

NEW MEXICO OIL CONSERVATION DIVISION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NOS. 10552, 10553, 10554

Consolidated Cases

IN THE MATTER OF:

The Application of ARCO Oil and
Gas Company for Pool Creation
and Contraction and, if Applicable,
Pool Extensions and/or Redesignations,
Lea County, New Mexico.

The Application of ARCO Oil and
Gas Company for Statutory Unitization,
Lea County, New Mexico.

The Application of ARCO Oil and
Gas Company for Approval of a
Waterflood Project, Lea County,
New Mexico.

BEFORE:

DAVID R. CATANACH

Hearing Examiner

State Land Office Building

September 17, 1992

REPORTED BY:

CARLA DIANE RODRIGUEZ

Certified Shorthand Reporter
for the State of New Mexico

ORIGINAL

A P P E A R A N C E S

FOR THE NEW MEXICO OIL CONSERVATION DIVISION:

ROBERT G. STOVALL, ESQ.

General Counsel
State Land Office Building
Santa Fe, New Mexico 87504

FOR THE APPLICANT:

CAMPBELL, CARR, BERGE & SHERIDAN, P.C.

Post Office Box 2208

Santa Fe, New Mexico 87504-2208

BY: **WILLIAM F. CARR, ESQ.**

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1 EXAMINER CATANACH: Call the hearing
2 back to order and at this time we'll call Case
3 10552.

4 MR. STOVALL: Application of ARCO Oil
5 and Gas Company for pool creation and contraction
6 and, if applicable, pool extensions and/or
7 redesignations, Lea County, New Mexico.

8 EXAMINER CATANACH: Are there
9 appearances in this case?

10 MR. CARR: May it please the Examiner,
11 my name is William F. Carr with the Santa Fe law
12 firm Campbell, Carr, Berge & Sheridan. We
13 represent ARCO Oil and Gas Company in this case,
14 and I have three witnesses.

15 I would like the record to reflect that
16 the style of the case was generated by the
17 Division and not by ARCO, particularly the
18 provision that Mr. Stovall had a hard time
19 reading. I would further request that this case
20 be consolidated, for purposes of hearing, with
21 Cases 10553 and 10554. They all relate to the
22 creation of the South Justis Unit and we think it
23 would be appropriate to consolidate them for
24 purposes of hearing, but would request that
25 separate orders enter.

1 MR. STOVALL: I would like the record
2 to reflect that the Division tried to interpret
3 Mr. Carr's application.

4 EXAMINER CATANACH: So recorded. At
5 this time we'll call Case 10553 and Case 10554.

6 MR. STOVALL: 10553 is the application
7 of ARCO Oil and Gas Company for statutory
8 unitization, Lea County, New Mexico.

9 Case 10554 is the application of ARCO
10 Oil and Gas Company for approval of a waterflood
11 project, Lea County, New Mexico.

12 EXAMINER CATANACH: Are there
13 additional appearances in any of these three
14 cases?

15 Will your witnesses please stand to be
16 sworn in, Mr. Carr.

17 [The witnesses were duly sworn.]

18 **RAY PYLE**

19 Having been first duly sworn upon his oath, was
20 examined and testified as follows:

21 EXAMINATION

22 BY MR. CARR:

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

25 A. My name is Ray Pyle.

1 Q. Where do you reside?

2 A. I reside in Midland, Texas.

3 Q. By whom are you employed and in what
4 capacity?

5 A. I'm employed by ARCO Oil and Gas. I
6 work as a petroleum landman for ARCO.

7 Q. Have you previously testified before
8 the New Mexico Oil Conservation Division?

9 A. No. I have not.

10 Q. Would you summarize for Mr. Catanach
11 your educational background and then review your
12 work experience?

13 A. My undergraduate degree is in
14 communication. I'm a certified petroleum
15 landman. I worked as a landman for the last 14
16 years; the last four years of which I worked for
17 ARCO Oil and Gas. and prior to that time as an
18 independent landman.

19 Q. Are you familiar with the applications
20 filed in each of these cases?

21 A. Yes. I started working on this project
22 in April 1991.

23 Q. In fact, you're the land person
24 responsible for contacting working interest
25 owners and royalty interest owners, both before

1 and after an order is entered in this case,
2 assuming one will be entered?

3 A. Yes.

4 Q. Are you familiar with the status of the
5 lands in the proposed South Justis Unit area?

6 A. Yes, I am.

7 MR. CARR: We tender Mr. Pyle as an
8 expert witness in petroleum land matters.

9 EXAMINER CATANACH: Mr. Pyle is so
10 qualified.

11 Q. Would you briefly summarize what ARCO
12 Oil and Gas Company seeks in these consolidated
13 cases?

14 A. We're seeking, first of all, statutory
15 unitization of the South Justis Unit comprised of
16 5,360 acres made up of federal, state and fee
17 lands; also, the creation of a new
18 Blinebry-Tubb-Drinkard pool, along with a
19 contraction of the boundaries of the
20 Justis-Blinebry oil pool and the
21 Justis-Tubb-Drinkard oil pool; also seeking
22 approval of a waterflood project in the new pool.

23 Q. Mr. Pyle, would you please identify
24 what's marked as Exhibit No. 1. I think a copy
25 of that is on the easel?

1 A. Exhibit No. 1 is an orientation map
2 just to show you where the unit is located in
3 relationship to Lea County, to the southeastern
4 corner of Lea County. It's about two miles east
5 of Jal, New Mexico.

6 Q. Let's move now to Exhibit No. 2 which
7 is also on the easel. Would you identify that
8 and review that for Mr. Catanach?

9 A. Exhibit No. 2 outlines in red the
10 proposed unit outline. The outline in pink is
11 the existing Justis-Blinbry pool and the outline
12 in green is the existing Justis-Tubb-Drinkard
13 pool. It shows the correlation between the unit
14 area with the existing pools. It will be used
15 later on in further testimony.

16 Q. All right. Let's move on to Exhibit
17 No. 3. Could you identify that?

18 A. Exhibit No. 3 is an enlargement of our
19 Exhibit A to the unit agreement. It shows you
20 the outline of the proposed unit. It shows you
21 the character of the land. The green slashed
22 land is the federal acreage totaling 2,800 acres,
23 representing 52.24 percent of the unit area.

24 The slashed acreage in red is state
25 land. 920 acres, representing 17.16 percent of

1 the unit area, and the white tracts are the fee
2 lands. It's 1,640 representing 30.60 percent of
3 the unit area.

4 You'll also note that the federal and
5 lease numbers are illustrated on those tracts
6 that are federal and state lands, as well as the
7 name for the record title, according to the state
8 and federal records.

9 O. Let's now move to your Exhibit No. 4.
10 First would you identify that and then explain to
11 Mr. Catanach what they show. Is it in the
12 folder?

13 A. It's in the manila folder. yes.
14 Exhibit No. 4 is Exhibit B and C of the unit
15 agreement. It shows the current ownership on a
16 tract-by-tract basis, showing the record title
17 owners, royalty interest owners, overriding
18 royalty owners and working interest owners.

19 Exhibit C, which is on the back
20 following Exhibit B there, is a separate exhibit
21 that shows the tract participation for each
22 individual tract. One thing you might note in
23 Exhibit B is those tracts that have uncommon
24 ownership between the Blinebry and the
25 Tubb-Drinkard. We have characterized those with

1 the letter A for the Tubb-Drinkard.

2 An example of that on page 12, if you
3 look at that, you have tract 42 that is showing
4 the Blinebry ownership in there, and then on page
5 14. on Exhibit B, you'll see the Tubb-Drinkard
6 ownership.

7 We discussed that with the BLM in terms
8 of how to best illustrate those in that exhibit,
9 and so that's what we did. We didn't use a
10 separate tract number, we just added the A in
11 there for those few tracts that had uncommon
12 ownership between the Blinebry and the
13 Tubb-Drinkard.

14 Q. Let's move now to ARCO Exhibit No. 5.
15 Would you identify that?

16 A. Exhibit No. 5 is the unit agreement.
17 It has the basic, standard provisions as in most
18 unit agreements. We patterned this after the
19 unit agreement that was the Eunice Monument South
20 unit agreement.

21 When discussing this with the land
22 office, that is the unit agreement that is
23 recommended in terms of form for secondary
24 recovery for federal, state and fee lands.

25 It reflects, basically, the characters

1 of the land, provides for waterflooding and sets
2 out the basis for the participation for each of
3 the owners.

4 Q. Does this agreement provide for the
5 periodic filing of plans of development with
6 governmental agencies?

7 A. Yes, it does. Section 11 allows for
8 periodic filing of plans of operation.

9 Q. Will these plans be filed with the Oil
10 Conservation Division at the same time they're
11 filed with other agencies?

12 A. Yes, they will.

13 Q. Do you anticipate any further changes
14 being made to the text of this agreement?

15 A. No, we do not. The terms and
16 provisions should remain the same. Any changes
17 might be along the line of spelling, wording,
18 that type of thing; nothing that would impact the
19 terms of the provisions in the agreement.

20 Q. Let's identify what has been marked as
21 ARCO Exhibit No. 6?

22 A. Exhibit No. 6 is the unit operating
23 agreement. It's patterned after, also, the
24 Eunice Monument South operating agreement. It
25 contains the basic standard provisions of a unit

1 operating agreement. It outlines the supervision
2 and the management of the unit, defines the
3 rights and duties of all of the parties; shows
4 how the investments and costs are to be shared;
5 establishes the voting procedure for the
6 decisions to be made by the working interest
7 owners; and it sets out standard COPAS provisions
8 for accounting purposes.

9 Q. Has ARCO reviewed this proposal with
10 the Bureau of Land Management?

11 A. Yes, we have. When I first started
12 working this project, I contacted the BLM,
13 visited regarding what our objectives were, asked
14 them regarding the time frames of the filing
15 dates and that type of thing.

16 We had our first meeting with the BLM
17 on the 22nd of May, 1991. We met with Armando
18 Lopez and the other staff members there in
19 Roswell. We were represented by our geology
20 department, as well as engineering and land. We
21 discussed the unit outline at that time. We
22 discussed and showed them our initial drafts of
23 the unit agreement. Also we discussed the basic
24 objectives that we had, asked for their
25 suggestions and guidance as we went along on it.

1 We made application with the BLM on
2 February 4, 1992, for preliminary approval. If
3 you'll look at Exhibit No. 7, that's a letter
4 dated March 9, 1992, where the BLM gave us the
5 preliminary approval designating the proposal as
6 an area logically suited for development as an
7 area under a unit plan.

8 Q. Have you reviewed this proposal with
9 the New Mexico State Land Office?

10 A. Yes. we have. We followed basically
11 the same outline, same timing. In discussing
12 this with the BLM, we discussed it also with the
13 New Mexico State Land Office. Our first meeting
14 with them was May 23, 1991. The same parties as
15 I mentioned that met with the BLM also met with
16 the State Land Office.

17 Basically, reviewing the same types of
18 information with them that we did with the BLM,
19 asking for their input or suggestions. We made
20 our written application for preliminary approval,
21 also on February 4, 1992 with the State Land
22 Office, and if you'll notice in Exhibit No. 8, it
23 shows the preliminary approval by the
24 Commissioners of Public Lands, and that was dated
25 March 11, 1992.

1 O. Would you identify ARCO Exhibit No. 9?

2 A. Exhibit No. 9, that exhibit is the same
3 as the Exhibit D to the unit operating
4 agreement. That lists all of the working
5 interest owners alphabetically. It shows their
6 interest that they have in each individual tract
7 in which they own an interest, and it also totals
8 up their interest on that to reflect their entire
9 interest within the unit.

