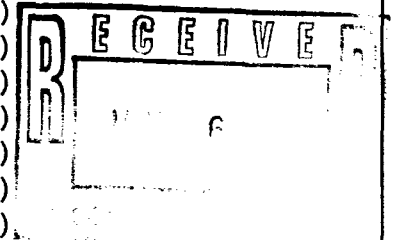


STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 11,512

APPLICATION OF MARATHON OIL COMPANY,)
KERR-McGEE CORPORATION AND SANTA FE)
ENERGY RESOURCES, INC., TO TERMINATE GAS)
PRORATIONING, TO INFILL DRILL AND TO)
AMEND THE SPECIAL POOL RULES AND)
REGULATIONS FOR THE INDIAN BASIN-MORROW)
GAS POOL, EDDY COUNTY, NEW MEXICO)



REPORTER'S TRANSCRIPT OF PROCEEDINGS
EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

May 2nd, 1996
Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, May 2nd, 1996, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

* * *

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 Examiner Hearing
 CASE NO. 11,512

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* * *

1 We then looked at operators of Morrow wells
2 offsetting the pool, and that added two more parties --
3 Conoco and Vernon Faulconer, Inc. -- to the list of parties
4 that were given notification.

5 We looked at the owners of undrilled leases
6 within the pool, and there was only one additional company
7 to be notified, being Devon Energy.

8 There were no owners of unleased minerals that
9 were not otherwise -- had not otherwise already received
10 notice.

11 We also gave notice to Natural Gas Pipeline
12 Company and Agave Petroleum Company, as the two pipelines
13 which could conceivably serve the pool. NGPL is currently
14 the only pipeline serving the pool.

15 As a result of the notices that were sent, which
16 was 124 total, 121 green cards were returned, indicating
17 receipt. Two cards were not returned. That was one from
18 Amoco Production Company, and Ann A. [sic] Stromberg. We
19 have attempted to trace those cards without success. We
20 did have one letter that was returned undeliverable to the
21 Optometric Education Program Foundation, Inc., due to an
22 expired forwarding notice. Several attempts to find a
23 substitute address were not successful.

24 I should note that there were three parties that
25 should have been on the list that were inadvertently

1 omitted. I have since retained waivers of notice from them
2 and --

3 MR. KELLAHIN: Mr. Examiner, that would show up
4 as proposed Marathon Exhibit B, and it's in a separate
5 exhibit. There are three pages to what I propose as
6 Marathon Exhibit B.

7 Q. (By Mr. Kellahin) Please continue, Mr. Lowry.

8 A. Those three companies or three entities are Oryx
9 Energy, Citation Oil and Gas, and Knoll H. Brunson, Jr.

10 Q. Am I correct in understanding, then, if there was
11 an active producing well within the pool in a spacing unit,
12 you notified that operator?

13 A. We notified the operator and all interest owners
14 in the well.

15 Q. How did you compile those lists for wells for
16 which Marathon did not operate?

17 A. We asked the operators to provide us with
18 divisions of interest.

19 Q. And did they do so?

20 A. Yes, all the operators of currently producing
21 wells did so.

22 Q. Within the pool area, if there is a spacing unit
23 that does not currently have a producing well, how did you
24 handle notification to those interest owners?

25 A. That was to the operator of that section.

1 Q. All right. And how did you determine who the
2 operator was?

3 A. Well, our land department checked for all
4 producing wells in the field, and that was -- determined
5 that from that review.

6 Q. If there was no producing well in that spacing
7 unit, then did you notify the lessees?

8 A. That's right.

9 Q. All right. Let's turn to the topic of Marathon's
10 polling of the operators with regards to their endorsement
11 of the issue of terminating prorationing. When was the
12 first questionnaire sent to the operators in the pool
13 concerning that topic?

14 A. On August 11th of 1995, as -- pursuant to a
15 request from OCD in our then-pending Case 11,333, we sent
16 out a questionnaire to all the operators in the pool,
17 requesting their opinion -- or their position with regard
18 to termination of prorationing in the Indian Basin-Morrow
19 Pool.

20 Q. When you made reference to that case number in
21 August of 1995, what was the general topic of issue in that
22 case?

23 A. We were looking at the transfer of certain lands
24 in the north part of the field to the Cemetery-Morrow Pool.

25 Q. And that was a case heard by Examiner Stogner

1 last summer?

2 A. That's right.

3 Q. And the issue then was freezing the pool boundary
4 for the Indian Basin Morrow Pool, and your request to take
5 certain sections out of that pool and dedicate them to the
6 Cemetery Morrow Pool, which is not a prorated pool?

7 A. That's right.

8 Q. All right. As part of that presentation, then,
9 you subsequently polled the operators to see if they
10 endorsed terminating prorationing for the Indian Basin-
11 Morrow Pool?

12 A. Yes, we did.

13 Q. With what results, sir?

14 A. All of the operators supported terminating
15 prorationing.

16 Q. In December of that year, when you received the
17 order with regards to freezing the boundary in the Indian
18 Basin-Morrow Pool, what then did you do with regards to
19 polling the operators on any other topic of interest to
20 that pool?

21 A. Well, our initial discussions were with Kerr-
22 McGee, who was the operator of the other -- better wells in
23 the pool, with regard to how we would proceed, whether
24 through the prorationing system or through a hearing of the
25 type that we are here for today.

1 Ultimately, that led to an additional
2 questionnaire that was sent to the remaining operators in
3 the pool on March 1st, addressing additional issues
4 regarding prorationing.

5 Q. The Examiner has before him what I propose as
6 Marathon Exhibit C. It is a stapled-together
7 questionnaire, the top of which says "Marathon Oil
8 Company", and then it's captioned, "Termination of
9 Prorationing Questionnaire". Do you have that before you,
10 Mr. Lowry

11 A. Yes, I do.

12 Q. When did you send this to the operators in the
13 pool?

14 A. On March 1st of 1996.

15 Q. All right. So apart from the facsimile date
16 codes on the top, those are obviously inaccurate, because
17 this was sent out on March 1st of 1995?

18 A. That's right.

19 Q. Are you with me?

20 A. That's right. I'm not sure how those dates get
21 up there.

22 Q. All right. This was not sent out in January. In
23 fact, it was sent out in March?

24 A. March 1st.

25 Q. All right. What if any response -- Let me ask

1 you this: What were you asking the operators specifically
2 in this questionnaire?

3 A. Well, the first question had to do with continued
4 production from -- allowing wells to continue producing
5 during the period of the pending application for
6 deproportioning, even if the wells were beyond the six-times
7 limit.

8 Q. All right. On that topic, then, what is your
9 understanding of the maximum daily gas volume that a well
10 could produce under the prorationing system during this
11 period in question?

12 A. Six times the limit set for the previous January.

13 Q. All right. And on a daily basis, that's
14 approximately 688 MCF a day, I believe; is that not true?

15 A. Yes.

16 Q. All right. The issue for you and others was what
17 to do in managing overproduction for those nonmarginal
18 wells during this period of time which, because of the low
19 allowable, were accumulating overproduction?

20 A. That's right.

21 Q. And you polled the other operators and asked them
22 what did they want to do with regards to that issue?

23 A. That's right.

24 Q. And what did they tell you?

25 A. Well, they had no objection to the continuing

1 production of wells beyond the six-times limit.

2 Q. All right. Number 2, then, what did you ask them
3 under that paragraph?

4 A. We asked them if they agreed that upon an order
5 terminating prorationing in the pool, that existing over-
6 or underproduction should be canceled, and all of them
7 again agreed to that as well.

8 Q. All right. The third question asked was what,
9 sir?

10 A. Whether they would join as co-applicants in
11 seeking deproration.

12 In response to that, we already had agreed with
13 Kerr-McGee to go forward, but Santa Fe also agreed to join
14 us. The other companies declined.

15 Q. Okay. Question four, you're asking what, sir?

16 A. We asked the operators if they anticipated a need
17 for unorthodox well locations in the Indian Basin-Morrow
18 Pool. The intent of that was under current spacing
19 requirements.

20 There was a mixed response. Oryx indicated they
21 did not need unorthodox locations; Santa Fe did. Yates
22 said no, but that was based on the setbacks going to 660
23 feet from the proration unit boundaries.

24 Q. Did you more directly, then, in the last question
25 ask them if they had in fact supported reducing the

1 setbacks to a minimum of 660 feet?

2 A. Yes, I did.

3 Q. And what response did you get as to that
4 question?

5 A. They all -- It was supported by all operators.

6 Q. All right.

7 A. I should correct that. With the -- Citation
8 declined to -- and I guess I should correct this for all my
9 answers.

10 Citation, since they do not have a currently
11 producing well in the field, declined to respond to any of
12 the questions.

13 Q. In your opinion, Mr. Lowry, have you undertaken
14 and satisfied the notice requirements with regards to the
15 topics at issue before the Division?

16 A. I believe we have.

17 MR. KELLAHIN: That concludes my examination of
18 Mr. Lowry.

19 We move the introduction of Marathon's Exhibit A,
20 B and C.

21 EXAMINER STOGNER: And C being --

22 MR. KELLAHIN: -- the questionnaire response, Mr.
23 Examiner.

24 EXAMINER STOGNER: Exhibits A, B and C will be
25 admitted into evidence at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. As I understand it, the waivers of notice by Oryx, Citation and Brunson was because they were inadvertently left off the mailing list --

A. That's right.

Q. -- in the beginning?

A. That's right.

Q. Now, two of those are operators, are they not?

A. Yes, they are.

Q. Or -- Okay, one is a current operator, one is an operator without an active well, according to your questionnaire?

A. Right, Oryx has an active well. Citation is the operator in Section 31 of Township 24 East -- 21 South, 24 East.

Q. And Mr. Knoll Brunson, Jr.?

A. He is an owner in, I believe, Sections 30 and 31 of 24 East.

Q. And they were just inadvertently omitted, or was there a reason?

A. Well, my secretary and I obviously didn't communicate very well.

Q. Oh, okay. All right. But you did get waivers of notice?

1 A. Yes, that's what's provided there.

2 Q. And a questionnaire for that matter?

3 A. The operators had previously responded with
4 questionnaires, yes.

5 EXAMINER STOGNER: I have no other questions of
6 this witness at this time.

7 You may be excused.

8 Mr. Kellahin?

9 DENISE MRUK,

10 the witness herein, after having been first duly sworn upon
11 her oath, was examined and testified as follows:

12 DIRECT EXAMINATION

13 BY MR. KELLAHIN:

14 Q. All right, would you please state your name and
15 occupation?

16 A. My name is Denise Mruk. I'm an advanced
17 geologist for Marathon Oil.

18 Q. And Ms. Mruk, would you please spell your last
19 name? It's M-r-u-k, is it not?

20 A. That's correct.

21 Q. And pronounce it one more time for the court
22 reporter.

23 A. Mruk.

24 Q. Mruk.

25 A. Rhymes with "brook".

1 Q. All right. And you reside in Midland, Texas?

2 A. Yes, sir.

3 Q. On prior occasions have you testified before the
4 Division and qualified as an expert in petroleum geology?

5 A. No, sir, I've never testified.

6 Q. Summarize for us your education.

7 A. I have an undergraduate degree, four-year degree,
8 from the State University of New York at Binghamton, a two-
9 year degree from the University of Colorado at Boulder,
10 1985. I've worked for Marathon Oil for 11 years now, and
11 I've worked a number of reservoirs, carbonates and
12 clastics.

13 Q. Describe for us the analysis that you've gone
14 through in terms of studying the Morrow reservoir. Is that
15 something within your expertise? Have you studied this
16 Morrow reservoir?

17 A. I have recently begun undertaking detailed
18 studies of the Morrow reservoir. My previous experience is
19 with fluvial sand systems in Texas.

20 Q. Have you satisfied yourself that you've had
21 sufficient geologic data within the area that we're about
22 to discuss to reach specific geologic conclusions
23 concerning this reservoir?

