

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 10,777

EXAMINER HEARING

IN THE MATTER OF:

Application of Texaco Exploration and Production,
Inc., for special pool rules, Lea County, New
Mexico

ORIGINAL

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

August 12, 1993

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 Building
Santa Fe, New Mexico 87504

FOR THE APPLICANT:

CAMPBELL, CARR, BERGE & SHERIDAN, P.A.
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I N D E X

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Appearances

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ROBERT H. HEIMKE

Direct Examination by Mr. Carr.

4

Examination by Examiner Catanach

9

KEVIN RABENALDT

Direct Examination by Mr. Carr

10

Examination by Examiner Catanach

20

Certificate of Reporter

25

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E X H I B I T S

APPLICANT'S EXHIBITS:

Exhibit 1

6

Exhibit 2

11

Exhibit 3

12

Exhibit 4

13

Exhibit 5

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1 WHEREUPON, the following proceedings were had
2 at 2:21 p.m.:

3 EXAMINER CATANACH: At this time we'll call
4 Case 10,777.

5 MR. STOVALL: Lucky sevens in the Application
6 of Texaco Exploration and Production, Inc., for special
7 pool rules, Lea County, New Mexico.

8 EXAMINER CATANACH: Appearances in this case?

9 MR. CARR: May it please the Examiner, my
10 name is William F. Carr with the Santa Fe law firm
11 Campbell, Carr, Berge and Sheridan.

12 I represent Texaco Exploration and
13 Production, Inc., and I have two witnesses.

14 EXAMINER CATANACH: Any other appearances?

15 Will the witnesses please stand, and will you
16 please swear in the witnesses, Mr. Stovall?

17 (Thereupon, the witnesses were sworn.)

18 ROBERT H. HEIMKE,
19 the witness herein, after having been first duly sworn
20 upon his oath, was examined and testified as follows:

21 DIRECT EXAMINATION

22 BY MR. CARR:

23 Q. Will you state your name for the record,
24 please?

25 A. Robert Heimke.

1 Q. Mr. Heimke, where do you reside?

2 A. Midland, Texas.

3 Q. By whom are you employed?

4 A. Texaco.

5 Q. And what is your position with Texaco?

6 A. I'm a geophysical interpreter.

7 MR. STOVALL: How do you spell your name, Mr.
8 Heimke?

9 THE WITNESS: H-e-i-m-k-e.

10 Q. (By Mr. Carr) Have you previously testified
11 before this Division?

12 A. No, I have not.

13 Q. Could you briefly review for the Examiner
14 your educational background and your work experience?

15 A. In 1979 I graduated from Kansas State
16 University with a bachelor of science in geology with a
17 geophysics option.

18 Upon graduation I was employed by Texaco, and
19 I've been with Texaco now for 13 1/2 years.

20 Q. Does your geographic area of responsibility
21 with Texaco include southeastern New Mexico?

22 A. Yes, it does.

23 Q. Are you familiar with the Application that
24 has been filed in this case on behalf of Texaco?

25 A. Yes.

1 Q. And have you made a study of the general
2 area?

3 A. Yes.

4 MR. CARR: Mr. Catanach, at this time we
5 tender Mr. Heimke as an expert witness in geophysical
6 interpretation.

7 EXAMINER CATANACH: He is so qualified.

8 Q. (By Mr. Carr) Could you briefly state what
9 Texaco seeks with this Application?

10 A. Texaco seeks the adoption of special pool
11 rules and regulations for the North Teague-Ellenburger
12 Pool, including a special depth bracket allowable of
13 700 barrels of oil per day.

14 Q. When was the North Teague-Ellenburger Pool
15 established?

16 A. July 1st, 1988, by Order Number R-8688.

17 Q. Have you prepared exhibits for presentation
18 here today?

19 A. Yes, I have.

20 Q. Could you refer to what has been marked
21 Texaco Exhibit Number 1, identify this exhibit, and
22 then review it for Mr. Catanach?