10 O. Could you review your efforts to obtain
11 the support of these working interest owners in
12 this unit plan?

13 A. We gave a brief history of our contact
14 in working with the working interest owners.
15 ARCO first became involved with the working
16 interest owners in pursuing a secondary recovery
17 project in 1984. At that time we participated in
18 a technical committee in which the effort was to
19 evaluate the prospect of waterflooding the
20 Blinebry and the Tubb-Drinkard.

21 In 1986, the firm of Hickman &
22 Associates in Midland conducted a technical
23 study, feasibility study, and the results of
24 their study were released in 1987. The Hickman
25 report basically recommended the waterflooding of

1 the field in two units. S. J. Missoulo published
2 a geological study as part of that Hickman
3 feasibility report.

4 As a result of that study and report,
5 ARCO proceeded to pursue the forming of a
6 secondary recovery unit in the South Justis field
7 and took on the role as expediter at that time.
8 June of 1991, the technical committee report was
9 approved. January of 1992 the equity formula,
10 participation formula, was approved.

11 At this point in time we have
12 approximately 50 working interest owners within
13 the proposed unit. We have not--ARCO has not
14 pursued prehearing ratifications. We have
15 ballotted each one of the working interest owners
16 seeking their ballot of support. At this point
17 we are in excess of 91 percent support from the
18 ballots that we sent out, and we have received no
19 negative vote.

20 Q. What has ARCO done to obtain support
21 from the royalty interest owners in the unit
22 area?

23 A. Following the approval of the unit
24 agreement by the working interest owners, we have
25 prepared and distributed a royalty owner brochure

1 as Exhibit 10. The purpose of the brochure is to
2 explain the project to the working interest
3 owners. We sent that to them along with the unit
4 agreement and a letter seeking their support as
5 well for the unit. We did not, again, proceed
6 with getting prehearing ratifications from them.

7 At this point in time we have in excess
8 of 80 percent ballotted support from the royalty
9 owners. We still have those ballots coming in,
10 and we have not received any negative vote from
11 royalty owners.

12 Q. Is ARCO Exhibit No. 11 a copy of an
13 affidavit from the law firm, Campbell, Carr,
14 Berge & Sheridan, confirming that notice of
15 today's hearing has been provided in accordance
16 with OCD rules?

17 A. Yes.

18 Q. To whom was notice mailed?

19 A. We mailed notice to all interest owners
20 within the unit area, all surface owners for all
21 proposed injection wells, and all leasehold
22 operators within a one-mile radius of the unit
23 boundary.

24 Q. Are those owners identified by name and
25 address on Exhibit A to this affidavit?

1 A. Yes.

2 Q. Behind that affidavit we first have
3 royalty owners, then we have working interest
4 owners, later than that we have surface owners,
5 and then we have other operators within the areas
6 of review, is that correct?

7 A. That's correct.

8 Q. How was this list of owners actually
9 prepared?

10 A. The unit area has been held by
11 production for several years, numerous years. I
12 don't know how far back the production goes. As
13 a result of that, we have relied on the operators
14 to provide us with their pay sheets for the
15 updated information regarding the ownership.

16 We've also done, initially, early on in
17 the process, courthouse and record checks to
18 begin to establish our ownership.

19 Q. Since notice of this hearing was
20 provided, approximately how many people did you
21 give notice to, do you know?

22 A. There were in excess of 395 royalty
23 owners, 50 working interest owners. I don't know
24 in terms of the other numbers for the surface. I
25 would estimate the total number in excess of 450

1 people.

2 Q. After providing notice to these
3 individuals, did you discover new addresses or
4 changed addresses for any of the interest owners?

5 A. There were some that came back where we
6 were able to find out a more up-to-date address
7 and we immediately tried to get notice out to
8 them as well.

9 Q. About how many people are we talking
10 about?

11 A. We had seven that we sent
12 additional--we had updated addresses where we
13 sent notice out.

14 Q. Will ARCO call geologic and engineering
15 witnesses to review the technical portions of
16 this case?

17 A. Yes.

18 Q. Were Exhibits 1 through 11 prepared by
19 you or compiled under your direction and
20 supervision?

21 A. Yes.

22 MR. CARR: Mr. Catanach, at this time I
23 would move the admission of ARCO Exhibits 1
24 through 11.

25 EXAMINER CATANACH: Exhibits 1 through

1 11 will be admitted as evidence.

2 MR. CARR: That concludes the land
3 portion of our presentation.

4 EXAMINATION

5 BY EXAMINER CATANACH:

6 Q. Mr. Pyle, the unitized interval will be
7 addressed by a geologic witness?

8 A. Yes.

9 Q. Do you anticipate nonjoinder or
10 nonratification by any working interest owners?

11 A. Not at this point in time. What we
12 have done over a period of probably the last
13 three years is we have, in those situations,
14 we've had working interest owners that have
15 expressed an interest to be bought out in the
16 area as much as we have been able to do
17 capitally.

18 We have acquired that interest, and at
19 this point in time I do not know of any working
20 interest owner that would oppose formation of the
21 unit.

22 Q. So the remaining nine percent that
23 haven't ballotted to join at this point, you
24 expect those to come in?

25 A. Hopefully.

1 Q. Has there been any concern expressed to
2 you by any royalty owners over the formation of
3 the unit?

4 A. No. All of our response from the
5 royalty owners has been very positive. They've
6 seen their royalty over a period of years in a
7 decline, and the prospect of that royalty now
8 continuing has been a very positive response from
9 the royalty owners.

10 Q. Are you satisfied that you've been able
11 to find all the interest owners in the proposed
12 unit?

13 A. Yes, we have. From the pay sheets of
14 several of the operators' addresses that are
15 shown on the Division orders that show "address
16 unknown," in which they've been in that status
17 for some extended period of time, and it's
18 doubtful as to whether or not we'll be able to
19 locate those if the operators, themselves, over a
20 period of time have been unable to locate them.

21 We will continue to make every effort
22 we can, if we obtain leads on them, to pursue
23 getting those addresses.

24 Q. Do you know what percentage that might
25 be of owners that you can't locate?

1 A. I would, and it would just be
2 estimating right now, but those that actually
3 showed up on any of the operators as "address
4 unknown," would not be more than 15 total.

5 One of the problems that we have
6 encountered with this is the fact that there was
7 a major shift in ownership into this six to eight
8 months ago, when Union Texas' interest went to
9 Meridian, so there has been a lapse in time
10 period to get those records changed over.

11 Meridian, at this juncture, is really
12 quite unfamiliar with their pay sheets and their
13 records at this point in time, so there may be
14 some we'll be able to catch up with once they get
15 set up and become familiar with the ownership to
16 those that they acquired.

17 Q. Will ARCO make an attempt to locate
18 those persons that they can't locate at this
19 point?

20 A. We feel, at this juncture, that in
21 terms of those owners that in the individual
22 tracts where the operators have not been able to
23 locate them. we have to have some type of cutoff
24 that we feel would be economically prohibitive to
25 continue and try to pursue those.

EXAMINATION

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BY MR. STOVALL:

Q. What provision does the unit agreement or operating agreement have for nonconsent to any operations, or nonpayment? As I read through, I notice there's a lien provision for the collection. Is there any provision for nonconsent or forfeiture of interest?

A. I'm not sure I'm following what your question is.

Q. In other words, if an owner were to choose to go nonconsent or not want to participate in the particular operation, is there a provision for that or is it strictly, once it's voted on and agreed upon, everybody is bound by it?

A. That is correct. In other words, any operation that you would receive the majority of your vote on, they would be obligated to participate in that operation.

Q. If somebody failed to pay for it, you would assert a lien because there would be no forfeiture of interest or penalty attached? It would just be a lien in interest?

A. Right, until that amount is recooped.

1 Q. Now, with respect to the secondary
2 recovery operations, I assume ARCO is, at some
3 point, going to want the project to receive the
4 tax credit under the EOR bill, is that correct?

5 A. Yes. That's something that I wouldn't
6 speak to.

7 MR. STOVALL: Who do we have a
8 discussion with about that?

9 MR. CARR: Our engineering witness will
10 be able to discuss that with you. It's our
11 intention to seek approval of the project, but we
12 have some initial injectivity tests that we're
13 going to mention later, that we're going to
14 conduct are just tests, and we'll be back asking
15 for approval of the project before we actually
16 commence injecting water into the formation.

17 The reason for that is there's some
18 time frames after you commence injection and get
19 the project approved, during which time you must
20 achieve a positive production response. And,
21 while we're doing this initial testing, we need
22 to have a clock running on that.

23 MR. STOVALL: For your information,
24 subsequent to some discussions we had on this
25 with the Division before this application, the

1 approach we've actually taken on the one case
2 we've seen at this point is to include a
3 provision in the Order, assuming that it does
4 qualify, that it qualifies for the credit, and
5 then requesting the operator to come back and
6 request certification to the secretary, because
7 that starts that clock running on the time we
8 need for positive production response.

9 So, it would not necessitate an
10 additional hearing to come back and get that
11 approval.

12 MR. CARR: It was our intention and we
13 think we will do it today, to provide all
14 information required by the rules that you've
15 recently promulgated for qualifying projects for
16 the tax incentive rate. And our intention was to
17 simply present it and advise you that we would be
18 seeking the formal approval at a later date.
19 Your new procedure, as you've outlined it, would
20 be agreeable to us.

21 MR. STOVALL: I don't think it asks you
22 to do anything different, but it may change,
23 slightly, what you ask for when you leave today.

24 I'll tell you, the other thing that
25 we've discovered, and this is largely as a result

1 of the discussions we had with ARCO, prior to
2 this hearing, and on the one other case that
3 we've got--and the engineer may want to discuss
4 the plan for implementation--because what we can
5 do is approve the project area, the initial
6 phase, if it's phased or whatever, and get a
7 preliminary approval. And then, at such time as
8 you ask for certification to the Taxation &
9 Revenue Department, we would certify and we could
10 amend that at that time, if you didn't intend to
11 implement the whole thing. It saves you coming
12 back for another hearing, is what we would
13 anticipate, and we've reviewed it with Tax & Rev
14 and they're agreeable to that procedure.

15 MR. CARR: Mr. Stovall, we're prepared,
16 as part of our presentation, to identify Phase I
17 and Phase II development areas.

18 MR. STOVALL: Good. And the rest of my
19 questions I will save for the engineer on that
20 issue.

21 EXAMINER CATANACH: Mr. Pyle, does the
22 unit agreement or the unit operating agreement
23 contain the allocation formula for allocation of
24 production?

25 MR. CARR: The answer to the question

1 is yes, and that will also be reviewed by the
2 engineering witness who participated in the
3 meetings where that was developed.

4 EXAMINER CATANACH: Okay.

5 MR. STOVALL: Mr. Examiner, I did look
6 at the agreement, and there is a formula in
7 Section 13 on page 8 of the unit agreement.

8 EXAMINER CATANACH: Okay. That's
9 fine. I'll save my questions until then.

10 I have nothing further of the witness.
11 He may be excused.

12 MR. CARR: At this time we call Mr. Tim
13 Altum, A-L-T-U-M.

14 **TIM ALTUM**

15 Having been first duly sworn upon his oath, was
16 examined and testified as follows:

17 EXAMINATION

18 BY MR. CARR:

19 Q. Would you state your name for the
20 record, please?

21 A. Tim Altum.

22 Q. By whom are you employed?

23 A. ARCO Oil and Gas, in Midland, Texas.

24 Q. In what capacity?

25 A. A development geologist.

1 Q. Have you previously testified before
2 this Division?

3 A. No, I have not.

4 Q. Would you briefly summarize your
5 educational background and review your work
6 experience.

7 A. Yes. I have a B.S. degree in geology
8 from Hardin-Simmons University and an M.S. degree
9 in geology from Baylor University. I worked
10 three years with an independent oil company in
11 Abilene, Texas, as an exploration geologist, and
12 six years with ARCO Oil and Gas, the last two
13 years as development geologist.

