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

22 August 1984

EXAMINER HEARING

IN THE MATTER OF:

Application of Yates Petroleum Corporation for new pool creation and special pool rules, Roosevelt County, New Mexico. CASE 8305

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce
Attorney at Law
Oil Conservation Commission
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Chad Dickerson
Attorney at Law
LOSEE, CARSON & DICKERSON P.A.
P. O. Drawer 239
Artesia, New Mexico 88210

I N D E X

EDDIE MAHFOOD

Direct Examination by Mr. Dickerson 3

Cross Examination by Mr. Stogner 13

E X H I B I T S

Yates Exhibit One, Plat 4

Yates Exhibit Two, Structure Map 4

Yates Exhibit Three-A, Decline Curve 6

Yates Exhibit Three-B, Decline Curve 6

Yates Exhibit Four-A, Log 7

Yates Exhibit Four-B, Log 7

Yates Exhibit Four-C, Log 7

Yates Exhibit Five, Calculations 8

Yates Exhibit Six, Tabulation 10

MR. STOGNER: We'll call next Case Number 8305.

MR. PEARCE: That case is on the application of Yates Petroleum Corporation for new pool creation and special pool rules, Roosevelt County, New Mexico.

MR. DICKERSON: Mr. Examiner, I'm Chad Dickerson of Artesia, New Mexico, appearing on behalf of the applicant. We have one witness.

MR. PEARCE: Are there other appearances in this matter?

(Witness sworn.)

EDDIE MAHFOOD,

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

DIRECT EXAMINATION

BY MR. DICKERSON:

Q Mr. Mahfood, will you state your name, your occupation, and where you reside, please?

A Eddie Mahfood, petroleum engineer, Yates Petroleum, Artesia, New Mexico.

Q And, Mr. Mahfood, you have previously testified as a petroleum engineer before this Division, have

you not?

A Yes, I have.

MR. DICKERSON: Is this witness acceptable, Mr. Examiner?

MR. STOGNER: He is so qualified.

Q Mr. Mahfood, what is the purpose of Yates application in this case?

A We seek the creation of a new pool with special rules for 160-acre spacing.

Q Refer to what we have marked as Exhibit Number One and direct the Examiner's attention to the well in question.

A Okay. Exhibit Number One is an ownership plat showing the location of our well in Section 11 of 7, 33.

Q And what's the name of that well?

A Well, it's the Smith -- Smith "ZJ" Well No. 1, located 660 from the south and west lines of Section 11.

Q And that 160-acre spacing unit outlined in red is the requested special pool initial boundaries?

A Yes.

Q Okay. Refer the Examiner to Exhibit Two and tell us what you've shown on that document.

A Exhibit Two is a structure map taken from GeoMap, Midland, Texas, and the north half of this map we

have a circle in the Section 11 of 8, 33, showing -- of 7,33, showing the location of the well in question.

In the south part of the map I have two circles drawn there. One in Section 16; the other one in Section 30. These two wells at the bottom are in the Tobac Bough C, and I've used their production history because of the decline curve for 80-acre spacing and 160-acre spacing.

Q Now, Mr. Mahfood, you say the two wells circled in the lower lefthand corner of the map both produce from the Bough C formation?

A This is correct.

Q In what zone is the Yates Smith Well in the southwest quarter of Section 11?

A It's in the Bough A or Bough B. This structure map shows a general strike or a similarity in the producing horizons.

Q Direct the Examiner's attention to the small semicircle around some of the wells indicated on your map and explain to him the significance of that symbol.

A That means they're deep wells completed in the Bough C.

Q Mr. Mahfood, why have you chosen the two wells in the lower left corner of this map for comparison purposes as opposed to some of the others?

A Well, I was trying to establish a decline curve for 160-acre spacing or greater.

Q And one of those wells in the south part

of this map is the only one which is -- can be shown to have drained 160 acres with only one well?

A This is correct, the one in Section 30.

Q Okay. Refer to your Exhibits Three-A and B, Mr. Mahfood.

A Okay, those are decline curves that we took on -- it was (not understood).

We first put the history of the production from those two wells referred to previously in Section 16 and Section 30, plotted their decline and we came up with a decline curve.

And the 80-acre spacing for Section 16 saw a decline rate of about 33, 34 percent.