23 A. Okay. Exhibit Number 1 is a structure map on
24 top of the Ellenburger, contour interval of 25 feet.

25 The yellow area on the map indicates Texaco

1 acreage.

2 The blue outline is an area of a 3-D survey.

3 The structure map was generated using well
4 control and the 3-D survey.

5 If you look down at the production code on
6 the lower right of the map, you can see several zones
7 produced on this field, the Ellenburger, Fusselman,
8 Devonian, the Blinebry and Paddock.

9 The fault system is the limiting features
10 that limit the production of the field.

11 There's a north-south trending fault that
12 limits the east production of the field.

13 There's an east-west trending fault that
14 limits the northern limits of the field.

15 And if you'll notice in Section 4, the
16 southeast quarter of the southwest quarter, well number
17 2, that tested the Ellenburger, and the Ellenburger was
18 wet in that location.

19 The south and western limits of the field can
20 be delineated by the well in Section 9 in the southwest
21 quarter of the northwest quarter, well number 5. That
22 also tested the wet in the Ellenburger.

23 Q. Now, based on this interpretation, if I
24 understand it, we have a small reservoir that is
25 confined by faults on the north and on the east, and

1 you have wells that are wet on the south as well?

2 A. Yes.

3 Q. Now, this is the productive part of the
4 reservoir, but what is the -- how is this reservoir
5 defined by the Oil Conservation Division?

6 A. The pool boundaries are defined by the
7 southwest quarter of Section 4 and the northwest
8 quarter of Section 9.

9 Q. Are there any other Ellenburger wells within
10 a mile of these defined pool boundaries?

11 A. No, there are not.

12 Q. And so there's no one to whom notice of this
13 Application needed to be given?

14 A. That is correct.

15 Q. Are there other potential -- You've indicated
16 there are other potential producing zones in the area.
17 Are these actually -- Are there locations from which
18 these zones could be produced, other than what's shown
19 on your map?

20 A. Yes.

21 Q. Generally, what conclusions have you been
22 able to reach from your just geophysical interpretation
23 of the reservoir?

24 A. Well, it's a small, isolated reservoir that's
25 well defined by the structural limits that I described,

1 and all the producing area is on Texaco acreage, and
2 there's uphole shallower potential that's still behind
3 pipe from the four Ellenburger wells.

4 Q. Will Texaco also be calling an engineering
5 witness to review that portion of the case?

6 A. Yes, we will.

7 Q. Was Exhibit Number 1 prepared by you?

8 A. Yes.

9 MR. CARR: At this time, Mr. Catanach, I move
10 the admission of Texaco Exhibit Number 1.

11 EXAMINER CATANACH: Exhibit Number 1 will be
12 admitted as evidence.

13 MR. CARR: That concludes my direct
14 examination of Mr. Heimke.

15 EXAMINATION

16 BY EXAMINER CATANACH:

17 Q. Mr. Heimke, do you have an opinion on where
18 the gas-water contact is in this reservoir, or the oil-
19 water contact?

20 A. Yes, we do, and the engineer will go into
21 detail in that later.

22 Q. Okay. The existence and location of the
23 faults were mapped by using seismic data?

24 A. Yes, a 3-D survey.

25 Q. Is a 3-D survey accurate in mapping faults?

1 A. Yes, very accurate. That's one of its
2 strengths.

3 Q. Okay. There currently is three producing
4 wells in this reservoir?

5 A. Four producing reservoirs [sic].

6 Q. Four?

7 A. They're the purple circles on the map.

8 EXAMINER CATANACH: Nothing further.

9 MR. CARR: We have nothing further of Mr.
10 Heimke, and at this time we call Kevin Rabenaldt.

11 KEVIN RABENALDT,
12 the witness herein, after having been first duly sworn
13 upon his oath, was examined and testified as follows:

