BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 10, 1963

EXAMINER HEARING

- -
)
IN THE MATTER OF:)
)
    Application of Standard Oil Company of Texas for)   CASE 2858
    special pool rules, San Juan County, New Mexico.)
    Applicant, in the above-styled cause, seeks the)
    establishment of special pool rules for the   )
    La Plata-Gallup Oil Pool, San Juan County, New)
    Mexico, including provisions for 80-acre spacing)
    therein.   )
- -

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: We will take up Case 2858.

MR. DURRETT: Application of Standard Oil Company of

Texas for special pool rules, San Juan County, New Mexico.

MR. KELLAHIN: May the record show the same appearances

as in the preceding case, and we will have the same witnesses,

Mr. Robert Murphy and Mr. John Cameron. May the record show that

they have been sworn?

MR. UTZ: The record will so show.

                              (Whereupon, Standard's Exhibits
                              Nos. 1 through 11 marked for
                              identification.)

                    ROBERT E. MURPHY

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

as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q   Would you state your name, please?

A   Robert E. Murphy.

Q   Are you the same Mr. Murphy who testified in Case 2857?

A   Yes, sir.

Q   Mr. Murphy, are you familiar with the application of Standard Oil Company of Texas in Case 2858?

A   I am.

Q   Would you state briefly what is proposed by Standard in this application?

A   To establish 80-acre spacing in this pool.

Q   Have you made a study of the La Plata Pool, --

A   Yes, I have.

Q   -- Gallup Oil Pool?

A   I have.

Q   On the basis of that study, have you prepared a structure map?

A   Yes, sir.

Q   Referring to what has been marked as Exhibit No. 1, will you identify that exhibit and discuss the information shown on it?

A   Yes, sir. Exhibit No. 1 is a structure map; the mapping point in this case is what we call the top of the Lower Gallup. The scale of the map is one inch to 2,000 feet. The contour

interval is 500 feet on all except the eastern portion of the

map where we have shifted to 100-foot interval in the shallow

dip area.

This pool is located on the northwest rim of the San

Juan Basin in an area of relatively steep southeast dip. The Verde-

Gallup Field is located four to five miles west of the La Plata-

Gallup Pool. The production in the La Plata is from fractures

in the Gallup shale section. Production in the Verde-Gallup is

also from this type of reservoir; however, production in the two

fields is separated by an absence of fracture in the area between

the fields. There are several dry holes. They have been circled

in red. One of them is in Section 14 of 31 North, 14 West.

That's our Ute 1 No. 1. The other is in Section 13, same town-

ship and range; a third well is in Section 18 of 31 North, 13

West, the Century Elliott, a dry hole between the two fields.

We feel that this conclusively proves the absence of

fracturing between the two producing areas. The blue outline on

Exhibit 1 represents the pool limits at the present time. The

yellow area is company, Standard of Texas acreage that is possibly

productive and could be developed on 80-acre spacing.

The discovery and only well in the field is our Federal

12-5 No. 1 located in Section 5. This well was completed in

April, 1959, with a flowing potential of 167 barrels of oil in

16 hours. If you'll note that it's been offset on the south and

west by dry holes. These have been circled in red. The well to

the south is our 12-8-1, Federal 12-8-1 in Section 8. The well

to the west is Federal 13-6-1, Section 6. This well was later

farmed out to Mr. Bayless and he made a completion in the Mesaverde,

a very small gas well. This, we feel, limits the field to the

south and east.

You will notice that another well has been circled in

red. This well was dry in the Gallup and completed as a Dakota

gas well. About a mile north of Federal 1 in 32 is the Texas

Natural No. 1 Johns; this is also a dry hole in the Gallup.

Q   You made reference to the Verde-Gallup Oil Pool. Is

this reservoir a more prolific producer than the Verde-Gallup?

A   Well, of course, it's a much larger field. However,

this Federal 12-5-1 has a capacity far in excess of any well I

know of in the Verde-Gallup Pool.

Q   What is the producing interval and depth of this well?

A   It's completed in open hole section from 5900 to 6200

feet.

Q   Then it's completed below 5,000 feet, is that correct?

A   Yes, sir.

Q   What acreage would you consider possibly productive in

the pool?

A   The three 80-acre tracts immediately north of our

Federal 12-5-1. I believe if I was asked to pick a location, the

next one would be north of 12-5-1.

Q   North of 12-5-1?

A   Yes.

Q   Would you consider there's any risk factor in drilling this acreage?

