

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

17 September 1986

EXAMINER HEARING

IN THE MATTER OF:

Case 8305 being reopened pursuant to CASE
the provisions of Order No. R-7660 in 8305
Roosevelt County, New Mexico.

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division:

Jeff Taylor
Legal Counsel for the Division
Oil Conservation Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

Chad Dickerson
Attorney at Law
DICKERSON, FISK, & VANDIVER
Seventh & Mahone/Suite E
Artesia, New Mexico 88210

I N D E X

EDDIE MAHFOOD

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E X H I B I T S

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Exhibit Number Five, Isopach 11

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MR. CATANACH: Call next Case
8305.

MR. TAYLOR: In the matter of
Case 8305 being reopened pursuant to the provisions of Order
Number R-7660, which order promulgated temporary special
rules and regulations for the North Chaveroo Permo-Pennsyl-
vanian Pool in Roosevelt County, New Mexico.

MR. CATANACH: Are there
appearances in this case?

MR. DICKERSON: Mr. Examiner,
I'm Chad Dickerson of Artesia, New Mexico, appearing on be-
half of Yates Petroleum Corporation and I have one witness.
He evidently is not here yet. He should be here in a few
minutes. Sorry.

MR. CATANACH: Do you know for
sure he'll be here in a few minutes?

MR. DICKERSON: He's at La Fonda
taking an insulin shot and eating something sweet.

He should be here in just a
minute, but you can pass us, Mr. Examiner, and we'll stick
around.

MR. CATANACH: All right, we'll
come back to this.

(Hearing postponed.)

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MR. CATANACH: We'll now continue with Case 8305.

Are there any other appearances in Case 8305?

(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, what is your name, your occupation, and by whom are you employed?

A Eddie Mahfood, petroleum engineer, for Yates Petroleum in Artesia.

Q And you have testified before this Division as a petroleum engineer on numerous occasions and your credentials are a matter of record, are they not?

A Yes.

Q And have you made a study of the available engineering data surrounding the case called as 8305 today?

1 A Yes, I have.

2 MR. DICKERSON: We tender Mr.
3 Mahfood as an expert engineer, Mr. Examiner.

4 MR. CATANACH: Mr. Mahfood is
5 considered qualified.

6 Q Mr. Mahfood, what is the purpose of Yates
7 appearance in Case 8305 today?

8 A In August of '84 we came to a hearing as
9 to 160-acre spacing for the North Chaveroo Permo-Penn Pool
10 and under the order it was required that we come back and
11 justify the 160-acre spacing and I am here to do that today.

12 Q Mr. Mahfood, refer to what we have sub-
13 mitted as Yates Exhibit Number One and tell the Examiner
14 what you show on that map.

15 A Exhibit Number One is an ownership plat,
16 a lease ownership plat showing the four completions in the
17 Chaveroo North Permo-Penn Pool with 160-acre spacing allo-
18 cated to each well and on the map I've outlined the 160 ac-
19 res in the light green color.

20 Q Mr. Mahfood, what was the first well
21 drilled subsequent to the -- or after the original hearing
22 in Case 8305 shown on your Exhibit Number One?

23 A The Burgland Well in Section 14.

24 Q And point out to the Examiner the wells
25 which have been drilled and completed since time.

1 A The Weistrop Well in Section 10, Unit I.
2 The Tucker ABI No. 2 Well in Unit E of
3 Section 11, and another Tucker No. 1 Well in Unit K of Sec-
4 tion 10, which was dry and plugged.

5 Q Now of those four productive wells which
6 you show are on Exhibit Number One, are each of those wells
7 commercial wells, in your opinion?

8 A Three of them are.

9 Q And which one is not?

10 A The Tucker ABI No. 2 is not a commercial
11 well.

12 Q Okay, refer to Exhibit Number Two, which
13 consists of three pages and tell us what you show on that
14 exhibit.

15 A The first exhibit is on the Smith ZJ No.
16 1, the original well in this pool, and the -- this well was
17 completed prior to August of '84 and at that time I
18 projected a percentage type depletion for it and showed by
19 my calculations at that time that it was draining more than
20 160 acres.

21 This plat shows some interference from
22 the new wells that were drilled and they were still draining
23 more than 160 acres.

24 Q Does the fact of interference with the
25 Smith Well production by subsequent wells indicate to you as

1 an engineer that there is communication between those wells?