14 DIRECT EXAMINATION

15 BY MR. CARR:

16 Q. Will you state your name for the record,
17 please?

18 A. Kevin Rabenaldt.

19 Q. And where do you reside?

20 A. In Midland, Texas.

21 Q. By whom are you employed and in what
22 capacity?

23 A. Texaco, as a petroleum engineer.

24 Q. And have you previously testified before this
25 Division?

1 A. No, I have not.

2 Q. Could you review your educational background
3 and work experience for Mr. Catanach?

4 A. In 1979 I graduated from Texas Tech
5 University with a bachelor of science degree in
6 petroleum engineering.

7 Upon graduation I began my career with Texaco
8 in Midland, Texas, and since being with Texaco I've had
9 various operational and reservoir-engineering duties.

10 Q. Are you familiar with the Application filed
11 in this case on behalf of Texaco?

12 A. Yes, I am.

13 Q. And have you made an engineering study of the
14 North Teague-Ellenburger Pool.

15 A. Yes, I have.

16 MR. CARR: We tender Mr. Rabenaldt as an
17 expert witness in petroleum engineering.

18 EXAMINER CATANACH: He is so qualified.

19 Q. (By Mr. Carr) Have you prepared exhibits for
20 presentation at this hearing?

21 A. Yes, I have.

22 Q. Let's go to what has been marked as Texaco
23 Exhibit Number 2, and I'd ask you to identify this and
24 review it for Mr. Catanach.

25 A. This is a structural cross-section, four

1 producing wells in the Teague North-Ellenburger Pool.

2 The structure map is situated -- If you look
3 at the structure map you'll see the orientation that
4 I've used. I started with the most western well, the
5 Harrison Number 4, went to the Harrison Number 2, the
6 Harrison Number 1, and the most northern well and the
7 highest structural well, the Sims Number 1.

8 Also marked on the logs and the cross-section
9 are the perforations in the Ellenburger formation.

10 Q. Okay. Let's move now to Texaco Exhibit
11 Number 3. Would you identify that?

12 A. Exhibit 3 is an outline basically of the
13 pressure history of -- taken in the reservoir.

14 When the field was discovered in 1988, a
15 buildup test was run on the Harrison Number 1. That
16 had a total shut-in of 71 hours. The buildup pressure
17 indicated that we had a reservoir pressure of
18 approximately 2450 pounds.

19 In April of 1989, two additional tests were
20 conducted, again tests on the Harrison Number 1. At
21 that time, the tests showed a bottomhole pressure of
22 1908. The Harrison Number 2, through a static gradient
23 survey, showed the bottomhole pressure to be 1934.

24 In July of 1993, two additional pressure
25 tests were taken, one on the Sims Number 1, showing an

1 average reservoir pressure of 932, and the Harrison
2 Number 2, showing an average pressure of approximately
3 973.

4 This exhibit, along with the following
5 exhibit, Number 4, will show the pressure, general
6 pressure depletion of this reservoir.

7 Q. All right. Let's go to Exhibit Number 4.
8 Would you review that for the Examiner?

9 A. Okay. Exhibit Number 4 is the information
10 taken from Exhibit Number 3 and put in graphical form.
11 It's a curve showing the pressure levels through time.
12 Each pressure point is designated by the red square.

13 You'll notice how close the pressures are in
14 1989, agreeing with each other from two separate wells
15 and also the agreement of pressures in 1993.

16 The blue line designates the bubble point
17 pressure of the reservoir taken from a fluid analysis
18 on the Harrison Number 1.

19 Q. Basically, what this shows is that the
20 initial reservoir pressure was extremely close to the
21 bubble point; is that correct?

22 A. That's correct.

23 Q. Now, as the reservoir was produced, the
24 pressure declined. What -- below the bubble point. In
25 your opinion, what impact has this had on the

1 reservoir?

2 A. As you can see, in just looking at the time
3 element, we dropped below the bubble point very early
4 in the life of this field, and as a result we were
5 liberating gas within the formation.

