STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

22 June 1988

EXAMINER HEARING

IN THE MATTER OF:

In the matter of Case No. 8822 being reopened pursuant to the provisions of Division Order No. R-8188-A, Rio Arriba County, New Mexico.	CASE 8822 (REOPENED)

BEFORE: Michael E. Stogner, Examiner

A P P E A R A N C E S

For the Division: Robert G. Stovall
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico

For the Applicant:

MR. STOGNER: Call next Case Number 8822, which is in the matter of said case being reopened pursuant to the provisions of Division Order No. R-8188-A, which promulgated temporary special rules and regulations for the Northeast Ojito Gallup Dakota Oil Pool in Rio Arriba County, New Mexico.

Amoco, which was the original applicant in this case, has requested that this case be continued to the Examiner's Hearing scheduled for July 20th, 1988, and that hearing is to be held here in Santa Fe, New Mexico, in this room.

(Hearing concluded.)

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 (Commission) 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. 8822 (REOPENED) heard by me on 22 June 1988.

Michael E. Stogner, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

20 July 1988

EXAMINER HEARING

IN THE MATTER OF:

In the matter of Case No. 8822 being reopened pursuant to the provisions of Division Order No. R-8188-A which promulgated temporary special rules and regulations for the Northeast Ojito Gallup-Dakota Oil Pool, Rio Arriba County, New Mexico. CASE 8822

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Robert G. Stovall
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MR. STOGNER: This hearing will come to order.

Call next Case Number 8822.

MR. STOVALL: In the matter of Case Number 8822 being reopened pursuant to the provisions of Division Order Number R-8188-A, which promulgated temporary special pool rules and regulations for the Northeast Ojito Gallup-Dakota Oil Pool, Rio Arriba County, New Mexico, including a provision for 160-acre spacing.

MR. STOGNER: Call for appearances.

MR. LUND: Kent Lund on behalf of Amoco Production Company, which is the operator of the pool.

MR. CARR: William F. Carr with Campbell & Black, P. A., of Santa Fe, representing Benson-Montin-Greer Drilling Corporation.

MR. PEARCE: W. Perry Pearce, Montgomery & Andrews, P. A., appearing in this matter on behalf of Mobil Producing Texas and New Mexico.

MR. STOGNER: Any other appearances?

Mr. Lund, how many witnesses do you have?

MR. LUND: We have one witness

and two exhibits.

MR. STOGNER: Okay. Mr. Carr, do you have any witnesses?

MR. CARR: We do not intend to call a witness.

MR. STOGNER: Mr. Pearce?

MR. PEARCE: I do not, Mr. Examiner.

MR. STOGNER: Okay. Will the witness please stand and be sworn at this time?

(Witness sworn.)

MR. STOGNER: Okay, Mr. Lund, please continue.

MR. LUND: If I may, Mr. Examiner, may I give a quick background of why we're here and the orders that led up to us being here?

MR. STOGNER: Okay.

MR. LUND: This is the Northeast Ojito Gallup-Dakota Pool which is in Township 26 North, Range 3 West, and it originally covered Sections 25, 26, 35 and 36, and it subsequently got expanded a little bit as we'll discuss later.

But the vertical limits are

the Gallup and the Dakota formations, and as you indicated, this pool was formed in Case Number 8822, Order No. R-8188-A.

There was a hearing in May of '86. The order came out in June of '86, and Amoco sought the creation of this pool and its deletion from the then existing Ojito Gallup-Dakota Pool and among other things we sought the creation of 160-acre spacing, and we showed that by the geologic and engineering evidence at that time that there were different producing characteristics in this pool, basically the extent of natural fracturing, that warranted the creation of this new pool.

We were opposed at that time by two companies, Minel, Inc., and Union Texas, who were concerned about the production at the southern end of the pool.

There was a negotiated settlement where we agreed to have the wells on the south half of Sections 35 and 36 produce at no greater than a 40-acre allowable.

Subsequently that was removed when the West Lindrith Field, which is directly south of this field, was expanded and West Lindrith is spaced on 160-acre spacing also.

But anyway, we showed that at

that time that drilling on 40-acre spacing was uneconomical and it would result in the drilling of unnecessary wells and that's why we're back here to present some additional study as to what the proper spacing should be.

As I indicated before, in Case Number 9259, which resulted in Order No. R-8188-B, there was a hearing in December of '87 and the order was issued in March of '88, that we asked for a rescission of Rule 7 of the special pool rules of this pool. That was the one that I indicated before that had 40-acre allowable for the south half of Section 35 and 36, and by the order issued, the New Mexico Commission in Order No. R-8544, dated November 19, 1987, and effective December 1, 1987, this Division abolished the Ojito Gallup Dakota Pool, which was the pool that we separated off the Northeast Ojito Gallup Pool from, and extended the West Lindrith area, as I indicated before, so that the West Lindrith boundary is flush with the southern boundary of this particular pool.