24 A. Yes, sir, I've worked in detail with both my
25 supervisor and colleague that's worked this area before me.

1 We passed -- all the knowledge that they have had, all the
2 work they have done, has been passed on and shared with me.
3 I also feel that in my own work in the time I've been
4 working it is up to speed with almost anyone working the
5 Morrow.

6 Q. Have you utilized publications and reference
7 material or literature that dealt specifically with Morrow
8 channel systems in New Mexico?

9 A. Yes, sir, that's a good question. There is a
10 very comprehensive study of the Morrow done by Reservoirs,
11 Inc. It's a proprietary study, of which most of the
12 companies that operate the Morrow in this area have
13 participated. Marathon Oil also has a copy of the study.
14 I have read that study, I have integrated the models and
15 the geologic concepts into my work in the Indian Basin
16 area.

17 MR. KELLAHIN: At this time, Mr. Examiner, we
18 tender Ms. Mruk as an expert geologic witness.

19 EXAMINER STOGNER: Ms. Mruk is so qualified.

20 Q. (By Mr. Kellahin) Let me have you turn to what
21 we've marked as Marathon Exhibit Number 1, and help us get
22 oriented as to this pool and its relationship to other
23 pools in the area.

24 EXAMINER STOGNER: Now, we're looking at Marathon
25 Exhibit 1, not Kerr-McGee Exhibit 1?

1 MR. KELLAHIN: Kerr-McGee is simply our locator
2 map to help us know the wells by name and operator. I've
3 asked her to turn to Marathon Exhibit 1, which is a
4 regional structure map that's got some color codes on it.

5 Q. (By Mr. Kellahin) What are we seeing here?

6 A. This is a regional map that's mapped on the top
7 of the lower Morrow. The Morrow has three basic
8 components. We will informally refer to those as the
9 lower, middle and upper. This lower Morrow map shows
10 basically west-to-east gentle dip, and it also outlines
11 here the Indian Basin-Morrow Pool and the Cemetery-Morrow
12 Pool.

13 Importantly shown on this map -- if you'll look,
14 you'll see black arrows. Starting from west, there's one,
15 two, three, four, five different arrowed trends. These
16 show major sand channels within Morrow time. What this is
17 representing is that during deposition you have over a very
18 large area of southeast New Mexico sand being deposited,
19 but these sands are actually focused in very limited areas,
20 and these areas where they're focused are represented by
21 these arrows.

22 Q. When we identified an area outlined in red as the
23 Cemetery-Morrow Pool, is that a pool that also produces
24 from these various Morrow intervals?

25 A. That's correct.

1 Q. The approximation of the current boundary of the
2 Indian Basin-Morrow Pool is shown in the light green?

3 A. That's correct.

4 Q. What's the significance of the cross-section?

5 A. The cross-section is constructed to show that in
6 Morrow time there is no difference between the wells that
7 extend from the Indian Basin-Morrow Pool through the
8 Cemetery-Morrow Pool and outside both pools.

9 Q. Let's turn to Exhibit Number 2, Marathon Exhibit
10 Number 2, and have you give us an illustration of what
11 you're seeing as we more specifically look at the Morrow in
12 this particular area.

13 A. I will stand up and walk over to the board.

14 Q. Okay.

15 A. The cross-section that -- You have a locator map
16 there. We're looking from west to east, southwest to
17 northeast, from the Indian Basin-Morrow Pool, through
18 Cemetery-Morrow and outside the pool.

19 What's shown here is, it's a stratigraphic cross-
20 section, so we are hung on a Morrow marker. This allows us
21 to try and put back in geologic time formations or zones
22 that are equivalent in nature. We're not going to have any
23 structural overprint on our sands.

24 Now, what's shown here are three informal
25 markers, the lower Morrow, the middle Morrow and the upper

1 Morrow. The focus of my discussion, especially related to
2 the Indian Basin-Morrow, will be the lower and the middle
3 areas. The upper Morrow is not productive in the area
4 where we produce.

5 The color-coding here, for your reference, blue
6 is limestone, nonreservoir rock; yellow are the channel
7 sands. This is our reservoir in the lower and middle
8 Morrow.

9 What is shown here -- I referred in earlier
10 talking to Exhibit 1 that there are four -- no, five,
11 trends showing through this area in these arrows. So what
12 this map, this cross-section, is illustrating is, if we
13 were to make a slice through the earth and look at how
14 those sand trends looked at, that's what this cross-section
15 is showing.

16 So you can see, each one of these wells
17 represents a different sand trend that has been
18 intersected. And that's illustrated here by these U-
19 shaped, lens-shaped sandbodies. So you can see in terms of
20 each well has got its distinct set of sands that are
21 characteristics to the area. These represent a single
22 channel.

23 I'd have you refer to Exhibit Number 3. It's a
24 diagrammatic cross-section of what an effluvial sand
25 channel looks like.

1 So what you have in time -- and this cross-
2 section is trying to illustrate that too -- is that you
3 have topography upon which these sands are deposited. You
4 have a scoured channel, an incised valley, and the rivers
5 are meandering down this valley. As they meander down, the
6 sands are deposited as point bars. That is represented on
7 your diagram in the yellow sand thick.

8 If you are to take a slice, a cross-section
9 through those, you can see in the front of that diagram,
10 Number 3, they're isolated sand lenses. And that's what
11 you see here, these isolated sand lenses that occur within
12 the fluvial sand channels.

13 And the idea of making this regional map was just
14 to show that there are very specific sand trends that
15 basically go from north to south, that cross-sect our two
16 different pool areas and outside the pool areas.

17 And I would point out that the cross-section also
18 illustrates unrestricted allowables for the three wells
19 here, and then the Indian Basin-Morrow with a 640-acre
20 spacing, 680 allowable.

21 Q. Ms. Mruk, as part of your study, have you
22 examined the logs and geologic data for the other wells
23 that compose the Indian Basin-Morrow Pool?

24 A. Yes, I have.

25 Q. You're welcome to return to your seat.

1 If you were to construct a cross-section through
2 any other portion of the reservoir, are you going to get
3 substantially the same geologic conclusion as you're
4 illustrating here with Exhibit Number 2?

5 A. Yes, I believe that's correct. Because you are
6 dealing with a fluvial sand system, you're dealing with
7 very isolated areas in which the sand can be deposited.
8 And it's more important than just the isolated trends upon
9 which they're deposited, it's the number of stacked sands
10 within that trend that makes it even further isolated, and
11 that again is shown on your Exhibit Number 3.

12 Q. Do you have an opinion as to whether geologically
13 it is necessary, in order to more appropriately develop
14 this opportunity, to have well density patterns greater
15 than a single well in a 640-acre spacing unit?

16 A. I'd have to definitely agree that one well per
17 640, you are doing yourself a disservice in trying to
18 developed stacked sand channels, and I have a more detailed
19 cross-section if you'd like to move to that.

20 Q. Before -- let me -- A couple of preliminary
21 questions before we get --

22 A. Certainly.

23 Q. -- to that detail.

24 As we move throughout the pool, then, while there
25 may not be a specific cross-section to illustrate this

1 point to the Examiner, there would be no question that we
2 could look any place in the pool and find an opportunity in
3 an existing spacing unit that would represent new reserves
4 for that section that the original parent well is not
5 accessing?

6 A. I would agree with that.

7 Q. And that is explained geologically by what
8 phenomenon?

9 A. That is explained by the series of individual
10 sand reservoirs within an interval. For instance, on this
11 regional cross-section, you see the lower and the middle
12 Morrow. Within the lower Morrow, I count up to four sands
13 on some wells, two sands on others.

14 So you have these stacked individual reservoirs
15 within a lower Morrow interval, and you also have the
16 meander. The movement of the sand down the sand trend is
17 moving at -- over that 640 acres. If you were to drill one
18 half, you may not be even touching the sands that have
19 meandered to the second -- the other half of the section.

20 Q. No doubt in your mind that geologically, then,
21 the current limitation in the pool of the single well, if
22 you will, is leading to an insufficient number of wells
23 being drilled?

24 A. I would agree with that.

25 Q. Now, there are certain spacing units in the pool,

1 where under prorationing you can simply have a second well
2 and you're controlled by the allowable for the spacing
3 unit. So there are spacing units now that in fact have a
4 second well?

5 A. That's correct.

6 Q. Geologically, are you seeing that those
7 additional wellbores in a section in fact are encountering
8 Morrow reservoirs that are not present in the other well?

9 A. That's true.

10 Q. When you look at well spacing, the current
11 spacing rules for the pool require a 1650 setback from the
12 outside, and if you want to encroach on that you have to
13 file an application and obtain approval to move closer.

14 What's your position with regards to relaxing
15 that rule, to have a 660 setback?

16 A. This is one of the most difficult things for a
17 geologist, the spacing requirement. We are basically
18 handed a land plat and said, Put your Morrow somewhere in
19 this area, your Morrow well in this area. And so we have
20 one hand tied behind our back before we even start drilling
21 the well. I have to --

22 Q. What do you mean by that?

23 A. Based on my work, if I can support drilling a
24 Morrow well, I want to support it based on my knowledge and
25 my interpretation of the individual sand distribution

1 within the area.

2 I don't -- If I want to put the well where I
3 think the sands have the strongest chance to be stacked or
4 the sands have the strongest chance to be clean and porous,
5 I want to put my well in that location, and then I want to
6 decide what do we have to go through in order to be able to
7 drill that well?

8 Right now, the situation is, try and put your
9 well in the legal location -- excuse me, in an orthodox
10 location -- and then, well, we'll do the best we can once
11 we get down there to make a good completion for you.

12 Q. So the issue, then, is the small size of the
13 standard drilling window for the current 1650 rule; is that
14 what you're saying?

15 A. That's what I'm saying.

16 Q. Let's turn it around. Would you have any
17 objection if an offset operator put their well 660 from a
18 common spacing unit that you controlled in this pool?

19 A. Based on my work that I've -- the detailed work
20 that I've done in this area, I'd have no objection at all.

21 Q. And why is that?

22 A. When I look at the -- From a geologic point of
23 view only, when I look at the distribution of the sands,
24 the number of reservoirs, the inhomogeneity, just the
25 variation within the sand quality, I feel that they may

1 even prove up sands on our acreage.

2 Q. Let's turn now to Exhibit Number 4, and let's
3 look at the next portion of your presentation. What are we
4 looking at when we turn our attention to Exhibit Number 4?

5 A. Exhibit Number 4 will bring forward the detailed
6 work that I have done in the Indian Basin-Morrow Pool. The
7 cross-section B-B' outlined here, I will flip to that and
8 go through on a detailed scale how separated and isolated
9 the sand channels do appear to be.

10 Q. All right. Before we start with that, let's talk
11 about the color code on the display. Again, what's being
12 illustrated?

13 A. The pink area is the Cemetery-Morrow Pool, the
14 green area is the Indian Basin-Morrow Pool. The cross-
15 section is shown in blue through six wells. The red gas
16 symbols are current Morrow gas producers. The gas symbols
17 with no color are depleted gas wells, and the dryholes are
18 dryholes.

19 Q. Okay, all right. Let's go to the next display.

20 A. Cross-Section B-B' is a U-shaped cross-section
21 through the Indian Basin-Morrow field. It -- I'm going to
22 run through how it's set up, the same setup that we saw in
23 the original cross-section. We have blue for limestones,
24 nonreservoirs; yellow for sandstones, the reservoirs.
25 We're broken again into the lower, middle and upper Morrow.

1 It is again datumed on the stratigraphic datum, so we're
2 able to compare equivalent geologic time units.

3 Also, I want to run through how this lays out.
4 From the first well to the second well we're going north to
5 south. This would be along the sand trend. From -- The
6 next three wells go west to east, so we're looking -- we're
7 actually going through -- we're cutting right through a
8 channel, so we get a cross-sectional view here. And then
9 again we're going -- the last three wells, we'll be going
10 from north to south, so we're looking along the sand trend
11 again.

12 The reason I selected these wells, it is where we
13 have the most data, the most recent data, so we can make
14 interpretations of the sand, and also it's because it's the
15 area we're actually drilling right now.

