

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

DEC

IN THE MATTER OF THE HEARING CALLED BY)
THE OIL CONSERVATION DIVISION FOR THE)
PURPOSE OF CONSIDERING:)

CASE NO. 11,665

APPLICATION OF EXXON CORPORATION FOR)
APPROVAL OF A WATERFLOOD PROJECT AND TO)
QUALIFY SAID PROJECT FOR THE RECOVERED)
OIL TAX RATE PURSUANT TO THE ENHANCED)
OIL RECOVERY ACT, LEA COUNTY, NEW MEXICO)

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

December 5th, 1996

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, December 5th, 1996, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

* * *

STEVEN T. BRENNER, CCR
(505) 989-9317

I N D E X

December 5th, 1996
 Examiner Hearing
 CASE NO. 11,665

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A P P E A R A N C E S

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By: W. THOMAS KELLAHIN

* * *

1 WHEREUPON, the following proceedings were had at
2 8:42 a.m.:

3
4 EXAMINER STOGNER: At this time I'll call next
5 case, Number 11,665.

6 MR. CARROLL: Application of Exxon Corporation
7 for approval of a waterflood project and to qualify said
8 project for the recovered oil tax rate pursuant to the
9 Enhanced Oil Recovery Act, Lea County, New Mexico.

10 EXAMINER STOGNER: At this time I'll call for
11 appearances.

12 MR. BRUCE: Mr. Examiner, Jim Bruce from the
13 Hinkle law firm in Santa Fe, representing the Applicant.

14 I have one witness to be sworn.

15 EXAMINER STOGNER: Any other appearances?

16 MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of
17 the Santa Fe law firm of Kellahin and Kellahin, appearing
18 on behalf of Conoco, Inc.

19 EXAMINER STOGNER: Do you have any witnesses, Mr.
20 Kellahin?

21 MR. KELLAHIN: No, sir.

22 EXAMINER STOGNER: Any other appearances?

23 Will the witness please stand to be sworn at this
24 time?

25 (Thereupon, the witness was sworn.)

1 WILLIAM T. DUNCAN, JR,
2 the witness herein, after having been first duly sworn upon
3 his oath, was examined and testified as follows:

4 DIRECT EXAMINATION

5 BY MR. BRUCE:

6 Q. Would you please state your name for the record?

7 A. William Thomas Duncan, Jr.

8 Q. And where do you reside?

9 A. Midland, Texas.

10 Q. What is your occupation and who are you employed
11 by?

12 A. I'm an engineer employed by Exxon Company, USA, a
13 Division of Exxon Corporation.

14 Q. Have you previously testified before the Division
15 as a petroleum engineer?

16 A. Yes, I have.

17 Q. And were your credentials as an expert petroleum
18 engineer accepted as a matter of record?

19 A. Yes, they were.

20 Q. And are you familiar with the Application before
21 us today?

22 A. Yes, I am.

23 MR. BRUCE: Mr. Examiner, I would tender Mr.
24 Duncan as an expert petroleum engineer.

25 EXAMINER STOGNER: Any objections?

1 MR. KELLAHIN: No, sir.

2 EXAMINER STOGNER: Mr. Duncan is so qualified.

3 Q. (By Mr. Bruce) Mr. Duncan, briefly what does
4 Exxon seek in this case?

5 A. Exxon seeks the approval of a cooperative
6 waterflood project for our J.D. Knox and A.J. Adkins leases
7 and to qualify the project for the recovered oil tax rate.

8 Q. Referring to Exhibit 1, could you identify the
9 property involved in this Application?

10 A. Exhibit Number 1 is a land plat of the area
11 showing all of Section 10 and the individual leases within
12 Section 10. That's Section 10 in 21 South, 27 West.

13 Exhibit Number 1 is mislabeled; it shows 21
14 North. It's actually 21 South.

15 That covers the A.J. Adkins lease, which covers
16 the entire west half of the section, except for the 20
17 acres comprising the north half of the northeast quarter of
18 the northwest quarter. That acreage is leased to Texaco
19 and is within the Exxon-operated Blinbry Oil Com, which is
20 shown as the north half of the northwest quarter. However,
21 the entire east half has common royalty ownership, and
22 these are all fee leases.

