conoco Exhibit Number One and have you identify that plat for us and specifically the proposed waterflood area of operation.

A. All right. Exhibit One is an ownership and completion map of the area of our application. We're proposing a cooperative waterflood project including the southernmost part of our Warren Unit and the Northernmost part of our Tract 9-3 Leases and Southland Royalty's State Lease.

Q. A waterflood project for what formation?

A. This is in the Blinebry formation. The dashed line outlining the boundary of the proposed flood

gation?

A Yes, we have. And Exhibit Two are copies of the certified mail receipts sent to these parties.

A What type of acreage do you have included in the flood area, Mr. Hoover, in terms of whether it's fee, or Federal, or State acreage?

A The Warren Unit acreage and the Hawk-3 Lease are federal acreage, Southland Royalty's State Lease is, of course, State acreage.

Q All right, sir, let me direct your attention to Exhibit Number Three and have you identify that.

A Exhibit Three is a copy of the Form C-108 required by the NMOCD governing this type of application. The exhibits and data included with this application will be discussed by later testimony.

Q All right, sir. All right, sir, let me direct your attention now to what you have prepared as Conoco Exhibits Four through Twelve, and would you generally describe what those exhibits are?

A Exhibits Four through Twelve are injection well data sheets. This is the Form that's provided by the NMOCD for this purpose, and includes a schematic for each of the injection wells proposed for the project, with other data called for by the form involving the completion

of the wells.

Q. Are all of the nine proposed injector wells anticipated that you will complete them in the same fashion?

A. That's correct.

Q. Let's take one of them for an example, then, Mr. Hoover, and run through the types of information you included on the form.

A. All right, looking at the first one, Exhibit Four, Warren Unit Well No. 80, we'll remove the producing equipment that is currently in the well and go back in with 2-3/8ths plastic-coated tubing and a Baker Model AD packer. Most of these are set -- packers will be set at approximately 5650 to 5700, and the completion will be somewhat standard and similar for all the wells.

Q. While we're reviewing the schematics, Mr. Hoover, would you tell us something concerning the source of the proposed water to be used in these injection wells?

A. The water that we propose using for this project is the same water that we're currently using in our Warren McKee Waterflood, which is about three miles to the northwest.

It's city sewage effluent water which has brine added to it. We'll be drawing our water from the

same tanks. In fact, we'll be pumping it from the McKee Station through a transfer line down to a header in the area of this project.

Q Would you generally describe for us what you anticipate in terms of volumes of barrels of water per day per injection well?

A We're anticipating initial injection rates of approximately 300 barrels per day per well. We're looking -- think we're looking at about 400 barrel a day average for the life of the project.

Q All right, sir, leaving the schematics now, if you'll turn to Exhibit Number Thirteen and identify that for us.

A Exhibit Thirteen is a 7-page exhibit showing the well data for all wells within the area of review, that half mile radius, that penetrate the proposed injection zone.

Q This is a tabulation of that well information pursuant to the Rules and Regulations of the Division?

A That's correct.

Q And did you personally make this tabulation?

A Yes, I did.

Q Now, within the half mile radius of investigation, Mr. Hoover, looking at Exhibit Number One, I note that there are at least two well symbols that indicate there are some plugged and abandoned wells within the half mile radius. Would you identify and explain what those are?

A Yes. In the northeast quarter of the northeast part of Section 33 you'll note a plugged well, and just above that in Section 28. Both of these were only completed and drilled down to the Queen formation, which is above the Blinebry.

Q All right, sir. Within the half mile radius of investigation, Mr. Hoover, did you find any plugged and abandoned wells that had penetrated to or through the Blinebry formation?

A No, I did not.

Q Now with regards to Exhibit Number Thirteen, Mr. Hoover, have you made a determination and reached an expert opinion with regards to the adequacy of the cement jobs in each of these wells, so that the disposal of water into the disposal for the injection formation will not migrate out of that formation through any of these wellbores or wells?

A In examining the records of these wellbores we did not locate any problems.

Q. Now, while we have Exhibit Number One before us, would you identify for us what, if any, sources of fresh water within the area of the investigation?

A. There is one fresh water well within a mile and a half of the nearest injector, and it's in the upper part of Section 10 right at the bottom of the map.

Q. Is that well spotted on this exhibit?

A. No, the well is not spotted on this exhibit.

Q. Would you identify where it is?

A. All right. If you will look in the northwest of the northwest quarter of Section 10, the fresh water well is located about 200 yards northeast of Well No. 10 there in that quarter section.

See the Hawk B-10 Well No. 10?

Q. You said the northwest of the northwest.

A. I'm sorry, that's northeast of the northwest.

Q. All right, sir.

A. Thank you. Very close to the section line.

Q. From what formation or source does that fresh water well produce?

A. This well produces from the Ogalalla

formation, which has a base at about 200 feet.

Q In your opinion, Mr. Hoover, will the proposed waterflood project of Conoco's pose any type of hazard or risk to fresh water sources in the area?

A No, I don't believe it will.

Q Let me ask you some questions with regards to the types of injection pressures you anticipate being required for the project, Mr. Hoover.

