BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
STATE LAND OFFICE
SANTA FE, NEW MEXICO
Wednesday, August 23, 1972 at 1:15 P. M.

EXAMINER HEARING

IN THE MATTER OF:	
Application of Yates Petroleum Corporation to directionally drill and an unorthodox location, Eddy County, New Mexico.	Case No. 4803

BEFORE: RICHARD L. STAMETS, Examiner

TRANSCRIPT OF HEARING

PROCEEDINGS

MR. STAMETS: The hearing will come to order, please. We will call next case 4803.

MR. HATCH: Case 4803, Application of Yates Petroleum Corporation to directionally drill and an unorthodox location, Eddy County, New Mexico.

MR. LOSEE: Mr. Examiner, I am A. J. Losee, Artesia, representing the applicant. We have two witnesses.

(Whereupon, Mr. Ray H. Beck was called to the stand and sworn.)

MR. RAY H. BECK

having been first duly sworn according to law, upon his oath, testified as follows:

DIRECT EXAMINATION

BY MR. A. J. LOSEE:

Q State your name, please.

A Ray H. Beck.

Q Where do you live and what is your occupation?

A I live in Artesia, New Mexico. I am a petroleum geologist.

Q Employed by?

A Yates Petroleum.

Q You have not previously testified before this Commission and had your qualifications made a part of the record?

A No.

MR. LOSEE: Are Mr. Beck's qualifications acceptable?

THE EXAMINER: They are.

Q (By Mr. Losee) What is the purpose of the application of Yates Petroleum Corporation in this case number 4803?

A Yates wishes to drill and end up in an unorthodox location in the North Half of Section 25 and they wish to directionally drill at that point from an abandoned hole nineteen-eighty from the north and six-sixty from the east of Section 25, 18 South, 25 east.

Q What is the bottom-hole unorthodox location to be, Mr. Beck?

A It is to be 500 feet from the north line and 600 feet from the east line of Section 25, Township 18 south, Range 25 East.

Q To dedicate the North Half of 25 to that well?

A That's right.

Q And the proposed bottom is then at the Atoka West Morrow?

A Atoka West Morrow field.

Q Please refer to what has been marked Exhibit 1 and explain what is shown on this exhibit.

A Exhibit 1 is a land ownership map and this marks off the North Half of Section 15, 18 South, 25 East. It is on acreage dedicated to the proposed well.

Q It also shows the offset operators and the wells within the two mile radius of this acreage dedication, does it

not?

A Yes, sir.

Q Please refer to what has been marked as Exhibit 2, the isopach map, and explain what is portrayed by this exhibit.

A Exhibit 2 is an isopach map of the Atoka B Sand interval which covers the Atoka Penn field in eighteen twenty-six and the Atoka Morrow West field which is in eighteen twenty-five in the extreme western portion of eighteen twenty-six. The blue lines indicate isopach values of interconnected shoreline strike sands such as beaches, laguna beaches, barrier island beaches and a channel system which cuts across the field indicated in orange. It indicates a river bar channel system and it is interconnected and reservoir connected with the shoreline strike sands. To the left in the Atoka Morrow West field red indicates the shoreline strike sands, the thicknesses of them, and the yellow indicates the thicknesses of the channel sands which cross-cut the shoreline strike sands. Now, we wish to draw an analogy between the Atoka Penn well on the right and the Atoka Morrow field on the left. Geological studies such as these on isopach map in the cross sections presented later indicate along with pressure data that the partially completed Atoka Penn gas field is a reservoir consisting of a thick channel sands cross-cutting but reservoir connected to thinner shoreline

strike sand bodies. Geologic studies, this map and cross sections to be shown later indicate along with pressure data to be introduced by Mr. Mahfood simarly indicate that the newly developing Atoka Morrow West gas field in eighteen twenty-five is also a reservoir consisting of a thick channel sands body cross-cutting but reservoir connected to thinner shoreline strike sand bodies. The Fasken Brown Yates well in the Southwest Quarter of Section 24, eighteen twenty-five and the Mountain States McCaw well in Section--in the Northwest Quarter of Section 19, eighteen twenty-six are in the Atoka Morrow West field. The Fasken Brown Yates well Section 24 is producing from the channel sand stone and the Mountain States McCaw is producing from interconnected shoreline strike sand and beach deposit. The pressure information indicates that these wells are in the same reservoir system even though one is in a thinner sand stone body and the other is in a thicker channel sand stone body.

Q Now, those are the only producing wells in Morrow West field, are they not?

A That's right.