A   Yes, there's considerable risk involved. The number of dry holes that surround this are evidence of that fact. I think there's risk in not only establishing a commercial well, but in establishing any well at all.

Q   Would you recommend the drilling of any additional wells?

A   We have made recommendations that a well be drilled north of Federal 12-5-1. However, our management has turned it down because this proposal was uneconomical on 40-acre spacing.

Q   What risk factor would you consider to be valid in this area in drilling additional wells?

A   Between 70 and 80 percent, 75 percent dry hole risk.

Q   Referring to what has been marked as Exhibit No. 2, would you identify that exhibit and discuss the information that has been shown on it?

A   Exhibit No. 2 is a copy of the induction,electric and gamma ray induction log run in our Federal 12-5-1. The top of the Mancos shale and the Gallup, Upper and Lower Gallup, have been marked on there, and our mapping point which we call the Lower Gallup has been indicated.

Q   How was the well completed? Was it perforated or open hole?

A   It was completed in open hole with a liner set from the casing to total depth, a slotted liner.

Q   Have you marked the producing interval on the log?

A   I do not believe it's marked. It would be from 5900 to total depth. Total depth is 6200.

Q   Were Exhibits 1 and 2 prepared by you or under your supervision?

A   Yes, sir.

MR. KELLAHIN: I would like to offer in evidence Exhibits 1 and 2.

MR. UTZ: Without objection, Exhibits 1 and 2 will be entered into the record.

(Whereupon, Standard's Exhibits Nos. 1 and 2 received in evidence.)

MR. KELLAHIN: That completes the direct examination of the witness.

CROSS EXAMINATION

BY MR. UTZ:

Q   You stated your management had turned down the proposed location north of your 12-5 on the basis of 40-acre economics?

A   Yes, sir.

Q   Do you anticipate what they would do on 80-acre economics?

A   I can't give you those figures here. The engineering

witness will discuss that later.

Q   I would like to know on what basis you located this well in the middle of all of the dry holes.

A   This was the first well.

Q   This is where you pointed your finger?

A   Our Exploration Department picked this out as being an area which had good potential in that it was on the Hogback monocline and it was offset, as you can see, on the south with a company dry hole and on the west with a dry hole which dampened our enthusiasm quite a bit.

MR. UTZ: Any other questions?   The witness may be excused.

(Witness excused.)

JOHN T. CAMERON

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q   Will you state your name, please?

A   John T. Cameron.

Q   Are you the same Mr. Cameron who testified in Case 2857?

A   I am.

Q   Mr. Cameron, have you made a study of the La Plata-Gallup Oil Pool in connection with the case before the Commission at this time?

A   I have.

Q   In connection with that, have you compiled some data

on the reserves in this pool?

A   Yes, sir, I have.

Q   Referring to what has been marked as Exhibit No. 3,

would you identify that exhibit and discuss the information on it?

A   Exhibit No. 3 is a sheet of general reservoir character-

istics for the La Plata Pool which shows, among other things,

first bottom hole pressure, 1462; latest bottom hole pressure,

1312; saturation pressure, 1169; gravity of oil, 40 degrees.

It shows that this single well has produced 129,831 barrels of

oil as of April 30, 1963.

Q   During what period of time was that produced?

A   That was from 1959 to 1963.

Q   Referring to what has been marked as Exhibit No. 4,

would you identify that exhibit and discuss the information shown

on it?

A   I suppose Exhibit No. 4 is the build-up--

Q   Yes.

A   -- of the 12-5 No. 1. This build-up test was run pri-

marily to give some indication of permeability, and it shows a

permeability of 13 millidarcies. I might point out that this

is what we consider a lower limit of the permeability in this

well, since a longer shut-in time would flatten the slope of this

build-up curve out and result in a higher permeability. I think

13 millidarcies is the lower limit of permeability.

Q   How was this build-up test made?

A   This build-up test was made by just shutting the well in for 72 hours and recording the pressure periodically during the 72 hours. Calculation was made by using Horner's method.

Q   Had the well been produced regularly prior to the time of the build-up test?

A   Oh, yes, it had produced 170,000 barrels before the test was made.

Q   Have you made any reserve calculations of the La Plata-Gallup Oil Pool?

A   Yes, I have.

Q   Referring to Exhibit No. 5, will you discuss that exhibit, please?

A   This exhibit shows our reserve calculation in this pool. From the pressure decline versus cumulative production we've calculated that the ultimate recovery will be 909,903 barrels.

Q   That is the total recoverable reserves, on the basis of your calculation?

A   That is correct.