2 A Yes, it does.

3 Q Okay, what is the second page of Exhibit
4 Number Two?

5 A The second page is the production curve
6 on the Weistrop, which was completed in January of '85, went
7 into production in February, and you can see a genuine
8 hyperbolic decline on that.

9 Q Again is there any evidence of communica-
10 tion to you as an engineer between these wells exemplified
11 by this decline curve?

12 A Well, the hyperbolic condition, it
13 doesn't necessarily mean that there's communication but it
14 does correlate with the interference on the Smith projec-
15 tions.

16 Q And what is your third decline curve as
17 part of Exhibit Number Two?

18 A The third decline curve is on the Burg-
19 land, which was the first offset to the Smith and which is
20 in line with that water influx.

21 As you see, it started off with a 90 per-
22 cent water cut and it's down -- after twelve months of pro-
23 duction it's down to 80 percent water cut and it's still 80
24 percent water cut.

25 Q Okay, refer us to our Exhibit Number

1 Three, Mr. Mahfood, and tell us what that is.

2 A Okay, Exhibit Number Three is a cross
3 section with the four completions in this pool.

4 On the lefthand side is the Tucker ABI
5 No. 2 Well, the highest on the structure, and on the
6 lefthand bottom corner there I have a copy of the plat
7 showing the cross section lines.

8 And the second one from the left is the
9 Weistrop. The third one is the Smith; the fourth one is the
10 (unclear.)

11 You can see there that the Smith is on an
12 anticline and the Tucker Well is definitely higher than all
13 three wells.

14 Q Okay, turn to your Exhibit Number Four,
15 consisting of two pages of calculations, and summarize.

16 A Okay. Back to Exhibit Three, this was
17 intended to show you the relative thicknesses of the pay
18 with the porosities in each well and you can see in the
19 Tucker Well it's almost pinched out.

20 Q And that again is the well that does not
21 appear to be commercial.

22 A Commercial, that is correct.

23 Q Okay. On your Exhibit Number Four, Mr.
24 Mahfood, you have performed numerous calculations.
25 Summarize for the Examiner the purpose of your calculations

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and what conclusions you have drawn from those.

A Okay. This -- I wanted to show that these wells are draining effectively the pool, and from the decline curves we saw that we had hyperbolic decline so I used a hyperbolic formula, which is q_t is equal to q_i to the n th power times $(q_i$ to $1-n-q_t$ to the $1-n$) and divide all of that by $1-n$ times the initial decline.

Now the computer was given only the data that we have, which is the initial -- the actual production and it is given this formula, and it goes ahead and plots from the actual data the curve.

So I have to go back and compute what values the computer derived from that curve and this is the equation we used by trial and error and come up with the value of q for n and d_i . (SIC)

The q values, of course, are actual values, so we have that data.

Q Now at the upper lefthand corner of the first page of Exhibit Number Four you have separately set forth the cumulative production through August 31st of 1986 for each of the four wells.

A That is correct.

Q And to the right of that you have projected the ultimate recovery of future reserves from each of these wells?

1 A That is correct. First, to the economic
2 limit of 200 barrels of oil per month, qt is the economic
3 limit.

4 And when we add those sums to the cumula-
5 tive we come up with 213,933 barrels of stock tank oil.

6 Now, if we were to project this on to an
7 economic limit of 75 barrels of oil per month, we would
8 recover another 55,720 barrels of oil, which would give a
9 maximum ultimate recovery of 269,653 stock tank barrels of
10 oil.

11 Now I have another exhibit, which I'll
12 present in a moment, and which is an Isopach of this field
13 and by planimetering that Isopach I came up with 315
14 porosity acre feet, and the very last formula on this page
15 shows how you compute the maximum ultimate oil recovery.

16 The data you need is the saturation, the
17 average formation volume factor, and the recovery factor.

18 In August '84 I showed how the recovery
19 factor was calculated using Crace and Buckley formula. (sic)

20 I've used that same formula in these
21 other -- for these other wells, and the weighted average
22 values for the saturation for oil is 69.1 percent. The
23 formation volume factor is 1.685 reservoir barrels per stock
24 tank barrel, and the recovery factor is 27.1 percent.

25 Plugging all these data into that formula

1 we come up with 271,600 barrels of stock tank oil, which
2 compares very well with the maximum ultimate recovery of
3 269,653.

4 Q Okay, refer to Exhibit Number Five, Mr.
5 Mahfood, and state what that is?

6 A Exhibit Number Five is the Isopach map
7 illustrating the reservoir volumetric capacities affecting
8 the producing wells.