16 I would point out that "12" 5, which we have
17 done, is a deepening of an Upper Penn well, and we're
18 currently not completed at this time, but we hope to have
19 production from that well.

20 What I've done here when I've constructed this
21 cross-section, we have a problem in dealing with fluvial
22 sand systems, because you do not know which sands truly do
23 correlate. So we're using basic geologic tenets in picking
24 these major markers, the lower marker, the middle marker
25 and the upper marker. I draw those as hard boundaries on

1 this cross-section.

2 Now, then when I draw my individual units within
3 that, I try to remain parallel to those units. If I dip
4 significantly or try and crosscut those, then I'm breaking
5 some basic geologic tenets in stratigraphic time, I'm
6 saying that these units do not correlate. So you'll see a
7 parallelism between these lines, and I'm trying to obey
8 that.

9 Now, when I correlate between each well, if I
10 have to break that dip angle, I know that the probability
11 of them being the same sand is much, much less.

12 Q. You're looking at -- For the record, this is
13 Exhibit 6?

14 A. I'm sorry, yes, this is Exhibit 6, cross-section
15 B-B', stratigraphic.

16 Q. The blue shading on the logs, what does that
17 indicate?

18 A. As I stated earlier, that is limestone,
19 nonreservoir rock.

20 Q. The datum point that you have used, is that a
21 readily identifiable marker when we get to the top of the
22 middle Morrow?

23 A. The data marker here in the Morrow is a very
24 regional identifiable marker.

25 Q. All right. And the top, then, of the middle

1 Morrow, is that one that you and other geologists can agree
2 upon?

3 A. It's one we can agree upon, that's correct, it's
4 a hot shale.

5 Q. And we get down to the base, then, and you're at
6 the top of the Barnett shale?

7 A. That's correct.

8 Q. What's the basis to subdividing that Morrow
9 interval into a middle Morrow and a lower Morrow?

10 A. There's a regional geologic study done by
11 Reservoirs, Inc. They looked at the distribution of the
12 sands, they also showed this lower, middle and upper
13 Morrow, and they consisted with the published -- consistent
14 with the published literature.

15 Q. Between the logs, you've identified a footage
16 between the first two on the B side when we go from left to
17 right, from B to B'. The first well is the Indian Basin
18 15, and then you move to the Indian Basin 21. They're
19 approximately a mile apart?

20 A. That's correct.

21 Q. Why have you not connected the upper portion of
22 the middle Morrow in those two wells to show that this is
23 continuous?

24 A. Well, first off, I'll reiterate the parallel
25 rule. Straight from geology, I didn't want to break -- I

1 didn't want to cross-cut stratigraphic time boundaries.

2 Secondly, and more importantly, we have pressure
3 data in those two wells. The North Indian Basin Unit 15
4 well was drilled in March of 1995, and it was completed in
5 the lower Morrow. Two of the sand zones, this zone and
6 this zone, were completed in the lower Morrow and went on
7 production.

8 And eight months later we drilled the Indian
9 Basin 21 and completed in three sand zone, and the pressure
10 was virgin pressure. So even after, I believe it's 600 MCF
11 of production, we still saw virgin pressures in the offset
12 well.

13 Based on those two data, I can't realistically
14 connect those two wells.

15 Q. Let's go the other direction, and show me why you
16 have determined that there is a discontinuity between the
17 21 and the Number 2. Those wells are what? 1800 feet
18 apart?

19 A. That's correct, these are our closest wells, and
20 again I was following the parallel rule. I also know that
21 I have production, gas production well here, and I am wet
22 over here.

23 EXAMINER STOGNER: Are you referring to -- The
24 gas production well is the 21 --

25 THE WITNESS: Yes, sir.

1 EXAMINER STOGNER: -- and the wet well is the
2 Number 2?

3 THE WITNESS: That's correct.

4 Q. (By Mr. Kellahin) And you're specifically
5 looking, then, at the lower portion of the lower Morrow?

6 A. That's correct.

7 Q. Now, the situation is that a wellbore in
8 proximity to another may in fact have one Morrow reservoir
9 or one lens that's connected, and that's what it shows on
10 that combination?

11 A. That's correct. There are places -- For
12 instance, at the very top of the lower Morrow, I have shown
13 that this sand, based on geologic rules, is probably
14 connected. I have no data to dispute that.

15 But I also have a sand here at the bottom, which
16 has no representation in the offset well. So I know that
17 indeed that is a separate reservoir.

18 Q. And as we continue across the cross-section,
19 there are other illustrations of that discontinuity?

20 A. That's correct. I've shown, trying to stick
21 strictly to the parallelism rule, wells that could be
22 connected where I can here, between the "12" 5 and the
23 Number 8, the lowermost sand, between the Number 8 and the
24 Number 4, the top sand in the 8 and the lower sand in the
25 4.

1 But likewise, I've also shown discontinuities,
2 that the sand present in the Number 4 well is not present
3 in the 8, and sands that are present in the "12" 5 well are
4 not present in the Number 8.

5 So you can find both examples. But on the whole,
6 when you look at this as a system, you're seeing numerous
7 stacked individual reservoirs within this channel system.

8 Q. In terms of developing a well density pattern for
9 the Indian Basin-Morrow Pool, do you see any reason to have
10 that density less than the density that's occurring in the
11 Cemetery-Morrow? You get two wells in the section in
12 Cemetery-Morrow. Is there a geologic reason or difference
13 that you can see where the density in Indian Basin-Morrow
14 should be less than the density that's occurring in the
15 Cemetery-Morrow?

16 A. I actually think that the well density could be
17 higher in the Indian Basin-Morrow field than the Cemetery
18 field.

19 Q. So there may be a point in time where you might
20 want the opportunity for more than simply two wells --

21 A. Certainly.

22 Q. -- in the section? All right.

23 A. As we drill more, we know more.

24 Q. Let's look at the issue of how you addressed an
25 attempt to create isopachs of these Morrow intervals,

1 recognizing the complexity of the Morrow system. How did
2 you approach it, and what did you do?

3 A. This is a complex problem. I guess I would talk
4 about it in terms of why we did it and then how we did it.
5 This might answer your question the best way.

6 The reason we tried to make an isopach map of the
7 lower Morrow, our major pay in the Indian Basin-Morrow
8 area, was, I wanted a generalized sense of what the sand
9 distribution was. So we tried to do that.

10 And also I wanted an idea, based on my cross-
11 section work, is, on a map what does the lateral continuity
12 of the sands look like on a map? So that's the why.

13 I also wanted to look at just -- we talked about
14 spacing limitations. Could I find a reason to justify to
15 our management putting unorthodox locations down. And that
16 was more of a minor reason.

17 And the last, I also wanted to see -- I wanted to
18 see the areal restrictions and can I justify putting down a
19 second and even a third well in an area, based on what we
20 know as we drill? From what we drill, I should say.

21 In terms of a "how", this is -- It's an art, it's
22 not done -- because it's difficult. You don't find people
23 trying to make individual sand maps in the Morrow. And
24 that goes back to, what do you connect?

25 So what I did is, I recognized that the lower

1 Morrow is an interval, a consistent geologic interval. I
2 added up all the net sand within that interval at a 6-
3 percent density neutron porosity cutoff or equivalent
4 thereof, and then I -- I mapped them, using my model, the
5 fluvial sand channel model. And when I did that, I've
6 mapped out what you see in Exhibit 7.

7 So this is based on making cross-sections,
8 looking at the individual nature of the sands, and
9 following the meandering sand channel model.

10 Q. While this is focused on the lower Morrow as a
11 net sand map, what is your opinion with regards to how this
12 would reflect the sand distribution, had you also created a
13 middle Morrow sand map? Is there a substantial difference?

14 A. I'm sorry, could you rephrase that, please?

15 Q. Yeah, I'm looking at the lower middle Morrow. Am
16 I looking only at a sand map that's packaged the lower
17 middle Morrow as we look on cross-section 6, or does it
18 also include the middle Morrow?

19 A. No, I strictly isopached the lower Morrow --

20 Q. All right.

21 A. -- I did not try and add in the middle Morrow.
22 But you could make the same map in the middle Morrow.

23 Q. And that's my question.

24 A. Oh, I'm sorry.

25 Q. If you make a map of the middle Morrow, an

1 isopach map, is it going to be substantially different in
2 terms of the ultimate geologic conclusions than what we're
3 about to see on Number 7?

4 A. No, not in terms of the ultimate conclusion.

5 Q. All right. Let's focus, then, on the other
6 Morrow net sand map, and describe for us, then, what we see
7 when we look at what Mr. Lowry calls the bean map.

8 A. I love that term. I will reference that there is
9 an enlargement of the bean map as Figure 8, and that may be
10 easier --

11 Q. All right, let's go to that --

12 A. -- for you to refer to.

13 Q. -- let's go to 8, and it's simply a larger
14 production of the same thing we're seeing on 7. Let's turn
15 to that. Describe for us what we're seeing and what
16 conclusions --

17 A. And now that you've done that, I will ask that
18 you go back to 7 and look at it in the sense of the
19 regional picture, that there are three sand trends we're
20 looking here, outlined by the zero isopach line, one that
21 is from west to east, that's more northwest-southeast, one
22 that is roughly north-south, coming from the Cemetery-
23 Morrow Pool, and another one further to the east of that,
24 running north-south, again coming from the Cemetery-Morrow
25 Pool, into the Indian Basin area.

1 Now, going to the enlarged map, Exhibit Number 8,
2 we can look at the isopach thicks. And what I've shown
3 here is, within the sand channels outlined by the zero
4 isopach line it is a meandering sand system. So if you
5 were to take your finger and run down any of those trends,
6 you should be able to make a very -- a sinusoidal curve
7 running through each of the point bars that comprise the
8 channel.

9 Q. All right. So when we look at each little bean
10 here, what we're seeing is a composite or an accumulation
11 of data from that well log --

12 A. Uh-huh.

13 Q. -- that sums the net total of sand in those
14 multiple lenses?

15 A. That's right. You would be looking at individual
16 reservoir sands stacked together and mapped together.

17 Q. So there should be no misunderstanding that an
18 individual bean, as shown on Exhibit 8, is not a uniform
19 reservoir that's connected within that area?

20 A. Oh, no, not at all. That indeed some of the
21 thickest sands you see represent more sand lenses present,
22 as opposed to a thick sand -- an individual sand
23 thickening, that's correct.

24 Q. All right. With that understanding, then,
25 describe for us what you see as your geologic challenge, if

1 you will, in terms of well density and well location as
2 you've tried to further develop the pool.

3 A. My challenge really is to -- knowing that I'm
4 only representing the stacked lenses as to pick locations
5 that represent my best shot at finding clean sand. This
6 doesn't necessarily mean being in the middle of a bean; it
7 means being somewhere in the proximity of a bean.

8 But what I would point out, for instance, if I
9 were to choose a location at Sections 3 and 10, I show the
10 odds or the probability that there is a sand there, and I
11 would probably have to pick a 660 from either the southeast
12 corner or the northeast corner of 10, to put a Morrow well.
13 And I would like the option, if I did get a well down and
14 it wasn't good, I'd like an option to drill another one.

15 And likewise, you can find numerous locations on
16 this map -- I'd also point out the northeast section of 15.
17 There's a dryhole in the northwest section of 14. Based on
18 the sand data I have from that, I think we should be
19 proposing a well in the northeast corner of 15.

20 We could go on and on about this, but if I could
21 have some flexibility for this unique map, I think we could
22 drill some wells.

23 MR. KELLAHIN: That concludes my examination of
24 this witness. We tender her for questions, and we would
25 move the introduction of her Exhibits 1 through 8.

1 EXAMINER STOGNER: Exhibits 1 through 8 will be
2 admitted into evidence.

3 EXAMINATION

4 BY EXAMINER STOGNER:

5 Q. I'm a little confused at this point. If I
6 remember right, we're proposing only a second well, but due
7 to this testimony am I hearing you right that you'd want to
8 drill more than two wells on a 640?