14 Q. Are you familiar with the application
15 filed in this case?

16 A. Yes, I am.

17 Q. Mr. Altum, how long have you actually
18 worked on this project?

19 A. I've worked Southeast New Mexico since
20 February of 91, and South Justis an equal amount
21 of time. Since October of 91, I've spent over 80
22 percent of my time working the South Justis Unit.

23 Q. Could you summarize for Mr. Catanach
24 the work you have done on this particular unit?

25 A. The work at South Justis began by

1 digitizing the entire well log database. A
2 detailed study from our ARCO reservoir analysis
3 group in Plano was completed and turned over to
4 us in October of 1991. The results of that study
5 included a detailed core description, a detailed
6 core log integration, a state-of-the-art
7 petrophysical geochemical log suite to define
8 mineralogy, and a sonic porosity logarithm to
9 analyze the available sonic porosities to core
10 porosities.

11 Based on that work, we integrated the
12 entire 180 well log database at South Justis.
13 We're working on a state-of-the-art silicon
14 graphics computer workstation, and we're using
15 industry standard computer software.

16 In working on these, the marker beds
17 which were defined by the geochemical log suite
18 were carried and correlated across the field.
19 Structure and stratigraphic cross-sections were
20 generated to adequately define the extent of
21 these marker beds, as well as structure and
22 isopach maps on each of these markers.

23 An in-house program was developed to
24 auto interpolate the petrophysical properties,
25 for instance porosity, across the field on

1 two-foot intervals on X, Y and Z dimensions, and
2 a three-dimensional volume based on pore footage
3 was calculated, and original oil in place numbers
4 were confirmed by this process.

5 Very detailed perforation histories for
6 each of these wells were entered into this
7 computer workstation, and a detailed report of
8 each of these histories were obtained for each
9 well.

10 Q. How would you characterize the
11 sufficiency of the data available to you to
12 conduct your study of this particular portion of
13 the formation?

14 A. I believe we have ample data and a high
15 degree of confidence in our understanding of this
16 formation.

17 MR. CARR: We tender Mr. Altum as an
18 expert witness in petroleum geology.

19 EXAMINER CATANACH: He is so qualified.

20 Q. You've prepared certain exhibits for
21 presentation here today, have you not?

22 A. Yes, I've prepared a structural contour
23 map, a north/south strike structural
24 cross-section, an east/west dip structural
25 cross-section, a generalized isopach contour map

1 and a type log for the Blinebry-Tubb-Drinkard.

2 Q. Let's start with the type log. Which
3 one is that?

4 A. It's right here, on the right.

5 Q. Would you refer to the type log and
6 identify the formations we're talking about, for
7 Mr. Catanach?

8 A. Sure. ARCO's Exhibit No. 12 is a type
9 log. The type log is the ARCO Oil and Gas,
10 formerly the Amerada Hess-Ida Wimberley No. 4.
11 This log is the same log as identified in the
12 unitized formation portion of the unit
13 agreement.

14 The Blinebry is defined at 4980
15 measured depth, or minus 1899 subsea, and the Abo
16 is defined as 6180 measured depth, or minus 3099
17 subsea.

18 Four markers were identified in
19 analyzing this formation, the Blinebry. Main
20 Blinebry-Tubb and Drinkard. The Tubb is defined
21 at 5670 measured depth and the Drinkard at 5870
22 measured depth.

23 Q. Let's move to Exhibit 13, the structure
24 map on the easel next to Mr. Catanach, and would
25 you explain what this shows?

1 A. Sure. ARCO's Exhibit No. 13 is a
2 structure map of the top of the Main Blinebry.
3 By referring to the top log, the Main Blinebry is
4 at 4980--excuse me. 5122 measured depth. The
5 contour interval is 20 feet, and I selected this
6 interval, although each marker bed which has been
7 mapped mirrors this same particular structure,
8 and I've brought several along in case you would
9 like to look at some of the others.

10 We have approximately 2 to 220 foot of
11 closure, again reflected in each mapable horizon,
12 and the structure closure is necessary, although
13 the actual trapping mechanism is the inner
14 fingering of porous and nonporous reservoir rock.

15 Q. Anything else on your structure map?

16 A. No. I believe that's all.

17 Q. Let's go to the isopach which is behind
18 the structure map. Would you review this exhibit
19 for the Examiner?

20 A. ARCO's Exhibit No. 14 is a generalized
21 gross isopach of the Main Blinebry, this same
22 interval that I referred to on the type log for
23 the structure map.

24 The contour interval is 25 feet and a
25 thick exists in the northeast of approximately

1 400 feet, with the formation averaging 350 feet
2 thick along the crest with some indications of
3 thinning to the west. A lack of well
4 penetrations really preincludes a thorough
5 investigation of the flanks of the structure.

6 All of the intervals within the
7 unitized formation of interest are similar, and
8 the entire unitized area can contribute economic
9 reserves.

10 Q. Let's now to go to the cross-sections,
11 Exhibits 15 and 16, that are on the wall.

12 A. Okay. Exhibit 15 is a cross-section
13 A - A' and this is a north/south structural
14 cross-section along strike. Exhibit 16 is
15 cross-section C - C', which is an east/west dip
16 structural cross-section.

17 The datum for both of the
18 cross-sections is minus 1800 feet subsea. The
19 horizontal scale is one inch equals 500 feet,
20 with the vertical scale equal to one inch equals
21 100 feet.

22 Both cross-sections exhibit a fairly
23 uniform thickness in each of the zones of
24 interest, the Upper Blinebry, the Main Blinebry,
25 the Tubb and the Drinkard. The reservoir limits

1 are basically defined by oil-water contacts
2 within the Tubb and the Drinkard, and defined by
3 an increase in water saturations, therefore,
4 higher water cuts at the edge of the pool.

5 We have three shallowing upward
6 sequences capped by quartz-rich supra title
7 dolomites and these capping rocks exhibit
8 sufficient properties to act as seals for these
9 shallowing upward sequences. Again, like
10 depositional environments are exhibited in each
11 zone. The differences only occur in the
12 thicknesses of each of these units relating to
13 geologic time and length of time deposition
14 occurred.

15 Each package exhibits lateral pinchouts
16 of pay and nonpay facies; therefore, we do not
17 have perfect seals between zones. And throughout
18 geologic time, this lateral discontinuity could
19 have permitted communication between zones,
20 thereby accounting for a common source of supply.

21 Q. What conclusions have you reached about
22 the formation based on your geologic study of
23 this portion of this reservoir?

24 A. The conclusions reached are that the
25 proposed unit boundary closely reflects the

1 limits of economic production in this reservoir,
2 and that the unitized zones are continuous across
3 the proposed unit area. The primary zones of
4 interest are made up of the same rock and of like
5 depositional environments. Any segregation of
6 these zones into separate pools would be the
7 result of the historical way they were developed
8 and not based upon geology.

9 Q. In your opinion, can the portion of the
10 pool which is included in the proposed unit area
11 be efficiently and effectively developed under a
12 unit plan?

13 A. Yes. From a geological perspective,
14 the proposed unit area includes the economically
15 productive portion of this reservoir and can
16 efficiently be developed as a unit.

17 Q. Were Exhibits 12 through 16 prepared by
18 you?

19 A. Yes, they were.

20 MR. CARR: At this time, Mr. Catanach,
21 I move the admission of ARCO Exhibits 12 through
22 16.

23 EXAMINER CATANACH: Exhibits 12 through
24 16 will be admitted as evidence.

25 MR. CARR: That concludes our

1 geological presentation in this case.

2 EXAMINATION

3 BY EXAMINER CATANACH:

4 Q. Mr. Altum, let's talk about the unit
5 boundary outline a little bit. You said that
6 closely resembled the what?

7 A. The economic limits of production. The
8 boundaries to the east, west and south are
9 defined by, again, economic limits. The boundary
10 to the north will be defined by our engineering
11 participant, and the Tubb and the Drinkard are
12 defined by basically oil water contacts or tests
13 of water, whereas the Blinebry is defined by an
14 increased water cut; therefore, less economic
15 reserves to the east, west and south.

16 Q. Will waterflooding not benefit wells
17 outside the unit to the north, to the east, west
18 and south?

19 A. No. I don't believe so.

20 MR. CARR: Mr. Catanach, the wells
21 outside the unit boundary but which are also
22 producing from this reservoir, and there are, I
23 believe, three of them, they're going to be
24 reviewed by our engineering witness.

25 Q. Is the main producing interval in the

1 unit the Main Blinebry?

2 A. Yes, that's correct.

3 Q. The Tubb and the Drinkard are
4 productive?

5 A. Yes.

6 Q. It's your intention to waterflood all
7 three intervals?

8 A. That is correct.

9 Q. How about the Upper and Lower
10 Blinebry? Will those also be flooded?

11 A. The Upper Blinebry, as you can see, has
12 very thin fingers of supra title or quartz-rich
13 rocks so there will be dolomite stringers within
14 that 150 or so feet that will be flooded.

15 The Lower Blinebry, we have
16 perforations in that interval and yet it has been
17 comingled with other production; therefore, I
18 don't know its contribution. When we define the
19 pay zones within the Lower Blinebry, they will be
20 flooded.

21 Q. Has the field, essentially, been
22 depleted in all three zones, as far as primary
23 production?

24 A. I don't believe so. I believe that
25 there is primary production remaining.

1 Q. As to the contraction of the
2 Justis-Blinebry and Justis-Tubb-Drinkard, have
3 you consulted with our people down in Hobbs about
4 this situation?

5 A. I have not been to Hobbs, no.

6 MR. CARR: The engineering witness,
7 again, following a meeting here in Santa Fe, did
8 meet with Mr. Kautz and Mr. Sexton, and he'll
9 review that, too, as part of the presentation.
10 That's the unfortunate thing about being the last
11 witness, it gets passed back to you.

12 Q. Are all of the potential or all of the
13 zones generally productive with just oil, or are
14 there gas in these formations?

15 A. There is gas in the formations, yes.

16 Q. Are there gas caps, or--

17 A. It's my opinion that a secondary gas
18 cap was formed, but I don't have any indications
19 of a primary gas cap, when it was developed or
20 discovered.

21 EXAMINATION

22 BY MR. STOVALL:

23 Q. You indicated, in response to the
24 Examiner, that you think there's still some
25 primary left. Do you have an opinion as to

1 whether initiating this secondary enhanced
2 recovery operation is premature?

3 A. No, I don't believe it's premature.
4 Historically, whenever you decrease the well
5 spacing in a Clearfork reservoir, you recover
6 ultimate or primary reserves, and we hope to do
7 the same.

8 Q. You're saying, by decreasing spacing
9 alone, you could recover primary, right?

10 A. Sure.

11 Q. What about the initiation of secondary
12 recovery operations themselves? Is it
13 appropriate, in your opinion--and again, we may
14 be tossing this on to the engineering witness
15 here--you've expressed an opinion there's primary
16 left. From a geologic standpoint, would it be
17 premature to start waterflooding at this point,
18 based upon whatever geological expertise you've
19 got?

20 A. No, I don't believe so.

21 Q. I would have to go into details with
22 that with the engineer, is that right?

23 A. That's the best one, yes.

24 Q. In the course of qualifying you, you
25 were asked some questions about your knowledge of

1 the area and you talked about digitizing and
2 doing all sorts of weird things to the rocks?

3 A. Right.

4 Q. I'm assuming your opinions are based
5 upon the results of that electronic analysis of
6 this reservoir, at least in part, is that
7 correct?

8 A. That's correct.

9 Q. Upon what basis do you have confidence
10 that both the process that was used and the input
11 of data was substantially reliable and would
12 allow you to rely on the information you derived
13 therefrom to form an opinion?

