BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 23, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a waterflood project, Lea County, New Mexico.

Case No. 3904

BEFORE: Daniel Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: Case Number 3904.

MR. HATCH: Application of Continental Oil Company for a waterflood project, Lea County, New Mexico.

(Whereupon Applicant's Exhibits Number 1 through 7 were marked for identification)

MR. KELLAHIN: If Examiner please, Jason Kellahin appearing for the applicant. This is our witness, Mr. V. T. Lyon. May the record show he has been sworn.

(Witness sworn)

MR. NUTTER: He is under oath.

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Lyon, are you familiar with the application of Continental Oil Company in the Case Number 3904?

A Yes, sir, I am.

Q Would you state what is proposed in this application?

A Case 3904 is the application of Continental Oil Company for authority to install a pilot water-flood in the North Mason-Delaware Pool by injecting water into its Thompson Federal 19, Well Number 2,

which is located nineteen hundred and eighty feet from the north line, nineteen hundred eighty feet from the west line of Section 19, Township 26 South, Range 32 East, Lea County, New Mexico.

Q Referring to what has been marked as Exhibit number 1, would you identify that exhibit?

A Exhibit number 1 is a copy of ownership plat showing the location of the well -- which is circled in red -- and located as I just described and the lease which is outlined in red. I believe that basic lease also includes section 18. But for designation purposes we refer to it as Thompson Federal 19 and this involves the north half of section 19 as shown on this exhibit.

Q Now, does the exhibit also show all of the producing wells within a radius of two miles?

A Yes, it does.

Q And the formation?

A The formation from which they produce and the ownership of those wells.

Q Now referring to what has been marked as exhibit number 2 and 3, would you describe those exhibits?

A Exhibit numbers 2 -- well, exhibit number 2 is the form C 108 showing the pertinent data on this well. Exhibit number 3 is a schematic diagram showing essentially the same information, but the subject well, Thompson Federal 19, number 2, is located in Unit F in Section 19, Township 26 South, Range 32 East.

It has eight and five eighths inch casing, set at 1,014 feet, cemented with 350 sacks of cement, which was circulated to the surface. Five and a half inch casing was set at 4,320, with 350 sacks of cement. The top of the cement indicated by the temperature log was 3,080 feet. We propose to inject, through cement or plastic coated tubing, two and three eighths inch in size at approximately 4,250 feet, where it will be tied into a packer at that depth. We propose to inject in the Delaware sand through perforations, 4,303 to 4,307 feet.

Q Now, as I understand, you will use a lined tubing. Is that correct?

A Yes, sir.

Q And will the casing tubing annulus be filled with inert fluid?

A Yes. Right.

Q Will you install a pressure gauge at the surface?

A Yes, sir.

Q Now, referring to what has been marked as Exhibit Number 4, would you identify that exhibit?

A Exhibit Number 4 is a copy of a portion of the radioactivity log run on the Thompson Federal 19, Number 2. It shows the Delaware lime or the El Mar at 4,251. The top of the Delaware sand at 4,290. It shows the perforation 4,303 to 4,307.

Q Would you give a brief history of the North Mason Pool?

A The North Mason Pool was discovered on September 18, 1954, when the Ibex Company completed the Hanson Federal Number 1, located 330 feet from the south and west lines of Section 25, Township 26 South, Range 31 East, Eddy County, New Mexico. The discovery well flowed 34 barrels of oil per day on the initial potential from an open hole completion interval 4,140 to 4,147. This was after a 500 gallon sand fracture treatment. Since discovery, 40 producing wells and one dry hole have been completed

in the New Mexico portion of the Pool. The Pool extends on down into Texas. Development drilling was essentially completed during 1956, with only three wells being completed after that time. Most of the wells were completed open hole and fractured treatment withapproximately 3,000 gallons of lease crude and sand.

Q What is the current average daily production for the Pool at the present time?

A During July, 1968, the Pool averaged 228 barrels per day of oil, 215 barrels of water, 726 MC of gas per day. The average gas rate is 3.190 cubic feet per barrel. The oil production average is 5.4 barrels per day per well.

Q Do these producing rates indicate that the reservoir is essentially completed?

A Yes, they do.

Q Now what was the cumulative production from the Pool?

A As of August 1st, 1968, the Pool had produced slightly in excess of 2,600,000 barrels.

Q Now, what was the reservoir's drive mechanism on primary recovery?