23 MR. BRUCE: Actually, Mr. Examiner, on that map
24 the Township and Range are both wrong. That's --

25 THE WITNESS: Oh, I'm --

1 MR. BRUCE: -- should be 21 South, 36 East, where
2 the Section 10 is located.

3 THE WITNESS: Good point.

4 Q. (By Mr. Bruce) Mr. Duncan, looking at this map,
5 what are the initial injection wells for this proposed
6 project?

7 A. The proposed injection wells are the A.J. Adkins
8 Number 11 Drill Well, shown in the west half with a black
9 triangle, and the J.D. Knox Number 13 Proposed Drill Well,
10 shown in the east half with a black triangle.

11 Q. And what pool will the water be injected into?

12 A. The waterflood project will be conducted in the
13 Oil Center-Blinebry Pool.

14 Q. Are there any special rules applicable to that
15 pool?

16 A. Yes, there are.

17 Q. Would you identify Exhibits 2 and 3 for the
18 Examiner?

19 A. Exhibit 2 is a copy of the special field rules
20 for the Oil Center-Blinebry Pool. It shows that they were
21 adopted pursuant to Order Number R-2408 and made permanent
22 pursuant to Order R-2408-A in January 29th, 1964.

23 The rules provide for 80-acre proration units for
24 the producing wells and that no well shall be located
25 closer than 330 feet to the boundary of the quarter-quarter

1 section where the well is located.

2 The Exhibit Number 3 is a copy of the gas-oil
3 ratio rule for the Oil Center-Blinebry Pool. It was
4 adopted pursuant to Order R-3912 and adopts a 4000-cubic-
5 feet-per-barrel gas-oil ratio and also adopted a no-flare
6 rule for the field.

7 Q. What is Exhibit 4?

8 A. Exhibit Number 4 is a structure map of the top of
9 the Blinebry Pool, showing the top of the Blinebry Pool in
10 the Oil Center-Blinebry. It shows the entire pool, or a
11 large portion of the pool. Exxon's A.J. Adkins and J.D.
12 Knox leases are shown in Section 10, in the lower right-
13 hand portion of the exhibit.

14 Q. And let's move on to Exhibits 5 and 6 together.
15 Could you identify those for the Examiner and discuss their
16 contents, please?

17 A. Exhibit 5 is a listing of some of the reservoir
18 parameters for the Oil Center-Blinebry Pool and fluid
19 parameters, and Exhibit 6 is a type log for the pool.

20 Exhibit 5 shows that the depth of the reservoir
21 is at about 5900 feet, that the permeability is 2.5
22 millidarcies, average, and the average porosity is about
23 7.2 percent. Connate water saturation is estimated to be
24 30 percent, and the effective thickness of the pay is about
25 60 feet.

1 The total productive area of the pool is
2 approximately 2700 acres. The fluid is -- The initial
3 formation volume factor was 1.48, and the specific gravity
4 of the fluid is about 44 degrees API.

5 That's from Exhibit 5.

6 Exhibit 6 is a type log from the Humble A.J.
7 Adkins Well Number 8, now Exxon. It's on two pages. It
8 shows the Blinebry marker on the second page, and in the
9 depth track it shows with tick marks the perforations in
10 this well. The perforations pretty well coincide to the
11 Blinebry interval.

12 Q. Let's discuss your injection operations. Would
13 you identify Exhibit 7 for the Examiner?

14 A. Exhibit Number 7 is a copy of the Form C-108, or
15 Form C-108 filed by Exxon for the two injection wells being
16 permitted for this waterflood.

17 There are two C-108s in this package. The second
18 C-108 begins on page 12 of Exhibit Number 7. The page
19 numbers are shown in the lower right-hand corner.