14 A. First of all, I entered all the data
15 myself, personally. I quality--QC'd each and
16 every wellbore, each and every digitized well log
17 to the paper copies, and worked from paper to the
18 machine.

19 So, it's a very, very good, reliable
20 program, and I have a very high degree of
21 confidence in the data.

22 Q. This is not an experimental program?

23 A. No, it's an industry standard program.

24 Q. Do you have an independent opinion.
25 based upon observation of the logs themselves and

1 the data which was digitized, by which you could
2 confirm the analysis? Could you look at it, take
3 two different approaches, and come to the same
4 result?

5 A. We actually did, because I worked off
6 paper copies at the same time that I'm trying to
7 enter the rest of the data. The entering of the
8 data or the results these guys needed couldn't
9 wait on me to enter the data, so I was doing a
10 lot of work-off-the-paper-copies and reaching the
11 same conclusions. Once it was all entered,
12 reaching the conclusions was much faster and much
13 quicker.

14 FURTHER EXAMINATION

15 BY EXAMINER CATANACH:

16 Q. You mentioned something that the zones
17 may not be fully separated and there may be some
18 communication occurring. Could you elaborate on
19 that a little bit?

20 A. Yes. Throughout geologic time, we have
21 inner fingering of pay and nonpay facies, as well
22 as inner fingering of the rock properties that
23 seal, or the rocks that have the necessary
24 properties to seal these zones. All of these
25 zones finger and inner finger and pinch out

1 laterally; so, over geologic time, we've had
2 communications which have allowed for this
3 accumulation to occur.

4 Today, based on production time, these
5 properties or these cap rocks have the sufficient
6 properties to seal this reservoir. So, over
7 geologic time we've had communications today over
8 production time, necessary to seal the reservoir.

9 Q. So there is no communication at this
10 point between any of the zones?

11 A. Not geologic communication.

12 EXAMINER CATANACH: I think that's all
13 I can think of at the moment.

14 MR. CARR: Mr. Altum will remain
15 available if Mr. Prentice decides that the
16 questions are geologic.

17 MR. CARR: All right. At this time we
18 would call Richard Prentice.

19 **RICHARD S. PRENTICE**

20 Having been first duly sworn upon his oath, was
21 examined and testified as follows:

22 EXAMINATION

23 BY MR. CARR:

24 Q. Would you state your full name for the
25 record, please.

1 A. Richard S. Prentice.

2 Q. By whom are you employed?

3 A. ARCO Oil and Gas.

4 Q. In what capacity?

5 A. I'm a senior operations analytical
6 engineer.

7 Q. Are you the individual to whom all the
8 prior questions have been referred?

9 A. Yes.

10 Q. Could you summarize your educational
11 background and then briefly review your work
12 experience?

13 A. I have a BA in chemistry from Austin
14 College. I have a master of science in chemical
15 engineering from Texas Tech. I've worked 18
16 years in the Permian Basin as an OA or production
17 engineer.

18 Q. How long have you been with ARCO?

19 A. 18 years.

20 Q. Does your geographic area of
21 responsibility with ARCO include the portion of
22 Southeast New Mexico which is involved in this
23 case?

24 A. Yes, it does.

25 Q. Are you a registered petroleum

1 engineer?

2 A. In the state of Texas.

3 Q. And are you familiar with the
4 application filed in this case?

5 A. Yes, I am.

6 Q. Have you made an engineering study of
7 the area involved in this application?

8 A. Yes, I have.

9 Q. Are you the person who was primarily
10 responsible for the preparation of the Form C-108
11 which was filed seeking approval of a waterflood
12 project in this unit?

13 A. Yes, I was.

14 MR. CARR: We tender Mr. Prentice as an
15 expert witness in petroleum engineering.

16 EXAMINER CATANACH: Mr. Prentice is so
17 qualified.

18 Q. Initially I think it would be helpful
19 if you could just briefly start us off by
20 reviewing the efforts of ARCO to work with other
21 interest owners and develop these unit plans.

22 A. In Exhibit 17, which is a list of the
23 historical events leading up to where we are
24 today, Mr. Pyle has already gone over that
25 exhibit.

1 As you may recall his comments,
2 beginning in 1984 with our first technical
3 committee work, the T. Scott Hickman report, the
4 associated S. J. Missoulo report, the
5 recommendation to split waterflooding the field
6 into two units, our agreement to expedite the
7 southern unit in 1988, the technical report
8 released in 1990, in 1991, the adoption of the
9 technical report and the adoption of the equity
10 formula in 1992, the approval of the equity
11 formula and contacts with the State Land Office
12 and the NMOCD and BLM.

13 Q. Mr. Prentice, you've prepared exhibits
14 for presentation here today, have you not?

15 A. Yes, I have.

16 Q. Let's go to ARCO Exhibit 18, which is
17 the well status map. Is that the exhibit that is
18 on the easel to Mr. Catanach's right?

19 A. Yes, it is.

20 Q. Would you identify that and then review
21 the information on that exhibit for the Examiner?

22 A. Exhibit 18 is a 1-to-1000 plat showing
23 the proposed unit boundary. The red line is the
24 one-half mile area of review line around the
25 unit. The heavy dotted line is the unit

1 outline. There are several colors and shapes
2 that need to be identified.

3 Small black dots on the map are shallow
4 wells completed in the Langlie-Mattox with the
5 Seven Rivers-Queen formations, 2500 and a few
6 thousand feet. There are several gas wells
7 located on the map, Glorieta wells.

8 A circle with a dot in the middle is a
9 sign of a well that has penetrated the proposed
10 unitized interval, the Blinbry and the
11 Tubb-Drinkard. I wish to note here that not all
12 of the circled wells will become unit wells, but
13 all of those wells have penetrated the unit
14 formation.

15 The triangles designate injection wells
16 in ARCO's scheme of numbering wells. The blue
17 wells indicate a staging or a phasing operation.
18 These are the wells that we propose to drill
19 first. The yellow triangles and yellow producers
20 are a few of those, are the second stage or
21 second phase of those we prepare to drill after
22 Phase I.

23 As you can tell, the field is currently
24 developed on 40-acre spacing. Our plan of
25 development is to drill mainly injector wells and

1 to infill, to develop the field on 20-acre
2 spacing.

3 Q. If we look at Exhibit No. 18, Phase I
4 development program is indicated by the blue or
5 purple triangles?

6 A. That is correct.

7 Q. How was the Phase I portion of the unit
8 determined?

9 A. Phase I was determined by looking at
10 the geological data and the production history
11 and choosing the very best part of the reservoir
12 that we could, and implementing our program in
13 that area first.

14 Q. The yellow triangles indicate Phase II
15 development?

16 A. That's correct.

17 Q. Is Phase II in any way contingent upon
18 the results you achieve in Phase I?

19 A. ARCO's senior management has given
20 formal approval for the entire project, Phase I
21 and Phase II. It is our intent to do both Phase
22 I and Phase II.

23 Q. So, there is no contingency as to Phase
24 II? It's completely an approved project?

25 A. That is correct.

1 Q. What is the current status of your
2 drilling program in the area?

3 A. We are preparing requests for permit at
4 this moment for four wells located in the Phase I
5 area, to be drilled in concurrence or at the same
6 time as the unitization process is going on.

7 Our intent is to drill on ARCO acreage,
8 take cores from these four wells, and help
9 develop our core-to-log model response.

10 Q. When do you anticipate drilling the
11 bulk of the new injection wells, particularly in
12 Phase I?

13 A. Our plan right now is to implement
14 Phase I beginning about the middle of 1993, the
15 second quarter or the middle of 1993, and
16 implement the entire program within 12 to 18
17 months.

18 Q. The other facilities will be
19 constructed to serve the Phase I portion of this
20 unit at that time as well?

21 A. The construction of the facilities
22 would begin, most likely, after the first of the
23 year.

24 Q. How were the unit boundaries actually
25 selected?

1 A. As Mr. Altum has indicated, the east
2 and the west and the south boundaries coincide
3 with economical contribution to the unit. The
4 north boundary is based upon the recommendation
5 from the Scott Hickman report. That report
6 opinion was based on economical and mechanical
7 aspects of the northern one-third of the field.

8 Q. What are those aspects?

9 A. The major impact in the northern part
10 of the field relates to the existence of slim
11 hole wellbores that most likely are not suitable
12 for secondary recovery operations and most likely
13 would have to be somehow replaced.

14 Q. Now, ARCO became the expediter for the
15 unit that is indicated on this exhibit?

16 A. That's correct.

17 Q. Has there been an expediter designated
18 to proceed possibly with unitization efforts for
19 the northern portion of the field?

20 A. Texaco is the likely expediter, is the
21 expediter of the northern third field.

22 Q. Have you reviewed these boundaries with
23 the Oil Conservation Division?

24 A. Yes, we have.

25 Q. Could you summarize the efforts to work

1 with the OCD on this particular point?

2 A. We met with the Hobbs OCD
3 representatives on August the 31st, and reviewed
4 our implementation program, our unit boundaries,
5 showed them most of what we have here today with
6 the exception of the geological data, and got
7 their concurrence on what we were doing.

8 Q. Was that as a follow-up to a meeting
9 held in Santa Fe with the OCD Division?

10 A. Yes, it was. We did meet with Santa Fe
11 OCD personnel earlier than that.

12 Q. Mr. Prentice, you're familiar with
13 Exhibit No. 2, are you not?

14 A. Yes, I am.

15 Q. When you reviewed this, the unit
16 boundary, with the Oil Conservation Division
17 personnel, did you discuss the acreage which is
18 outside the unit but indicated as is shown on
19 Exhibit No. 2, to currently be within a defined
20 pool boundary?

21 A. Yes, we did.

22 Q. What will be the status of that
23 acreage? It's either in the Justis-Blinbry or
24 the Justis-Tubb-Drinkard pool, if this
25 application is approved?

1 A. The status of the existing wells
2 outside the unit boundary would be that they
3 would be included in the new South Justis
4 Blinebry-Tubb-Drinkard pool because they're
5 within a mile of the unit boundary, and it would
6 be under those rules.

7 Q. What you're proposing, however, is that
8 everything south of the north line of Section 11,
9 which is the northern boundary of the red unit
10 area--

11 A. Yes.

12 Q. --that everything in an existing pool
13 be deleted from that pool and a new pool created
14 that encompasses the acreage outlined in red?

15 A. That's correct.

16 Q. And the new pool boundaries would be
17 identical to the proposed unit boundary?

18 A. That is correct.

19 Q. And those pool rules would tend to have
20 effect a mile outside the pool boundary, like
21 regular pool rules do?

22 A. That is correct, yes.

23 Q. The only acreage that is currently
24 within a pool that is not within a mile of the
25 proposed pool boundary, is the extreme southern

1 portion of the Justis-Blinebry pool as indicated
2 in green, is that correct?

3 A. The green outline is the
4 Justis-Tubb-Drinkard pool.

5 Q. Is there any production in the extreme
6 southern portion of that pool?

7 A. There was a well located near the
8 bottom of that green line. It has been plugged
9 since 1988. There is no existing current
10 production down toward that south line at the
11 moment.

12 Q. At this time there would be no
13 technical reason to justify including that
14 acreage in the pool?

15 A. No, there would not be.

16 Q. How many wells are there that are
17 currently producing in that sort of border area,
18 between the unit boundary and the boundary of the
19 current pool?

20 A. There are three.

21 Q. Could you review the status of those
22 wells for the Examiner?

23 A. Yes. On the west side in Section 23,
24 toward the middle, Mr. Leeser operates the El
25 Paso Federal No. 1. The well produces

1 approximately two barrels a day of oil and 15 Mcf
2 a day of gas. The only other two wells currently
3 active in the Blinebry pool, but outside the unit
4 area, are in the very extreme southeast portion
5 of the area, located in Section 6.