Q   Have you made any estimate of the drainage area involved?

A   Yes, sir, I have, using this predicted ultimate recovery.

Q   Are you referring to what has been marked now as Exhibit No. 6?

A   Yes, I suppose I am. I have mine numbered wrong.

We calculated the drainage area of this well from the estimation

of reserves and by using a figure for estimated recovery per acre

foot. If we can calculate a recovery per acre foot and also

calculate a number of feet, we know the barrels; so using those

three figures we can come out with the number of acres which must

contribute to 909,000 barrels of ultimate recovery. This Exhibit

6 shows that by using a fracture porosity of two percent, recovery

factor of 25 percent, and the formation volume factor of 1.27,

we come out with an estimated recovery of 30.5 barrels per acre

foot. I might try to justify those figures. The two percent

fracture porosity is a figure taken from cores and neutron logs

in the nearby Verde-Gallup Field. In that field the cores showed

the matrix porosity of 4.6 percent, while the neutron showed a

gross porosity of 7.7 percent. The difference in those figures

must be fracture porosity.

Since we feel that all the oil comes from the fractures

in here, we consider that to be the sum and total of our effective

porosity contributing to oil production, so we got a two percent

from that figure.

We used a recovery factor of 25 percent which is assumed

to be about the maximum that could be attributed to a fractured

shale reservoir, so the result, 35.5 barrels per acre foot, is

about the most we could give it on a per acre foot basis. I'll

go in later to why we came up with an upper limit on the barrel per

acre foot estimate.

Next I calculated an estimated net pay. In this well, as I say, it's an open hole section, 300 feet of open hole section was drilled with gas. It quit dusting at 5970 feet and began producing oil. It produced oil all the way to total depth, 6200 feet. If we assume that the entire feet from 5970 to 6200 is contributing to the production, that will leave us with a net pay of 230 feet. Since we've already calculated the estimated ultimate recovery, in order to calculate our drainage area we divide ultimate recovery of 909,903 barrels by a recovery per acre foot and net pay and we come out with 130 acres.

I feel that since we used 30.5 per acre foot as an upper limit of per acre foot recovery, and 230 feet as the maximum that we could assign for a net pay, then the 130 acres is the minimum figure that we can attribute to this well in order to come out with 909,000 barrels.

The whole sum of it is that we have such a large volume of reserves that cannot be accounted for on less than 80 acres, and it comes out to 130 acres would be about the minimum that would have to be productive in order to result in this large recovery of oil.

Q   In making the calculation, you have, for example, taken 230 feet of net pay. Actually, do you feel that you have 230 feet of net pay in this well?

A   No, sir, I really doubt if we do, but we don't have

any other figure to go by and that's the maximum that I feel
could be productive, so I wanted to end up with a conservative
estimate of drainage area.

Q   In each instance have you used the maximum figure in
that fashion?

A   Yes.

Q   Do you feel that your calculation is the most conserva-
tive?

A   That's right.

Q   In that case, does this show that this well is draining
more than 80 acres?

A   It sure does.

Q   Would you discuss the economics of developing this area
on 80 acres versus 40 acres?

A   On 80-acre spacing, we have used our actual well costs
of our single well, used this ultimate recovery of 909,000 barrels
and assuming a top allowable of 164 barrels per day, this would
take 11 years before declining at 20 percent to produce this
909,000 barrels. I have used a dry hole risk factor of 75 percent,
which means that one producer out of four wells drilled. This,
I think, was established by the geologist.

On 40-acre spacing I have used the same well cost and
half the ultimate recovery, assuming the top allowable of 94
barrels per day for nine years, 25 percent decline until this
reserve is produced. This assumption also bears a 75 percent

dry hole risk factor.

The results of these economics show that on 80-acre spacing, the well will pay out in 3.76 years with a 29.4 percent rate of return, with a net profit of $760,624.00 on an investment of $260,888.00, for profit-to-investment ratio of 2.96. We consider those economics pretty good, even though the payout is not too outstanding.

The 40-acre spacing, 6.49 year pay-out, 12.10 rate of return, net profit of $240,631.00 on investment of $260,888.00, for profit-to-investment ratio of .922. While this shows a large profit and a good profit-to-investment ratio, the payout is slow and rate of return is low, and this is below the company standards for development of wells.

Q   What is the company standards?

A   Approximately four years and 20 percent.

Q   Four years and 20 percent?

A   Yes.

Q   Have you also made calculations on the economics of the 80 acres and the 40 acres on which this exhibit is based?