20 Q. Are -- I think you've already indicated this, but
21 the proposed injection wells, are they existing wells?

22 A. No, they're not, they are proposed drill wells.

23 Q. And are schematics of those wells included in the
24 C-108?

25 A. Yes, they are. If you can flip through the C-108

1 with me, on page 6 of the -- of Exhibit 7, is the proposed
2 wellbore sketch, and there's a corresponding wellbore
3 sketch on page 16 for the second injection well. They're
4 both essentially the same.

5 Q. Will these two wells be properly cased and
6 cemented so as to prevent water from escaping to other
7 zones?

8 A. Yes, they will.

9 Q. Why don't you go through the C-108 for the
10 Examiner and discuss the proposed injection operations, et
11 cetera?

12 A. All right. On page 3 of Exhibit 7, the proposed
13 operations are described. It shows that during the first
14 year of the project we anticipate injecting an average of
15 1600 barrels of water per day, and then that injection rate
16 would drop to 1300 barrels of water per day in the second
17 year, 800 barrels of water per day in the third, and 400 in
18 the fourth and subsequent years.

19 Total injection over the life of the project is
20 estimated to be about 3.5 million barrels of water. The
21 planned injection system is closed, and the average
22 injection pressure is expected to be approximately 800
23 p.s.i., and the maximum injection pressure will not
24 exceed -- I believe it's -- it actually should be eleven
25 hundred and --

1 Q. 1160?

2 A. Correct, 1160 p.s.i., using the depth to the
3 bottom -- excuse me, to the top perforation, rather than
4 the bottom perforation.

5 In addition to reinjecting the produced water, we
6 intend to use makeup water from Chevron's Eunice Monument
7 South Unit. And we've done water compatibility tests, and
8 the water does appear to be reasonably compatible. There's
9 a small tendency to see some barite precipitation, but we
10 think that that is relatively small and can be remediated
11 by acidizing.

12 We intend to inject into the Blinebry formation
13 at approximately 5800 feet to 5900 feet, and the reservoir
14 is approximately 200 feet in gross thickness. And we
15 believe will be protecting the Ogallala, which is the only
16 underground source of drinking water in the vicinity.

17 Q. Do the C-108s contain information on the wells
18 within the area of review?

19 A. Yes, they do, on page 7, and the corresponding
20 page 17 for the second application, we've included a
21 listing of the wells within a half-mile radius of each of
22 the proposed injection wells, along with their casing and
23 completion information.

24 Q. And are any of these wells plugged and abandoned?

25 A. No, they are not.

1 Q. Are these producing wells in the area of review
2 properly completed, and will they prevent the movement of
3 fluids to other zones?

4 A. There appears to be no problems.

5 Q. Now, you will be injecting water into a producing
6 zone. Do you anticipate any harm to offsetting operators?

7 A. No, we do not. Actually, we expect to see no
8 effect to offset operators because of the distance removed
9 from the injection wells.

10 Q. Is Exxon pursuing unitization of this pool?

11 A. No, we are not.

12 Q. Do you think unitization is necessary to recover
13 secondary reserves from this pool?

14 A. No, we do not.

15 Q. This is a cooperative program, and Exxon is the
16 operator of the entire Section 10. You've got two leases
17 here. Royalty ownership in the east half is common, is it
18 not?

19 A. Yes, it is.

20 Q. And despite having the Texaco lease and the Exxon
21 lease in the west half, is royalty ownership common in the
22 west half?

23 A. Yes, it is.

24 Q. Now, referring back to your Exhibit 1, what are
25 the producing rates of the wells in Section 10?

1 A. Well, the currently producing wells in Section 10
2 include the Adkins Number 9 -- excuse me, Adkins Number 8,
3 which is currently producing about 10 barrels of oil per
4 day; the Blinebry Oil Com, which is currently producing
5 about 6 barrels of oil per day; the Knox Number 10, which
6 is currently producing about 14 barrels of oil per day.

7 The other producing wells in the section are not
8 producing from the Blinebry; they are producing from the
9 Queen. And the reason that they're shown on this exhibit
10 is that they -- the wells -- all of the -- all four wells
11 adjacent to each of these injection wells will be
12 recompleted back to the Blinebry and actually produced from
13 the Blinebry.