So, anyway, the Rule 7 was rescinded as no longer being necessary, and the West Lindrith Pool was established in 1972 and that was in Case Number 4703, Order No. R-4314, and that -- the approval was in West Lindrith of 160-acre spacing with a 2000 GOR among other things.

And then subsequently, just by

some nomenclature this Division expanded the area of the Northeast Ojito Pool in an order, added some strip sections to the east and a couple other quarter sections that we'll show you on Exhibit Number One.

So we're here to report back in response to the show cause hearing and we are going to advocate that the temporary pool rules be made permanent and we're going to advocate that 160-acre spacing be made permanent, and we're going to prove the elements of New Mexico Statute 70-2-17P that 160-acre areas be will be the efficient and economic area that can be drained by one well.

And with that, we'll turn to our witness.

BETSY LOUGH,

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

DIRECT EXAMINATION

BY MR. LUND:

Q Would you please state your name and by whom you're employed?

A My name is Betsy Lough. I work for Amoco Production Company.

Q And you're employed as a reservoir engineer?

A Yes, that's right.

Q You've testified as an expert before the full Commission before, haven't you?

A Yes, I have.

Q But not before this Division.

A That's correct.

Q So briefly just state when you graduated from college, what your degree was in, and quick work experience from that time.

A Okay. I graduated with a Bachelor of Science degree in petroleum engineering in 1980 from Stanford University. I've worked for Amoco for eight years in various reservoir assignments. I've been working in this area with naturally fractured reservoirs for about a year now.

Q So you studied this area for purposes of the hearing?

A Yes, I have.

Q And you have prepared two exhibits for purposes of your testimony?

A Yes.

MR. LUND: Are her qualifications acceptable?

MR. STOGNER: They are.

Q Would you please turn to Exhibit Number One, state what that shows, and why it's important for this hearing?

A Exhibit One is a map showing the location of the Northeast Ojito Gallup-Dakota Pool. The dark outline shown is -- outlines the Jicarilla Apache A-118 Lease and which shows the original pool boundaries.

The dashed lines indicate areas that were subsequently included in the Northeast Ojito Gallup Pool by later expansions.

Q What about the development in the pool itself?

A Okay. There are eleven wells on the 118 Lease. The discovery well, Well No. 8, is highlighted with the orange dot. That well was completed in 1984. It was put on production in 1985 in October, October of 1985.

There were four other wells that were also put on production in October of '85, those being the No. 9, the No. 10, and the No. 11 Well, and in May of 1986 the No. 13 and the No. 14 Wells were put on production, and in October and November of 1986 Wells Nos. 15, 16, 17 and 19 were put on production.

Well No. 24 was drilled and completed in the last quarter of 1987.

Q And that's the only well that was actually drilled since the '86 hearing.

A Yes, that's right. At the time of the May, 1986, hearing 10 of the 11 wells had been drilled and tested and completed.

Q What about the cumulative production in this pool?

A The lease has a cumulative production of 1.1-million barrels of oil and 1.5 BCF.

Q And again we're talking about the original area of the pool, the 118 Lease for those figures?

A That's right. I also want to mention that the wells shown on the map here are wells that are completed in the Gallup formation. You'll notice that we start here with Well No. 8. Wells No. 1 through 7 are not completed in the Gallup formation, which is why they aren't shown on the map here.

Wells No. 18, 20, 21, 22 and 23 are not shown on the map. Those are reserved for additional drilling that may occur later on the lease.

Q So even though there are some gaps in the numbers, those are drilling locations for future development?

A Right.

Q Now, is it your understanding that

Amoco's position in 1986 was that this ought to be a separate pool because of the extent of natural fracturing and some different producing characteristics?

A Yes, that's my understanding.

Q What about the nearby field spacing, particularly West Lindrith and Gavilan?

A Yes. West Lindrith to the -- immediately to the south of the Northeast Ojito Field, is spaced on 160 acres, and then the Gavilan Mancos Pool directly to the east is spaced on 640's with an optional second well.

Q What about -- it looks like there isn't very much development in Section 25 in the northern part of the pool.

What are Amoco's plans for development?

A We -- there are five potential drilling locations and we are currently evaluating the situation for further development.

Q Let's turn then to Exhibit Number Two. Would you please state what that shows and why it's important?

A Exhibit Number Two is a series of production curves from four wells on the 118 Lease. I'll first describe the annotation that applies to the curves.

The well name is located at the top of the plot. The Y axis is oil rate in barrels of oil per

day, a log scale starting with 1 and up to 100,000.

The X axis is the time axis starting in January of 1985 through December of 1989.

On these different plots some of the plots are shown -- some of the plots showed some names of offset -- offset wells with arrows indicating where the -- at what time these offset wells were put on production.

