

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1511

TRANSCRIPT OF HEARING

OCTOBER 2, 1958

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BEFORE THE
OIL CONSERVATION COMMISSION
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IN THE MATTER OF:

CASE 1511 Application of Newmont Oil Corporation for
an order authorizing a pilot water flood
project. Applicant, in the above-styled
cause, seeks an order authorizing it to in-
stitute a pilot water flood project in the
Loco Hills Pool in Eddy County, New Mexico.
Applicant proposes to inject water into the
Grayburg formation through one well in Sec-
tion 1, Township 18 South, Range 29 East,
and through five wells in Section 6, Town-
ship 18 South, Range 30 East, all in Eddy
County, New Mexico.

BEFORE:

Mr. Elvis A. Utz, Examiner.

T R A N S C R I P T O F P R O C E E D I N G S

MR. UTZ: Next case on the docket will be Case 1511.

MR. COOLEY: Case 1511. Application of Newmont Oil Cor-
poration for an order authorizing a pilot water flood project.

MR. CAMPBELL: I am Jack M. Campbell, Campbell & Russell,
Roswell, New Mexico, appearing on behalf of the applicant, Newmont
Oil Corporation.

MR. UTZ: Is there any other appearance to be made in
this case? If not, you may proceed.

MR. CAMPBELL: We have one witness, Mr. Darden, to be
sworn.

(Witness sworn)

FRANK DARDEN,

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Frank Darden.

Q Where do you live, Mr. Darden?

A Fort Worth, Texas.

Q By whom are you employed?

A Newmont Oil Corporation.

Q Have you ever previously testified before this Commission or any of its Examiners?

A No, I have not.

Q Have you testified before any other oil or gas regulatory agency?

A Yes, sir.

Q Which --

A Railroad Commission of Texas.

Q Will you please give the Examiner a brief summary of your educational and professional background?

A I was graduated from the University of Kansas with a Bachelor of Science degree in mechanical engineering in 1946. And in January of 1948 I commenced my petroleum engineering with Humble

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Oil & Refining Company. In the ensuing ten years, I worked for Humble Oil, Murphy Corporation of El Dorado, Arkansas, and Empresa Colombiana de Petroleos, a petroleum company in Colombia, South America as a petroleum engineer and reservoir engineer. For the past two and a half years, I have been employed as reservoir engineer for Newmont Oil.

Q Mr. Darden, in connection with your experience with Humble and with the Murphy Corporation and whatever that company was in British Colombia, have you had occasion to work on matters relative to secondary recovery?

A Yes, sir.

Q Was that the principal type of work you were doing in South American for the Colombian government?

A Yes, sir.

Q Are you acquainted with the application of Newmont in this particular case?

A Yes, sir.

Q Mr. Darden, I refer you to what you have before you that has been identified as Newmont's Exhibit No. 1. Will you state what that is, please?

A Yes. This is a plat of the Newmont Oil Corporation properties in the Loco Hills Field with the proposed pattern injection wells circled, and with the other wells designated by number.

Q How are the properties of Newmont in that area identified

on the Exhibit, please?

A By a dashed line.

Q What is the nature of the operating rights or ownership that you have under the properties identified on Exhibit 1?

A We have operating rights to a depth of 100 feet below the Loco Hill sand.

Q And were those operating rights acquired by an agreement effective July 1, 1958 from those who had previously owned those properties?

A Yes, sir.

Q What is it, Mr. Darden, that you propose to do if the Commission gives you their approval in this case?

A We propose to inject water into the Loco Hill sand in the six wells circled on this plat in order to perform a pilot water flood in the expectation of increasing oil recovery from this property.

MR. CAMPBELL: Mr. Examiner, at this time with regard to Exhibit No. 1, you'll note that one of the wells circled, which is a proposed injection well, the one furthest to the southwest, identified by No. 5 on the application submitted, the application and the plat identified the injection well there as No. 1. I would like to at this time request that the application be amended to identify that injection well as the Yates et al "A" 1 as shown in the application. They are both in the same section, and I checked a notice this morning, and the notice identified the in-

jection well as being five of them in Section 6, and one in Section 1, so it would not change the notice on it in that regard.

MR. UTZ: You are requesting the plat and the application both to be amended?

MR. CAMPBELL: Yes.

MR. COOLEY: What is the quarter-quarter section of the well that you just referred to, Mr. Campbell?

MR. CAMPBELL: It is in the north -- I would say it is in the northwest quarter of the southwest quarter of Section 6, which is the same quarter-quarter section that the other well was in. There is, as you know, more than one well on some of these 40-acre units in that area.

MR. COOLEY: Is this a redesignation of the well that was identified as the Yates "A" 1, or is it a different well?

MR. CAMPBELL: A different well.