14 But the current producing rates on the east half
15 of the section and the west half of the section wells are
16 approximately equal, approximately 17 barrels a day for the
17 west half and approximately 16 barrels a day for the east
18 half.

19 Q. Are there any sources of fresh water in this
20 area?

21 A. Yes, there are. The Ogallala is a source of
22 fresh water in the area.

23 Q. And do you have a freshwater analysis?

24 A. Yes, we've included that as Exhibit Number 8.

25 Q. To the best of your knowledge, are there any open

1 faults or other connections between the disposal zone and
2 any drinking-water sources in this area?

3 A. No, there are not.

4 Q. Let's move on now to your Exhibit 9. Could you
5 discuss that for the Examiner?

6 A. Exhibit Number 9 shows the anticipated -- well,
7 actually the historical and the projected future producing
8 rates for the waterflood that we're proposing to implement
9 in the -- on the Adkins-Knox leases.

10 Q. Did we -- I forget, Mr. Duncan, was there an
11 estimate of total ultimate recovery from Section 10 due to
12 the waterflood program?

13 A. The actual estimated incremental waterflood
14 recovery is approximately a half million barrels of oil,
15 and that corresponds to the flow stream that's shown in
16 Exhibit Number 9.

17 Q. Okay, and that would be roughly equal to the
18 primary oil recovered?

19 A. Actually, it's significantly less than the
20 primary recovery, approximately a quarter of it, I believe.

21 Q. In your opinion, will the waterflood project
22 result in an increase in the amount of crude oil that will
23 ultimately be recovered from the reservoir?

24 A. Yes, it will, a significant increase.

25 Q. And what project area do you request?

1 A. We're requesting that the entire Section 10 be
2 designated as the project area, because that would include
3 each of the 80-acre units that have producing wells or will
4 have producing wells, and each of the adjacent 80-acre
5 units within the same section.

6 Q. Okay. Is the project area so depleted that it's
7 prudent to apply enhanced recovery techniques at this time
8 to maximize ultimate oil recovery?

9 A. Yes, it is.

10 Q. Is this waterflood project economically and
11 technically feasible at this time?

12 A. Yes, it is.

13 Q. What is Exhibit 10?

14 A. Exhibit Number 10 is a copy of Form C-102 for the
15 two proposed injection wells, the Adkins 11 and the Knox
16 Number 14.

17 Q. Okay. Was notice given to the offset operators
18 and the surface owner as required by Form C-108?

19 A. Yes, it was, and an affidavit to that effect is
20 included as Exhibit Number 11.

21 Q. In your opinion, is the granting of this
22 Application in the interests of conservation and the
23 prevention of waste?

24 A. Yes, it is.

25 Q. And were Exhibits 1 through 11 prepared by you or

1 under your direction or compiled from company business
2 records?

3 A. Yes, they were.

4 MR. BRUCE: Mr. Examiner, at this time I would
5 move the admission of Exxon's Exhibits 1 through 11.

6 EXAMINER STOGNER: Exhibits 1 through 11 will be
7 admitted into evidence at this time.

8 MR. BRUCE: And I have nothing further at this
9 time, sir.

10 EXAMINER STOGNER: Thank you, Mr. Bruce.

11 Mr. Kellahin, your witness.

12 MR. KELLAHIN: I have no questions, Mr. Examiner.

13 EXAMINATION

14 BY EXAMINER STOGNER:

15 Q. In referring to Exhibit Number 1, Mr. Duncan, the
16 wells which you have information on --

17 A. Yes, sir.

18 Q. -- and there are eight of them on this map, the
19 ones that marked in red -- let me make sure I get this
20 right -- the ones that are marked with red circles, those
21 are the current producers?

22 A. Those are actually the proposed producers, the
23 producers during the waterflood phase.

24 Q. Okay.

25 A. What we're proposing to do is implement a two-

1 pattern waterflood. There will be two injection wells, the
2 11 and 13. Each of those injection wells will be
3 surrounded by four producing wells, a total of six
4 producing wells.