Q And that's represented on the Exhibit Three-A, is it not?

A That is correct.

And the second one, it was for Section, the one in Section 30, we see a decline rate of about 27-1/2 percent.

Q And what significance do you see in comparing those two decline rates?

A The 27-1/2 percent was for the greater -- the more gradual decline, 27-1/2 percent, was for the greater spacing being drained and compared very favorably with previous testimony submitted to this Commission some ten years ago on the Allison 10-B, which was 28 percent.

Q Okay, Mr. Mahfood, refer to your exhi-

bits, the copies of the logs marked Exhibits Four-A, B, and C and tell the examiner the significant parts of those exhibits.

A Okay, the Four-A, the first one is the compensated density log, compensated neutron gamma ray log on the Smith "ZJ" No. 1. It's a section of that log and it shows the Wolfcamp and the Bough sections of the well.

On the right I have colored in the porosities in the Wolfcamp and Bough. The -- the only question is completed in the middle of these perforations, these porosities that I have designated here and I have the porosities in red in the center column.

The -- this log shows that there's porosities in the Wolfcamp as well as in the Bough and therefore we feel like the -- the new field should be a Permo Penn completion, Permo Penn Pool.

Q What about Exhibits Four-B and C, Mr. Mahfood?

A Four-B is a log showing the permeability and the porosities that I referred to before. It also shows that the Bough C section is encountering water. It's pretty wet. Therefore we had to come up and complete in the Bough B.

The Permo Penn, the Wolfcamp zone up there is commercial also.

The third log is a two casing log and the reason for putting this in here is to show the gamma ray and

the first two logs you'll notice that there is some radioactive zones in the zone I have perforated and that is probably due to this was an old hole, drilled back in the sixties with mud sitting on the perforations for some twenty years, and the formation had imbibed some fluid and become radioactive.

After cleansing the hole and cementing we don't see that radioactivity in the pay zone.

Q Mr. Mahfood, by later exhibits you intend to calculate the drainage area anticipated for this Smith "ZJ" Well and the estimated total recovery, do you not?

A Yes, sir, I do.

Q For those purposes what have you used these -- the information shown by logs for?

A Yes, I've used this log to come up with a certain data, the feet of perf -- the feet of porosity greater than 3 percent, the porosities, the saturations.

Q To be used in the next calculation?

A To be used in the next calculation.

Q Okay, refer to the exhibit we have marked as Exhibit Number Five and briefly summarize what you've calculated by this exhibit.

A Okay, I've listed the interval by foot with the porosities and saturations and have come up with a porosity -- well, a net pay of 14 feet out of that 19 feet I've listed there; an average porosity of 6 percent; an average saturation of 27.8 percent.

The viscosity, which is computed from standing, was .325 centipoise; the rock compressibility, 17x10 to the -6 psi.

The oil gravity from surface measurement was 47.2 gravity. The gas gravity is .968. The gas/oil ratio after 36 days of production was 969 cubic feet per stock tank barrel.

I've proceeded to develop a formation volume factor and that was the various calculations here using the dissolved gas and the amount of oil.

The formation volume factor was 1.54 reservoir barrels per stock tank barrel.

I have developed an estimated bottom hole pressure and that was 2795 psi, approximately.

From three different fluid levels shot in the well while it was pumping, one of the 13th day of production, one on the 14th day of production, one on the 31st day of production, I've come up with flowing bottom hole pressures and proceeded from there to calculate an average permeabilityl. We came up with an average permeability of 3.7 millidarcies.

I went one step further and using the reservoir equation for the radius of investigation is equal to hours divided by the porosity divided by the viscosity and the rock compressibility and gave me a radius of investigation on the 13th day of production at 1711 feet, which is right away greater than 160-acre spacing.

Q Mr. Mahfood, refer to your Exhibit Number Six and describe for the examiner what you have shown on that exhibit.

A On this exhibit I've tabulated all the data that we have acquired from the field and from the electric logs. We have the oil gravity, 47.2; gas gravity, 21 and July the 20th of 8750 barrels of oil.

From electric log we saw that pay with 3 percent cutoff was 14 feet; the average porosity was 6 percent and average saturation was 27.8 percent.

Those calculations were in the previous exhibit.

After standing we saw the oil viscosity at reservoir conditions was .325 centipoise.