MR. COOLEY: But in the same quarter-quarter section?

MR. CAMPBELL: Yes, sir.

MR. UTZ: What quarter-quarter section did you say that was in?

MR. CAMPBELL: In the northwest quarter of the southwest quarter of Section 6.

MR. UTZ: The previous well was "A" 2?

MR. CAMPBELL: No, the previous well was "A" 1. Yates et al "A" 1.

MR. UTZ: Is there objection to the amendment of the

application? If not, it will be so amended.

Q (By Mr. Campbell) What is the present stage of depletion of this area that you propose to use as a pilot area, and the general Loco Hill area, please?

A We estimate it is 92 percent depleted by primary means.

Q What is the average per well, per day, production of oil in the area?

A Approximately ten barrels per well per day.

Q If this pilot project is approved, what source of water do you intend to use?

A Well, we, recognizing that we would need a source for the pilot, made an extensive survey of the water sources in the area, and in this search, we drilled an exploratory well in Section 1.

Q Is that identified on the plat?

A It is identified on the plat as a supply well on 1 -- Section 1, 18 South, Range 21 East.

Q Were you able to obtain a source of water there?

A Yes, we were. We found an 18-foot water sand approximately 295 feet, and we have tested that sand, and we believe that that well or another well with it will supply water for the pilot.

Q Have you advised the office of the State Engineer with regard to the location of this water source for the pilot portion of your project?

A Yes, sir, we have.

Q Has the State Engineer been furnished with a copy of the application in this case?

A Yes, sir.

Q Has the State Engineering Office been furnished with an analysis of the water from that particular well?

A Yes, sir.

Q Mr. Darden, I am going to hand you what has been identified as Newmont's Exhibit No. 2, and ask you to state what that is, please?

A This is a survey and water report prepared by the Bradford Laboratories concerning several possible water sources which we examined, including an analysis of the water from the source which we plan to use for the pilot.

Q Has a copy of this laboratory report been furnished to the office of the State Engineer?

A It has.

Q Now, if you inject water in this pilot area, into what formation will the water move?

A The Loco Hill sand.

Q Do you believe that if the pilot project proves successful that you may be able to recover automatically more oil than would otherwise be recovered without a secondary recovery project?

A We certainly do.

Q Do you believe that that can be done without adversely affecting the rights of other owners in the area?

A Yes, sir.

MR. CAMPBELL: I believe that's all I have. I offer in evidence Newmont's Exhibits Nos. 1 and 2. Oh, let me ask him one other question too.

Q (By Mr. Campbell) How much water do you hope to inject into these wells initially?

A Well, we hope to be able to inject a thousand barrels per well per day. However, we won't know until we try. That may be optimistic.

MR. CAMPBELL: That's all.

MR. UTZ: How much was that?

A A thousand barrels per well per day.

MR. UTZ: Without objection, Exhibits 1 and 2 will be accepted. Are there any questions of the witness? Mr. Fischer.

MR. FISCHER: I have some questions.

MR. UTZ: You may proceed.

CROSS EXAMINATION

BY MR. FISCHER:

Q Mr. Darden, the way I understand it, there are two No. 5 Wells on that lease?

A No, sir. One of them is No. 5, the other one is No. 1.

MR. CAMPBELL: There is a Ballard. You've got two No.5, is that what disturbs you? They are separate leases. That's a Ballard "B" 5 in the northern portion there.

A And also in Section 6, there are two leases, both having

a No. 5 well.

MR. UTZ: Actually, there is considerable change over the plat, in respect to well numbers, over the plat that was submitted with your application?

A Yes, sir. These numbers of the wells in the Yates et al Lease were in error.

MR. CAMPBELL: The Exhibit that you have offered here today contains the correct identity of the wells, does it not?

A Yes, sir.

MR. CAMPBELL: And it does contain the proper location of the wells you propose to use as injection wells?

A Yes, sir.

Q (By Mr. Fischer) That hundred feet below the base of the Loco Hill sand, is that correct? Is that where you have your operating rights too?

A Yes, sir.

Q What is the characteristic of that hundred feet generally? Can you tell me?

A Generally shale.

Q Shale?

A Yes, sir.

Q Is that Loco Hill sand in the Grayburg?

A Yes, sir. I believe it is designated as zone 4 of the Grayburg.

Q You said that you -- according to your calculation,

depletion by primary method. had been 92 percent?

A Yes, sir.

Q Could you give the Commission an approximation or recapitulation of what that amount of oil, or 100 percent of that, what the amount of oil was?

A Yes, sir. We estimated an ultimate recovery by primary of 4,599,500 barrels, and to the first of this year the property had produced 4,179,500 barrels.

Q At what pressure do you think you can get your estimated hundred barrels per day per well? What pressure will it take?