Q Would you point out the other wells that have been drilled to the Morrow in this field?

A In the Northwest Quarter of Section 25 there is a well, Fasken Number 1 Yates Federal Comm which was drilled to

the Morrow and the operator decided not to complete the well, but we believe that it is connected geologically and we present pressure information later supporting this. Also in the Northeast Quarter of Section 25 there is a well drilled, a Fasken Number 1 Yates Hornbaker E, which penetrated the extreme left-hand or western side of the channel sand stone. The operator found the Morrow B sand channel there to be the edge of the channel and a natural levy environment and was indicated to be tied on drill system. They sidetracked the hole 310 feet to the east and 83 feet south or about 321 feet from the original hole and found the channel, whereas the channel was 45 feet thick in the original hole, it was 106 feet thick in the well, only 321 feet of well.

THE EXAMINER: Let me get a clarification on this. The original Fasken Yates Hornbaker is that the one you are referring to?

THE WITNESS: Yes.

THE EXAMINER: That is represented by the small circle?

THE WITNESS: Yes, sir.

THE EXAMINER: To the right of the well as you have drawn it on your map?

THE WITNESS: Yes, sir.

Q (By Mr. Losee) What is the bottom-hole location of the sidetrack well?

A The bottom-hole location of the sidetrack is 310 feet from the east of the original surface location and 83 feet south.

Q Now, there is one other well in the field that we were talking about that has been drilled.

A This is the Bates Number 1 Linck in the Southwest Quarter of Section 23, eighteen twenty-five. This well is also near the channel edge and again it is in the unfavorable natural levy environment rather than being in the cleaner sands of the channel. Near the edge of the channel you run into lesser permeability than you do in the channels themselves. We have an article here written by Wayne Prior of the University of Cincinnati. It was a study conducted for the A.P.I. and it was published in the Journal of Petroleum Engineers and his results indicate that the permeability on the channel edges is less than the permeability in the channel proper. That is, you lose permeability as you approach the natural levy or edge of the channel.

Q Do you have any further comments on the isopach map?

A No, I believe not.

Q Please refer to what has been marked as Exhibit 3 and explain what is shown by this exhibit.

A Exhibit 3 is a stratigraphic cross section extending from location A, as you see on the index map, to location A-Prime.

It goes from the Atoka Morrow West field on the left to the Atoka Penn field on the right and tends to supplement the original Exhibit Number 2, the osopach map. The wells included are the Fasken Number 1, Yates Federal Comm 25, Fasken Yates Hornbaker Number 1, Fasken Hornbaker Number 1 and the whipstock hole. That is in the Atoka West field. Starting into the Atoka Penn field there is the Marathon Nicks Number 1 and the Ohio Nicks Number 1 and the Ohio Noel Number 1 and the Yates-UA Number 1. On the cross section it is located at the top of the Morrow Clastics. This is the horizon on which the structural contours which are on Exhibit 2 are taken from. On the left of the cross section the beds in red match the beds of the isopach's map in red. The yellow would be the channel going through the Atoka Morrow West field and then the blue on the right corresponds to the shoreline strike sands of the Atoka Penn field and the orange corresponds to the cross-cutting channel. Each well is indicated and the drill stem test data and perforations.

Q Do you wish to comment on the drill stem test data on either of these Fasken wells in the North Half of 25?

A No. I would just point out that speaking from a geological standpoint the stratigraphic relationships that the isopach indicates, we see that the shoreline strike sands on the Atoka west are intercepted by the channel. The

channel of the Fasken Yates Hornbaker well indeed has been deviated only a short distance into a channel much like the channel that the Ohio Nicks is in and the same stratigraphic relationships apply from the Atoka Penn which is a pool that is about 12 years old to the newly developing Atoka Morrow West field which we would like to develop more.

Q Were Exhibits 1 through 3 prepared by you or under your direction?

A Yes, sir.

MR. LOSEE: We move the introduction of Exhibits 1 through 3 and I have no more direct examination of this witness.

MR. STAMETS: Without objection applicant's Exhibits 1 through 3 are admitted into evidence.

Are there questions of the witness?

Now, speaking about the Fasken Yates Hornbaker well, this was sidetracked and did encounter the channel?

THE WITNESS: Yes, sir.

MR. STAMETS: That a substantial amount of pay in there, 106 feet or at least of sand?

THE WITNESS: 106 feet of channel sands, yes, sir.

MR. STAMETS: Can you tell me why that well didn't produce and why you are seeking, at least according to your map, to drill a location which would encounter the channel at about the same thickness?