6 Q. What has happened to that gas? Do you
7 understand that?

8 A. Yes, this is a -- this reservoir, I think --
9 This curve also demonstrates that we have good
10 communication within the reservoir, since we have
11 pressure points taken at two different points in time
12 from two different wells, and they agreed in pressure.

13 We also know that in the geological setting
14 that the Ellenburger is a fractured formation, so we
15 feel we have good conductivity within the reservoir.

16 As we stated, the gas has migrated
17 upstructure through these fractures, and it has
18 created, in our opinion, a secondary gas cap in this
19 field. And this gas cap is actually providing us some
20 reservoir energy in the push, the production of the
21 hydrocarbons.

22 Q. Have the wells in the pool actually produced
23 gas at rates you would anticipate for wells in this
24 pool?

25 A. No, they haven't. As a matter of fact -- and

1 we'll discuss it as we look in the next exhibits with
2 the production curves, but you will see that the GOR in
3 the early life of the field was declining, and that's
4 indicative that we were producing gas within the
5 formation, but we were not producing it through the
6 wellbores, and it was migrating upstructure.

7 Q. Are you ready to go to the pressure curves?

8 A. Yes.

9 Q. Let's go, then, on to Texaco Exhibit Number
10 5. Could you identify and review those, please?

11 A. Exhibit Number 5 is a series of production
12 curves.

13 The first curve is a curve of the total pool
14 production. Marked on there are the different times
15 when different wells were drilled, and you can see the
16 corresponding production increases. The GOR is so
17 marked on this curve.

18 The green curve designates the barrels of oil
19 produced per day.

20 The blue curve is water production per day.

21 The red is the gas production per day.

22 And as stated, the magenta curve is the GOR.

23 The following curves are individual
24 performance curves for each well in the field.

25 Q. Some of these curves indicate that wells are

1 on artificial lift. Are the wells mechanically
2 equipped so that they can in fact produce an allowable
3 of 700 barrels a day?

4 A. No, they're not. We had obtained the level
5 of production that this -- these artificial-lift set-
6 ups could handle, and that is 560 barrels per day.

7 Q. So it would be appropriate to amend the
8 Application to request a special oil allowable of 560
9 barrels per day?

10 A. That is correct.

11 Q. What is the current pool allowable?

12 A. The current allowable is 320.

13 Q. And which wells are actually able to make
14 that allowable at this time?

15 A. I believe there's three wells capable of
16 making 320. That's the Harrison Number 2, Harrison
17 Number 1 and the Sims Number 1.

18 Q. Has Texaco done other things to better
19 understand this reservoir, other than the information
20 you've presented so far?

21 A. Yes, just recently we performed material
22 balance calculations, and this was done through a
23 Texaco program. The program uses standard, accepted
24 petroleum methods for material balance calculations.

25 And that material balance calculation

1 confirms that we virtually have no water drive taking
2 place in this reservoir. And the reason we know that
3 is that any time any values of water production -- I
4 mean water influx -- are entered, the program will not
5 material balance.

6 It also shows that we should have produced
7 more gas from this reservoir than we've actually
8 produced, and so that also confirms to us that we have
9 a secondary gas cap forming.

10 The material balance can also be used for
11 estimating the original oil in place. Those values
12 come out in the range between 2 1/2 to 3 million
13 barrels. And when you compare that to the field total
14 production -- and that will be shown on the pool
15 curve -- you have cumulative oil through June of 1993
16 of 1.12 million barrels.

17 And what that is telling us is, to date we've
18 had -- based on this material balance calculation,
19 we've had a very good recovery factor to date.

20 Q. So basically what you've been able to
21 determine with your material balance calculation and
22 material balance program, is no water drive in the
23 reservoir?

24 A. Correct.

25 Q. You are not producing the volumes of gas that

1 you would anticipate, which confirms the existence or
2 development of a secondary gas cap?

3 A. Correct.

4 Q. But you are efficiently producing the
5 reservoir?

6 A. That is correct.

7 Q. Based on your study, how would you actually
8 describe what we're dealing with when we're talking
9 about this particular pool?

