BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 3, 1961

IN THE MATTER OF:

Application of Honolulu Oil Corporation for a pressure maintenance project. Applicant, in theabove-styled cause, seeks permission to institute a pressure maintenance project in the Chisum Oil Pool, Chaves County, New Mexico, by the injection of water into certain wells Underlying its State B Lease, N/2 SE/4 of Section 13, Township 11 South, Range 27 East. Applicant further seeks the promulgation of special rules and regulations governing said project. Case 2207

BEFORE:

Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: Case 2207.

MR. MORRIS: Application of Honolulu Oil Corporation for a pressure maintenance project.

MR. CRISTY: Sim Cristy, Hervey, Dow & Hinkle, for applicant, Honolulu Oil Corporation. We have one witness, Mr. Examiner, and ask that he be sworn.

(Witness sworn.)

GEORGE R. HOY

called as a witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. CRISTY:

Q Would you please state your name, address and occupation?

A George R. Hoy; live in Midland, Texas; employed by Honolulu Oil Corporation as Division Drilling and Proration Engineer for the Midcontinent Division.

Q Have you previously appeared before this Commission, Mr. Hoy, as a geologist and had your qualifications accepted?

A Yes, sir, I have.

Q Are you familiar with the matters contained in this application?

A Yes, sir.

Q And with the section?

A Yes, sir.

Q Are you familiar with the two wells involved in the application?

A Yes, sir.

Q And their production history?

A Yes, sir.

Q Basically, Mr. Hoy, what are you seeking by this application, sir?

A We are requesting the Commission to approve a pressure maintenance project for this Chisum Pool, allowing us to inject produced water from the Devonian back into the Devonian in Well No. 3 to sustain the present pressure that has been furnished by a

water drive.

Q I understand that the Chisum Pool involved in this application is only 980 acres; that is the total pool?

A Yes, sir, that's correct.

Q I refer you to the exhibit which has been prepared, and which I would like to have marked as Exhibit 1, refer you to the first page. I believe that is a plat map of the area; is that correct?

A Yes, sir, that's correct.

Q It shows the two wells involved inthis application and some surrounding dry holes?

A Yes, it does.

Q Are there any other Devonian wells in this area?

A No, sir, there are not.

Q Referring you to the second page of the exhibit, this is an electric log on the proposed injection well?

A Yes, sir. It is an electric log and gamma ray log from top to bottom on the Honolulu State "B" No. 3. At the bottom of the log is shown a combination microlog and gamma ray log in detail. The porosity shown on this log between the depths of 6500 feet and 6557 is the interval into which we plan to inject the water.

Q Is the No. 3 Well you propose to use as an injection, and the No. 1 as an output?

A Yes, sir, that is correct.

Q Do you have a contour map on this, contoured on the Dev-

onian?

A Yes, sir, that is Sheet No. 3 showing all of the wells in the immediate area that penetrated the Devonian formation; the sub-sea datum of the Devonian as determined by electric logs is shown below each well. This contour interval is 20 feet showing the Chisum Pool to be an asymmetrical anticlinal structure.

Q I notice anA and A-prime running east-est, B and B-prime running north-south on that exhibit. I assume that is a cross-section?

A Those lines are cross-section lines running through the wells indicated on the contour map.

Q And the cross-sections are shown on the succeeding two pages?

A Yes, sir, they are. The cross-sections are based on electric and radioactive logs on each well. The name of each well is at the top. The dotted line on the cross-section is the top of the Devonian formatinn as determined by electric and radioactive logs. Also, on each log are marked the drill stem test intervals, and at the bottom of the log is the test number, the interval and results of the tests.

Q With respect to reservoir pressure tests, have you conducted tests on that? Do you have any exhibit in connection with reservoir pressure?

A Yes, sir, I have a graph showing the reservoir pressure decline from the initial pressure of 2650 psi to a pressure in

January of 2425 psi.

Q That is shown on the next succeeding page?

A Yes, sir, that's right.

Q What is the bottom hole pressure at this time on the two wells?

A The last measured bottom hole pressure in January, 1961, was 2425 psig for both wells.

Q What has been the accumulated production from these two wells, Mr. Hoy?