5 The flood could be expanded an additional two
6 half patterns to the northeast and the southwest, but that
7 will be contingent upon the success of the first two
8 patterns.

9 Q. But now each of these eight wells that you have
10 indicated have had production from that Oil Center-
11 Blinebry, have they not?

12 A. That's correct, they include as the first long
13 line of information the key mode of recovery from the
14 Blinebry.

15 Q. The ones that are no longer producing that were
16 recompleted uphole into the Queen, do you know what the
17 rates were at the time of abandonment?

18 A. I don't have that information right here.

19 Q. Okay, keeping with this exhibit, the east half of
20 Section 10, that is a fee lease, correct?

21 A. Yes, it is.

22 Q. Okay. And the ownership is common throughout the
23 east half?

24 A. Yes, it is.

25 Q. And is Exxon the current operator in all the

1 proration units or all of the acres there in that -- in the
2 east half?

3 A. In the entire Section 10.

4 Q. Now, the west half, is that the same fee simple
5 royalty owner as the east half?

6 A. No, it is not.

7 Q. Okay. So we have -- But the entire west half is
8 common throughout?

9 A. Yes, it is.

10 Q. Okay. Now, you have yellow marked -- You have a
11 yellow perimeter and a green perimeter. Is the yellow
12 perimeter the Exxon operations?

13 A. No, it is not. The hached area surrounding the
14 entire Section 10 is the boundary of Section 10, and Exxon
15 operates the entire section.

16 Q. Okay, I thought you said Texaco operated that
17 Boyle Well Number 1 up there in the north half of the --
18 what appears to be the northeast quarter of the northwest
19 quarter?

20 A. Texaco actually has that under lease, and if I
21 said that they operated it, I was incorrect and I misspoke.

22 The north half of the northwest quarter is the
23 Blinebry Oil Com, operated by Exxon. That is composed of
24 60 acres from the Adkins lease that Exxon contributed and
25 20 acres from the Texaco lease -- excuse me, 20 acres from

1 the same lease -- a different lease, but to Texaco, that
2 Texaco contributed. Exxon operates the Blinebry Oil Unit
3 Well Number 1. Texaco just has a 25-percent working
4 interest.

5 Q. Will these well designations remain the same?

6 A. Yes, they will.

7 Q. Will the production in this cooperative agreement
8 or this cooperative area be pooled, or will they be
9 separated out and the royalties attributed just to that
10 production that's from the west side or the east side?

11 A. The production from the producing wells will be
12 paid to the royalty owners from where the well's located.
13 We believe that that's appropriate or that that will be
14 fair -- a fair way to go, and that unitization wasn't
15 necessary, simply because of the equivalency of these two
16 half-sections, the parity that appears to exist.

17 The current producing rates are about the same,
18 the cums are not that different. The waterflood will have
19 three producers in the east half and three producers in the
20 west half. The waterflood will have one injector in the
21 east half and one injector in the west half.

22 Texaco will have a producer on their tract, and
23 though they will not share in any of the cost of the
24 waterflood, they will share in the benefit of it.

25 There just doesn't -- the only one that seems to

1 be slightly -- If there's any inequity here, it's that
2 Exxon will be supplying the waterflood that an offset -- or
3 that Texaco would benefit from, but we believe that that's
4 acceptable and are willing to incur that disparity.

5 Q. Will that hold true with the working interests?
6 Will they attribute the cost to the whole project, or just
7 to that portion which they're a party to in the lease
8 agreement?

9 A. Exxon will bear the entire -- Exxon is the sole
10 working interest owner in the Adkins and Knox leases and
11 will bear the entire cost of the waterflood.

12 The only other working interest owner, as I said,
13 is Texaco, who's a 25-percent owner in the Blinebry Oil
14 Com, and for that small an interest there didn't appear to
15 be any reason to approach them to participate in the
16 waterflood cost; they will participate in the benefit.