THE WITNESS: Yes, sir. Mr. Mahfood may expand on this later, but they found after they had drilled into the channel 78 feet, they attempted to drill stem test, and in this drill stem test they obtained gas to surface nine and a half minutes at a maximum of 692,000 but then in 49 minutes the mud and formation water flowed to the surface and recovered 5650 feet of salt water and they had it--it indicates that we believe that they drilled too far into the channel before they drill stem tested. Subsequent tests also obtained water but they did finally have good pressure and we are of the opinion that had they not penetrated as far as they did that perhaps they would have found the gas above the water or that they might be in a transition zone where the cut may be a little bit too high. They thought it would be not good from a mechanical standpoint to complete the well because of the water problems.

THE EXAMINER: According to Exhibit 2 it would appear that substantially most of the reservoir that you would be producing from would lie outside the boundaries of Section 25; is that correct?

THE WITNESS: Would you say that again?

THE EXAMINER: Well, the reservoir that you propose to tap--

THE WITNESS: Yes.

THE EXAMINER: --With your well, the channel appears to be mostly outside Section 25.

THE WITNESS: Well, the channel does cross through Section 24 there, yes, more than it does in 25. However, we believe, and we tried to point out by analogy with the Atoka Penn West field, that even though the channel would be a likely place to go, you can still drain from the same reservoir by interconnected strike sands so that the entire half of 25 is still part of the system.

THE EXAMINER: For the record would you run over the results of the drill stem tests on the Yates--Fasken Yates Comm which is the well which was not completed in the North Half of the Northwest Quarter of Section 25?

THE WITNESS: Yes, sir. Drill stem test number 2 eighty eighty-eight, thirty eighty-eight, ninety-two. Condensate 450 foot of gas cut mud. Flowed gas at 2.65 million and decreased 2.4 million at the end of the test. Flow pressures twenty-two ninety-one to twenty eighty-nine. Shut-in pressures thirty-four eighty at one hour and final shut-in pressure was thirty eighty-one in six hours.

THE EXAMINER: Do you feel that the entire North Half of the Section 25 can reasonably be presumed to be productive of gas?

THE WITNESS: From the geologic standpoint, I believe that's true.

THE EXAMINER: The well at the bottom-hole location that you propose, will that efficiently and economically drain

the entire half of the north section?

THE WITNESS: I believe it will.

THE EXAMINER: Are there any other questions of this witness?

MR. HATCH: It is proposed to dedicate the North Half rather than the East Half. Is there any reason?

MR. LOSEE: I can offer one. Looking at their isopach I suppose one is that it is more logical that those beach sands will drain in the channel across the North Half than it will across the East Half. Another reason which may be the foremost reason is that Yates is the owner of the entire North Half. Although they have a good part of the East Half they don't have it all, as I understand it.

THE EXAMINER: The witness may be excused.

(Whereupon, Mr. Eddie Mahfood was called to the stand and sworn.)

MR. EDDIE MAHFOOD

having been first duly sworn according to law, upon his oath, testified as follows:

DIRECT EXAMINATION

BY MR. A. J. LOSEE:

Q State your name, please.

A Eddie Mahfood.

Q Where do you live and what is your occupation?

A Artesia, New Mexico, petroleum engineer employed with Yates Petroleum Corporation.

Q Have you previously testified before this Commission and had your qualifications made a part of the record?

A Yes.

Q Please refer to what has been marked as Exhibit 4 and explain the data that is shown on this exhibit.

A Exhibit 4 is a pressure build-up and supporting data log of the Fasken Yates Federal Number 1. The purpose of this is to show that there is gas reserves in this area and that it is not a limited reservoir and that there is communication with the rest of the West Atoka field. You will note that the extrapolated pressure is thirty-seven seventy-one on the initial test period and also on the frontal test period. You will note that the well is very tight and that the well is some three feet away from the well bore and to extend state conditions would have yielded only 100 MCF per day. This is just not enough quantity sufficient to justify most operators' completion of the well. For that reason I believe the well was not completed.

Q Would you compare the pressure, initial pressure, on this well with other wells in the field?