10 A. Okay, it's probably on a two-drive mechanism:
11 solution gas and gas cap.

12 Based on the performance, it appears that the
13 primary mechanism is gas-cap expansion to the
14 secondary.

15 And also, this study shows that the reservoir
16 is not being supported by water influx to any great
17 degree.

18 It also indicates to us that through these
19 mechanisms, the ultimate recovery is not dependent on
20 rate; ultimate recovery is independent of the rate.

21 Q. So what we basically have here is a reservoir
22 which is simply not rate-sensitive?

23 A. Right.

24 Q. Could you explain to Mr. Catanach why Texaco
25 is requesting these higher oil allowables?

1 A. Okay. First of all, since this is a multi-
2 pay area, we would like to be able to produce the
3 Ellenburger as quickly as possible. We feel that no
4 harm will come to the reservoir in doing this, and so
5 we will not be creating any waste.

6 And when the Ellenburger is depleted, it will
7 give us the opportunities to use this wellbore for
8 uphole potentials.

9 Q. In essence, if you're able to produce these
10 shallower zones without having to drill new stand-alone
11 wells, are you going to be more effectively developing
12 the reserves in this area?

13 A. Yes, we are.

14 Q. Will it be more efficient?

15 A. Yes.

16 Q. Would drilling additional wells to produce
17 these shallower zone simply be unnecessary wells in
18 view of the existing Ellenburger wellbore?

19 A. Yes, they would.

20 Q. In your opinion, would approval of this
21 Application have an adverse effect on the correlative
22 rights of any interest owner?

23 A. No, it would not.

24 Q. In fact, there's no other offsetting interest
25 owner to be affected?

1 A. That is correct.

2 Q. Now, are you seeking permanent rules or
3 temporary rules?

4 A. We're seeking temporary rules.

5 Q. For what period of time?

6 A. Six months.

7 Q. Why only six months?

8 A. Well, we like to produce these wells at the
9 higher allowable, or what they would be able to
10 produce, and use that information -- In, say, a four-
11 month time, take additional pressure tests and
12 incorporate that data in the material balance to see if
13 we're falling on track with the earlier calculations.

14 Q. Were Exhibits 2 through 5 prepared by you?

15 A. Yes, they were.

16 MR. CARR: At this time, Mr. Catanach, we
17 move the admission of Texaco Exhibits 2 through 5.

18 EXAMINER CATANACH: Exhibits 2 through 5 will
19 be admitted as evidence.

20 MR. CARR: And that concludes my direct
21 examination of this witness.

22 EXAMINATION

23 BY EXAMINER CATANACH:

24 Q. Texaco currently has three wells producing in
25 the pool?

1 A. There's four.

2 Q. Four wells.

3 A. There were five wells in the pool at one
4 time. The Harrison Number 5 basically produced all
5 water, and it's the lowest structural well.

6 Q. Okay. Is this pool spaced on 40 acres?

7 A. Forty-acre spacing.

8 Q. Do you have an opinion as to whether any more
9 wells will be drilled in this pool?

10 A. In the Ellenburger?

11 Q. Yes.

12 A. No, there will be none.

13 Q. You made a statement that the pool was not
14 rate-sensitive, and you're basing that on what?

15 A. Well, the two mechanisms would be solution-
16 gas drive and gas-cap expansion, and that for every
17 barrel that you produce you're dropping the pressure in
18 the reservoir, but in doing so you're not -- you could
19 draw that down at a faster rate, and although you would
20 be liberating more gas from the fact that you're below
21 the bubble point, it's all in a material-balance
22 situation, and you would just -- your gas cap is going
23 to expand at whatever rate you draw the reservoir down
24 and liberate gas.

25 Q. You're basically asking for -- Okay, you're

1 asking for 560 barrels a day?