Q All right, let's turn to the first plot in the packet, which relates to the No. 8 Well --

A Okay.

Q -- the discovery well.

A The No. 8 Well is a 160-acre location. We can see here that in the first half of 1987 we have a distinct change in character on the decline -- of the decline rate for the well, indicating some sort of interference from offsetting wells.

Q And the particular wells that you've noted with arrows on that exhibit, what do they represent?

A Those are the NZ No. 1 Well, located directly to the south; the 118-13, which is a north -- northwest offset; and then the additional -- additional wells to the offset well to the south. Those are just indicating at what time those wells were put on production and they may have had some effect on the producing -- on the decline rate of the well.

Q Let's turn to the curve for the No. 10 Well.

A The No. 10 Well is located in the northeast quarter of Section 35, showing here when the offset Well No. 14 was put on production, and the offset Well No. 17 was put on production. Here we see a distinct, again a distinct change in decline rate occurring towards the end of 1986. It's coincidental with when the No. 17 Well was put on line.

We also see a distinct change in character of the curve in the first half of 1988 becoming a much steeper decline, which is indicating some competition for reserves and interference from offsetting wells and again this well is also a 160-acre well.

Q Let's turn to the next page of the exhibit for the No. 11 Well.

A The No. 11 Well we show offsetting wells the NZ No. 1, located to the south, excuse me, Well No. 11 is located in the southwest quarter of Section 36. The Minel NZ No. 1 Well, located directly to the south, the 118 No. 14 to the north, the No. 19 and the NZ No. 2 Wells located to the east of Well 11.

Here in the end of 1986 we see a steepening of the decline rate changing character; the decline rate of the well occurring coincidentally with the -- with

when the Well 19 and the NZ No. 2 Well were put on production.

This indicates to us that there is some competition for reserves and interference between wells on 160's.

Q Let's turn to the last page of the Exhibit Number Two which relates to the No. 16 Well.

A The No. 16 Well, which is located in the northwest quarter of Section 26, this is a well that is in an area that's developed on 320 acres.

Based on the data that we have available to us at this time, we don't see any interference from offsetting production. On the figure here we can see that in the beginning of 1988 we did have an increase in production. That's due to installing compression on the well and the decline rate that's shown here is parallel to the initial decline rate established by the well.

Q Do you think that the adding of compression hides, or I guess contaminates this particular data for this well?

A No, I don't. Again you can see here that we are on the same type of decline rate that we were experiencing before putting on the production (sic). We simply saw an increase in production.

Q Would you just sum up what you conclude

from Exhibit Number Two and the various production curves?

A Okay. Exhibit Number Two shows that we see interference between wells that are developed on 160-acre spacing; therefore, to drill on any denser spacing than that would be unnecessary and wasteful.

We see on a -- a well that's developed on a 320-acre area we do not see interference from offsetting wells, at least at this time.

Q So do you see some competition for the same reserves on a 160-acre basis?

A No, we don't see the same competition for reserves on the well that's on 320-acre area compared to the 160's.

Q Before we -- were Exhibits Number One and Number Two prepared by you or under your supervision and control?

A Yes, they were.

MR. LUND: I offer them into evidence.

MR. STOGNER: Are there any objections?

MR. CARR: No objection.

MR. STOGNER: Exhibits One and Two will be admitted into evidence.

Q Before we conclude your testimony, let's

hit a couple quick points.

Number one, there's a lot of well development out here and you don't have true laboratory conditions. How do you interpret the data as a reservoir engineer given those conditions?

A Yes, that's -- that's true. We're working on an area here that we have some wells on legitimate 160-acre areas, some on 320's. It does make it difficult to interpret some of the data. We -- we -- on the curves that I've shown you can see some effect of offsetting wells. Exactly which wells are causing the changes we can't really point to but we do see that something is happening and the effect that we see is on the wells that are on 160-acre spacing as opposed to 320's, which indicate that 40-acre spacing is not necessary.

Q Now, this is a fractured reservoir, isn't it?

A Yes, that's right.

Q And is that -- how does that affect your analysis as an engineer in terms of a fractured reservoir versus a traditional reservoir?

A I think that the -- the -- this formation is very -- a very complex formation with the natural fracturing and we have basically two different factors influencing the performance of the wells. We have matrix and

then the fracture system, and the traditional type of reservoir engineering, particularly the volumetric type of calculations, in my opinion are difficult and just highly interpretive the main problem being in how do we define net pay to perform the pore volume type of calculations. In the conventional sense we have the -- in conventional reservoirs we have the porosity/permeability type cutoffs by which we define net pay and those type of cutoffs are not applicable to this type of fractured reservoir, and so in my opinion it's better to rely on the hard and fast data we have, such as the performance of the wells, in determining what type of spacing is optimum.