A The reservoir's drive mechanism is solution gas.

Q Now referring to what has been marked Exhibit Number 5, would you identify that exhibit?

A Exhibit Number 5 is a structure map on the base of the Castillo Formation which is coincident with the top of the Delaware formation of El Mar lime with the countour interval of ten feet. It is obvious from the structure map that this is a stratographic trap type of reservoir. The production to the east is limited by a permeability pinch-out.

Q The structure would have little to do with oil production current?

A That is correct.

Q Do you have a definite oil-water contact in this area?

A No, we have not established a definite oil-water contact. The down structure wells northeast of the Inbe Pool were completed for a water cut of about 60%, while wells on the top of the structure were completed with a water cut of about 10%.

The productive limits of the reservoir to the northwest and southwest are fairly well defined by marginal wells or dry holes, into the south the reservoir course continues on into the State of Texas.

Q How about the development, then, to the northeast?

A Well, development to the northeast was discontinued because of the poor quality of the wells which were

drilled up there.

MR. NUTTER: You are referring to those two wells up there in Section 18?

THE WITNESS: In Section 18.

Q (By Mr. Kellahin) Well, the production limits of the reservoir to the northwest and southeast are fairly well defined, are they not?

A Yes, sir.

Q What is the pay sand in this reservoir?

A The pay sand is a Ramsey Member of the upper sand body in the Delaware seried. It occurs at an average depth of about forty-one hundred fifty feet. It is part of the Bell Canyon Formation of the Delaware Mountain Group, Guadalupe Series and Upper Permian. The production is limited to an interval which occurs from five to thirty feet into the top of the horizon.

The Delaware sand is described as a light gray to gray-green, very fine green silt angular sand is found with varying amounts of silt and shale contamination. Bedding is usually massive with no evidence of fracture.

Q Now, Mr. Lyon, referring to what has been marked as Exhibit Number 6, would you identify that

exhibit?

A Exhibit Number 6 is a summary data sheet showing reservoir properties. The average porosity is indicated to be 24.7% silicone average air permeability 42.6%. The water saturation, 40%; initial oil saturation 60%, and estimated bottom hole pressure, reservoir pressure, eighteen hundred forty pounds per square inch.

We also show the reservoir fluid volume in acre feet, 13,800 acre feet.

Original stock tank oil in place 11,975,000 barrels. Cumulative recovery approximately 2,600,000 barrels, with an estimated remaining primary of 346,000.

We estimate secondary recovery volume based on 12,800 acre feet of volume, 1,792,000 barrels, secondary recovery.

Q In your opinion, is water flooding feasible in the North Mason Pool?

A Yes, sir. Based on the data which is available and from my knowledge of this data, it is my opinion that the North Mason Delaware can be economically flooded.

Q Would water flooding of the Pool result in

recovery of oil, which otherwise would not be recovered?

A Yes, it will.

Q Has Continental Oil Company made an engineering study of the feasibility of flooding in this reservoir?

A Yes, sir. We have conducted such a study. We have formed committees to unitize, and had actually scheduled a meeting of the engineering committee in order to begin our negotiations for unitization.

However, one of the operators had just completed some remedial work in his well, and increased his production rate so that the perimeters which we were considering were no longer applicable -- at least in some people's opinion -- so further negotiation is impossible until these things can be re-evaluated.

Q Do you anticipate that the area will be ultimately unitized?

A Yes, sir.

Q How much water do you anticipate will be injected in this particular project?

A At this time, we expect to inject between 150 and 250 barrels of water per day.

Q But, ultimately, you would anticipate that that volume would be increased if the flood is successful?

A Yes, sir. If the flood is expanded this would increase the water.

Q What is the source of the water to be injected in this waterflood project?

A We propose to inject produced water from our leases in this area and also water which is tendered to us by other operators in the Pool.

Q Do you have an analysis of this water?

A Yes, sir. Exhibit Number 7 is a copy of an analysis which was performed on a sample obtained from our Thompson Federal 19 battery.

Q Now, do you anticipate that this water will be compatible to the formation water?

A Yes, it certainly should be. It's the same water.

Q What waterflood allowable would you anticipate for this project?

A Well, we have two Federal leases involved here and I am not certain which way the Commission will interpret this. If you include both leases in

the project area, the North Mason Pool has a normal unit allowable of 37 barrels per day, which with three direct and one diagonal offset wells to the injection well would create a five well project area.