Will your waterflood project use injection of water under gravity or under a pressure system?

A We will inject under pressure.

Q And would you describe for us generally what that pressure will be?

A The surface pressure required to fracture the Blinebry formation in this area ranges between 2300 and 2500 psi.

Q How do you know that?

A Wells 75 and 76, which -- in the Warren Unit, which are within the project area, were completed in 1979 and observing the treatment pressures in these wells we observed that this range of pressures was required in order to fracture the formation.

MR. STAMETS: What was the -- what were those pressures again, please?

A Specifically in No. 75, Well 75, the pressure was 2470 psi.

And Well No. 76 we observed 2300 psi.

Q And what kind of pressure test was that, Mr. Hoover?

A This was the instantaneous shut-in pressure following the fracture treatment.

Q In your opinion is that a reliable pressure test from which to determine the fracture of the formation?

A I feel that it is in this area.

Q All right, sir.

A And we're anticipating limiting, in light of these figures, our injection pressure to 2000 pounds.

Q Will the 2000 pounds of pressure at the surface for injection exceed the Division guidelines of .2 of a percent per foot of depth?

A Yes, that will exceed the previous gauge of .2.

Q In your opinion will the pressure limitation of 2000 pounds at the surface be sufficient enough to insure that the formation above and below the Blinebry will not be fractured?

A. Yes, I believe it will.

Now, I might note that this a higher pressure than we -- we put in our application, but in looking at these completions, we felt like this would keep us well under the fracture pressure of the formation.

Q. Prior to the commencement of injection, Mr. Hoover, will you test the injection wells to determine the integrity of the casing, tubing, and packer?

A. Yes, we will.

Q. And how will these wells be equipped so that you can monitor the injection pressure and the annular pressure?

A. They will be equpped so that we can record tubing injection pressure and the annular pressure, and also that we may -- we can take rates and volumes, which will be -- can be determined at the wellhead and will be recorded.

Q. Mr. Hoover, let me refer you now to your exhibits that we've marked as Exhibits Fourteen through Eighteen, and would you generally describe for us what those exhibits are?

A. Yes. These exhibits are water analyses of water that will be involved in this project.

Exhibit Fourteen is an analysis of

Blinebry formation water.

Exhibit Fifteen is an analysis of the sewage effluent water that will be -- we'll be buying from the city, and since we're using the water that goes to our Warren McKee Flood, which includes also brine added to it, the Exhibit Sixteen shows an analysis of the sewage effluent plus the brine.

Then Exhibit Seventeen is a 50/50 mixture of the Warren Blinebry formation water and just the sewage effluent from the city.

Eighteen, then, is a mixture of the Warren Blinebry water and the sewage effluent plus brine.

Q. Based upon your studies of the water analyses from the various waters in the area, Mr. Hoover, do you have an opinion with regards to the compatibility of the produced water and the water, if any, found in the formation?

A. These analyses showed no problems in combining the waters.

Q. All right, sir, let's go on to Exhibit Number Nineteen and have you identify that one.

A. Exhibit Number Nineteen is a water analysis of the fresh water well which we previously identified.

Q. And this is cemented pursuant to the requirements of the Division?

A. That's correct.

Q. Who is the owner or operator of that water well?

A. The owner of this well is Alice McCasland, who owns the surface area.

Q. All right, sir, let me direct your attention to Exhibits Twenty through Twenty-eight, and have you identify those for us.

A. Exhibits Twenty through Twenty-eight are copies of well logs for each of the proposed injection wells in this project area, showing the productive zones of the Blinebry formation in this area.

Q. Would you describe for us, Mr. Hoover, the geology in the Blinebry formation?

A. The Blinebry formation is the upper member of the Yeso Group in the Leonardian series in the Permian system.

There are five major cycles of deposition in the Blinebry; only the upper three are productive in this area of the Blinebry Pool.

These zones are separated by very tight, resistive formations.

We're looking at a net pay of approximately 46 feet in these upper three zones and the deepest

production in this area is about 6100 feet.

Q. Will your waterflood project, Mr. Hoover, at this time do you anticipate using any stimulation program for the waterflood project?

A. We have no stimulation program planned at this time.

Q. All right, sir. I direct your attention to Exhibit Number Twenty-nine and have you identify that.

A. Exhibit Twenty-nine is a letter from Southland Royalty asking that their State Well No. 6 be included as an injector in this project.

Our lease line operating agreement is currently in the process of being drawn up.

Q. Mr. Hoover, do you have any recommendations to the Examiner with regards to whether or not you would like to have an administrative procedure established for the expansion or contraction of the waterflood project?

A. We would like to request approval for administrative approval for expansion of the project in the future.

Q. Do you have any recommendation, Mr. Hoover, to the Examiner with regards to the addition of additional producers or injectors at orthodox or unorthodox locations by some administrative process?

A. We don't anticipate any infill drilling, if that's what you're referring to.

Q. Yes, sir.

A. We feel like the spacing of the development at this time will probably be adequate for the project.

Q. Were exhibits, except for the letter, Exhibit Twenty-nine, were Exhibits One through Twenty-eight prepared by you or compiled under your direction and supervision?