9 A. That's correct. I think if we could look at the
10 bean map again, if I could convince you that we have
11 separate channel meanders -- For instance, Section 14, I
12 show three channel meanders coming in Section 14. I don't
13 see how two wells, especially when one is a dry hole and
14 one is a producer, has proven up whether or not there is
15 sand in the southeast corner of 14.

16 So it would have to be based on -- As we drill
17 and gain more data, we would be asking for additional wells
18 if we could justify to you that there is sand present that
19 needs to be drained.

20 MR. KELLAHIN: Point of clarification, Mr.
21 Examiner. Ms. Mruk is forecasting ultimately what she
22 would like to do in the reservoir. But currently, we only
23 are asking the Division to consider the second-well option
24 in a 640. We are not asking you to give us more than a
25 second well in a 640 at this time.

1 EXAMINER STOGNER: So the Application as it is
2 stands?

3 MR. KELLAHIN: Yes, sir.

4 EXAMINER STOGNER: Okay.

5 THE WITNESS: It's just my enthusiasm.

6 Q. (By Examiner Stogner) Do you know any instances
7 -- I'm referring now to your Exhibit Number 6, which is
8 your B-B' cross-section, where you have lenses, and let's
9 go in between the 21 and the Number 2 well, toward the
10 middle of the exhibit, but back toward the left -- where
11 you had some connecting sands, but there was nothing
12 indicating, in this particular instance, communications.
13 Did you see communications or evidence of communications
14 between two wells there was some continuity between a lens?

15 A. I have not seen that evidence, no.

16 Q. Now, the same deposition that's going through the
17 Indian Basin is also up toward the north in the Cemetery;
18 is that correct? Same --

19 A. I'm sorry --

20 Q. -- environment, right?

21 A. Oh, yes, I'm sorry. Yes, absolutely.

22 Q. As is toward the south?

23 A. That's correct.

24 Q. Is there much production below that Indian Basin-
25 Morrow Pool, or much -- very many producing Morrow wells?

1 A. When you say below, you mean beyond?

2 Q. To the south.

3 A. To the south? The production that is shown is
4 the production I'm aware of, on Exhibit Number 7. On a
5 regional sense, yes, there is additional production.

6 Q. With the testimony today and everything, it just
7 seems like it stops to the southern boundary of the Indian
8 Basin. I just wondered if there was any reason for that.

9 A. My study really has focused on this area. I can
10 reference the regional study that's been done by the
11 Reservoirs, Inc., where they show study over the entire
12 southeast New Mexico area, so that would be well beyond the
13 boundaries of this.

14 MR. KELLAHIN: Point of clarification. Ms. Mruk,
15 isn't there an operational choice or a drilling sequence in
16 here that packages the Upper Penn-Cisco with the Morrow,
17 and does that not explain why we're seeing Morrow wells in
18 the north, while as we move farther south that development
19 has not yet occurred?

20 THE WITNESS: That's right, it's very
21 economically expedient to deepen our Upper Penn wells to
22 the Morrow and see what's there at this point.

23 MR. KELLAHIN: Show the Examiner where he is.
24 He's in --

25 THE WITNESS: I'm sorry.

1 MR. KELLAHIN: -- the South Dagger Draw-Indian
2 Basin area with this Morrow system, isn't he?

3 THE WITNESS: That's correct. I would reference
4 Sections 1, 2, 11 and 12 are Marathon's South Dagger Draw
5 field, and that's why you can see B-B' cross-section runs
6 through there. That's where we're currently drilling, and
7 we're taking the orthodox locations down to the Morrow.

8 EXAMINER STOGNER: I was just reviewing, Mr.
9 Kellahin --

10 MR. KELLAHIN: Yes, sir.

11 EXAMINER STOGNER: -- the present rules and
12 regulations, and what I'm hearing, essentially, the
13 ultimate goal -- perhaps not goal, the ultimate development
14 in this area could go to as many as four wells in the
15 proration unit, and you can already have that, already.

16 MR. KELLAHIN: Yes, sir, we --

17 EXAMINER STOGNER: You can always get unorthodox
18 locations provided -- In fact, with the new rules and
19 regulations, you can get it in administrative. I'm just --
20 I'm a little confused.

21 MR. KELLAHIN: Yes, sir, I understand your
22 confusion at this point. Under the current rules we could
23 do some of this development, and what then occurs is the
24 issue about whether the development best occurs under the
25 current prorationing system, or whether we might simply

1 terminate that and deal with it in a nonprorated sense.

2 And so that's a topic that Mr. Folse and I are about to
3 discuss with you here shortly. It's beyond this witness's
4 expertise.

5 EXAMINER STOGNER: Okay. With that, let's -- I
6 have no other questions of this witness, and we can move
7 on.

8 THE WITNESS: Thank you.

9 RONALD J. FOLSE,
10 the witness herein, after having been first duly sworn upon
11 his oath, was examined and testified as follows:

12 DIRECT EXAMINATION

13 BY MR. KELLAHIN:

14 Q. Mr. Folse, for the record, sir, would you please
15 state your name and occupation?

16 A. My name is Ronald J. Folse. I'm a senior
17 petroleum engineer with Marathon in Midland.

18 Q. Mr. Folse, on prior occasions have you testified
19 not only as a petroleum engineer but a petroleum engineer
20 with expertise in prorationing cases, having testified
21 before the Commission on those topics?

22 A. Yes, I have.

23 Q. And with regards to the Indian Basin-Morrow Pool,
24 have you also made a reservoir engineering study of certain
25 aspects of production and performance from that pool?

1 A. Yes, I have.

2 MR. KELLAHIN: We tender Mr. Folse as an expert
3 petroleum engineer.

4 EXAMINER STOGNER: Mr. Folse is so qualified.

5 Q. (By Mr. Kellahin) Mr. Folse, let's provide some
6 more data and information for the Examiner, and then we
7 will start our discussion with the question that he had on
8 his mind with the last witness.

9 Let's start with Exhibit 9 and set the stage for
10 what currently is the status of the pool. Show us what
11 you're describing in Exhibit 9.

12 A. In Exhibit 9, as indicated in the green area, is
13 the Indian Basin-Morrow Gas Pool. There are 10 1/4
14 sections in Township 21 South, Range 23 East. There are 9
15 1/2 sections over in Township 21 South, Range 24 East. To
16 the northern area above that in red is indicated the
17 Cemetery-Morrow Pool.

18 On the map you'll notice that in the lower part,
19 lower left section, it indicates the Morrow producers, and
20 each near the well is the cumulative production for those
21 wells, and it is through March 31 of 1996. The wells that
22 are indicated with the circles are penetrations but
23 dryholes in the Morrow.

24 Q. All right. Let's turn to the current status on
25 the proration system, as currently reported on ONGARD. If

1 you'll show us Exhibit 10, what are we seeing?

2 A. Okay, on Exhibit 10, this is the current gas
3 proration schedule for the period October, 1995, through
4 March of 1996. What we see here are the operators.

5 Barbara Fasken operates currently two wells
6 producing in the Indian Basin-Morrow Gas Pool.

7 Kerr-McGee operates two wells currently producing
8 in the pool. One is a nonmarginal well; it is the Martha
9 Creek Number 2. In addition to that, they've recently
10 drilled a well. It's the Winston Gas Com Number 2 that
11 should be coming on the gas proration schedule soon.

12 Third operator, Marathon Oil, operates two wells
13 that are indicated on this gas proration schedule that are
14 producing. We also have two additional wells that are
15 currently believed -- currently nonmarginal wells, North
16 Indian Basin Unit Number 15 and North Indian Basin Unit
17 Number 21, as previously discussed by Denise.

18 Oryx Energy is another operator that operates one
19 producing well indicated on this exhibit. However, in the
20 middle of 1995, the well has ceased to produce in the
21 Morrow Gas Pool. Remedial work that was performed earlier
22 this year was not successful in regaining production in the
23 Morrow Gas Pool.

24 Q. When we look at the Marathon Number 15 well, that
25 was completed -- what? In the spring of last year, was it?

1 A. Number 15 was completed in March of 1995.

2 Q. All right, 1995. And that well is still not on
3 the proration schedule?

4 A. That's correct.

5 Q. It's not on the system, but it would be -- if it
6 was on the system, it would be a nonmarginal well?

7 A. That's correct, yes.

8 Q. All right. The NIBU 21 is a well that you --
9 what? Completed in -- was it December?

10 A. In October.

11 Q. October of 1995?

12 A. Yes.

13 Q. And it's still not in the system?

14 A. That's correct.

15 Q. All right. And then Kerr-McGee has got their new
16 Winston Number 2. I think that was completed -- what? In
17 January or February of this year?

18 A. That's correct.

19 Q. And it's not on the system yet either?

20 A. (Nods)

21 Q. All right. Setting those three wells aside, when
22 we look at the proration schedule, on the schedule how many
23 nonmarginal wells are there?

24 A. On the current schedule there's only one
25 nonmarginal well that's producing.

1 Q. And that's the Martha Creek Number --

2 A. Martha Creek Number 2.

3 Q. The Martha Creek Number 2. All right.

4 Let's go back historically and describe in a
5 summary fashion how we get to where we are now.

6 Prorationing in the pool was established May 6th, 1965, by
7 Order Number R-1670-F. You've examined that information,
8 have you not, Mr. Folse?

9 A. Yes, I have.

10 Q. What was occurring, then, that caused the
11 operators to seek prorationing in the pool?

12 A. What was occurring at that time, starting in --
13 commencing in 1963, with Morrow discoveries, there were
14 several gas wells available to deliver Morrow gas
15 production, however there were no transporters. At that
16 time there were two pipeline companies or transporters that
17 were -- had plans to take the gas and --

18 Q. In addition, development had occurred also in the
19 Upper Penn and the Cisco?

20 A. That's correct, yes.

21 Q. And that's our Indian Basin-Upper Penn Prorated
22 Pool?

23 A. That's correct, yes.

24 Q. So in this area, you have two prorated pools,
25 each on 640 spacing?

1 A. Yes, we do.

2 Q. And both of them, then, were awaiting the
3 construction of a gas plant and transportation facilities?

4 A. Yes, that's right.

5 Q. When you look at the documentation, is there any
6 reservoir engineering basis for the concept of 640-acre
7 spacing?

8 A. For the Indian Basin-Morrow Gas Pool?

9 Q. Yeah.

10 A. No.

11 Q. What appears to be the reason for that wide a
12 spacing?

13 A. At the time -- I guess at the time the final
14 reason was that in order to ensure that all wells were
15 going to be able to go into the gas market and pipeline,
16 based on the deliverability of the Morrow wells at that
17 time, they wanted to ensure each gas proration unit the
18 capacity in the line.

19 Q. When you're looking at spacing unit sizes,
20 though, was part of the reason to maximize the amount of
21 acreage that was held by a single well within that pool at
22 that time?

23 A. Yes, that's true.

24 Q. So -- And that may have been done independent of
25 any scientific basis to show drainage patterns or potential

1 contribution of that acreage to that wellbore?

2 A. That's correct, yes.

3 Q. When we go forward, now, we have under the
4 current prorationing system an established allowable for
5 the pool, and if you do it on a daily basis, which helps me
6 because that's the way I can remember it, it's about 680,
7 688 MCF a day for a nonmarginal well?

8 A. That's correct, yes.

9 Q. Describe for me -- Well, under the current
10 prorationing system, you are allowed to have multiple wells
11 in the section, except the spacing unit is going to be
12 limited to the maximum gas allowable for that spacing unit,
13 right, sir?

14 A. That's correct, yes.

15 Q. All right. What do you see as an engineer that
16 causes you to believe that it is preferable to simply
17 terminate prorationing in the pool and allow that
18 development to occur, at least at this point, with a
19 density of no more than two wells to a section? Why do you
20 want to terminate proration?

21 A. The reason primarily to terminate prorationing is
22 based on engineering evidence that will be presented.
23 Drainage areas are less than 320 acres. With current
24 development in the area that we're focusing on, Marathon is
25 drilling several wells to a shallower target, the Upper

1 Penn Oil Pool, South Dagger Draw-Upper Penn Oil Pool.

2 What we feel in engineering terms is,
3 incrementally it is of benefit to take a well down to the
4 Morrow at an incremental cost to see if there is sufficient
5 gas reserves to produce a well there. One well per 640
6 acres is not sufficient to fully test or develop the
7 Morrow.