A Yes. I would like to refer back to Exhibit 2. You will notice that the McCaw Number 1 well in Section 19 of eighteen twenty-six was the discovery well of the West

Atoka field. In October of '70 the top hole pressure test was 3600 pounds. Two months later the Brown Yates well in the Southeast Quarter of Section 24 eighteen twenty-five was completed and tested with a bottom-hole pressure of thirty-five ninety-nine. Three months later the one twenty-five in Section 25 was drilled and its pressure was thirty-seven seventy-one after extrapolation shown in Exhibit 4. The Linck well in Section 24 was approximately thirty-six ten by extrapolation and the Baker well drilled some 12 months later was thirty-five seventy-nine and thirty-five eighty-one. These pressures are all very close to one another and would indicate communication to me. I would direct your attention to the log on this Yates Federal one twenty-five. You will notice in the red in the Morrow B section the porosities. That portion of the pay is what I consider to have reserves. This would suggest a fingering effect. The log suggests beach phases or a trough between sand bars such as you will find down there. You can wade three-quarters of a mile or a mile from the shore and you go through several troughs and come up on sand bars. I think that this will just happen to be in a bad location. It was drilled in that local tight spot.

Q Please refer to what has been marked as Exhibit 5 and explain what is shown by this exhibit.

A Exhibit 5 is a pressure build-up on the Hornbaker Number 1, the original hole to the left and the deviated hole on the right top side of the graph. Supporting data is drill stem test data on both holes and the electric log of each hole. We notice that drill stem test number 1 of the original hole shows a very tight formation. The well flows 90 MCF per day with no fluid but it just didn't have it because as Mr. Beck stated earlier, this well is located on the levy of the channel. I ask you to look at the gamma ray side of the log. This would indicate to me that it was outside of a beach area and that this is in a channel. Then we have a deviated hole, this great thick channel, in there and you note again on the gamma ray side there how thick and low activity is. It is our conclusion from the several drill stem tests run on this deviated hole that a transition zone exists in this channel and I refer you back to Exhibit 3. Drill stem test number 4 was first run through the A and B zone and it flowed 652 MCF per day with a salt water recovery of 5650 feet. Drill stem test number 6 tested the bottom part of this interval in the B zone and it flowed 240,000 cubic feet per day and recovered 5300 feet of salt water. The drill stem test number 5 was taken at the upper part of the B zone and it flowed 600 MCF per day and recovered only 2700 feet of gas cut water. Drill stem test number

9 was taken still a half part of that B zone and a quarter or one-quarter million cubic feet a day, recovering very little water. Only after five hours of flow did that water--did it produce any water. It seems to me that if we can get up dip from this location, say approximately 400 feet, that we can complete in this channel free of water. Furthermore, this channel will drain the beach sands much more effectively than would a well in the beach sand because of the greater permeability in the channel sands and the greater surface area of the beach sands exposed to the channel sands. I also draw your attention back to Exhibit 2 that the pool's location is approximately the same elevation, subsea elevation, as the McCaw Number 1 well. McCaw Number 1 was in nineteen eighteen twenty-six and the McCaw well is free of water.

Q Have you found any evidence of the transition zone in your study of the older Atoka Penn field in the channel?

A We know of two wells in the channel in the old Atoka field which is not included in this cross section. I am referring to the Haukins well and the Everest well. It is not included in this cross section, but I believe our examiner is familiar with them.

Q Explain what water was encountered in those wells.

A The Haukins well which was located on top of this transition zone there, produced gas for some ten years before

it was finally voided out and the Everest well, produced several years later than that. Also there was a Pan-American well in there between the Haukins and the Everest, but the point that I am making here is that a well can be at the top of this transition zone although it may produce some water it will effectively drain the gas.

Q Please refer to what has been marked as Exhibit 6 and explain what is shown on this exhibit.

A Exhibit 6 is a pressure build-up on the Brown Yates Number 1 well which is in this channel. It is located in the Southeast Quarter of Section 24. You will observe the pressure came up rapidly and stabilized at thirty-five ninety-nine on the initial charts. This just supports the previous testimony about the pressures in these other wells that are in the West Atoka field.

Q How do these compare with a one twenty-five well that is in the Northwest Quarter of 25?

A The pressure is higher but it was a well that was drilled three months earlier and I believe is already in production at the time that the one twenty-five was drilled.

Q What about the pressure in the Hornbaker?

A The pressure in the Hornbaker is a little less than the Brown Yates, although it is in a channel and in the transition zone which would probably explain for it being a little bit higher than the one twenty-five.