9 Since the water influx is evidently from
10 the south and there's a definite gradation in water satura-
11 tions, I had them just dot in the bottom part of that map,
12 showing that there is not definite (not clear.)

13 Q So what you did, again, with reference to
14 your last calculation on Exhibit Number Four, Mr. Mahfood,
15 you took your Isopach on Exhibit Five and with a planimeter
16 calculated the area within each of the contour lines shown
17 on Exhibit Number Five?

18 A Right, and I did not go beyond -- I did
19 not go into Section 3 and I did not go into Section 12, and
20 the bottom part was a subsea elevation of -3900.

21 Q And the purpose of this second calcula-
22 tion and the use of Exhibit Number Five in this instance, or
23 in this manner, was to compare the ultimate recoverable re-
24 serves as calculated in that manner with those projected by
25 your decline curve method?

1 A This is correct.

2 Q Okay. Mr. Mahfood, do you conclude from
3 this information that the drilling of additional wells on a
4 40-acre spacing pattern or less than -- anything less than
5 160 acres would be in any way wasteful or uneconomic?

6 A It's unnecessary, it would be wasteful
7 and it's uneconomical.

8 Q In your opinion will the entire reservoir
9 be drained if developed on 160-acre spacing?

10 A Yes, I think so. I'm sure it will.

11 Q Were Exhibits One through Five -- Exhi-
12 bits One through Four were prepared by you or under your di-
13 rection and supervision.

14 A That is correct.

15 Q And Exhibit Number Five was prepared by
16 your geologist.

17 A Our geologist.

18 Q Okay.

19 MR. DICKERSON: Tender Exhibits
20 One through Five, Mr. Examiner.

21 MR. CATANACH: Exhibits One
22 through Five will be admitted as evidence.

23 MR. DICKERSON: I have no
24 further questions.

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CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Mahfood, Yates is the only operator in the pool, is that correct?

A Yes, sir.

Q And your green outline on Exhibit Number One, are those the pool boundaries?

A No, they are the boundaries of the 160s only. The -- the east half of Section 11 belongs to the Tucker ABI Lease.

MR. DICKERSON: As well as the northwest quarter.

A Yes.

MR. DICKERSON: You might note, Mr. Examiner, that it does, not appear from Exhibit Number One that this is an instance where even if contracted there would be an expiration of leases or anything of that nature to cause Yates to wish to develop on 160-acre spacing. They would not lose any leases or anything of that nature. It's simply that Yates believes that the drilling of additional wells or developing this field on 40-acre spacing would be wasteful and result in the drilling of unnecessary wells.

Q Mr. Mahfood, does Yates have any intention of drilling any additional wells in the pool?

1 A We had a location staked in Unit J of
2 Section 11, but it's no longer economical to do it.

3 Q When you said on the -- your Exhibit
4 Number One, you said there was some interference shown on
5 that graph?

6 A That's on Exhibit Two, page one.

7 Q Will you point that out? Where was that,
8 which curve?

9 A Okay, in the month of -- that was the
10 month of April.

11 MR. DICKERSON: 1985.

12 A 1985. You know, if you would just look
13 from the initial production, from the first production to
14 April or through March of '85, you would have to draw a
15 straight line more or less.

16 Q Okay, and in March of '85 is when the
17 other well came on?

18 A Yeah, we see the production curve take a
19 deep dive.

20 Q That's when the other well came on,
21 wasn't it?

22 A No, that's when the interference
23 occurred. It took roughly three months for the Burgland to
24 interfere, to reach the interference from the -- from the
25 Smith Well.

1 Q Approximately how far away is it?

2 A Less than a half mile; more than a quar-
3 ter of a mile and less than a half mile.

4 It would be approximately 2000 feet.

5 Q Mr. Mahfood, in your opinion would it be
6 uneconomical to drill these wells on 40-acre spacing?

7 A Yes, sir, it sure would, because it costs
8 approximately \$650,000 and it takes a lot of \$10.00 oil to
9 pay for that.

10 Q Mr. Mahfood, in your volumetric analysis,
11 where was the 27.1 percent recovery factor?

12 A Okay, on the second page of the calcula-
13 tions I have used the Chace and Buckley (sic) many, many
14 years ago. I don't have the -- I'm sorry, I don't have that
15 formula on this page. I thought I did.