The apparent rate of permeability in the oil from calculations on the previous exhibit was 3.7 millidarcies.

The exponential production decline rate from the Tobac Bough C for 160 acres spacing was 2.65 percent per month, which is 27-1/2 percent per year. For 80 acre spacing it would be 3.33 percent per month, or roughly 66 percent per year -- 34 percent per year, pardon me.

After Craze and Buckley, authors who have presented a rule of thumb equation to come up with recovery factor for a water drive system, and this reservoir is a partial oil drive and a partial solution drive, we -- the recovery factor for the water drive system was 30.9 percent

of the oil in place, which I think would be pretty much representative also for a gas drive. You have to go to a (not understood) solution to come up with a gas drive recovery factor, which we don't have enough data to do.

However, using a 30.9 recovery factor, we find that recoverable oil is 946.3 barrels of oil per acre.

The calculated economic limit for this well is 75 barrels of oil per month and it would take 170 months at the present production rate to reach that economic limit.

The equation for the ultimate recovery is the -- I have it written out here, Q times Rn minus 1 divided by R minus 1, which computes at 326,750 barrels of oil after 170 months.

The drainage area then would be this volume, 326750 divided by the 946.3 barrels per acre, and that gives us a drainage area of 345 acres.

Q And Yates is requesting special pool rules permitting development on 160-acre spacing units?

A Yes.

MR. DICKERSON: Mr. Examiner, at this time we move the admission of Applicant's Exhibits One through Six.

MR. STOGNER: Exhibits One through Six will be admitted into evidence.

Q Mr. Mahfood, what would you request that the Division do with respect to the well location require-

ments for wells located in this pool?

A I would ask for 330 from each point.

Q Within the --

A Within the 160.

Q From any boundary in the 160.

A Yes.

MR. PEARCE: I'm sorry, between the two of you I just got confused. Could you repeat that?

Q Do you request that development of well locations be permitted in this pool with the only limitation that no well shall be located closer than 330 feet to any exterior boundary?

A Yes.

MR. STOGNER: Mr. Dickerson, would you please clarify that? Are you speaking of 30 -- 330 foot from any boundary, and that includes the quarter quarter section line?

MR. DICKERSON: No, no. From any exterior boundary of 160-acre unit.

MR. STOGNER: Mr. Dickerson, Mr. Mahfood, I believe the Division in the past has really frowned on drilling on a quarter quarter section line or any boundary thereof.

MR. DICKERSON: Well, no, not closer than 330 feet.

MR. STOGNER: Oh, okay, let's go back --

MR. DICKERSON: And -- oh, I see what you're saying.

MR. STOGNER: -- and clarify that.

MR. DICKERSON: And we have no problem with a further stipulation that no well in the interior of 160-acre unit will be closer than 10 feet to any 40-acre boundary.

Q Mr. Mahfood, in your opinion will one well in this area and in this formation effectively and efficiently drain 160 acres?

A Yes.

Q And will permitting development on 160-acre spacing prevent the drilling of unnecessary wells in your opinion?

A Yes.

Q And will it otherwise prevent waste and protect correlative rights?

A Yes.

MR. DICKERSON: Mr. Examiner, I have no further questions of this witness.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Mahfood, the Smith "ZJ" Well No. 1, it's located 660 foot from the south and west line, is it not?

A Yes, sir. That was a re-entry.

Q Oh, it is a re-entry?

A Yes, this well was drilled twenty years ago.

Q What is its present status now?

A It's producing something in the neighborhood of 360 barrels a day.

Q Mr. Dickerson, Mr. Mahfood, I still have a problem with this 10 foot from any quarter quarter section line.

That's getting pretty close. Would there be any objection to it being 330 feet from any boundary and that including the quarter quarter section line, as with a 40-acre spacing unit, the --

A That will be satisfactory.

Q Thank you, Mr. Mahfood.

MR. DICKERSON: We just like to drill where we like to, Mr. Examiner.

MR. STOGNER: I'm well aware of Yates past experience with that.

There is no wilderness areas out there, are there?

A No, thank God.

Q Oh, temporary -- you're requesting temporary pool rules. How long would Yates propose that these pool rules in existence before another hearing is called to look at further evidence, make them permanent.