Q Please refer to what has been marked Exhibit 7.
A Exhibit 7 is the drill stem test data on McCaw Number 1 well in Section 19 of eighteen twenty-six. You will note that the original shut-in pressure was 3600 pounds.
Q That is a beach sands well. How does that pressure compare with the one twenty-five?
A It compares very well considering that this was a discovery well in that beach sands and was drilled several months before the one twenty-five was penetrated.
Q So that the two wells in the field that are producing are this McCaw and the Brown Yates well?
A That is correct.
Q How much gas approximately have they produced since discovery?
A It has been around three billion cubic feet of gas.
Q In your company's studies of the reserves in this field, have you reached any estimate as to what might be the reserves in the total field?
A Yes. I would estimate 40 billion cubic feet as the reserves in the Atoka field just from the draw on these two wells. That is a lot more gas in dedicated acreage to these two wells. It is a lot more gas than there is in that channel, so it must be draining the beach also.
Q Mr. Mahfood, do you have an opinion as to whether the entire North Half of Section 25 will contribute gas to a

well located 500 feet from the north line and 600 feet from the east line?

A Yes. I definitely think it would.

Q Do you think that a well at that location will sufficiently and economically drain the North Half of the section?

A Yes.

Q Do you have anything further to add?

A I think to enter this old well would prevent economic waste insofar that it is $30,000 cheaper to deviate the old well than to drill a new well. It would protect correlative rights since it would afford drainage of that entire North Half and it would prevent waste insofar as the channel completion and will afford us better recovery from the beach sands at a more economic rate.

Q Were Exhibits 4 through 7 prepared by you or under your direction?

A Yes.

MR. LOSEE: We move the introduction of Exhibits 4 through 7.

THE EXAMINER: Without objection the exhibits will be admitted.

MR. LOSEE: I have no further direct examination.

THE EXAMINER: Other questions of the witness?

Mr. Mahfood, how do you propose to directly drill this well?

THE WITNESS: We will set a whipstock at 5400. We would set a target space probably 50 feet east of where we want to wind up which is, I believe, what our docket says.

THE EXAMINER: You say 5400 or 5500?

THE WITNESS: 5400 feet. We will set this whipstock and we will aim 50 feet east of the objective and the objective is 600 feet from the east line and 500 feet from the north line. We feel that the permeability trends and the dip of the channel will carry the tubing back on to target.

THE EXAMINER: Do you propose to follow the course of the hole during the time of drilling?

THE WITNESS: Yes, sir. We intend to do that.

THE EXAMINER: By running deviation directional surveys?

THE WITNESS: That's correct. We will probably have to reset the whipstock several times.

THE EXAMINER: Do you know if a directional survey has been run by the previous operator which would already show us the location of the bottom of the hole 5400 feet?

THE WITNESS: This is correct.

THE EXAMINER: So you would go ahead and use that one rather than running a completely new directional survey?

THE WITNESS: This is correct, yes.

THE EXAMINER: Upon completion of the drilling, you would run a directional survey.

THE WITNESS: Directional survey.

THE EXAMINER: From the 5400 point on down?

THE WITNESS: This is correct.

THE EXAMINER: Has Yates Petroleum to your knowledge discussed this proposal with the offset operators in the field?

THE WITNESS: Yes. They are familiar with our intention.

THE EXAMINER: Do you know if they have expressed any opposition to this?

THE WITNESS: They just thought we were crazy.

THE EXAMINER: So they are not objecting to the final location?

THE WITNESS: I don't believe they are.

THE EXAMINER: But they have been advised as to this and they could be here if they did object?

THE WITNESS: Yes.

THE EXAMINER: Does Yates Petroleum propose a penalty for this non-standard location?

THE WITNESS: No, sir.

THE EXAMINER: Referring to Exhibit Number 5 and to previous testimony, I believe it has been stated that along the margins of this channel the porosity development is somewhat less than in the center?

THE WITNESS: Yes, it is.

THE EXAMINER: Would this act as any type of a barrier

to migration of the gas between the beach sands and the channel sands?

THE WITNESS: I would not think so. We know there is a decrease in permeability as we go back from the channel. This is rarely observed today in all big rivers, but it does not eliminate the porosity. It just decreases it as shown in that original hole.

THE EXAMINER: Do you propose some sort of a tolerance on the target area or do you anticipate any problem?

THE WITNESS: No, sir. I would ask a clearance of at least 50 feet.

THE EXAMINER: Are there any other questions? The witness may be excused.

Are there any statements in this case?

The case will be taken under advisement. Call next case 4804.

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EXHIBITS

STATE OF NEW MEXICO)
: ss.
COUNTY OF BERNALILLO)

I, MARCIA J. HUGHES, Court Reporter, do hereby certify that the above and foregoing pages are a true and correct transcript of the proceedings had before the New Mexico Oil Conservation Commission on Wednesday, August 23, 1972.

Marcia J. Hughes

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Aug 23
Richard L. Stamets