6 Merrill Oil operates two wells, the
7 Self 5 and the Self 6. Both of them produce
8 approximately three barrels a day of oil and one
9 well makes 15 Mcf and the other makes 50 Mcf a
10 day.

11 Q. Are all of these wells marginal wells
12 from the Blinebry?

13 A. Yes, they are.

14 Q. Is there any production in that border
15 area from the Tubb-Drinkard?

16 A. No, sir.

17 Q. Were these three wells originally
18 considered as potential unit wells when the unit
19 was originally under discussion?

20 A. Yes, they were.

21 Q. What happened? Why are they out?

22 A. The technical committee looked at
23 offsetting production, and it became important to
24 include only wells that would contribute 110,000
25 barrels of oil or more to the unit in secondary

1 recovery. These wells could not meet that line,
2 that cutoff, therefore were excluded from the
3 unit.

4 Q. When these wells were excluded from the
5 unit, was this exclusion reviewed with the
6 individual operators of those wells?

7 A. Yes, we called both operators and
8 informed them of our decision.

9 Q. Are they aware of the hearing today?

10 A. Yes, they were. They were notified of
11 the hearing.

12 Q. In your opinion, could these wells that
13 are producing from the Blinebry, but outside the
14 unit area, could they benefit in any way from the
15 proposed waterflood?

16 A. It is possible, as in any carbonate.
17 It is not always easy to predict where the water
18 and oil will go. It is possible that we may
19 benefit, then, from our secondary recovery
20 operations.

21 Q. And they would be responsible for none
22 of the costs of the operation?

23 A. No cost at all.

24 Q. They were excluded because they simply
25 couldn't meet the criteria for inclusion within

1 the unit?

2 A. They could not economically make a
3 sufficient economic contribution to the unit to
4 warrant inclusion in the unit.

5 Q. Let's go to what has been marked as
6 ARCO Exhibit No. 19. Could you identify that for
7 the Examiner, please?

8 A. Exhibit No. 19 is a performance
9 forecast of the unit. There are two lines drawn
10 on the unit. The bottom line, the thin line is
11 the remaining primary reserves forecast. There
12 are approximately 1,000,000 barrels of primary
13 reserves left in the field on existing spacing
14 and with existing completions. The heavy line
15 toward the top of the page is the waterflood
16 forecast, waterflood reserves forecast.

17 The waterflood should recover
18 approximately 35 million barrels of oil. That
19 includes the remaining primary. The incremental
20 benefit of the project is an expected recovery of
21 34 million barrels.

22 Q. What are the projected costs for this
23 project? And I want you to include both Phase I
24 and Phase II.

25 A. Phase I and Phase II are expected to

1 cost \$56.4 million at this point.

2 Q. Basically, what increase in daily
3 production rate do you hope to achieve by
4 implementation of this waterflood project?

5 A. Presently, the wells within the
6 unitized area produce approximately 500 barrels a
7 day. We expect to increase production to
8 approximately 88,000 barrels a day in about 10
9 years, eight to ten years.

10 Q. Have you been able to estimate the
11 additional value of these reserves?

12 A. The incremental value of these reserves
13 is \$86 million.

14 Q. What prices did you use in making this
15 estimation?

16 A. That benefit is based on the \$20 oil
17 before federal income tax and with a 10 percent
18 discount factor.

19 Q. Without unitization and the
20 implementation of a waterflood project in this
21 unit area, would this additional oil be
22 recovered?

23 A. Most certainly not. The only oil that
24 would be recovered is the remaining 1,000,000
25 barrels.

1 Q. In your opinion, is implementation of
2 enhanced recovery in this portion of this
3 reservoir premature?

4 A. No, it is not at all. We're at the
5 very tail end of a depleted reservoir. We are
6 not premature at all in making secondary recovery
7 operations in this field.

8 Q. Do you have an opinion concerning
9 whether or not the proposed project is, in fact,
10 going to be feasible?

11 A. The project, by all the studies that
12 I've conducted, is a feasible project.

13 Q. Would you identify what has been marked
14 ARCO Exhibit No. 20?

15 A. Exhibit No. 20 is the technical report
16 we published in 1990. The technical report does
17 three things: It describes the analysis to
18 calculate the secondary reserves, it sets out a
19 plan of development, and it provides parameters
20 for equity determination.

21 Q. Does this report, then, summarize the
22 analysis used to initially determine whether or
23 not waterflooding would be appropriate in this
24 reservoir?

25 A. Yes, it does. It does make a

1 comparison with several other Blinebry-type
2 reservoirs in the area.

3 Q. Could ARCO physically waterflood just
4 the Blinebry?

5 A. There are approximately 30 wells in the
6 area that has been comingled in the Blinebry and
7 the Tubb-Drinkard. It is unlikely that we could
8 waterflood simply the Blinebry in this operating
9 scenario. Most likely we would be flooding the
10 Tubb-Drinkard also.

11 Q. Because of these completion practices,
12 is it fair to say we have virtually created a
13 common source of supply?

14 A. Yes.

15 Q. From an economic point of view, would
16 it be possible to go to the other portion of the
17 reservoir, the Tubb-Drinkard, would it be
18 economically possible to just waterflood that
19 portion of the reservoir?

20 A. We estimate that the Tubb-Drinkard
21 contributes about 30 percent of the secondary
22 potential in this area. We also estimate that
23 waterflooding the Blinebry accounts for 90
24 percent of the cost, so it would be economically
25 unfeasible for us to waterflood simply the

1 Tubb-Drinkard.

2 Q. And if you don't, physically it would
3 probably be impossible as well; isn't that right?

4 A. The same argument holds true for the
5 Blinebry.

6 Q. If you were not able to flood these,
7 then the enhanced or the additional recovery
8 you've indicated, being 34 million barrels, could
9 not be achieved?

10 A. That's correct.

11 Q. And that production, therefore, would
12 be wasted?

13 A. Wasted and lost.

14 Q. Let's go now to Exhibit No. 21. Would
15 you identify that for Mr. Catanach?

16 A. Exhibit No. 21 sets forth the
17 participation formula that was agreed upon by the
18 working interest owners earlier this year.

19 Q. Were you involved in the decision to
20 develop the process whereby this formula was
21 developed and adopted?

22 A. Yes, I was.

23 Q. Would you review it for the Examiner?

24 A. The participation is based on the
25 following parameters: One percent acreage plus

1 four percent BOE rate, plus 21 percent cumulative
2 BOE production, plus 34 percent remaining primary
3 oil production, plus 40 percent ultimate BOE
4 primary recovery.

5 As the exhibit sets out, the BOE rate
6 is based on 1989 oil and gas production. The gas
7 equivalency rate was 10 Mcf per barrel of oil.
8 The cumulative production is through December 31,
9 1989. The remaining primary is from January 1,
10 1990. Ultimate, of course, is simply the sum of
11 cumulative plus remaining primary.

12 Q. In developing this formula, did the
13 working interest owners consider not only the
14 multiple zones involved but the differing
15 ownerships in those properties?

16 A. Yes, they did.

17 Q. At the bottom of this exhibit it shows
18 some approval numbers. Could you review those
19 for Mr. Catanach?

20 A. The formula was formally adopted by 89
21 percent of the working interest in the unit. We
22 had a very small, negative vote, and we had
23 approximately 11 percent abstention rate between
24 the four votes and the abstaining votes. We have
25 approximately 99 and a half percent approval of

1 the formula.

2 Q. That 11 percent that abstained, part of
3 that have not been involved in the development of
4 this project?

5 A. Part of those folks who abstained, in
6 fact most of them who did abstain, did not
7 participate in any facet of the technical
8 committee work or unitizing the project.

9 Q. The negative vote was what?

10 A. .045 percent.

11 Q. So you have 99.95 percent that has
12 either approved or abstained?

13 A. That's correct.

14 Q. In your opinion, does the formula
15 allocate production to the separately owned
16 tracts in the proposed unit on a fair, reasonable
17 and equitable basis?

18 A. Yes, it does.

19 Q. In your opinion, will unitized
20 management, operation and further development of
21 a portion of this pool which is the subject of
22 this application, is this unitization reasonably
23 necessary to effectively carry out secondary
24 recovery operations?

25 A. Yes.

1 Q. I would like to move at this time to a
2 discussion of the application for approval of the
3 waterflood project. Could you identify what has
4 been marked ARCO Exhibit 22?

5 A. Exhibit 22 is the C-108 that we filed
6 with the Commission.

7 Q. Could you refer to the plat in the back
8 of this exhibit and review it for Mr. Catanach?

9 A. The plat in the very back of the C-108
10 is a 1-to-2,000 plat similar to the plat we have
11 up on the wall. It shows the unit outline and
12 the red outline indicates the one-half mile area
13 of review.

14 Q. Now, instead of drawing an area of
15 review around each of the injection wells, what
16 you've done here is simply draw a line around the
17 unit boundary a half-mile out which would include
18 at least all acreage that's required as being
19 shown within the area of review, is that correct?

20 A. That is correct. We've gone a little
21 bit beyond the OCD requirements and have included
22 more acreage than what was necessary. Most of
23 the unit injectors are one location--two
24 locations within the unit boundary.

25 Q. This does show all lease ownership

1 within two miles of any of the injection wells?

2 A. Yes, it does.

3 Q. And it shows the proposed development
4 for the unit area?

5 A. Yes, it does.

6 Q. Let's identify the map located behind
7 tab Roman number V in the C-108.

8 A. The map located behind Roman numeral
9 Tab V is a similar map on a smaller scale that
10 outlines the area of review.

11 Q. Exhibit 22, the C-108, does it contain
12 the data required by OCD rules for each well
13 within the area of review, which, in fact,
14 penetrates the injection zone?

15 A. Yes, it does. Behind Exhibit Tab Roman
16 numeral VI are the wells listed in the area of
17 review, and behind that table is a series of
18 schematics and well histories for each well that
19 has penetrated the formation within the unit and
20 within the area of review.

21 Q. Does this portion of the C-108 include
22 all data required by that firm, including
23 location, casing records and things of that
24 nature?

25 A. Casing records are included, completion

1 dates, spud dates, intervals of completion. The
2 information the OCD has required are included in
3 those exhibits.

4 Q. Does this exhibit also include
5 schematics, showing all plugging data for each
6 plugged and abandoned well within the unit area
7 of review?

8 A. Yes, it does.

9 Q. Is that information also located with
10 the other schematics behind Tab VI?

11 A. The schematics are listed by section,
12 by alphabetical location and, yes, the plugged
13 wells are listed with the schematics.

14 Q. Have you reviewed the information on
15 each of the plugged and abandoned wells?

16 A. Yes, I have.

17 Q. In your opinion, are they
18 satisfactorily plugged to be sure they don't
19 become vehicles for the migration of injection
20 fluids into other zones?

21 A. Yes.

22 Q. Would you go to what has been tabbed
23 Roman numeral III and identify that and its sub
24 parts for the Examiner.

25 A. Roman numeral III, starting with III-A,

1 is a list of the new wells that we propose to
2 drill or convert in our unit, with proposed
3 footage locations, what kind of wells they are.

4 Exhibit III-B is a schematic of a
5 typical new injector in the unit, showing casing
6 and tubing design and perforated interval.

7 Exhibit III-C are the schematics for
8 the converted wells that we have planned in the
9 unit.

10 Q. If we look at the well locations shown
11 behind tab III-A--

12 A. Yes, sir.

13 Q. --these wells have not been drilled?

14 A. That is correct.

15 Q. And you have not had on-site inspection
16 for the various indicated well locations?

17 A. We have not.

18 Q. Is it possible that when you go out to
19 stake these locations, they might have to be
20 moved?

21 A. It is possible and most likely.

22 Q. Do you seek a procedure whereby, if
23 those locations have to be moved, that can be
24 approved administratively by the Hobbs District
25 Office without the necessity of coming back to

1 the Oil Conservation Division for further
2 hearing?