8 Q. All right, let's talk about the prorationing
9 concept. Let me get back to my question.

10 Under prorationing, is prorationing useful in a
11 reservoir if you had a general common reservoir, of general
12 uniformity and thickness over a wide area, such that a gas
13 well in one portion of that reservoir is going to have a
14 direct pressure relationship and effect on another well,
15 even if it's not an offset, some distance away? And in
16 order to protect those correlative rights so everybody has
17 an opportunity to produce their fair share of the gas
18 before it's depleted, that you control the level of
19 withdrawals? Is that not the reason for prorationing?

20 A. That is correct. The reason for prorationing,
21 for example, in the Indian Basin-Upper Penn Gas Pool, the
22 wells from each 640-acres are in communication, are in
23 connection, and producing from the same reservoir.

24 Q. When we get down into the Indian Basin-Morrow,
25 are we having wells producing out of the common container?

1 A. No, we are not.

2 Q. They're all in little different containers,
3 aren't they?

4 A. That's correct, yes.

5 Q. All right. So we can continue prorationing and
6 pretend it matters, and I guess we could artificially set
7 the allowable at some very high rate, so it never gets in
8 the way. I guess that's one solution, isn't it?

9 A. Yes, it is.

10 Q. All right. Another solution is to simply remove
11 prorationing from a reservoir or system for which it's not
12 appropriate?

13 A. Yes, it is.

14 Q. All right. Why would the operators unanimously
15 vote to terminate prorationing when it appears to be an
16 option to simply ask for an artificial allowable and go
17 ahead with development? Why do they all want out of the
18 prorationing system?

19 A. The primary reason is, the current prorationing
20 system does not quickly respond to changes in development
21 plans in the area.

22 The gas prorationing system in the Morrow in
23 particular, with the declining production rates on existing
24 wells, they're flowing or producing at less than a million
25 a day, or half a million cubic feet of gas per day. With

1 additional development and discoveries of gas wells that
2 can produce between 3 and 5 million cubic feet a day, the
3 current prorationing system is not responding quick enough
4 to get the gas prorationing -- the allowables up. And
5 that's why most of the operators probably feel it's better
6 to simply just terminate prorationing.

7 Q. Is it easier for you as an engineer to get
8 management to approve a well in a nonprorated pool than it
9 is in a prorated pool, regardless of the allowable?

10 A. Yes, it is.

11 Q. Why does that happen, Mr. Folse?

12 A. The -- I guess the biggest reason would be
13 management's perception of restrictions on the gas
14 production from the well, and in an area where there are no
15 -- it is felt that the drainage is less than 320 acres,
16 there are no correlative-rights issues in all cases here,
17 they feel that they could drill the wells and approve the
18 drilling of those wells and the funds if in fact they were
19 not prorated.

20 Q. You get to forecast, do you not, as an engineer,
21 the economic consequence of expending that money with the
22 assurance that if you have the capacity to produce that
23 well, you may do so without a restriction?

24 A. That's correct, yes.

25 Q. And if you add into it the regulatory component

1 of having that restriction set in this reservoir, it
2 dampens the enthusiasm of management to go forward with
3 drilling in this type of pool, does it not?

4 A. That's correct, that's true.

5 Q. Let's look at some of the data that you have to
6 persuade you that the Morrow reservoir here, this reservoir
7 system, can be effectively produced independent of the
8 prorationing system. What's your next exhibit?

9 A. Exhibit 11.

10 Q. All right. Let's look at that. What have you
11 plotted here?

12 A. Exhibit 11 is the Indian Basin-Morrow Gas Pool.
13 It's the allowables indicated in red from the period of
14 January, 1989, through the six-month period, October, 1985,
15 through March 1996. Production from the pool is indicated
16 with a blue line, and the historical trend indicates in
17 particular, early on, the production increases are followed
18 by, a few months later, increases in the gas allowables for
19 the pool.

20 Q. Historically, then, there appears to be a lag in
21 the productivity of the well, or the production from the
22 well in relation to the allowable available?

23 A. Yes.

24 Q. Is that what's happening here?

25 A. That's correct, yes.

1 Q. All right. So what? What's the point?

2 A. The point also being, though, is that the pool
3 allowables in general have been made up -- are being taken
4 care of by production from the wells.

5 Q. So what happens is, the one or two nonmarginal
6 well is being curtailed to stay within this allowable,
7 which may be artificially low; is that what's happening
8 historically?

9 A. That's correct, yes.

10 Q. All right. Does the pool -- the nonmarginal
11 wells have the capacity to produce more than the current
12 allowables?

13 A. The current nonmarginal well on schedule?

14 Q. Yes, sir.

15 A. It does not have the capacity to produce more
16 than the allowable.

17 Q. All right. The new wells now do have the
18 capacity to produce more than the allowable?

19 A. Yes, they do.

20 Q. All right. You polled -- Based upon the results
21 of the NIBU 15 well, you now had a well that could exceed
22 the allowable?

23 A. Yes, we do.

24 Q. And you sought, then, in the summer of last year,
25 to have the acreage in which the 15 was dedicated

1 transferred over into the Cemetery-Morrow Pool, did you
2 not?

3 A. Yes, we did.

4 Q. All right. And that was unsuccessful by December
5 of 1995?

6 A. That's correct, yes.

7 Q. In the summer, while you were facing the issue of
8 the 15 well, did you poll the operators to see what they
9 wanted to do about terminating prorationing?

10 A. Yes, we did.

11 Q. And then you moved forward until we got to today
12 on that topic?

13 A. That's correct, yes.

14 Q. All right. Right now, then, in the pool, we have
15 nonmarginal wells that by themselves could produce the
16 whole allowable for the pool for a month, right?

17 A. Yes, we do.

18 Q. That could happen. All right. Let's look at
19 Exhibit 12. Show me what you're describing on Exhibit
20 Number 12.

21 A. Exhibit 12 is a graph showing the allowable and
22 production for the nonmarginal well, North Indian Basin
23 Unit Number 8. It's in Section 9, Township 21 South, Range
24 23 East. Production began in September of 1990.

25 As you can see, each data point is one month.

1 The allowable -- the production exceeded the allowable for
2 three months prior to the allowables actually increasing
3 because of production from the nonmarginal well.

4 On the other hand, though, you also can tell that
5 production from the well was limited, and after three or
6 four months of extended production, over 150 million cubic
7 feet of gas per month, production decreased dramatically
8 through the end of 1992, early 1993.

9 Q. During this period of time, we're seeing, then,
10 as to this well, its production and allowable, the
11 allowable lag substantially behind the production in the
12 well?

13 A. That's correct, yes.

14 Q. Okay. When you look at the issue of nonstandard
15 locations that were approved by the Division in the pool,
16 one of the issues in terminating prorationing is whether
17 there are currently any unorthodox well locations of
18 producing wells for which we need to address whether or not
19 a penalty continues for those wells, right?

20 A. That's correct, yes.

21 Q. All right. Are there any unorthodox well
22 locations for any Indian Basin Morrow well that's still
23 currently producing out of the pool?

24 A. No, there are not.

25 Q. So we don't have any of those floating around to

1 worry about?

2 A. That's correct.

3 Q. All right. Let's turn to Exhibit 13. What are
4 you showing here?

5 A. Exhibit 13 is a table of the wells in the -- I
6 guess we've been calling it the northern area, that
7 Marathon and other operators operate. It's in Township 21
8 South, Range 23 East.

9 The well names are on the left side. The
10 location is the second column. Initial test data for the
11 wells is the third column of data. The fourth column is
12 the cumulative production from the wells as of March 31,
13 1966. The fourth column is an indication of the year that
14 well depleted. The fifth column is the farthest to the
15 right, is the drainage area in acres for the well, based on
16 calculations I will detail later.

17 Q. Have you been able to verify Ms. Mruk's geologic
18 conclusion about the necessity to have wells located at
19 greater densities in this pool than has taken place in the
20 past?

21 A. Yes, I have.

22 Q. As to those existing wells, do you see any
23 correlative-rights impairment if the Division were to
24 terminate prorationing for the pool and let any of these
25 wells be produced unrestricted?

1 A. No, I do not.

2 Q. And you reach that conclusion because
3 consistently these wells exhibit small drainage areas?

4 A. That's correct, yes.

5 Q. All right. Would it matter to you, if you were
6 offset to any of these wells, to have these wells produce
7 unrestricted next to you?

8 A. No, it would not.

9 Q. Let's look at 14. Identify and describe what
10 you're showing on Exhibit 14.

11 A. Exhibit 14 is a daily production plot for North
12 Indian Basin Unit Number 15. It's the well in Section 2.
13 It was the first well drilled down through the Morrow in --
14 early last year, March. March, 1995, is when it began
15 production.

16 The red curve is the gas production, and the
17 initial peak production from the well was approximately 3.2
18 million cubic feet of gas. And it has been on production
19 for slightly over a year, and the current rate has declined
20 to right at 1.5 million cubic feet a day.

21 I'd like to also point out that since it is daily
22 data, there have been times when we have actually noted
23 some water production at different points in time.

24 You'll notice, also, that in early March of 1996
25 the well was shut in. Actually, it was March 1st. It was

1 shut in through March 22nd, and it required about nine days
2 to bring the well back on production due to water-loading
3 problems. However, the well is currently on production at
4 about 1.5 million cubic feet a day.

5 Q. Okay. Let's talk about the shut-in. By March of
6 1996, the well has accumulated overproduction, you're more
7 than six time overproduced. Marathon shut the well in, and
8 then you sought the Director's approval to turn this well
9 back on?

10 A. That's correct.

11 Q. And you did that after you polled all the
12 operators in the pool and obtained their approval to
13 restore this well to production?

14 A. That's correct, yes.

15 Q. All right. The well comes back on, and then it
16 takes what? Nine days to get the liquids off of it or to
17 pump it down or do something to restore the gas production?

18 A. That's correct, nine days to return the well to
19 full production.

20 Q. Did it return to a level of productivity that it
21 had prior to the shut-in?

22 A. It's approximately 200 MCF a day short of what it
23 was producing before the shut-in.

24 Q. So that there is some sensitivity of the -- this
25 well, apparently, to shut-in?

1 A. Yes, mostly because of the water -- It's
2 completed in two zones. It's felt that one of the zones
3 could have began water production, or should have, or did,
4 and has hindered or reduced some of the production for the
5 gas-productive zone, the other productive zone.

6 Q. All right. Let's turn to Exhibit 15 and have you
7 identify and describe that display.

8 A. Exhibit 15 is a similar graph of daily production
9 for our North Indian Basin Unit Number 21. It's completed
10 in Section 11, Township 21 South, Range 23 East. It is
11 approximately a mile due south of NIBU 15.

12 The gas production came on in October, 1995. The
13 initial rates, based on the red curve, were slightly over 8
14 million cubic feet a day. The well declined to
15 approximately 7.2 million cubic feet a day, and then the
16 well was shut in, early March through March 21st, when it
17 was returned to production.

18 The well is currently producing about 6.4 million
19 cubic feet a day.

20 Q. Again, the well was shut in in March by Marathon,
21 and then you approached the Director and obtained approval
22 to turn it back on, pending the Examiner's decision in the
23 case?

24 A. Yes, sir, that's correct.

25 Q. And this well has accumulated some overproduction

1 too, has it not?

2 A. Yes, it has.

3 Q. Let's go to Exhibit 16 and have you show us what
4 we're seeing with Exhibit Number 16.

5 A. Exhibit 16 is a P-over-Z versus cum production
6 for the North Indian Basin Unit Number 15 well that was
7 completed or producing early March, 1995.

8 Based on data acquired, the indicated original
9 gas in place, in extrapolation, is approximately 2400
10 million cubic feet of gas. And that pressure, the last
11 pressure data point, was -- reservoir pressure, was 2131
12 pounds.