17 But it's a small waterflood, and we're trying to
18 implement it quickly with relatively minor cost and delay.

19 Q. Other than the implementation of the waterflood
20 order, is there such a document as an Adkins and Knox
21 cooperative agreement?

22 A. No, there is not.

23 Exxon operates both leases, and a cooperative
24 agreement is usually executed by the working interest
25 owners in each of the two sides, so we didn't see any need

1 to draw up an agreement with ourselves, and we thought we'd
2 try to keep that fairly done ourselves. We realize that
3 there's a need to balance the injection and make sure that
4 the flood is equitable.

5 Q. Do you foresee any expansion at this time, as far
6 as the waterflood facilities, like additional injection
7 wells?

8 A. The -- There are two possible expansions within
9 Section 10. It could be expanded to the northeast, it
10 could be expanded a half pattern to the southwest. That
11 would depend upon the success of the first two patterns.
12 As I said, they would actually be half patterns.

13 You might be able to see that better on the
14 structure map, Exhibit Number 4. In Section 10 you can see
15 that there are eight wells, eight producing wells with
16 circles around them. Those are the eight possible
17 producers for a waterflood in Section 10. The ones that
18 are being implemented initially are the two patterns that
19 run northwest-southeast and include the four wells with
20 circles around them, surrounding the two proposed injection
21 wells.

22 There is a half-pattern to the northeast and a
23 half-pattern to the southwest that could be added. There
24 would probably not be a lot of injection support for those,
25 but that's another possible couple of producers.

1 And there is a possibility that if it's very
2 successful, that we would add another couple of injectors.
3 But at this point, that is just, you know, speculative, and
4 we're not -- It's not a part of our concrete plans of
5 implementation.

6 Q. As far as the enhanced recovery portion of the
7 Application, again, what is the anticipated incremental oil
8 production?

9 A. About a half million barrels.

10 Q. And that's additional barrels that would not
11 otherwise be recovered?

12 A. That's correct.

13 Q. Do you have an anticipated cost of the injection
14 facilities?

15 A. No, not separated out from the injection wells.
16 I have an anticipated cost of the two injection wells plus
17 the injection facilities, and that cost is about \$1
18 million.

19 Q. The actual field operations out there, are the
20 Knox wells, the proposed producers -- will they be -- I
21 guess their production was put in one single battery, as
22 opposed to your Adkins, which would also be in another
23 battery?

24 A. I don't know whether we have a commingled battery
25 out here at this point or not. We're not anticipating

1 changing the surface facilities for the producing wells.

2 Q. Okay, how about the injection -- the actual
3 injection wells and the injection lines and facilities?
4 Will they be separated out by lease, or will they be put
5 together in this instance?

6 A. My understanding is that they'll be on a common
7 header.

8 Q. Okay.

9 A. The produced water from the two leases will be
10 put together and injected back in with the additional
11 source water into the two wells.

12 But we are not planning to maintain segregated
13 injection for the two injection wells. In other words,
14 Adkins water wouldn't just go into the Number 11 and Knox
15 water into the Number 13.

16 Q. Okay. And the source water again? I --

17 A. From --

18 Q. -- didn't quite catch all that.

19 A. -- Chevron's Eunice Monument South Unit.

20 Q. So all of it will be reinjected produced waters,
21 no fresh waters?

22 A. That's correct.

23 EXAMINER STOGNER: Any other questions of Mr.
24 Duncan?

25 You may be excused.

1 Mr. Bruce, do you have anything further in this
2 matter?

3 MR. BRUCE: No, sir.

4 EXAMINER STOGNER: Does anybody else have
5 anything further in Case Number 11,665?

6 Then this matter will be taken under advisement.

7 (Thereupon, these proceedings were concluded at
8 9:10 a.m.)

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that the foregoing is
proceedings in
11665.
5 December 96
Michael E. Storn, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

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

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

WITNESS MY HAND AND SEAL December 6th, 1996.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998

STEVEN T. BRENNER, CCR
(505) 989-9317