3 A. Yes, we do.

4 Q. Do you also seek an administrative
5 procedure whereby unorthodox locations, at least
6 one standard location within the outer boundary
7 of the unit, could be approved administratively
8 by the district supervisor of the Hobbs District
9 Office?

10 A. Yes, we do.

11 Q. Have you reviewed that with Mr. Sexton?

12 A. Yes, we have.

13 Q. In fact, he has requested that we
14 suggest that as part of this hearing process?

15 A. Yes.

16 Q. What is the source of the water you
17 propose to inject?

18 A. The sources of the water are two. We
19 intend to use the produced Blinbry and
20 Tubb-Drinkard water from our unit operations. We
21 intend, also, to drill two water supply wells to
22 the San Andres, a shallower zone, use those two
23 wells, plus a conversion for makeup water.

24 Q. Will any fresh water be used for
25 injection purposes?

1 A. No.

2 Q. What volumes do you propose to inject?

3 A. We initially intend to inject up to
4 1,000 barrels a day per well, with a limit of
5 45,000 barrels per day for the entire unit.

6 Q. This will be a closed system, will it
7 not?

8 A. Yes, it will.

9 Q. Will you be injecting by gravity or
10 under pressure?

11 A. We will be injecting under pressure.

12 Q. What is the maximum injection pressure
13 you propose to use?

14 A. We are seeking a maximum injection
15 pressure of 1,100 pounds.

16 Q. Will a pressure limitation of
17 two-tenths pound per foot of depth to the top of
18 the injection interval be satisfactory for ARCO's
19 purposes?

20 A. Yes, it would.

21 Q. Does ARCO request that the orders
22 resulting from this hearing also include an
23 administrative procedure whereby the injection
24 pressure could be increased after step-rate tests
25 are run and the results of those tests reviewed

1 with the Division?

2 A. Yes, we do.

3 Q. Are water analyses of the injection
4 fluid included in Form C-108?

5 A. Yes, behind Tab Exhibit VII, there are
6 two pages with water analyses. Sample No. 1,
7 produced water taken from Chevron's Stewart,
8 Langlie and Mattox well is a sample taken from a
9 Grayburg water supply well. Samples 2, 3 and 4
10 are typical Blinebry Tubb-Drinkard water
11 samples.

12 If you look at the bottom of the second
13 page of samples, it is noted that these waters
14 are not incompatible.

15 Q. Are there fresh water zones in the
16 area?

17 A. Behind Tab VIII is a geological review
18 with a fresh water zone in the area.

19 Q. What are those fresh water formations?

20 A. Fresh water formations are mainly the
21 Ogallala and the Chinle.

22 Q. Would you review the information behind
23 Tab XI?

24 A. The information behind Tab XI locates
25 where the fresh water wells are in and around the

1 unit area. Behind that plat are two pages of
2 analyses of eight wells that we were able to
3 catch samples on.

4 Q. Are logs of the wells you propose to
5 convert to injection on file with the Oil
6 Conservation Division?

7 A. Yes, they are.

8 Q. Mr. Prentice, there were some questions
9 raised a few minutes ago concerning the enhanced
10 oil recovery tax rate that might be applicable to
11 the production from this waterflood project.
12 Initially you're planning on running injectivity
13 tests, is that correct?

14 A. That is correct. In one of our cored
15 wells this fall, we would like to conduct and
16 have gotten preliminary Hobbs approval to conduct
17 short-term injectivity tests.

18 Q. These are only tests?

19 A. Just simply tests.

20 Q. This is not going to, in any way, be
21 the commencement of any sort of injection of
22 water for the purpose of waterflooding this unit?

23 A. That is correct, they will not be.

24 Q. You're not intending today to seek
25 approval of this project, as a result of today's

1 hearing, under the Enhanced Oil Recovery Act?

2 A. We had not planned to do that.

3 Q. If the Oil Conservation Division was
4 willing to accept the testimony of the
5 proceedings here today as a basis for such an
6 application but would not make the actual
7 approval effective until you were ready to
8 commence waterflood operations, would that be
9 acceptable to ARCO?

10 A. Yes, it would.

11 Q. Are you aware of similar applications
12 that have been granted for enhanced recovery by
13 waterflooding of the same general area as this
14 unit?

15 A. Yes. In the same general area, the
16 Eunice Monument South Unit, the Northeast
17 Drinkard Unit, and Morehead Grayburg Unit have
18 all been recently approved for secondary
19 operations.

20 Q. Have you examined the available
21 geologic and engineering data on this area?

22 A. Yes, I have.

23 Q. As a result of that examination, have
24 you found any evidence of open faults or other
25 hydrologic connections between the injection zone

1 and any underground source of drinking water?

2 A. No, I have not.

3 Q. At this time, has ARCO made a decision
4 on whether or not to ultimately implement a
5 carbon dioxide flood in this unit?

6 A. Tertiary recovery may be feasible, but
7 the purpose of our presence here today is to seek
8 authorization to conduct a secondary recovery
9 operation.

10 Q. In your opinion, will approval of this
11 application be in the best interest of
12 conservation, the prevention of waste and the
13 protection of correlative rights?

14 A. Yes, it will.

15 Q. How soon would ARCO hope to have this
16 unit ratified and in effect?

17 A. Our target date for unitized operation
18 is November 1 of this year.

19 Q. Were Exhibits 17 through 22 prepared by
20 you or under your direction and supervision?

21 A. Yes, they were.

22 MR. CARR: Mr. Catanach, at this time
23 we move the admission of ARCO Exhibits 17 through
24 22.

25 EXAMINER CATANACH: Exhibits 17 through

1 22 will be admitted as evidence.

2 MR. CARR: That concludes our
3 engineering direct presentation in this case, and
4 and I tender the witness for cross-examination.

5 EXAMINATION

6 BY EXAMINER CATANACH:

7 Q. Mr. Prentice, have you examined the
8 area of review wells and satisfied yourself that
9 they're cemented properly so as injected fluid
10 won't migrate upward?

11 A. Yes.

12 Q. Each and every one?

13 A. As many as I could possibly find, yes,
14 sir.

15 Q. Have you examined the plugged and
16 abandoned wells within the area of review and
17 satisfied yourself that these are plugged
18 adequately?

19 A. Yes.

20 MR. STOVALL: That's a lot of
21 reviewing.

22 THE WITNESS: Yes.

23 MR. CARR: Has it almost ruined your
24 marriage?

25 THE WITNESS: Yes. If I missed one,

1 Mr. Examiner, please let me know.

2 Q. Concerning the request you all have for
3 an administrative approval to relocate injection
4 wells, you request that that be handled at the
5 district office?

6 A. That is correct.

7 Q. And as far as producing wells within
8 the unit, have you requested the same procedure?
9 I must have not followed you there.

10 A. I'm sorry. We would like to have
11 permission to apply or get approval for
12 unorthodox locations, be they injectors or
13 producers, out of the Hobbs office.

14 EXAMINATION

15 BY MR. STOVALL:

16 Q. Without regard to the amount of
17 unorthodoxness? Is that a word?

18 A. I'm not sure I follow the--

19 Q. If, say, a well were--I assume that
20 your concern is that they'll have to be moved for
21 surface reasons?

22 A. That's correct, yes.

23 Q. If a well were moved 50 or 100 feet it
24 might not be a problem, but what's the basic
25 setback? 330?

1 A. As I understand, the unorthodox
2 definition in a secondary recovery unit is 330
3 off a lease line and 10 feet off a quarter
4 quarter line.

5 Q. If it were more than, say, half the 330
6 or more than a hundred feet unorthodox, do you
7 have any limit or would you like to be able
8 to--basically no limit on the district office?

9 A. We would like to put our wells where
10 they are staked. We would like to have a great
11 deal of flexibility, if at all possible.

12 MR. CARR: I would point out, Mr.
13 Catanach, that with this unit as well as with
14 earlier units, this request has been made by the
15 Hobbs district office. The applicant has been
16 asked to propose this to you.

17 Q. Let me ask a follow-up question of
18 law. Within a unit operation of this nature, do
19 you think that having well locations which are
20 dictated by lease or surface survey requirements
21 make sense?

22 A. No, sir, they really don't. We are
23 placing our injectors that you might have noticed
24 in a position where we think we'll most
25 effectively and efficiently flood the reservoir.

1 Because they fall nine feet from a quarter
2 quarter line or 300 feet from a section line
3 really doesn't make any sense to me to have to
4 move them to meet some preset limit. We would
5 really like to have the ability to put them where
6 it makes most engineering sense.

7 Q. Is there anything in the manner in
8 which the participation formula is established
9 whereby interest could be effected by where wells
10 are located in the secondary recovery?

11 A. No, sir, not at all. The two are
12 entirely separated.

13 Q. If you were given complete latitude to
14 place the wells where it made the most sense and
15 and where you could get approval for them, there
16 would be absolutely no change in what any party
17 would recover in terms of their share under the
18 formula?

19 A. The formula is based on historical
20 production. It's not based on anything that we
21 will get from here on out; any kind of historical
22 or any kind of forecasted secondary operation.
23 It's based strictly on historical data. Where we
24 place our--how we conduct our operations does not
25 impact interest at all.

1 Q. Can you anticipate or, based upon any
2 historical knowledge, see where perhaps if such a
3 provision were established to allow you to have
4 completion selection within the unit boundary,
5 you'll probably suffer subject to some sort of
6 boundary limitation of the external boundaries of
7 the unit, where conceivably that could have some
8 potential impact should the unit ever be
9 dissolved or future operations, or is that just
10 so unlikely as to not be significant?

11 A. I think that's a good question and one
12 we've thought about before. These two producing
13 horizons are the main producing horizons in the
14 whole field. Once these operations are finished,
15 in my opinion it is unlikely that further
16 operations will be conducted. So, I do not think
17 that once a unit is dissolved, that ownership
18 problems should arise. Most of our wells are
19 injectors. It is unlikely, to me, that if we
20 have an unorthodox location sitting close to our
21 lease line, to our section line, that somebody is
22 going to want to go back in and try to produce
23 that injector that has injected who knows how
24 many barrels of water, for whatever the reason.

25 Q. What about other formations? What

1 about the possible reentry for deeper formations,
2 for example?

3 A. Again, that has to do with this
4 formation relative to all the other formations.
5 This is the major producing horizon. By the time
6 operations are finished, I think with what little
7 is left on the underlying deeper formations, that
8 even the shallower formations would have been
9 plugged out. I think it's unlikely that you will
10 see any further primary operations going on in a
11 post-unit scenario. Does that answer your
12 question?

13 Q. I think so. I understand what you're
14 saying. Let's see, what are the depths, again?

15 A. 5,000, 6,000 feet.

16 Q. If I understand what you said, there's
17 really nothing above or below that somebody might
18 ultimately use a wellbore to go get?

19 A. That's my perception of where we are
20 and where we're going right now.

21 Q. Does the unit agreement, without having
22 looked specifically, I did notice there were some
23 provisions for operations outside of the unitized
24 formations, I guess. Without having read those,
25 is there a concern that anybody might--obviously

1 I'm looking at the correlative rights issue. The
2 waste issue isn't a problem, if the engineer has
3 got his choice. You're probably going to
4 maximize recovery and minimize waste.

5 Are there any concerns at all in, say,
6 the spacing of wells within relationship to each
7 other, or given the nature of the fact that it is
8 all being conducted under unitized operations,
9 everybody is paying their share, that you could
10 simply say you could put the wells where you want
11 to in presumably good engineering sense, without
12 competitive pressures, would prevent you from
13 putting wells in a location for some unnatural
14 advantage, if you will?

15 A. Once you're in a unitized operation,
16 there's no competitive advantage anywhere. The
17 correlative rights, in my opinion, are addressed
18 more than adequately in the participation
19 formula. That's where everybody has gotten their
20 fair share of this unit operation.