A Well, that's the reason for the pilot. We don't know.

Q You have no idea?

A No. It is impossible to guess that.

MR. FISCHER: Thank you. That's all.

MR. UTZ: Any other questions of the witness?

MR. COOLEY: One question, please.

QUESTIONS BY MR. COOLEY:

Q Mr. Darden, is the particular zone in which you intend to limit your formations, your injection, commonly identified in this area as the Loco Hills?

A Yes, sir.

Q Has it been so identified by the Commission? If not, how has the Commission identified this particular zone?

A I am not sure.

Q I understand that your entire operation -- your operation

would not extend to the entire Grayburg formation?

A That is correct.

Q Is this the only productive zone in this area?

A No. The Premier zone, which is below the Loco Hills, is productive to a limited degree, but this is the principal producing horizon in this area.

Q Are you aware of what the vertical limits of the Loco Hills Pool consist of?

A Well, it varies considerably because you have an appreciable dip from east to west.

Q How are the vertical limits of the Loco Hills Pool identified by the Commission Order which established the Pool?

A I don't know.

MR. CAMPBELL: I am not aware of that either. I presume the Commission's records will reflect it. Of course, any order should, identifying -- it is my understanding it is commonly known as the Loco Hill portion of the Grayburg. Whether it is identified as such as to vertical limits, I am not certain.

Q (By Mr. Cooley) Is there any other productive zone other than the one that you intend for injection, other than the Loco Hills Pool?

A Yes, sir. There are a few wells producing from the Premier.

Q Your operation would not extend, in any event, to the Premier?

A No, sir.

Q Mr. Darden, you said the average producing well in the area was somewhere around ten barrels a day, --

A Yes, sir.

Q -- am I correct?

A Yes, sir.

Q What do you know is the highest producing well in the area, and what is the production from that area?

MR. CAMPBELL: Which area?

MR. COOLEY: He must have picked his own area. He said --

A I was speaking of our properties when I said "an average of ten barrels of oil per day."

Q What are the extremes in the productivity that you have which you calculated as average?

A Well, we have one or two wells which will make 35 barrels per day.

Q Where are those located, Mr. Darden?

A The State 5 "BX."

Q In what quarter-quarter section?

A That's the southeast of the southeast of Section 32, 17 South, Range 30 East.

Q 5 "BX?"

A Yes, sir.

Q Any other high producing wells?

A I can't offhand recall any specific one, no, sir.

Q Can you account for the unusual high productivity of this 5 "BX" Well?

A No. That is an anomalous condition. We have not been able to determine why that one should be higher than the surrounding wells. Actually, as you can see from the plat, the other wells have been plugged, and possibly they have been plugged for mechanical reasons, and the well is draining a larger area. That is the only reason we can think of.

Q Are the completions in your wells, the Newmont wells, entirely limited to this Loco Hills sand, or do these include some perforations in the Premier?

A We have two wells, as marked on the plat, which are completed in the Premier zone also.

Q How are those identified?

A Well, the Premier zone is opened, and there are designating arrows to these two wells. They are in Sections 31 and 32, Township 17 South, Range 32 East.

Q Noen of the other wells are opened in the Premier?

A No, sir.

MR. COOLEY: That's all the questions I have. Thank you, Mr. Darden.

QUESTIONS BY MR. UTZ:

Q Mr. Darden, is there much structural dip in this particular area, particularly in regard to Sections 1 and 6?

A Well, from the west side of Section 1 to the east side

of Section 6, there is probably as much as 100 feet of structural dip.

Q What would be the approximate top of the Loco Hills sand that you have designated?

A Approximately 2,800 feet. That's well depth.

Q What is the approximate elevation in this area?

A I'll have to check that. Approximately 3550.

Q Now, are all of the wells in Sections 1 and 6 opened in the entire interval of the top of the Loco Hills to a hundred feet below, or are they just opened in the Loco Hills?

A They are just opened in the Loco Hills, and actually, some of them have not completely penetrated the Loco Hills.

Q About how thick is the Loco Hills sand in this area?

A Approximately 22 feet.

Q That's gross?

A That's net sand.

Q What would be the gross thickness?

A Oh, possibly 30 feet. It is a pretty solid sand, pretty clean sand.

Q Pretty homogeneous?

A Yes.

Q In Sections 1 and 6 again, can you tell me what the highest producing well would be in the last month of production in that immediate area?

A We'll have to check this record, I suppose, but I would

say it has not exceeded ten barrels. Most of these wells in the pilot area are producing less than ten barrels.

Q Well, if you think that is close, you needn't bother with looking up the record. In your injection wells, is it your intention to perforate them the full length of the 30 feet of gross sand, or where do you intend to inject the water in the formation?