A We hadn't discussed this but I thought it would be --

MR. DICKERSON: This was the -- the Smith Well, Mr. Examiner, was the first well in the unit and there's a large block of acreage to be explored, and we would anticipate that it proceed fairly rapidly, but probably request that these temporary pool rules be in effect for two years?

A It might be, yes.

Q The vertical limits on this, and if we'll refer back to Exhibit Number Four and its subparts, you have marked on here about 2/3rds of the way down on each log, there's a Virgillian.

A Virgillian.

Q I'm sorry.

A Yes, Virgillian, that is a geological name for the top of the Bough, I believe.

It's subject to interpretation. Every geologist has a different name for the top of the Bough.

Q Okay, I'm not familiar with the Virgillian, and that's spelled V-I-R-G-I-L-L-I-A-N.

A L-L-I-A-N.

Does it correspond with the top of the Cisco?

A I believe that is correct. It's a marker and I believe it is the top of the Cisco.

Again, I think different geologists have different interpretations of the top of the Cisco.

Q Okay. Where would be the base of the proposed Permo Penn Pool? Would that be at the base of the Cisco?

A Yes. Well, let me see now. Sir, there is -- there is another well already in another pool that is outside the -- more than a mile away from this well. That is in the Canyon, and I don't know whether that should be or should not be included in the Permo Penn, in this Permo Penn Pool.

Q Mr. Mahfood, I'm still bothered with the information that we have here as far as the Bough C and that's more than six miles away, and is there any Wolfcamp production in the area here?

A No, sir, not that I know of.

Q And --

A There is a Canyon and there is a Bough C well within two miles of this well.

MR. DICKERSON: Shown on Exhibit Number Two, Mr. Examiner.

Q Could you please describe that Canyon well with referring to Exhibit Number Two?

A The Canyon well is in the northwest quarter, northwest northwest of Section 9.

Q And that's marked the No. 1 Roberts, is that right?

A That is correct, yes, sir.

Q Who is the operator on that well?

A I believe Union is.

Q Is that within an established pool at this time?

A I believe that is just called Chaves undesignated, or something like that. I'm not positive, though.

And the northwest of the southwest is the Pauley Petro well which is in an established pool, the Chaveroo North Bough C.

Q Repeat that again, please.

A It's in Section 9, the northwest of the southeast, there is a Pauley Petroleum Tupper Federal No. 1 Well, which is completed in the Bough C, and it is designated, I believe, as Chaveroo North Bough C.

That's greater than a mile from our well.

Q Mr. Mahfood, have you been in communication with our Hobbs District Office, in particular Mr. Paul Kautz, our geologist down there, on this proposal?

A Yes, sir, about two months ago I contacted him concerning a new pool designation for our well and we both agreed that North Chaveroo Permo Upper Penn would be an appropriate name for the new pool.

Q The North Chaveroo Permo Upper Penn?

A Yes, sir.

Q And did you and Mr. Kautz talk in particular the vertical limits of this proposed pool?

A It's, let's see, 108, I believe, is the

Traum, and I don't remember what the full number is but we did designate the southwest quarter of 11, I believe.

MR. DICKERSON: But is the -- the Wolfcamp is requested to be included --

A Yes.

MR. DICKERSON: -- within the -- as the top of the vertical limits of this pool. What is the base of the vertical limits of the pool?

A We did not discuss that.

MR. DICKERSON: Well, we ask in the application for Upper Penn.

A Yeah.

MR. DICKERSON: Where from these logs do you calculate the base of the Upper Penn?

A The base of the Cisco I would call the base of the Upper Penn.

MR. STOGNER: Okay, so the vertical limits you're proposing, Mr. Dickerson and Mr. Mahfood, would be from -- running from the top of the Wolfcamp formation to the base of the Cisco, is that correct?

A Yes, sir.

MR. STOGNER: Okay. Thank you.

Are there any other questions of Mr. Mahfood? If not, he may be excused.

Are there any -- is there anything else further in Case Number 8305 at this time?

Mr. Dickerson, do you have any-

thing further?

MR. DICKERSON: No, nothing.

Does anybody else have anything further?

If not, Case Number 8305 will be taken under advisement.

(Hearing concluded.)

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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. 8305, heard by me on August 22, 1984.

Michael E. Stogner, Examiner
Oil Conservation Division