A Cumulative production to January 1st, 1961, for Well No. 1 is 204,454 barrels; for Well No. 3, 179,203 barrels.

Q Are these wells presently making their top unit allowable?

A No, sir.

Q What are they producing now?

A Our average daily production rate for the month of December for the Well No. 1 was 31 barrels of oil per day with an assigned allowable of 46 barrels of oil per day. For the month of December Well No. 3, average daily production was eight barrels of oil per day with an allowable of 12 barrels per day.

Q Whatis the top unit allowable for these wells at this depth?

A Approximately 60 barrels.

Q Are these flowing or pumping wells at present?

A Pumping wells.

Q Were they initially completed as flowing or pumping?

A Flowing.

Q How old, about?

A Both wells were completed during the first part of 1950.

Q How long did they flow?

A Approximately one year, less than one year.

Q So they have been pumping for about ten years?

A Yes, sir.

Q Have the wells ever made top unit allowable?

A Yes, sir, they have.

Q Do you have any data with respect to this production decline you have been speaking of?

A Following this bottom hole pressure graph we have a graph of monthly average production rates for each year, versus time. Line No. 1 is the actual history of theproduction from the reservoir. Line No. 2 paralleling it, during the summer of 1960 the pumping units were electrified giving us a more dependable source of power and also the installation of larger pumps, subsurface pumping equipment, as is shown on the last point this year, 1960. Now, curve No. 3 is an estimate of the production decline rate we anticipate if this project is approved.

Q Are these wells producing any water?

A Yes, sir, they are. Well No. 1 produces approximately 75% water, and Well No. 3 approximately 95%.

Q What type of water is this, salt or fresh?

A We have in the book an analysis made by the Western Com-

pany on a sampling from Well No. 1. The sample was taken during the normal production operations. It shows a rather low sodium chloride or hydrogen sulfide content.

Q Going back to the amount being produced, I believe we passed over Page 7 in the exhibit. That was your cumulative production in barrels?

A Yes, sir. That is a plot of daily average production versus cumulative production in thousands of barrels. At the top of this graph is shown three lines, 1-W, 2-W and 3-W. Line 1-W shows the present trend of water production under present producing methods. 2-W is the result of the equipment change as explained earlier. 3-W is our anticipated water production rate if the project is approved.

Q Let's turn to this type of pressure maintenance project you propose to install in the Chisum Pool as requested in your application. Would you explain what you prpose to do to maintain pressure in the pool?

A We propose to re-inject the produced water in Well No. 1 into Well No. 3. This injection will initially be by gravity flow through tubing under a packer. The packer will be set in the bottom joint of the 5 1/2-inch casing in Well No. 3.

Q Is that water corrosive?

A Only mildly so.

Q Where is your casing at present in this well?

A In Well No. 3?

Q That is the injection well?

A Yes, sir, 13 3/8 surface casing at 448 feet and cemented to the surface with 785 sacks of cement; intermediate string, 8 5/8, 2190 feet and cemented with 200 sacks of cement.

MR. NUTTER: Do you have the top of that cement?

A I don't have that with me, Mr. Nutter, But I can get it.

MR. NUTTER: Furnish that to us, please.

A (Continued) 5 1/2 casing set at 6400 to 6499 feet and cemented with 500 sacks of cement.

MR. NUTTER: Do you have the top of the cement on that?

A No, sir, I do not.

MR. NUTTER: You can furnish the information on both strings?

A Yes, sir. The total depth of Well No. 3 is 6556. If approved, this water injection will be in open hole. Well No. 1 has a surface string of 13 3/8 casing set at 440 feet, cemented to the surface with 500 sacks of cement; intermediate string of 9 5/8 casing set at 1866 feet and cemented with 500 sacks. The top of the cement on that string was 860 feet behind the pipe. 7-inch production casing set at 6490 feet and cemented in three stages. First stage was 500 sacks, from 4490 back to 4514; second stage, 400 sacks, 4235 back to 2760; third stage, 290 sacks from 2590 feet to surface.

Q In the drilling of the No. 3 well, did you encounter any fresh water zones?

A Yes, sir. There is fresh water at a depth of approximately 250 feet.

Q Do I understand you correctly, in the injection program proposed you would have to protect the fresh water basin; you would have the tubing, the casing and the cement?