2 A. Correct.

3 Q. A 240-barrel-a-day increase from current.

4 Do you know what cumulative recovery has been
5 to date?

6 A. Pardon?

7 Q. Cumulative recovery to date from these wells?

8 A. Do you want the individual wells or the
9 total?

10 Q. Total.

11 A. The total was 1,166,000 barrels of oil
12 through June of 1993. That's 1,166,000.

13 Q. Okay. Have you estimated what ultimate is
14 going to be?

15 A. No, I have not, because decline-curve
16 analysis would not suffice with this, and the other
17 method would be to run a simulation. I think any guess
18 on ultimate recovery at this point would have a wide
19 range of error.

20 Q. Producing rates on these wells have been
21 pretty stable for the past few years, have they not?

22 A. Generally speaking, yes.

23 One thing I can add is, you'll notice that
24 sometimes these wells have not been able to meet
25 allowable in the past at 320, and the reason for that

1 is on our pumping ignitions we were having gas
2 interference that we were just recently able to work
3 out with additional downhole equipment.

4 Q. They're all on pump?

5 A. They're all on artificial lift, correct.

6 Q. And it's your opinion that that 560-barrel-a-
7 day allowable is not going to have any effect of
8 reducing ultimate recovery?

9 A. No, I don't.

10 Q. Do the shallower zones in this area, do they
11 not contain enough reserves to justify stand-alone
12 wells?

13 A. I think there's a lot of potential in the
14 area which we haven't determined in exact form, and I
15 know Bob may be able to speak to that if you'd like to
16 call him back, because I don't work the current
17 development of this field.

18 But it is a multi-pay field; we have the
19 potential for five different producing zones. And then
20 we feel in the timely development of this field that
21 more wells than necessary would be needed to drain all
22 these reservoirs.

23 Q. In six months -- You proposed a six-month
24 time period. Do you propose to come back in six months
25 and request continuation of the allowable? Do you

1 anticipate that?

2 A. I think in six months if these wells are
3 still capable of producing above the old 320 and we run
4 through our calculations that confirms that we are not
5 damaging this reservoir, that -- I believe we'll be
6 coming for permanent rules.

7 EXAMINER CATANACH: Okay. I've got nothing
8 further of the witness. He may be excused.

9 MR. CARR: We have nothing further of this
10 witness, and nothing further to offer in this case, Mr.
11 Catanach.

12 EXAMINER CATANACH: There being nothing
13 further, Case 10,777 will be taken under advisement.

14 (Thereupon, these proceedings were concluded
15 at 2:54 p.m.)

16 * * *

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19 I do hereby certify that the foregoing is
20 a complete and correct report of the proceedings in
the Examiner hearing of Case No. 10777,
heard by me on August 12 1997.

21 David K. Catanach Examiner
22 Oil Conservation Division
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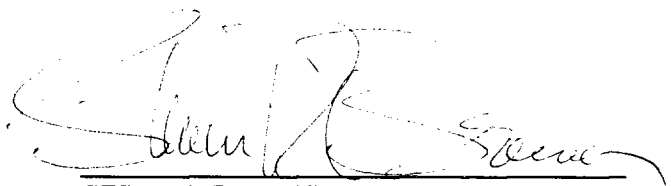
1 CERTIFICATE OF REPORTER

2
3 STATE OF NEW MEXICO)
4) ss.
5 COUNTY OF SANTA FE)

6 I, Steven T. Brenner, Certified Court
7 Reporter and Notary Public, HEREBY CERTIFY that the
8 foregoing transcript of proceedings before the Oil
9 Conservation Division was reported by me; that I
10 transcribed my notes; and that the foregoing is a true
11 and accurate record of the proceedings.

12 I FURTHER CERTIFY that I am not a relative or
13 employee of any of the parties or attorneys involved in
14 this matter and that I have no personal interest in the
15 final disposition of this matter.

16 WITNESS MY HAND AND SEAL September 10th,
17 1993.

18 

19 STEVEN T. BRENNER
20 CCR No. 7

21 My commission expires: October 14, 1994
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