21 Q. With that, if something like that were
22 to happen, what would be the distance you would
23 suggest it would be from the outside boundary?
24 330 from the outside boundary of the unit, is
25 that adequate?

1 A. Yes, that's adequate, surely.

2 Q. I suspect you studied this and made
3 your initial plan based upon spacing
4 requirements. If you were to go back in without
5 that restriction, can you see some significant
6 changes you would make in drilling patterns to
7 maximize recovery with, perhaps, a few less wells
8 or more effective--

9 A. No. If you have time to look at the
10 technical report, there's a whole chapter, a
11 whole section, on comparing Justis to other
12 similar reservoirs, mainly in Texas. One of the
13 things that comes across there is to effectively
14 waterflood this kind of reservoir because of the
15 heterogeneities Mr. Altum referred to. 40-acre
16 spacing is too wide a spacing. You must reduce
17 your spacing to 20-acre spacing and that's what
18 almost everybody has done. So, to answer your
19 question, no, we really wouldn't change our
20 spacing plan at this point in time. This is what
21 we feel it takes to efficiently waterflood this
22 type of reservoir.

23 MR. STOVALL: That's all I've got on
24 that issue.

25 FURTHER EXAMINATION

1 BY EXAMINER CATANACH:

2 Q. Mr. Prentice, with respect to the
3 injectivity tests you talked about, those will be
4 conducted for the newly drilled injection wells?

5 A. No, not really. We're going to drill
6 four wells. Our intent is to conduct the
7 injectivity tests in one of them. We think that
8 will give us the sufficient information that
9 we're looking for. We really don't anticipate
10 conducting four separate injectivity tests on
11 four different wells.

12 Q. That will be done on one of the newly
13 drilled injection wells, though?

14 A. Yes, it will.

15 Q. Okay. You mentioned something about a
16 30-percent contribution of production from the
17 Tubb-Drinkard or an estimated 30 percent
18 contribution. Is that based on primary recovery?

19 A. Yes. The Tubb-Drinkard, of course, is
20 an OCD designated pool. It has recovered
21 approximately nine million barrels, 10 million
22 barrels. When you add in the contribution from
23 the Blinebry, the ultimate recovery from both
24 zones is about 30 million barrels, so the
25 Tubb-Drinkard has contributed about 30 percent of

1 the ultimate primary.

2 Q. Ultimate primary from both zones would
3 be 30 million?

4 A. 30 million barrels, approximately. 30,
5 31 million.

6 Q. Do you have any information as to the
7 average production from these wells in the unit
8 at this point in time?

9 A. The unit makes approximately 500
10 barrels a day right now. There are oh, 100, 125
11 wells in the area, so less than five barrels a
12 day, four to five barrels a day might be the
13 average production per well right now.

14 Q. Most of the wells are stripper?

15 A. Yes. I would say all of the wells are
16 stripper at this point.

17 Q. You mentioned something about not all
18 of the Blinebry-Tubb-Drinkard penetrations will
19 be used as unit wells?

20 A. That is correct.

21 Q. What will they be used for?

22 A. For instance, if you referred to any of
23 the plats that we've given you, some examples up
24 in Section 24, there are multiple wells per
25 40-acre locations on some of the Texaco tracts.

1 There is some deep production still, that is
2 commercial, Ellenburger, Montoya and Fusselman,
3 and an operator can indeed hang onto that well
4 and will, in some instances wells.

5 So, when you've got two or three wells
6 in a given 40-acre location, obviously not all
7 those wellbores are needed by the unit and one or
8 more of those wellbores may be retained by the
9 current operator for primary operations. Those
10 are listed in the C-108 as we list the wells
11 within the unit area. The ones that are retained
12 will not have unit designations on them.

13 Q. That has already been determined?

14 A. We have some initial indications from
15 our partners as to which wellbores are coming to
16 us, which ones we plan to get and which ones will
17 not. That's not completely set in stone yet but
18 we have an idea of which ones are coming.

19 Q. Do you anticipate having to drill any
20 producing wells?

21 A. Yes. As you look at the bottom of that
22 plat, under Phase I we have one producer planned
23 and Phase II we have four producers planned, so
24 approximately five producers at this point.

25 FURTHER EXAMINATION

1 BY MR. STOVALL:

2 Q. How are the plan of producers
3 designated?

4 A. The producers are shown with circles
5 and with color on them. I think the yellow ones
6 are the Phase II ones, and easiest to identify.
7 Look up there in Section 12 in location N.

8 Q. Okay. The single circle with either
9 the blue or the yellow color, rather than the
10 double circle?

11 A. Yes, that's correct.

12 Q. You might also point out to your
13 geologist that there's been an earthquake in that
14 region, and the eastern portion of the formation
15 is suddenly dipping very steeply, according to
16 the cross-section, anyway.

17 FURTHER EXAMINATION

18 BY MR. CATANACH:

19 Q. The Phase I portion of the project,
20 mid-93 completion of drilling operations?

21 A. No. The Phase I operation would begin.

22 Q. Begin?

23 A. Begin. The Phase I drilling
24 operation. Let me also say that the construction
25 of facilities would begin right after the first

1 of the year, 1993.

2 Right now, the second quarter to
3 mid-1993 is our plan to start up for the majority
4 of the Phase I drilling.

5 Q. How long will Phase I take?

6 A. 12 to 18 months, we think.

7 Q. At what time will Phase II be
8 commenced?

9 A. Our plan right now is to assimilate the
10 data that we find in Phase I. There may be a
11 year delay, there may not be a year delay. If we
12 find as many surprises as we're hoping to find,
13 and we find we have a very prolific project, we
14 may begin Phase II immediately after Phase I
15 ends. That's to be determined.

16 Q. Now, did you testify that basically, to
17 flood the Blinbry on its own, is really not
18 economical for ARCO to do?

19 A. It's really more a question of
20 feasibility, I think, due to the current
21 completion practices, which has been the downhole
22 commingling and to frac both zones. In my
23 opinion it's highly unlikely that we would be
24 able to separate the Blinbry entirely from the
25 Drinkard at this point in time.

1 Q. How many wells are downhole commingled?

2 A. 30.

3 Q. 30 wells.

4 A. By the latest OCD monthly report.

5 Q. Is it your opinion that it would be
6 uneconomic to flood the Tubb and the Drinkard by
7 themselves?

8 A. Highly uneconomical and unfeasible.

9 Q. Are all of the producing zones going to
10 be opened up in all of the producing wells?

11 A. Our intent is to identify each
12 producing zone, each producing stringer, and to
13 open it up and make it match our offsetting
14 injector wells, yes.

15 Q. Is the north one-third of this field
16 going to be unitized, Mr. Prentice?

17 A. I refer that to my good friends at
18 Texaco. In my conversations with them, it is on
19 their list of things to do, but beyond that, I
20 can't predict the future up there, sir.

21 Q. Is it technically feasible to
22 waterflood the north one-third of this field?

23 A. Almost everything is technically
24 feasible.

25 Q. You guys just don't want to do it?

1 A. It's due to mechanical and economic
2 feasibility. We believe the South Justis portion
3 of this field is the place to be.

4 Q. With respect to the conversations
5 you've had with Jerry Sexton, it's your
6 recommendation that the Justis-Blinebry and
7 Justis-Tubb-Drinkard pools south of the north
8 boundary of your unit, be, in essence, deleted or
9 contracted?

10 A. Contracted to north of that line.

11 Q. Everything south of the north--

12 MR. STOVALL: Of the north line of
13 Section 7 and 11? Section 11 and 12?

14 THE WITNESS: 11 and 12, yes.

15 MR. STOVALL: Actually, it's 11 and 12,
16 isn't it?

17 THE WITNESS: Yes. Everything south of
18 that line in the Justis-Blinebry and
19 Justis-Tubb-Drinkard pools be contracted to north
20 of that line.

21 MR. STOVALL: In other words, the
22 southern boundary of those two pools would be the
23 south line of Sections 1 and 2?

24 THE WITNESS: 1, 2 and 3, yes, sir,
25 that's correct.

1 Q. (BY MR. CATANACH) So the proposed
2 pool, Justis-Blinebry-Tubb-Drinkard, would
3 comprise everything south of that line?

4 A. Matching the unit boundary.

5 MR. STOVALL: A follow-up on that; why
6 not just include, within the pool, those lands
7 which are already within the old pools and are
8 going to be included and brought in by
9 nomenclature, why not start out by putting them
10 in the pool?

11 A. That's entirely possible, too, given
12 the fact that you've got a well down to the south
13 that's been plugged for five years. We didn't
14 see any real technical reason to include that in
15 the new pool.

16 MR. CARR: Either one would accomplish
17 the same objective.

18 MR. STOVALL: You could contract the
19 pool, make the new pool, essentially, the
20 boundaries, and leave that plugged area out? It
21 essentially would not be a pool at that point
22 because there's no production there, right.

23 MR. CARR: I can probably shed some
24 light on that. From ARCO's perspective either of
25 those alternatives would accomplish our

1 objective. We did not want to come in here and
2 be making a presentation to you attempting to
3 justify creating a new pool that would include,
4 for example, the west half of Section 12, because
5 we did not believe, with no production down there
6 and the only wells outside the unit area are
7 producing from the Blinebry, that we could come
8 in and justify that with a technical case.

9 So, we don't care how that is done.
10 What we're concerned about is being able to
11 waterflood these zones as one unit and one
12 formation because, in fact, we think production
13 practices show they're one common source of
14 supply.

15 FURTHER EXAMINATION

16 BY MR. STOVALL:

17 Q. There's no production in Section 12 at
18 this time? Where is that, in 26 South?

19 A. Yeah, 26 South, 37 East. There's no
20 active Blinebry or Tubb-Drinkard production in
21 that section.

22 Q. So we wouldn't be isolating some wells?

23 A. No.

24 Q. So we don't have a problem with that?

25 A. We only have three active wells, and

1 they immediately offset the unit in the Blinebry
2 formation. There are no active wells in the
3 Tubb-Drinkard.

4 Q. Those wells are in--

5 A. Section 6.

6 Q. Section 6.

7 A. There are two wells there and--

8 Q. In Section 1, are there any in the
9 south half of Section 1?

10 A. No. The other main active well is over
11 in Section 23, in J.

12 Q. 23 of which?

13 A. I'm sorry, K.

14 Q. Of 25 South?

15 A. 25 South, 37 East, yes.

16 Q. In other words, if we were to make the
17 pool boundaries consistent, what we could do is,
18 the southern portion of the pool could be the
19 north half of Section and the northwest quarter
20 of Section 6 in 38 East, right?

21 A. That would accomplish the same thing.

22 Q. It would accomplish the same result and
23 it wouldn't leave any wells isolated or out there
24 by themselves, and it would save us a somewhat
25 complicated nomenclature. We could do it in one

1 step instead of two.

2 Are these nods of heads affirmations of
3 my statement? Is that what they mean? Both Mr.
4 Carr and Mr. Prentice?

5 MR. CARR: I have acknowledged that
6 that is your statement.

7 MR. STOVALL: Do you acknowledge the
8 accuracy and result of the statement? Is that
9 correct?

10 MR. CARR: That would not interfere at
11 all with ARCO's objective here. It's whatever
12 would be the--however the Commission or the
13 Division would desire to pursue.

14 FURTHER EXAMINATION
15 BY MR. CATANACH:

16 Q. Did Hobbs have any specific
17 recommendations on how to do it?

18 A. No.

19 Q. They did not.

20 MR. STOVALL: Are there any wells on
21 the east or west side of your unit that are
22 producing from one or the other pool that could
23 be adversely affected by that?

24 A. No, sir. I don't believe that there
25 are. I don't believe the active wells would be

1 adversely affected by either plan.