A   Yes, the next two exhibits are entered in support of Exhibit No. 7. This is simply the machine calculations of these economics which back up the Exhibit No. 7.

Q   If the pool is to remain on 40-acre spacing, in your opinion will it be fully developed?

A   No, sir, I don't believe there will be any more drilling

in the thing. We have, as the geologist said, proposed one well

and it has been turned down because of the marginal economics.

Q   If the pool were placed on 80-acre spacing and pro-

ration units, in your opinion would there be further development?

A   Well, sir, I'd certainly recommend further development.

As you may know, management acts in strange and wondrous ways,

but it's my opinion that it will be further developed on 80 acres,

yes.

Q   In the event this application is not approved and there

is no further development, in your opinion would there be any oil

left in the reservoir that would not be recovered?

A   Yes, sir, I believe it would. The area to the north,

maybe 320 acres or more productive to the north, that won't be

developed on 40 and maybe on 80 it will.

Q   In your opinion would that constitute waste?

A   Yes, sir, I believe it would.

Q   Have you made any production tests of this well?

A   Yes, sir. In June, with the concurrence of the Commission,

we tested Federal 12-5 No. 1 for 165 barrels of oil per day. It

shows that it will make the 80-acre allowable.

Q   And the 80-acre allowable would be --

A   164.

Q   -- 164?

A   Right.

Q   Has there been any decline in the productivity of this

well?

A   No, sir, there has not.

Q   Have you prepared any proposed rules for the La Plata-Gallup Oil Pool?

A   Yes, sir, I have.

Q   Referring to Exhibit No. 11, would you discuss briefly those proposed rules?

A   We have proposed 80-acre spacing with 80-acre unit to consist of any two contiguous quarter-quarter sections of a single governmental section, with the well to be located within 200 feet of the center of either quarter-quarter section in the unit.

Q   In substance, are these rules similar or the same as those proposed in the other case --

A   That's correct.

Q   -- for the Boulder-Mancos Oil Pool?

A   Yes, sir.

Q   Mr. Cameron, Standard is asking for 80-acre spacing on the basis of the information obtained from one well. In your opinion, does this information justify an application for 80-acre spacing?

A   Yes, sir, I believe it does.

Q   Do you feel that one well will drain 80 acres?

A   I do.

Q   Would Standard be willing to accept a temporary order, say for a period of one year or until additional information can

gathered on this pool, and then come back and present another case in connection with this spacing?

A   Yes, sir, I believe they would.

Q   Were Exhibits 3 through 11 prepared by you or under your supervision?

A   Yes, sir, they were prepared by me.

MR. KELLAHIN: At this time I would like to offer in evidence 3 through 11, inclusive.

MR. UTZ: Without objection, Exhibits 3 through 11 will be entered into the record.

(Whereupon, Standard's Exhibits Nos. 3 through 11 received in evidence.)

MR. KELLAHIN: That's all the questions I have on direct examination.

MR. UTZ: Are there any questions of the witness? Mr. Arnold.

CROSS EXAMINATION

BY MR. ARNOLD:

Q   I was wondering how you arrived at 6.49 years payout on a 40-acre well there. Can you run through that?

A   Yes, sir. If you will refer to, I think, Exhibit No. 11, which is the machine payout calculation, --

MR. KELLAHIN: It's 7, 8, and 9.

A   It would be 9.

MR. DURRETT: That's No. 9.

A   Over in the producer column you'll see the cost of $123,000, approximately, to which is added the DTF monies, which means the money that actually we used, 12 percent of our well cost, assuming that we're going to have to spend that on the fishing and the like, for a total cost of $138,000, but we have a dry hole risk investment of approximately three times that much because we plan on drilling three dry holes for every producing well, that's where the 75 percent dry hole risk factor comes, for a total investment of $500,000. After you subtract tax credits you come out with a net development investment of $260,000, more or less.

In the right column, net cash earnings, you can see it will take approximately six point some odd years of those accumulated net cash earnings in order to equal the $260,000.

Q   It's the dry hole factor there?

A   Yes, it's the dry hole factor that's killing us, yes.

MR. ARNOLD: That's all.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

MR. KELLAHIN: That's all we have.

MR. UTZ: Any statements? The case will be taken under advisement. The hearing is adjourned.

(Whereupon, the hearing was adjourned.)

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

    I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

    WITNESS my Hand and Seal this 6th day of August, 1963.

_____
NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2855, heard by me on July 10, 19 6 3.

_____ Examiner
New Mexico Oil Conservation Commission