13 Q. All right. When you did your drainage
14 calculations for a lot of those wells, you had actual total
15 production -- you had established an ultimate recovery for
16 those wells?

17 A. That's correct, yes.

18 Q. And for this newer well, then, you've used P over
19 Z to extrapolate what you expect to be its ultimate
20 recovery?

21 A. That's correct, yes.

22 Q. And then you backed that data into a drainage
23 calculation?

24 A. Yes, I did.

25 Q. All right. Let's look at 17. Identify and

1 describe that for us.

2 A. Exhibit 17 is a similar plot of P-over-Z versus
3 cum production for NIBU 21. It, based on the data taken
4 there, indicates original gas in place would be -- is 4.8
5 million cubic feet, or 4800 million cubic feet of gas.

6 The pressure at the last data point, which was in
7 early March, 1996, was 2770 pounds.

8 Q. Again, this gives you data by which then you
9 could perform a drainage calculation for that well?

10 A. That's correct, yes.

11 Q. All right. Let's go, then, to the summary sheet,
12 which is Exhibit 18, and have you summarize your
13 volumetrics for your drainage calculations.

14 A. Exhibit 18 is a table which shows all of the
15 wells that, in the northern area, we had on a previous
16 exhibit, and it's a calculation of drainage area for each
17 of the wells.

18 Starting in the second column from the left,
19 we've got basically -- we've determined porosity for each
20 of the wells, the productive intervals, we have the water
21 saturations used, initial pressures seen in the earlier
22 wells. Those were initial drill stem tests, final shut-in
23 bottomhole pressures, of course we've got the Z factor,
24 temperature of the reservoir, gas formation volume factor,
25 gas gravity, recovery factors. The first seven wells, the

1 cum production is known, because the wells are depleted.

2 What I did then is to get an original gas in
3 place for each of those seven wells. I was using the
4 recovery factors of 85 percent. Based on a net thickness
5 seen in each of the wells we can come up with a column to
6 the -- farthest to the right, which is the drainage area,
7 an approximate drainage area for each of the wells.

8 Q. What kind of pressure data is available
9 historically for the wells in the pool?

10 A. Historical production for -- or historical
11 pressure data for the wells in this pool generally are
12 shut-in tubing pressures acquired over the productive life
13 of the well and generally are not representative of
14 reservoir pressures.

15 The only pressures we do have on these wells,
16 from scout tickets and drill stem test data -- or is drill
17 stem test data, and so indicated here, as the initial
18 pressures.

19 Q. Okay. As part of your examination, have you seen
20 the event in the pool where -- I will characterize it a
21 high-capacity well, affects an adjoining well in terms of
22 impacting its production?

23 A. No, we have not.

24 Q. So if you had a high-capacity well in proximity
25 to another well, when the newer well comes on, you don't

1 see the old-well production decline take a sharper decline?

2 A. No, we don't.

3 Q. Do you see any evidence of pressure communication
4 between wells that would cause you to conclude that one
5 wellbore is draining or affecting the other wellbore?

6 A. No, we have not, in this northern area.

7 Q. Now, you see that in the Cisco Pool, the Upper
8 Penn, do you not?

9 A. Yes, we do, yeah.

10 Q. But down here, not so?

11 A. They're separate reservoirs.

12 Q. Yeah. And in the Morrow we're not seeing
13 evidence of pressure communication in offsetting wells?

14 A. That's correct, we are not.

15 Q. Ms. Mruk referred to the 21 and the 15 on one of
16 these cross-sections, I think, the lower Morrow
17 particularly, where one well was wet in that interval and
18 the other one in fact was gas productive.

19 Are you seeing events like that as a reservoir
20 engineer?

21 A. Repeat the question. That was --

22 Q. Yeah, she had an example here.

23 A. It was in 21 and Number 2?

24 MS. MRUK: That's correct.

25 Q. (By Mr. Kellahin) Yeah, 21 and 2, I'm sorry. I

1 said the 15. It's the 21 and the 2 down here in the lower
2 interval.

3 A. That's correct, the NIBU 2 is a well that is not
4 productive in those sands; it was wet. Based on production
5 performance from NIBU 21, which includes the sand that goes
6 over into NIBU 2, it is productive in NIBU 21.

7 Q. Have you contacted the individual in Marathon
8 that's responsible for determining if there is a sufficient
9 market for gas production out of this Morrow Pool to
10 determine whether or not if any production limitations are
11 removed, that there's enough market to take the full
12 capacity of that production?

13 A. Yes, I have.

14 Q. You've obtained a letter from Mr. Chambers of
15 Marathon, have you not, sir?

16 A. Yes, I have.

17 MR. KELLAHIN: Mr. Examiner, I don't have this
18 marked yet, but I will do so at the break.

19 Here's a letter from the -- from the Marathon
20 employee responsible for marketing the gas, and he attests
21 to the fact that one of the elements of prorationing, which
22 is excess deliverability above market, which justifies
23 prorationing, doesn't exist in this case.

24 Mr. Examiner, that concludes my examination of
25 Mr. Folse.

1 We move the introduction of his exhibits -- and
2 I've lost track of where you --

3 THE WITNESS: 9 through 20.

4 MR. KELLAHIN: Yours was 8, right?

5 9 through 20, Mr. Examiner.

6 EXAMINER STOGNER: Exhibits 9 through --

7 MR. KELLAHIN: I'm sorry, 9 through 19, and 19
8 will be the letter from the gas marketing.

9 EXAMINER STOGNER: Exhibits 9 through 19 will be
10 admitted into evidence at this time.

11 EXAMINATION

12 BY EXAMINER STOGNER:

13 Q. In looking at Exhibit Number 10 -- that is the
14 copy of the proration schedule -- it looks like the Martha
15 Creek Gas Com well is the -- how would you say? Most
16 overproduced?

17 A. It's the one that sets the allowables --

18 Q. Okay.

19 A. -- for the nonmarginals.

20 Q. Have you calculated the drainage area in that
21 well? Perhaps I'm missing it.

22 A. No, I have not.

23 Q. Why not?

24 MR. KELLAHIN: We have another engineer -- That's
25 the Kerr-McGee --

1 EXAMINER STOGNER: Oh, I'm sorry.

2 MR. KELLAHIN: -- engineer --

3 EXAMINER STOGNER: Okay.

4 MR. KELLAHIN: -- and he's got that discussion,
5 Mr. Examiner.

6 Q. (By Examiner Stogner) Okay. With the wells that
7 you testified to, which ones are overproduced?

8 A. The North Indian Basin Unit Number 15 and the
9 North Indian Basin Unit Number 21.

10 Q. Now, the Number 15 was curtailed in -- or at
11 least shut down or shut in -- what? In mid- -- latter
12 February, according to your Exhibit Number 14?

13 A. That should be March 1st.

14 Q. March 1st, okay. And what was the reason why
15 that well was shut in?

16 A. At that time we had done an evaluation of what
17 were our next -- what was our next recommendation for
18 proposing to management of what we should do for the wells
19 in this Morrow Gas Pool, being these wells were
20 overproduced at the time. We determined that we needed to
21 shut the well in and then meet with the OCD and determine
22 an action after that.

23 Q. Did Marathon ever come in and request a higher
24 allowable at the proration hearings?

25 A. In the proration hearing for the October-through-

1 March period, we did not. And of course, the one for the
2 current prorationing period, we did not present any
3 testimony either.

4 Q. Did Marathon feel there wasn't a need to, or --

5 A. At that time we were -- we had proposed a -- or
6 we were going through a plan of trying to withdraw these
7 two particular wells out of the Indian Basin-Morrow Pool,
8 instead of taking most likely or most probably a two-
9 pronged approach where we would have come to the gas
10 proration hearings and made testimony along with attempting
11 to pull the wells out. That probably would have been a
12 better solution. At that time we had only one plan of
13 action.

14 Q. Now, you've heard testimony today about offsets
15 of 660 feet in this pool, correct?

16 A. That is correct, yes.

17 Q. Okay. How would you feel about somebody
18 offsetting you that's outside the pool, of 660 feet, with
19 an unprorated -- or, I'm sorry, a well that's outside of
20 the Indian Basin-Morrow? Does that still go for them?

21 A. It still would go for them. We feel, based on
22 the drainage areas we are seeing in the Indian Basin-Morrow
23 area, the drainage areas are less than 320 acres, and some
24 well locations would be required to be closer than 1650
25 feet from the lease lines, and we feel 660 feet would be

1 appropriate, including for any offset operators.

2 Q. Are these wells stand-alone Morrow wells, or are
3 they dually-completed?

4 A. The completion in the early -- well, in the
5 Sixties and Seventies, the Morrow wells generally were dual
6 completions in the Upper Pennsylvanian -- in the Upper Penn
7 and in the Morrow.

8 Recent developments and drilling activity that,
9 in particular, Marathon is proceeding with, these are
10 single completions. If they are productive in the Morrow,
11 they would then be single in the Morrow. If they're
12 nonproductive, they are then completed in the Upper Penn.

13 Q. Can a new well be drilled as a stand-alone Morrow
14 today?

15 A. Marathon feels at this time that we would not
16 drill a new Morrow well as a stand-alone, a grassroots
17 well, because of the riskiness, and -- Well, the riskiness
18 of developing gas reserves.

19 We feel that it's a better approach in our area
20 of development to drill the well incrementally, with the
21 incremental cost to go approximately 1600 feet to the
22 Morrow, with a primary target in the Upper Penn.

23 Q. How many wells -- or how many proration units in
24 the Upper Pennsylvanian Prorated Pool in this area does
25 Marathon roughly operate?

1 A. Marathon operates wells that are currently
2 producing in the South Dagger Draw-Upper Penn Oil and
3 Associated Gas Pool, and we also operate wells in the
4 Indian Basin-Upper Penn Gas Pool.

5 Q. What overlies this particular pool? Is that
6 the -- Which pool overlies it?

7 A. That is the Indian Basin-Upper Penn Gas Pool,
8 overlies the Indian Basin -- Well, most of --

9 MR. KELLAHIN: Careful, Ron, you're going to get
10 all messed up.

11 THE WITNESS: Yeah, I know.

12 MR. KELLAHIN: May I approach the Examiner?

13 EXAMINER STOGNER: Yes, sir.

14 MR. KELLAHIN: Off the record for a second.

15 (Off the record)

16 EXAMINER STOGNER: I have no other questions of
17 this witness, Mr. Kellahin. He may be excused.

18 MR. KELLAHIN: Dan, you're up to bat.

19 DANIEL D. MILLER,

20 the witness herein, after having been first duly sworn upon
21 his oath, was examined and testified as follows:

22 DIRECT EXAMINATION

23 BY MR. KELLAHIN:

24 Q. All right, sir, would you please state your name
25 and occupation?

1 A. My name is Daniel D. Miller. I'm a geologist
2 with Kerr-McGee Corporation in Oklahoma City.

3 Q. Mr. Miller, on prior occasions have you testified
4 before the Division as a petroleum geologist?

5 A. I have not.

6 Q. Summarize for us your education.

7 A. I received a four-years bachelor degree in
8 geology at Eastern New Mexico University in Portales. I
9 subsequently attended the University of Nebraska, achieved
10 a master's degree in geology there, subsequent to that
11 worked for Getty Oil Company in Midland for five years, was
12 in Casper, Wyoming, for two years with True Oil Company as
13 a geologist. I was independent and consulting in Casper
14 for five years. In 1983 I joined Flag Redfern Oil Company
15 in Casper as their district geologist there. In 1989 Flag
16 Redfern was acquired by Kerr-McGee Corporation and I was
17 transferred to Oklahoma City.

18 Q. Mr. Miller, you're soft-spoken, and that
19 microphone doesn't amplify your voice, so if you speak up
20 for me, we can hear you.

21 A. Yes, sir.

22 Q. Have you made a geologic study of the Indian
23 Basin-Morrow and, in particular, with emphasis on the
24 southern portion where you have your own operations?