Q So Amoco tried to look at some traditional calculations like oil in place and volumetric calculations.

A Yes, that's right. We've done some work with the volumetric type of calculations. I tried to bracket some -- some oil in place type numbers but we feel more comfortable with looking at the -- again looking at the performance of the wells.

Q For example, in Section 35, that's fully developed on 160 acres. Do you have an opinion as to whether you needed all four of those wells to economically and effectively drain that particular area?

A Yes, I do, and that is the case. We did

require four wells in that particular section to fully develop the reserves.

Q Do you -- do you think that you need to drill up this pool on 40-acre spacing in order to effectively and economically drain the reserves?

A No, we don't. We see that the interference occurs on wells spaced on 160-acre areas and to go any denser than that would be -- would be drilling unnecessary wells, and uneconomic wells.

Q What is your recommendation for the Examiner?

A I would recommend that the temporary rules of 160-acre spacing be made permanent.

MR. LUND: Nothing further and we'd offer the witness for cross examination.

MR. STOGNER: Thank you, Mr. Lund.

Mr. Carr, your witness.

CROSS EXAMINATION

BY MR. CARR:

Q Ms. Lough, have you reviewed any pressure information on the wells in this pool?

A Yes, I have.

Q And what does that generally show you?

A Do you ask for specific --

Q Do you have initial bottom hole pressure information on these wells as they were drilled?

A We have an initial pressure on the No. 8 Well when it was initially completed.

Q And do you have any others?

A Not any initial pressure, no, sir?

Q And you don't have an initial pressure on the No. 16?

A No, sir. We do have pressure measurements that were made but not when the well was initially completed.

Q And how soon after completion do you have pressure information on No. 16?

A I don't recall exactly the date that we made that measurement.

Q Do you have any knowledge as to how those pressures would compare to the initial pressures in the No. 8?

A I know that the pressure was lower.

Q Was lower?

A Do you have -- does the pressure information that you've reviewed give you any indication as to whether or not wells are in fact draining 160 acres in this area?

A The pressure data indicates that they are draining 160 acres.

Q Would you be able to make the pressure information on the No. 16 Well available?

A As far as I know, yes, sir.

Q Okay.

MR. CARR: And I'll talk to you, Mr. Lund, about that.

MR. LUND: Be happy to cooperate.

MR. CARR: That's all I have.

MR. STOGNER: Thank you, Mr. Carr.

Mr. Pearce?

MR. PEARCE: Nothing, Mr. Examiner.

CROSS EXAMINATION

BY MR. STOGNER:

Q Ms. Lough, when -- when this well -- I mean when this pool was first formed, I guess back in 1986, how many of these wells were in existence, as shown on the map?

A Excuse me, could you --

Q Back in 1986 when the pool was first

formed, --

A Okay.

Q -- how many of these wells that you show on your map today were in existence?

A Okay. Within the -- within the North-east Ojitos Pool?

Q Yes.

A Okay, Ten wells were in existence within the original pool boundary at that time. That would be all of the wells with the exception of the No. 24.

Q All of the wells except the Number 24. So all the other wells were grandfathered in or they were in existence at the time this order was assigned.

A That's correct.

MR. STOGNER: I have no further questions of this witness and she may be excused.

Do you have any other witnesses, Mr. Lund?

MR. LUND: We do not.

MR. STOGNER: We are ready for closing statements, I would assume?

Mr. Pearce, you may first. Mr. Carr, you may go second, and Mr. Lund, you may follow up.

MR. PEARCE: Thank you, Mr.

Examiner. On behalf of Mobil Producing Texas and New Mexico, Inc., Mobil owns an interest in the well in the added area to the northwest of the original pool boundary, the 16 -- the Jicarilla 16-B, B-16 Well. Mobil has reviewed the data which Amoco has presented in this hearing and concurs in the conclusion that Amoco has reached, that to develop this pool on spacing larger than 160 acres threatens to decrease the ultimate recovery of reserves from the pool and also agrees that to develop the pool on spacing closer than 160 -- smaller than 160 acres, threatens to incur waste by the drilling of unnecessary wells.

Mobil therefore concurs in the recommendation that has Amoco has made to you and requests that the Division enter its order affirming 160-acre spacing in the Northeast Ojito Gallup-Dakota Oil Pool.

Thank you.

MR. STOGNER: Thank you. Mr. Carr?

MR. CARR: I don't have a closing, Mr. Stogner.

MR. STOGNER: Mr. Lund?

MR. LUND: I would simply echo Mr. Pearce's statement and would ask for the rules to be made permanent, and we believe that the elements in the statute on spacing, which is 70-2-17B have been established

and it's certainly inappropriate to develop on smaller spacing.

Thank you.

MR. STOGNER: If there is nothing further in Case 8822 it will be taken under advisement.

(Hearing concluded.)