A. Yes, they were.

Q. And in your opinion, Mr. Hoover, will approval of this application be in the best interests of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes, we believe it will.

MR. KELLAHIN: That concludes our examination of Mr. Hoover. We move the introduction of Exhibits One through Twenty-nine.

MR. STAMETS: These exhibits will be admitted.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Hoover, I would assume the intention

of both Conoco and Southland is to operate their properties separately, with Southland operating their injection wells and reporting injection and production volumes.

A. We are investigating the possibility of perhaps making an agreement with them whereby we will operate the well, but the agreement as yet has not been drawn up.

Q. Okay, and Conoco has basically two leases involved in this operation and Southland has one, is that correct?

A. That's correct.

Q. Now, there was some discussion of an approval process of an expansion of the project. I'm not certain that that is needed with the way the Division Rules and Regulations are written now. It would seem as though once this project is approved for the Warren Unit and the Hawk B Leases that you would be able to drill additional injection wells on those --

A. On those leases.

Q. -- basic leases and expand the project without any special finding.

A. We had originally talked with Shell about joining us, cooperating with us Taylor Lease just to the south of the project area, and they declined at this time. They had a couple of wells still making a pretty good

rate, and there is a possibility that in time as theirs declines, they may want to join us, still cooperatively.

And this is where we were anticipating possible expansion.

Q. Mr. Hoover, do you have any information with you on the gravity of the fluids used in fracturing treatments on these two wells and on the gravity you expect the average injection fluid to be?

A. I'm not real positive. I could quote some but I really ought to check that before --

MR. KELLAHIN: May we supply it to you?

MR. STAMETS: Yes, you certainly may.

MR. KELLAHIN: Subsequent to the hearing.

Q. Would Conoco be adverse to a requirement in -- in any order resulting from this hearing, which would require notice to our Hobbs Office, District Office, when the injection pressure on any well exceeded our rule of thumb .2 of a pound per foot of depth, and allowing the District Supervisor to make a determination at that time whether he would like to see a step-rate test on any such well?

A. I don't see any problem with that.

Q. Okay. Now, I would like to look at the series of exhibits, Exhibit Number Thirteen.

It would appear as though, from earlier

exhibits, that the injection inteval would run roughly from 5800 feet down to 6000 feet.

A. That's correct.

Q. And that would be the interval we would be concerned with as far as protection and as far as the possibility of fluid movement up hole.

A. Yes.

Q. Now you show top of cement on a number of these wells. In fact, you show a top of cement on all of them. Were these tops all calculated tops? How did you determine these?

A. Most of them were recorded in the NMOCD records. There were a few, seven or eight, no more than that, that were calculated tops.

Q. And you say they were recorded in the Division's records. Did they show in the records whether they were calculated or determined by survey?

A. Most of them were recorded by survey. If they were calculated, we did not see anything to indicate that.

Q. Okay. To your knowledge was Conoco the operator of these wells when they were drilled?

A. That's correct.

Q. And it's Conoco's operating procedure

to run temperature surveys when casing is run and cemented?

A. That is normal procedure.

Q. Okay. Now, I'd like to look at page two of that exhibit, the top well, the Hawk B-3 No. 16, and okay, I believe we can go on from that one. That one seems to be all right.

The next one would be on page five and there about half way down is the Taylor Glenn Well No. 2, and there we see 5-1/2 inch casing set at 6665 with the top of cement 6620. It would appear as though in that well the injection interval may be open.

A. That looks suspiciously like a typographical error. We'll check that out and get you the information.

Q. Well, that certainly doesn't look like a whole lot of fill for 600 sacks.

A. No.

Q. If you can find some additional information on that later, we will appreciate it.

Next page, the bottom two wells belonging to Southland Royalty, I believe -- I think the first one of those is all right. The second one is all right.

I just hurriedly checked these as I was running through and I --

A. These are liners, I'm sure.

Q. -- was apparently conservative.

Is the system that you will be using for water injection, would that be considered a closed system?

A. This refers to the use of open pits or backflowing, is that correct, or --

Q. Well, no, what it refers to is whether or not the fluids are kept in tanks where they will be subject the entry of air or the potential for corrosion , and oxygen corrosion.

A. In other words, a closed system would have a gas blanket on it.

Q. Yes. Or let me, let me ask a question. Do you plan to treat this water for -- to take out any of trained oxygen?

A. Yes, it is treated for oxygen.

Q. Okay.

A. It sure is.

Q. Since the water comes from a sewage treatment plant, you can't very well have a closed system?

A. Right. I don't believe it would be closed, which is what, I think, we indicated on our application.

Q. Will you be doing anything to any of

these wells in the way of stimulation program, the injection wells?

A. No, not on those that are just being converted as they now stand. I believe there's one well that has an additional zone to be opened and it will be fractured, but not the existing producing zones now.

Q. Okay.

MR. STAMETS. Are there any other questions of the witness?

MR. KELLAHIN: No, sir.

MR. STAMETS: He may be excused.

Anything further in this case?

The case will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7466, heard by me on 1-20 1982.

Richard L. Stamets, Examiner
Oil Conservation Division

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