A That's right.

Q At the 250 foot area?

A Yes, sir.

Q About what rate of injection would you propose; what amount of salt water?

A Initially 300 barrels per day, all the water produced from Well No. 1. That will increase as the water production percentage increases from Well No. 1.

Q Do you think that would be a sufficient amount of water to stabilize and maintain the pressure that you have mentioned?

A Yes, sir. We feel tnat it will with the fairly active water drive in the reservoir at the present time.

Q Are there any other operators in this project area, sir?

A No, sir, there are not.

Q What kind of lands?

A Owned by the State of New Mexico.

Q Any override?

A No, sir.

Q Just working interest owners, Honolulu, and State of New Mexico involved?

A Yes, sir.

Q The application includes a request for inauguration of special rules to cover the Chisum Pool here. Would you tell us, briefly, what suggestions you might have to the Commission with respect to special rules?

A Yes, sir. Our proposed rules: No. 1, that the project area be defined as the N/2 of the SE/4 of Section 13, Township 11 South, Range 27 East, Chaves County.

Q I believe those matters you are mentioning now are set forth on the last page on the exhibit?

A Yes, sir, lasttwo pages, and consisting of proration units assigned to Honolulu State "D" Nos. 1 and 3. Rule 2, Honolulu's State "B" 3 be converted to a water injection well for the injection of water into the Devonian producing formation of the Chisum Pool. Rule 3, allowable for the injection well be transferred to the producing well. Rule 4, the allowable for the injection well will be the top unit allowable for the Chisum Pool. Rule 5, the allowable for the project area will be the sum of the allowables of the two wells within the project area, including the injection well. Rule 6, the top allowable for the project be the top unit allowable of the Chisum Pool multiplied by the number of wells, in this case, two, in the project area, or the capacity of the producing well to produce as determined by a 24-hour test, whichever of these two amounts is the least. Rule 7, Well test be limited to the measurements of volumes of oil and water produced; be exempt from gas-oil

ratio tests. The amounts of gas being produced with the oil is too small to measure with normal equipment. I might state on that, bottom hole sample taken on Well No. 1 on April 27, 1950, showed a solution gas-oil ratio of 88 cubic feet per barrel, bubble point to be 244 psig, and present bottom hole pressure, 2425, so that the normal producing ratios will be through the life of this field, approximately the solution ratio. Rule 8, project operator will submit to the Commission each month, within a reasonable time after they establish the normal unit allowables for southeast New Mexico a pressure maintenance project operator report on a form prescribed by the Commission, requesting the total project allowable. In the final rule, 9, Commission shall assign the project allowable upon receipt of the above-required form which shall be the sum of the allowables of the injection well and the producing well.

Q Mr. Hoy, what do you feel the lifetime of this pool will be?

A We anticipate an additional seven years if this project is approved.

Q Without it?

A Approximately five more years.

Q Mr. Hoy, in connection with the application, do you see any way in which the correlative rights of either the State of New Mexico or Honolulu might be violated, or any other interested party if the application is granted?

A No, sir.

Q Would the granting of the application result in the prevention of waste?

A Yes, sir, in that we anticipate it will result in the recovery of 205,000 barrels of additional oil over the seven-year additional lifetime.

Q I believe, Mr. Hoy, you have prepared a summarization of your testimony; is that correct, sir?

A Yes, sir, that is correct.

Q May we have this marked as Exhibit 2, sir? I will ask you whether or not Exhibits 1 and 2, with the exception of the log, were prepared by you or under your direct supervision?

A Yes, sir, they were.

MR. CRISTY: At this time we would like to offer in evidence applicant's Exhibits 1 and 2.

MR. NUTTER: Honolulu's Exhibits 1 and 2 will be admitted.

Q Do you have anything else in connection with this application you feel would be of interest to the Commission that I have omitted?

A No, sir, I think not.

MR. CRISTY: That is all from this witness.

MR. NUTTER: Any questions?

BY MR. PAYNE:

Q Would you give me the producing capacity on the No. 1 and No. 3 wells again?

A Based on our December production the Well No. 1 had an

average daily production rate of 31 barrels per day. Well No. 3, average daily production rate of eight barrels per day.

Q Do you consider the No. 3 as a stripper well?