This would give an allowable of 185 barrels per day. Based on a 42 barrel allowable available under Rule 701, the project allowable would be 210 barrels, 126 barrels to the Thompson and 84 barrels to the Russell lease, which is the south half of Section 19.

Q You have two leases involved then?

A Yes, sir.

Q And they are not -- have not yet been unitized?

A No, they have not been unitized. They are both operated by Continental Oil Company. They are both Federal leases.

Q What is the present status of your injection well, Mr. Lyon?

A I am not sure.

Q You are not sure whether it is presently producing or not?

A It is my understanding that it is producing, but I don't have the rate.

Q In your opinion, will the granting of this application result in the protection of correlative rights and the prevention of waste?

A Yes, it will.

Q Will it also be helpful in disposing of produced water underground?

A Yes. The injection of water will be taking place at least a year in advance of what we would have proposed if Order Number R3221 had not been entered.

Q But, it is a waterflood project and not a salt water disposal project?

A Well, at this time it is really both. But, we do feel that we are gathering valuable information on the waterflood feasibility in that there is a reasonable likelihood that we will stimulate production.

Q Were exhibits 1 through 7 prepared by you or under your supervision?

A Yes, they were.

MR. KELLAHIN: At this time, I offer in evidence Exhibits 1 through 7.

MR. NUTTER: Continental's Exhibits 1 through 7 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 7 were admitted in evidence

MR. KELLAHIN: That is all I have on direct examination.

MR. NUTTER: Are there any questions of Mr. Lyon?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lyon, you mentioned that these are two separate leases. Is there a diversity of ownership between the two leases, any overrides or anything?

A I believe that there is a 3% override on each of them. And I think these overrides are diverse.

Q One is Thompson and one is Russell, I guess.

A I think that's right.

Q We will probably have to confine the project to the Thompson Federal 19 Lease.

A I don't think this will be a large penalty, at least --

Q At least for the time being.

A -- for the time being.

MR. NUTTER: Any other questions of Mr. Lyon? You may be excused.

(Whereupon, the witness was excused.)

MR. NUTTER: Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: That is all, Mr. Nutter.

MR. NUTTER: Does anyone have anything they wish to offer in Case 3904? Take the case under advisement and call Case Number 3905.

I N D E X

E X H I B I T

C E R T I F I C A T E

I, BRENDA BURKS, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission, was reported by me and contains a true and correct record of said Hearing, to the best of my knowledge, skill and ability.

WITNESS MY HAND THIS 15th day of November, 1968.

Brenda Burks
Court Reporter

I do hereby certify that the foregoing is a complete record of the Examiner hearing of Case No. 3904 heard by me on 10/23 68

New Mexico Oil Conservation Commission

Form C-108
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR	ADDRESS
Continental Oil Company	Box 460 Hobbs, New Mexico

LEASE NAME	WELL NO.	FIELD	COUNTY
Thompson Federal 19	2	North Mason	Lea

LOCATION: UNIT LETTER F; WELL IS LOCATED 1980 FEET FROM THE North LINE AND 1980 FEET FROM THE West LINE, SECTION 19 TOWNSHIP 26 RANGE 32 NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	8 5/8"	1014	350	surface	Circ.
INTERMEDIATE					
LONG STRING	5 1/2	4320	350	3080	Temp. log
TUBING	2 3/8	Approx 4250'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Tension Model AD or equivalent at 4250		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Delaware Sand	4290	5400

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
tubing	perforations	4303-4307

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	producing oil well	yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH
4302-4306, 4312-4313, 4315-4316, squeezed with 105 sks, cement.

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
Est. 300'	none	none

ANTICIPATED DAILY INJECTION VOLUME (BBLS.) MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSI)
150	250	closed	pressure	1000

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE — WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
yes	yes	no

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)
USA Lessee: M. R. & Ellen Kate Madera, Box 94, Orla, Texas

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL
Texaco, Inc. Box 728, Hobbs, New Mexico

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 3904

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING? SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	THE NEW MEXICO STATE ENGINEER
no	no	no

ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B) PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
yes	no	no

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

B. C. Thomson — Asst. Division Manager — September 26, 1968
(Signature) (Title) (Date)

NOTE: Should waivers from the State Engineer, the surface owner, and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

EXHIBIT NO. 2