25 A. I have.

1 MR. KELLAHIN: We tender Mr. Miller as an expert
2 geologist.

3 EXAMINER STOGNER: Mr. Miller is so qualified.

4 Q. (By Mr. Kellahin) Mr. Miller, when you examine
5 the geology of the Indian Basin-Morrow, do you come to any
6 geologic differences of opinion that are significantly
7 different from those of the Marathon geologists?

8 A. My opinion would be very similar to hers, that we
9 are dealing with largely discontinuous bodies that were
10 largely deposited in a fluvial channel-type system.

11 Q. When Ms. Mruk testifies about her desire to have
12 additional density in the pool and some relaxation in the
13 well-location rules, are those, the bases for those
14 arguments, consistent with your opinions?

15 A. They are consistent.

16 Q. Let's look specifically, then, at what you've
17 brought us to see. We have your Exhibit 1, which is the
18 locator map, to show your portion of the pool.

19 There's an area on Exhibit 1, Kerr-McGee Exhibit
20 1, that has three sections that are shaded so that you can
21 see those. They're 19, 30 and 31. Are those your
22 properties?

23 A. Yes, sir, Kerr-McGee has a working interest in
24 those three sections.

25 Q. All right. And you actually operate, then, the

1 wells in 30 and 31?

2 A. That's correct.

3 Q. On the topic of prorationing, Mr. Miller, was
4 your company involved in a request some time ago -- I've
5 forgotten exactly when it was; it may have been about two
6 years. Do you remember?

7 A. I was not directly involved in that. It's my
8 understanding that we were involved in a request for an
9 increase in allowable.

10 Q. All right, we're talking about going to the
11 Commission hearing and obtaining an allowable increase in
12 the prorated pool?

13 A. That's correct, that's my understanding.

14 Q. And your position was that the allowable was too
15 low, you needed an economic incentive established by a
16 higher allowable in order to justify additional drilling?

17 A. That is correct.

18 Q. And did you get the allowable increase?

19 A. No, sir, we were denied that increase.

20 Q. When you look, then, at the density in Section 31
21 and 30, in Section 30 and 31 you have added a second well
22 in your section?

23 A. That is correct.

24 Q. All right. The latest well you added was the
25 Winston Federal 2?

1 A. The Winston Gas Com Number 2 in the north half of
2 Section 31.

3 Q. All right. Part of Kerr-McGee's justification
4 for drilling that well was the hope and the expectation
5 that the Division would grant this common effort to
6 terminate prorationing, and you would have the ability to
7 produce these wells without restriction?

8 A. That's my understanding, yes, sir.

9 Q. That entered into part of the decision about the
10 additional wells?

11 A. That's correct.

12 Q. From a geologic perspective, then, when you
13 examine the relationship of these wells one to another, do
14 you have actual examples of where one of these Morrow
15 reservoirs in fact has not been penetrated by the offset
16 well that you operate?

17 A. Yes, sir, I believe we do.

18 Q. All right, let's look, then, at the Exhibit
19 Number 2 for Kerr-McGee and have you identify and describe
20 that display.

21 A. Okay. Exhibit Number 2 is essentially the same
22 plat as Number 1. On it, we have included structural
23 contours on the middle Morrow structure. The contour
24 interval is a hundred feet.

25 And in addition to that, I have shown cross-

1 section A-A'. A-A' is a north-south cross-section, it is a
2 stratigraphic cross-section that I will be showing you, and
3 it shows or it depicts the three end points or the three
4 wells, one well per 640 acres, that existed prior to
5 drilling the second well in Sections 30 and 31.

6 Q. Okay, let's look at that first cross-section.
7 It's Exhibit 3. Let me go ahead and put this board back
8 up, and we'll display this.

9 Why don't you just stand right there, Mr. Miller?
10 Identify and describe for us what we're seeing with this
11 cross-section.

12 A. Exhibit 3 is the north-, being on your right, the
13 -south, on your left, stratigraphic cross-section that
14 includes the well in Section 19, the Penroc Indian Federal
15 Number 1. The central well is the Martha Creek Number 1 in
16 the southwest quarter -- excuse me, southeast quarter of
17 Section 30. And the one on the far right here is in the
18 southwest quarter of Section 31. It is the -- originally
19 drilled by Flag Redfern, and it was the Winston Number 1.

20 It's a stratigraphic cross-section, similar to
21 what Ms. Mruk has previously described. The datum is the
22 middle Morrow marker, and again the purpose for hanging it
23 on a stratigraphic datum is an attempt to try to correlate
24 sands that we feel that can be correlated.

25 The color that I have on here, there is a green

1 and an orange. The green represents sand pods that we feel
2 may possibly be connected to one another, and were
3 interpreted that way when we had these three control points
4 that you see here. The red represents sandbodies that we
5 feel were probably not connected to the adjacent wellbores.

6 The methodology of deciding which ones to connect
7 and which ones not to connect was based on a number of
8 criteria, one being stratigraphic relationships, the
9 parallelism that Ms. Mruk has previously testified to.
10 Others were correlations of markers within the overall
11 Morrow interval.

12 There's a shaded marker, a very distinctive
13 marker, in this lower Morrow section here, and I'll point
14 that out because I'll be talking about that in a little bit
15 more detail.

16 You can see on this interpretation that marker is
17 cut out by another Morrow sand that comes in from the --
18 off to the side of the cross-section here. Other units
19 that appear to be in roughly correlative zones have been
20 separated by virtue of their either being no porosity
21 developed so there's basically is no reservoir in that
22 relative interval, there being water located high to gas in
23 the same apparently correlative zone. Again, that would
24 suggest they could not be the same reservoir. And the
25 interpreted nature of the sand, whether it be a marine-type

1 sand with an upward-coarsening nature, as identified by log
2 signatures, or a more channel-natured deposit, as
3 identified by a square blocking or a fining-upward-type
4 signature.

5 Q. When you look at this cross-section, we're seeing
6 the original well in each of the three sections that's
7 stacked vertically?

8 A. That's correct.

9 Q. All right. Let's look what happens when you
10 build the cross-section with these same three wells, but
11 adding in the two infill wells within the section.

12 A. Okay, Exhibit 4 is -- shows the index map. It's
13 the same thing, but it just shows the inclusion of the
14 wells that were drilled in between. So the cross-section
15 I'm fixing to show you is the same three wells in the same
16 relative positions, and this one will show the result of
17 drilling in between those wells.

18 What we've included now is the Martha Creek
19 Number 2 well that's located in the northeast quarter of
20 Section 30, that falls essentially in a straight line
21 between the Martha Creek Number 1 and the Indian Federal
22 Number 1. The reason that the Number 2 Martha Creek was
23 drilled was because of mechanical problems in the Number 1.

24 The other well that's been added to this cross-
25 section is the Winston Gas Com Number 2, located in the

1 northeast quarter of Section 31, and again essentially on a
2 straight line between the previously described well in the
3 southwest, Section 31, and the Martha Creek Number 1.

4 Again, the datum is the same, the markers are the same.

5 And a couple of things I'd like to point out:

6 The marker -- The hot shale, the very prominent marker that
7 we saw earlier, we can see now, has been cut by a large
8 channel deposit. It has removed effectively that marker as
9 well as some material or section below that, and in its
10 place it has infilled a nice channel sand. This channel
11 can be identified by its velocity-fining upward nature.

12 Q. Flip back to the prior cross-section. The
13 interpretation there does not show the probability that the
14 infill well drilled between those two locations had any
15 opportunity for a new Morrow reservoir. You show a shale
16 marker through there?

17 A. That's correct.

18 Q. So -- Flip down again. You get the new cross-
19 section, and all of a sudden you've found a Morrow
20 reservoir that you didn't know was there?

21 A. That's correct. In addition to that, some of the
22 ones that we thought possibly were connected earlier, we
23 now feel are probably not connected, and the reason is that
24 some of the pressure information, which will be looked at a
25 little closer later on, suggests that pressures that we

1 found in this well were not the same as what we had found
2 in the previous wells.

3 Q. Geologically, in your portion of the pool towards
4 the south, is there also a reasonable opportunity, then, to
5 encounter additional Morrow reservoirs and increase
6 ultimate recovery from the pool by drilling at densities
7 greater than one well per 640 acres?

8 A. It is my opinion that that is correct.

9 Q. Does it provide you an opportunity to access
10 those reservoirs if the well-location rules are relaxed to
11 a 660-side boundary setback?

12 A. That is my belief.

13 Q. In this part of the pool, are you drilling your
14 Morrow wells as stand-alone Morrow wells, or are they being
15 risked in combination with other reservoirs?

16 A. The most recent well which we have drilled, the
17 Winston Com Number 2, was drilled as a stand-alone Morrow
18 well. We looked at the Penn when we went through it, but
19 we did not rely on it as a primary objective.

20 Q. Is there a -- You've given us a structure map.
21 Is there a structural component to the reservoir that
22 affects the issues that we're discussing here this morning?

23 A. Not largely. There are -- If you look closely at
24 the cross-sections, you see that I do interpret a couple of
25 zones that could possibly be connected across our area of

1 interest here.

2 Those zones that are connected across that area
3 of interest could have a slight structural component.
4 There has been some water tested from that zone down on the
5 flanks.

6 But overall, it's my opinion that that is a small
7 portion of the component relating to production in this
8 field.

9 MR. KELLAHIN: That concludes my examination of
10 Mr. Miller, Mr. Stogner.

11 We move the introduction of his Exhibits 1
12 through 4.

13 EXAMINER STOGNER: Exhibits 1 through 4 -- that's
14 Kerr-McGee Exhibits 1 through 4 -- will be admitted into
15 evidence.

16 MR. KELLAHIN: Did I get that right, or is there
17 a 5?

18 THE WITNESS: There should be a fifth one.

19 MR. KELLAHIN: I'm sorry, I misspoke.

20 The last cross-section is 5, so it's 1 through 5,
21 that's correct.

22 EXAMINER STOGNER: Okay, the Number 1 was the --

23 MR. KELLAHIN: -- locator.

24 EXAMINER STOGNER: -- locator map that was talked
25 about very early in the hearing.

1 Okay, Exhibits 1 through 5, Kerr-McGee's, will be
2 admitted into evidence at this time.

3 And your next witness is -- ?

4 MR. KELLAHIN: Mr. Steve Krueger is the petroleum
5 engineer, and he is going to describe the performance of
6 his well.

7 EXAMINER STOGNER: Okay, I have no geological
8 questions of this witness. You may be excused.

9 Let's take a five-minute recess at this time.

10 MR. KELLAHIN: Thank you, Mr. Examiner.

11 (Thereupon, a recess was taken at 12:15 p.m.)

12 (The following proceedings had at 12:23 p.m.)

13 EXAMINER STOGNER: Hearing will come to order.

14 Mr. Kellahin?

15 MR. KELLAHIN: Thank you, Mr. Examiner.

16 Call to the stand Mr. Steve Krueger.

17 STEPHEN A. KRUEGER,

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

20 DIRECT EXAMINATION

21 BY MR. KELLAHIN:

22 Q. Mr. Krueger, would you please state your name and
23 occupation?

24 A. My name is Steve Krueger. I'm a reservoir
25 engineer and work for Kerr-McGee.

1 Q. And where do you reside, sir?

2 A. I reside in Oklahoma City.

3 Q. Mr. Krueger, have you made an examination from a
4 reservoir-engineering aspect of the performance of the
5 wells in your part of the pool?

6 A. Yes, I have.

7 Q. And based upon that analysis, are you here also
8 to support the Application for the termination of
9 prorationing, the increased well density, where we have a
10 second well on a 640, and relaxing the side boundaries of
11 the spacing-unit setbacks?

12 A. Yes, I am.

13 MR. KELLAHIN: We tender Mr. Krueger as an expert
14 petroleum engineer.

15 EXAMINER STOGNER: Mr. Krueger is so qualified.

16 Q. (By Mr. Kellahin) Let's take a locator map so we
17 keep straight on what wells we're going to talk about. And
18 then let's go through your three displays, and then come
19 back, and I want to tie some of the things that Mr. Miller
20 was talking about earlier with what you have analyzed for
21 those wells.