A It is, in our opinion, yes, sir.

Q The reason you filed an application for a pressure maintenance project rather than a waterflood project is because of the capacity of the No. 1 Well?

A Yes, sir.

Q Do you propose to drill any more wells on this 80-acre tract?

A No, sir, we do not.

Q If I understand your proposal, you are going to re-inject the salt water that is produced from which well?

A No. 1.

Q So you have no problem about it being compatible?

A No, we do not. It will only be the formation water from the Devonian formation.

Q Do you propose in your injection well to fill the annulus space with sweet oil, ammonia or naphtha?

A Ammonia and sweet oil.

Q And you propose that the injection will be assigned top unit allowable which would then, of course, be transferred and produced out of the No. 1 well?

A Yes, sir.

Q The No. 1 well be given top unit allowable, or its ability

to produce, whichever is less?

A Yes, sir.

BY MR. NUTTER:

Q What was it you recently did to the equipment, you set a casing pump or something?

A That is correct, upon approval from the Commission in January we put a casing pump in Well No. 1.

Q Now, on your exhibit sheet here that shows the production versus time, you show a jump in production for 1960.

A That was because of an electrification of the power units on the pump units and also installation of larger surface pumps, but they were tubing pumps, both of them.

Q If you had another point for the first part of 1961, with this casing pump in there you would probably have a point a little higher than 1760?

A That's right, and that is shown on the Curve 3, first point on that curve. That is based on tests made with this casing pump.

Q I thought the third curve was the curve under pressure maintenance?

A That's right, but that is our anticipated decline rate based on the initial test we got with this casing pump.

Q In other words, putting the casing pump in is going to bring it to this point, and pressure maintenance will hold the curve at the level you have drawn it here?

A Yes, sir, that's right.

Q The way I interpret the next table, where you show average daily versus cumulative, the second line is with the enlarged equipment you put in this well, and you would reach your economic limit at approximately 460 or 70 barrels; is this correct?

A 460,000 barrels; that's correct.

Q But by pressure maintenance you are going to shift this curve over to No. 3 and you will reach your economic limit at 670 barrels; is this correct?

A Yes, sir.

Q You expect to recover an additional 200,000 or so barrels of oil?

A Yes, sir.

Q Will the injection be under gravity all through the life of the project?

A It is doubtful, but we anticipate the pressures will never be very high.

Q Do you anticipate you will have to use makeup water, or will you only use Devonian?

A At the present time, the study we have made, only Devonian water. We don't anticipate having to use any makeup water.

Q What do you expect the rate of injection will be toward the end of the life of the project?

A Setting the economic limit on this project at 98%, I would not have any idea exactly what the rate would be.

Q What I was driving at, the ultimate rate of injection that you are planning, will it be too great to permit you to inject through tubing?

A We don't anticipate so. We may have to change to three-inch tubing, but we don't expect to have to go down the casing. We think we can handle it with tubing.

Q These rules that you have submitted here for your proposed rules, are substantially the same as previous rules which have been approved by the Commission?

A That's correct.

Q I notice you have left out the gas credit which is permissible, but you don't anticipate high GOR's?

A We do not.

Q Mr. Hoy, you stated the injection would be through tubing and packer.. Would you tell me where that packer will be set with relation to the top of the cement?

A It will be set in the bottom joint of the casing.

Q Will the injections be by gravity?

A We anticipated initially by gravity, with anticipated 300 barrel rate. Higher rates may require a small amount of pumping.

MR. NUTTER: Any further questions of Mr. Hoy? He may be excused. Do you have anything further, Mr. Cristy?

MR. CRISTY: That is all for the applicant.

MR. NUTTER: Anyone have anything they wish to offer in Case 2207? Take the case under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, JUNE PAIGE, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 10th day of March, 1961.

June Paige
Notary Public - Court Reporter

My Commission expires:

May 11, 1964.

I N D E X

E X H I B I T S

NUMBER	EXHIBITS	IDENTIFIED	OFFERED	ADMITTED
Ex.#1	Booklet	3	12	12
Ex.#2	Summary of Testimony	12	12	12

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2207 heard by me on 3/3, 1961.

....., Examiner
New Mexico Oil Conservation Commission