2 Q. And if we were to do so and then also
3 take into consideration the well location issue,
4 then we would have to rate special pool rules
5 that would say within the unit boundaries in this
6 pool there's no location requirements, but at the
7 edge of the unit boundaries there's a 330 foot
8 setback for all wells within 330 feet or outside
9 the unit? Something to that effect?

10 A. Yes.

11 Q. That's assuming we would grant you that
12 complete latitude to place your wells inside the
13 unit.

14 MR. CARR: I would also state that I'm
15 intending to submit a proposed order which
16 identifies, if you want to for nomenclature
17 purposes, what would need to be done to create
18 just a new pool equal to the unit boundary, and
19 contract the other two pools. It's whatever you
20 desire.

21 FURTHER EXAMINATION

22 BY MR. STOVALL:

23 Q. Okay. Let's move into the EOR question
24 area again. The first question I'm going to ask
25 you, the geologist testified that there's still

1 some primary recovery possible, would you agree?

2 A. One of the exhibits I showed already,
3 and I'm not sure you were here when I presented
4 it, had to do with a forecast. The remaining
5 primary under current spacing and under current
6 completion interval is about a million barrels.

7 I think what Mr. Altum was referring
8 to, and I referred to this already, when we go to
9 closer spacing, we expect to encounter zones that
10 have not been opened due to the heterogeneity of
11 the reservoir. That's the primary that he was
12 referring to when he said there was remaining
13 primary left, but that assumes a secondary infill
14 drilling program.

15 Under the existing conditions, very
16 little remaining primary is left to recover.

17 Q. Then, in your engineering expertise, is
18 it your opinion or do I understand correctly that
19 it is not premature at this time to commence
20 enhanced oil recovery operations?

21 A. It is not premature at this point in
22 time, at so late a stage in the primary life of
23 this reservoir to conduct secondary operations.
24 Indeed, it is late.

25 Q. And in fact, in some cases, it makes

1 sense to initiate secondary operations
2 prior--even earlier in the life of primary, is
3 that what you're saying?

4 A. Recovery tends to go up the sooner that
5 you begin your secondary operations relative to
6 when you discover the field. I think the most
7 outstanding case I can think of right now, that
8 comes to my mind, is an oil slope. They conduct
9 secondary operations almost immediately after
10 finding the field. And that's the proper way to
11 conduct secondary operations.

12 We're not premature at all, by waiting
13 this long, to conduct secondary operations.

14 Q. I think that's the requirement of the
15 Enhanced Oil Recovery Act, is that it not be
16 premature? It does not require primary to be
17 depleted; only that secondary not be premature.

18 Now, the other concern you've got, as I
19 understand, you do not want this project
20 certified to Taxation and Revenue Department
21 before you have the chance--actually have the
22 opportunity to do your injectivity testing,
23 construct your facilities and commence
24 operations, because you want the five years from
25 the time you actually start flooding to get a

1 positive production response to qualify for the
2 credit?

3 A. That's correct. We would like to have
4 most of that time available and not wasted in
5 construction time. We would like it close to
6 when we commence true injection.

7 Q. It's my interpretation that the Act
8 says that that five-year time frame is from the
9 time we certify the project to Tax & Rev, that
10 the actual approval of the project, which is
11 required, is the approval which is normal under
12 our rules, must only occur after, I think it's
13 the March 6th date, whatever date your well
14 passed.

15 A. Right.

16 Q. You would not object to having this
17 project approved as being qualified for this
18 Enhanced Oil Recovery tax credit, provided we
19 don't certify that qualification to Taxation or
20 don't start the clock running until you're ready
21 to go?

22 A. That is correct. You have our plans
23 down precisely.

24 Q. Now, you're familiar enough with the
25 Act, I assume, to know that it requires us, in

1 addition to certifying the project, to certify
2 the project area?

3 A. That's correct, yes.

4 Q. And it's your intent that there would
5 be a two-phase, and we would probably look at
6 Phase I as being the initial project area to be
7 certified to Tax & Rev and then we can come back
8 and establish the second project area?

9 A. That's the likely scenario, I think,
10 certify Phase I first.

11 Q. As far as the development of--and let's
12 talk about Phase I. I'll assume Phase II will
13 not be part of the initial project area that's
14 certified. Is it your intent, once you commence
15 the construction of facilities and drilling of
16 wells, is it going to be moving, say, north to
17 south, east to west, south to north, whatever?
18 What is the intent of ARCO with respect to how
19 the drilling will be commenced and the
20 construction of the facilities in the area?

21 A. The intent is to utilize a two-rig
22 program. I can't stand before you today and tell
23 you we're going to drill this well first, and
24 we're going to move north/south, east/west.

25 Q. I'm more concerned about, are you going

1 to be moving up? For example, if you start at
2 the south, are you going to move south to north,
3 or north and south and move together?

4 A. I would envision some sort of program
5 like you just pictured; either in the middle,
6 working out, or in the outside working in, with
7 two rigs. It is to our best interest to keep
8 those moving costs down, so we would move one
9 location at a time with two rigs, and that could
10 go either way.

11 Q. To give you the framework to understand
12 why I'm asking these questions, under the
13 procedure I just described to you, where we can
14 approve the project and identify the project area
15 within an order and say this project area can
16 qualify for the tax credit, the next thing we
17 would provide in the order is that the operator
18 would notify us when the project actually
19 commences, and at that time we would provide the
20 certification.

21 We would anticipate that if we were to
22 certify the entire Phase I project area at that
23 time, it would require that there be substantial
24 development and construction throughout the Phase
25 I project area or we would have to contract that

1 area for later expansion. Did you anticipate
2 that development would be such that by the time
3 you're ready for us to certify the project to Tax
4 & Rev as an EOR project, that you would have
5 substantial development throughout Phase I?

6 A. I think we probably would, given our
7 program and our timing. I think we would have a
8 substantial part of Phase I either under
9 construction or already constructed and ready to
10 go.

11 Q. I mean, that's the thought. What could
12 happen is, we could certify less than all of
13 Phase I, if, say, you started at the south and
14 only got up to the north before you were ready to
15 start injecting in the south. But, if you start
16 in the center or start at both ends and work
17 together, then it would be reasonable to certify
18 the whole Phase I area to Tax & Rev?

19 A. I think that would be one more
20 incentive to start either at the center and work
21 out, or start at one end or the other or both
22 sides and work towards the middle, for just the
23 reasons you've outlined.

24 Q. There's never been a project in this
25 area approved prior to this time, is that

1 correct? A secondary EOR project?

2 A. Not that I'm aware of.

3 Q. Are you able to give us an actual legal
4 description of Phase I such that we could use it
5 to identify the Phase I project area?

6 A. Yes, we could.

7 MR. CARR: And at the time we would
8 request that you actually certify, I think that
9 would be the time to identify it by section,
10 township and range, the Phase I portion of the
11 unit area.

12 MR. STOVALL: I think the way we've
13 envisioned this, Mr. Carr, we would actually in
14 the order say, "This is Phase I," which could be
15 amended, but that would not go to Tax & Rev until
16 you came back and requested the certification.

17 I think we would like to have an idea
18 of what those boundaries are at the time this
19 order is written, understanding that we would
20 come back, if necessary, and adjust it.

21 MR. CARR: If there was a need to
22 adjust prior to certification to Tax & Rev, you
23 would anticipate that could be accomplished?

24 MR. STOVALL: Correct. I don't believe
25 the exhibit I'm looking at, what is that, "4" on

1 the wall that shows the phase drilling program?

2 MR. CARR: That's Exhibit 18.

3 MR. STOVALL: I would not want to try
4 and define that area from that map, but I see the
5 boundaries of what you anticipate to be the
6 phase. Again, since the EOR bill is new, we're
7 fleshing things out a little bit as we go along,
8 but the Division's intent at this time is to
9 minimize the administrative burden on the
10 operator while still complying with the full
11 provisions of the Act.

12 As far as the concern of the area, we
13 don't want to certify an area larger than that
14 which you've actually conducted operations and
15 are, actually, conducting secondary recovery
16 operations. But, on the other hand, we don't
17 want to make you come back here every time you do
18 something different under the thing.

19 So that's the intent, and I think, Mr.
20 Carr if, after we finish, we can look at this
21 thing and review just exactly how we're going
22 to--

23 MR. CARR: And we'll supply you with a
24 description of the Phase I portion of this unit.

25 MR. STOVALL: Nothing further on that.

1 EXAMINER CATANACH: I have nothing
2 further of the witness. He may be excused.

3 MR. CARR: I have two other things I
4 need to do before we conclude. I have briefcases
5 full of return receipts I would be happy to leave
6 with you, if you would like. That's up to you.

7 MR. STOVALL: You don't happen to
8 have--we have, in the past, had a data base that
9 shows just the return receipt certified number
10 rather than actually having the cards. Do you
11 have that system prepared?

12 MR. PYLE: I can get that for you. I
13 don't have that with me. We have a log from the
14 post office from our mailing.

15 MR. CARR: The actual notice mailing
16 was not done by my office. We do not have a log
17 that shows by number. We have individual
18 letters, lists, and attached to the letters the
19 mailing notice and the return receipt for the
20 returned envelope.

21 MR. STOVALL: I'll leave it up to your
22 discretion whether you want to submit something
23 that shows us evidence of receipt or the return
24 cards themselves.

25 MR. CARR: We believe everyone is going

1 to benefit in this. It's not like changing
2 spacing rules. We've given you a list of
3 everyone we've notified by affidavit, and I don't
4 mind keeping the receipts myself.

5 MR. STOVALL: Keep them for a period of
6 time afterwards.

7 MR. CARR: The last thing is, we have
8 prepared proposed orders in each of these cases
9 for your consideration, and I'll also provide a
10 floppy disk from which these orders can be
11 printed. We hope to have the unit in effect the
12 first of November, and we will do anything we can
13 to assist you in getting these orders out.

14 MR. STOVALL: When you say the first of
15 November, is that the time you expect to get the
16 ratifications after the order is issued?

17 MR. CARR: We're hopeful that we can
18 have a ratified unit by that date.

19 MR. STOVALL: Ambitious, aren't you.
20 Mr. Pyle has his work cut out for him. With
21 respect to the pool, I assume your proposed pool
22 order does not address the wider pool
23 boundaries?

24 MR. CARR: No, it doesn't. It address
25 our application.

1 MR. STOVALL: Second thing is--I assume
2 it addresses the issue of the Hobbs office being
3 able to approve unorthodox locations?

4 MR. CARR: It does that.

5 MR. STOVALL: But it does not address
6 the possibility of special pool rules which would
7 not set spacing requirements in the pool?

8 MR. CARR: It does not, and we assume
9 you would make those changes in the proposed
10 order. We have nothing further in this case and
11 we would request it be taken under advisement.

12 EXAMINER CATANACH: There being nothing
13 further in these cases, Cases 10552, 53 and 54
14 will be taken under advisement.

15 MR. CARR: Thank you.

16 (And the proceedings concluded.)
17
18
19

20 I do hereby certify that the foregoing is
21 a complete record of the proceedings in 10553 10554
22 the Examiner hearing of Case No. 10552,
23 heard by me on September 17, 1992
24 David F. Catanach, Examiner
25 Oil Conservation Division

1 CERTIFICATE OF REPORTER

2

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

5

6 I, Carla Diane Rodriguez, Certified
7 Shorthand Reporter and Notary Public, HEREBY
8 CERTIFY that the foregoing transcript of
9 proceedings before the Oil Conservation Division
10 was reported by me; that I caused my notes to be
11 transcribed under my personal supervision; and
12 that the foregoing is a true and accurate record
13 of the proceedings.

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

19 WITNESS MY HAND AND SEAL October 7,
20 1992.

21

22

23

24

25


CARLA DIANE RODRIGUEZ, SPR
CSR No. 4