22 Let's start with your Kerr-McGee Exhibit Number
23 6, and describe for us what you're showing here.

24 A. Exhibit 6 is a pressure-versus -- a bottomhole
25 pressure-versus-time for the five wells in the three

1 sections that are shown on the locator map.

2 Q. All right, have we got a color-code here?

3 A. Yes, I have in red the Indian Federal Number
4 1-19, which is the most northern well, followed by the next
5 southerly well, the Martha Creek Number 2, shown in blue,
6 and then by the Martha Creek 1-30 in green. The Winston
7 Federal is shown as a single square point in -- I guess you
8 would call it orange -- and the Winston Federal 1-31, the
9 southernmost well, shown in black.

10 Q. All right. So you've got the three early wells.
11 They're all what? 1964 vintage?

12 A. That's correct.

13 Q. And then we later on -- In 1995 or thereabouts,
14 you add in the Martha Creek 2?

15 A. Well, it would be 1985, that's correct.

16 Q. I'm sorry, 19--what?

17 A. 1985.

18 Q. 1985, you add the Martha Creek 2. And then the
19 last red square far over is the second infill, and that's
20 the Winston Federal 2?

21 A. That's correct.

22 Q. And the vintage of that is late 1995, early 1996?

23 A. Early 1996 --

24 Q. All right.

25 A. -- as for completion.

1 Q. From what I understand by reservoir engineers,
2 pressure is the data point that you really would like to
3 have?

4 A. That's correct.

5 Q. You decide a lot of things with pressure?

6 A. Especially in gas wells.

7 Q. In these gas wells, when you look at the pressure
8 decline with regards to the three parent wells, what does
9 that tell you, when in 1985 you have an infill well that
10 comes in at 300 pounds pressure?

11 A. I assume you meant 3000?

12 Q. I'm sorry, 3000 pounds pressure.

13 A. That tells me I have encountered undepleted
14 reservoirs, or new reservoirs, keeping in mind that when we
15 complete these wells in the Indian Basin that we are
16 perforating a number of zones, so the pressures shown are
17 an average pressure of all of those zones.

18 Q. Despite that fact, though, you're coming in with
19 substantially more pressure with the Martha Creek infill
20 well than you had with the parent wells that were producing
21 in the area?

22 A. I'm sorry, would you restate that?

23 Q. The combination of pressures masks some of our
24 pressure data, because it is pressure from multiple Morrow
25 reservoirs in that wellbore?

1 A. Well, I don't know if it would mask it, but it
2 might mask the fact that you might have original pressures
3 in some individual zones, original reservoir pressures
4 reflected by the area.

5 Q. So when we get the Martha Creek Number 2, it has
6 a higher pressure. Is that pressure difference of
7 significance to you, from the parent wells?

8 A. Oh, you mean at the same point in time?

9 Q. Yeah, in 1985 --

10 A. Oh, yes --

11 Q. -- I'm not --

12 A. -- yes, very significant. Very significant in
13 fact that it is finding new reservoirs that would be
14 consistent with the geological model.

15 Q. All right. When we look at 1985, then, the three
16 parent wells are down to 1500 or less pounds. The new
17 wells, about 3000 pounds.

18 In this area for these type of reservoirs, is the
19 1500-pound pressure differential indicative of new
20 reservoirs being encountered by the infill wells?

21 A. Absolutely.

22 Q. What happens, then, when we get in 1996 with the
23 Winston Federal 2 well?

24 A. We find an identical situation in which we find
25 higher pressures that are indicative of finding new

1 reservoirs.

2 Q. All right. When we look at the Winston Federal 2
3 now, that's the infill well in Section 31 that is between
4 the Martha Creek 1 and the Winston Gas Com 1?

5 A. That's correct.

6 Q. Its pressure comes in less than 3000, but above
7 the 2500?

8 A. Yes.

9 Q. How do you explain that, and what does it mean
10 that it didn't come in at 3000 pounds?

11 A. Well, it's just simply a different combination of
12 connected versus new reservoirs, versus, say, maybe the
13 Martha Creek Number 2.

14 Q. All right. And we have that example on the
15 cross-section, don't we?

16 A. That's correct.

17 Q. All right. Here's the Martha Creek 1.

18 EXAMINER STOGNER: And you're now referring to
19 which exhibit?

20 MR. KELLAHIN: We're working on Kerr-McGee
21 Exhibit Number 5, and we're looking at the relationship of
22 the Winston Gas Com Number 2, which is this one.

23 EXAMINER STOGNER: That's the second well from
24 the --

25 MR. KELLAHIN: Second well from the left is the

1 Winston Gas Com 2.

2 Q. (By Mr. Kellahin) This is the infill well?

3 A. That's correct.

4 Q. All right. When we look at the bottom of the
5 log, in the very bottom, you're going to see Mr. Miller's
6 geologic conclusion that there is a reservoir that's
7 connected to the offset parent wells on either side of the
8 log?

9 A. That's correct.

10 Q. All right. If that is true, then, that would
11 help explain why the pressure in the Winston Gas Com Number
12 2 came in at less than 3000 pounds?

13 A. Yes.

14 Q. Because there is one of these lenses that's in
15 communication?

16 A. That's correct.

17 Q. But then when you get up and you hit the big pod,
18 if you will, up above that, that's colored in orange, that
19 represents a new reservoir that is going to give you the
20 additional pressure?

21 A. That's correct.

22 Q. All right. Mr. Stogner was interested in whether
23 or not you had the ability in your well to calculate
24 drainage areas. How did you attempt to address that issue,
25 and what conclusion did you come to?

1 A. Well, it is my opinion that the reservoirs are so
2 discontinuous and the geology is complex that from well
3 logs, when you try to calculate volumetrics in this small
4 area, you simply don't have reliable volumetric data.

5 The better indication of volumetric-type numbers
6 are the pressure data and the production data, which we'll
7 show in a minute, that indicate what you're seeing further
8 out from the reservoir, rather than from individual point
9 sources of net pay.

10 Q. All right, sir. You would have to make some
11 pretty general assumptions as a reservoir engineer for your
12 wells to calculate drainage areas on a volumetric basis?
13 You would have to assume one of those lower reservoirs --
14 attribute of all the gas to that, and you could have a
15 large drainage area that might not truly reflect what that
16 well is draining?

17 A. That's correct.

18 Q. Let's look at the significance, then, of the
19 actual performance of the wells so that you as a reservoir
20 engineer can reach the conclusion that based upon pressure
21 and performance, that in fact these wells are accessing no
22 more reservoirs that the other well is not producing from.

23 A. Right.

24 Q. Let's look at Exhibit Number 7 now and have you
25 identify and describe that display.

1 A. Exhibit 7 is real important to look at in
2 combination with Exhibit 6.

3 Exhibit 7 is the production history of the three
4 most northern wells, two of them being original wells
5 spaced on 640 acres. Their production is shown with a red
6 line, with circles that their production is combined, and
7 then it's contrasted versus the production of the well
8 drilled in between at the Martha Creek Number 2, shown also
9 in red, but it has starred points.

10 Q. Let me make sure I understand something; I think
11 it's important.

12 If you look in 1995 -- I'm sorry, 1985 -- and if
13 you're looking at the first well, the Martha Creek 1, if
14 you follow the decline, all of a sudden it takes a steep
15 decline. Is that a mechanical problem in this wellbore, or
16 is it simply responding to the infill well being drilled
17 and produced?

18 A. That line is a combination of the Indian Federal
19 and the Martha Creek Number 1, and the Martha Creek Number
20 1 was the dominant producer, and it did experience
21 mechanical problems in 1985.

22 Q. So this should not be read to mean that the
23 addition of the Martha Creek 2 as the infill well had any
24 effect on the other two wells?

25 A. No. In fact, it was the reason we drilled the

1 infill well --

2 Q. All right.

3 A. -- to replace the Martha Creek Number 1.

4 Q. And when you did that, you came in at an
5 incremental rate that was substantially -- you came in at
6 an initial rate that was substantially higher than the
7 decline that you had established for the other two?

8 A. That's correct. And it's important to note, if
9 it were truly a replacement well and not an infill well, I
10 would have expected a rate or production rate to follow on
11 the same previous lower trend. But in fact we had a much
12 higher rate, which in combination with the pressure tells
13 me that we have encountered new reservoirs at an infill
14 location.

15 Q. So for your wells, you chose not to attempt to
16 hypothecate some drainage areas, because you had better
17 data that indicated to you that these wells were in fact
18 not interfering with each other?

19 A. That's correct. With the pressure data and the
20 production data, it tells me more about the areal nature of
21 the reservoirs than what we can tell from individual well
22 logs.

23 We simply don't have in our area enough well
24 control to provide a realistic areal picture of the
25 reservoir, whereas the pressure data and the production

1 data is a direct measure of that.

2 Q. The infill well, then, in your opinion, is going
3 to increase ultimate recovery of gas from the pool and
4 thereby prevent waste?

5 A. That's correct.

6 Q. Let's go to Exhibit 8 and have you identify and
7 describe that display.

8 A. Exhibit 8 is very similar to Exhibit 7, except it
9 uses the southern three wells, being the Winston Number 1,
10 the Martha Creek Number 1 and the infill well, being the --
11 Winston Number 2, excuse me.

12 It's a very similar analysis. We had an
13 established production trend of the two 640-acre wells,
14 when we just recently drilled the infill well, the Winston
15 Number 2, and got a substantially higher rate and a higher
16 pressure than one might have been expecting if it was truly
17 a -- if it was truly connected with the other pair of
18 wells.

19 Q. And again, the same example as you have for
20 Exhibit 7. Here you're comparing the Winston 1, the Martha
21 Creek 1, with the new infill Winston 2, and you see the
22 same positive benefit from the infill well?

23 A. Absolutely.

24 MR. KELLAHIN: That concludes my examination of
25 Mr. Krueger.

1 We move the introduction of his Exhibits 6, 7 and
2 8.

3 EXAMINER STOGNER: Exhibits 6, 7 and 8 will be
4 admitted into evidence at this time.

5 EXAMINATION

6 BY EXAMINER STOGNER:

7 Q. Mr. Krueger, looking at -- oh, just one of the
8 maps, your Martha Creek, that seems to be about the most
9 prolific lease or section, I guess you will, at this time;
10 is that correct?

11 A. Yes, sir.

12 Q. Okay. Should this Application be approved, would
13 Kerr-McGee have objection with somebody moving 660 in
14 Section 22 against the Section 30 line, on such a prolific
15 section?

16 A. No, Kerr-McGee would not.

17 EXAMINER STOGNER: Okay. I don't have any other
18 questions, Mr. Kellahin.

19 MR. KELLAHIN: Thank you, Mr. Examiner.

20 One brief comment, Mr. Examiner, and then we will
21 do what we can to assist you in resolving the case.

22 In February of this year, I did present to the
23 Commission at the allowable hearing notification that Kerr-
24 McGee and Marathon were preparing to go forward with a
25 termination case that you've heard today. We made the

1 Commission aware that we -- rather than ask for additional
2 allowable, which would simply be an artificial change, that
3 we were seeking to terminate prorationing.

4 We could get the transcript and see the exact
5 discussion, but I think I was encouraged to go forward with
6 terminating prorationing, rather than present a request
7 where we simply artificially assign an allowable to the
8 pool, and so in February we did present a position to the
9 Commission on that case.

10 EXAMINER STOGNER: I'll take administrative
11 notice on that fact.

12 MR. KELLAHIN: In addition, I can find for you,
13 sir, and I will supply you the reference with regards to
14 Kerr-McGee's request for additional allowable. It was
15 about two years ago, I think, in 1993, where they made an
16 increased allowable request and the Commission denied that
17 request, if you think that's helpful.

18 EXAMINER STOGNER: Yeah, I would like to take a
19 notation of that and include that in the record in this
20 instance.

21 Also, I want to take -- I feel it necessary to
22 take administrative notice all the way back to 1963 in Case
23 2750, and that's Order Number R-2441, was issued, and it
24 should be interesting to note that 160-acre spacing was the
25 spacing at the time in the Morrow Pool. It seems like we


CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL May 6th, 1996.


STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998