A All the wells in this area are completed open hole with the pipe set on top of the pay, so the full sand -- gross sand will be exposed.

Q In other words, these injection wells that you are proposing are already completed?

A Yes, sir. All of the wells shown on this plat are existing wells.

Q Do you know how these wells are cased?

A Yes, sir. I have the list if you would like it, of specific wells in the pilot area.

Q Well, if you have a list you can submit that to the Commission.

A Well, it is not in form for submittal. I could do that later if you like.

Q Will you do that, please? Does that include all of the injection wells or producing wells in the area?

A The injection and producing wells?

Q The areas 1 and 6?

A No, sir, just the wells adjacent to the pilot area.

either enclosed wells, or offsetting producers.

Q That will be sufficient for the present. In your opinion, is the casing program for the wells -- all the wells in this pilot area sufficient to protect the fresh waters in this area?

A Yes, sir.

Q In other words, the cement is circulated up over the fresh water?

A I don't believe that cement was circulated through the fresh water sand. The only fresh water sand that we have any record of is at this 300 feet where we found our water supply well, and, of course, the casing program is carried down through that zone and cement is covering it. The oil string cement program did not tie into the surface casing.

Q But, at any rate, you feel that the schedule you will submit to the Commission will show that the surface casing is cemented through the fresh water zone?

A Yes, sir.

MR. UTZ: Any other questions of the witness?

MR. STAMETS: Yes, sir.

MR. UTZ: Mr. Stamets.

QUESTIONS BY MR. STAMETS:

Q I am not sure if this was asked or not. What is the vertical distance between the base of the vertical limits and the upper part of the Premier sand producing area?

A I will have to talk from memory on that, but I think it

is approximately 150 feet, maybe 200 feet.

Q Is there any possibility that this water will get down into the Premier sand zone?

A No, sir, I don't believe so, because for accumulation in the Premier you would have to have a seal above it, and, of course, our wells are above that seal which is a shale.

Q Is this Newmont General American "G" 2-A Well in Section 31, 17 South, 30 East, the closest Premier producing well in the pilot area?

A Yes, sir. I'd say that's true. I have not examined all the well logs of the offsetting properties which are owned by General American and by Roland Richwolly, but as far as we know, that is the nearest Premier producing well.

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

QUESTIONS BY MR. COOLEY:

Q Mr. Darden, in your opinion, what, if any, will be the effect of your injection program, if approved, upon offsetting property not belonging to Newmont Oil Corporation?

A Well, I think it possibly will stimulate production on the offsetting properties. The amount of increase will then be dependent upon whether they participate in backing up their own producers.

Q In your opinion, is there any reasonable possibility of adversely affecting offset operators' wells?

A I don't believe so, but, of course, we don't know until

we put water into the ground. We have no evidence of any high permeability zones which would cause rapid change.

Q Have all operators been notified of this application?

A I believe they have.

MR. CAMPBELL: I don't know whether they have received special notice or not.

Q (By Mr. Cooley) Of course, they have been notified by the advertisement, but I wondered if they had been consulted on the possibility of a cooperate lease line type of flood in the event this thing proved definite?

A I have talked with Mr. Crosscup of General American and generally outlined what we had in mind here. However, during this pilot phase we did not feel that it was necessary for offset cooperation. In the event the pilot is successful, we will certainly be consulting them for offset cooperation.

Q Do you think the way this area is laid out and the lease in the area is conducive to a cooperative lease line type of flood?

A We believe so.

Q I note that the projected plan on the Exhibit attached to the application would indicate that you thought that there was some possibility of --

A Yes, sir.

Q -- indications of possible offset wells on other acreage in the Exhibit?

A Yes, sir.

MR. COOLEY: That's all the questions I have. Thank you.

QUESTIONS BY MR. UTZ:

Q Does the yellow outline on the plat submitted with the application outline your interests --

A Yes, sir.

Q -- that you hold in the area?

MR. CAMPBELL: Yes, sir. That's identical with the dashed line markings on Exhibit 1 which we have offered in evidence here.

Q You own all rights in that entire area?

A Yes, sir, down to the depth indicated.

Q It is not communitized through?

MR. CAMPBELL: No.

MR. UTZ: Any other questions of the witness? If not, the witness may be excused.

(Witness excused)

MR. UTZ: Are there any statements to be made in this case? If not, we will take the case under advisement. We will take a ten-minute break.

C E R T I F I C A T E

STATE OF NEW MEXICO)
 : ss
COUNTY OF BERNALILLO)

I, J. A. TRUJILLO, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript by me and/or under my personal supervision, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal, this, the 9th day of October, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

J. H. [Signature]
Notary Public

My Commission Expires:
October 5, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1511 heard by me on Feb 2, 1958.

[Signature] Examiner
New Mexico Oil Conservation Commission