16 Yeah, I do, too. Recovery factor, you
17 see $.114 + .272 \log \text{ of } k + .265 S_w - .136 \log u - 1.538 \text{ poro-}$
18 $\text{sity} - .00035 \times \text{the thickness, } h.$

19 MR. DICKERSON: But I think the
20 question, Mr. Mahfood, was what was the source of your as-
21 sumed 27-some odd percent recovery factor?

22 A Okay. I determined the recovery factor
23 for each of the three wells and then I took a weighted
24 value. At the very bottom of that second page there I'm
25 weighting the values of the saturation, the formation volume

1 factor, and the recovery factor, the recovery factor being
2 the last column on your right.

3 The sum of those three wells give us .271
4 recovery factor.

5 So in all of the weighted four, I showed
6 the recovery factor for the Smith was 30.9 percent. This is
7 in our Exhibit Four, which I did not reproduce here, but you
8 have in your file, in your records.

9 Then the Weistrop gives us a recovery
10 factor of 22.2 percent and the Burgland gives a recovery
11 factor of 18-1/2 percent, and weighting all three values,
12 the 30.9 for the Smith, the 22.2 for the Weistrop, and the
13 18-1/2 for the Burgland, they come up with .271 recovery
14 factor.

15 MR. CATANACH: I have no
16 further questions for Mr. Mahfood. He may be excused.

17 Is there anythin further in
18 Case 8305?

19 If not, it will be taken under
20 advisement.

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22 (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 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. 8305,
heard by me on Sept 13 1986.

David R. Caton, Examiner
Oil Conservation Division

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

3 September 1936

EXAMINER HEARING

IN THE MATTER OF:

Hearings called on this docket but
for which no testimony was presented.

CASE
8305

8936, 8820,
8972, 8971,
8849, 8984

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division:

No attorney present.

For the Applicant:

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I N D E X

CASE 8305	3
CASE 8936	4
CASE 8820	4
CASE 8972	4
CASE 8971	5
CASE 8849	5
CASE 8984	6

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2 MR. STOGNER: Call next Case
3 Number 8305, which is in the matter of Case Number 8305
4 being reopened pursuant to provisions of Order No. R-7660.

5 This case, at the request of
6 an operator out in the Chaveroo Permo-Pennsylvanian Pool
7 area, will be continued to the Examiner's hearing scheduled
8 for September 17th, 1986.

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10 (Hearing concluded.)
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MR. STOGNER: Call next Case
Number 8936, which is the application of Santa Fe Energy
Company for compulsory pooling, Eddy County, New Mexico.

At the applicant's request this
case will be dismissed.

(Hearing concluded.)

MR. STOGNER: Call next Case
Number 8820, reopened, the application of Santa Fe Energy
Company for compulsory pooling, Eddy County, New Mexico.

At the applicant's request this
reopened case will be dismissed.

(Hearing concluded.)

MR. STOGNER: Call next Case
Number 8972, which is the application of the estate of
Edward Gerber and Iris Gerber Damson for a nonstandard gas
proration unit, and exception to rule 5 (a) 2 (2) of Divi-
sion Order No. R-8170, Rio Arriba County, New Mexico.

This case was heard August
20th, 1986.

Due to a number of advertise

1 ment errors, it was readvertised for today and will also be
2 continued and readvertised for the September 17th hearing.

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(Hearing concluded.)

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(Hearing concluded.)

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MR. STOGNER: Call next Case
Number 8971, which is the application of Cinco, Ltd. for a
nonstandard gas proration unit and for an exception to those
rules in Division Order R-8170, Rio Arriba County.

This case met with the same
fate and will be readvertised at the September 17th, 1986
hearing.

MR. STOGNER: Call next Case
8849, which is the application of Southland Royalty Company
for NGPA Wellhead Price Ceiling Category Determination, Lea
County, New Mexico.

At the applicant's request this
case will be continued to the October 22, 1986 hearing.

(Hearing concluded.)

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2 MR. STOGNER: Call next Case
3 Number 8984, which is the application of H. E. Prince
4 Construction and Petroleum for salt water disposal, Chaves
5 County, New Mexico.

6 This case will be continued to
7 the hearing scheduled for September 17th, 1986, and thereby
8 that concludes today's docket.

9 The hearing is hereby
10 adjourned.

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12 (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 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. 8305, 8436, 8571, 8849,
heard by me on 3 Sep. 19 86. 8820, 8971,
Michael E. Slagter Examiner 8984
Oil Conservation Division