

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. 11,671

APPLICATION OF YATES PETROLEUM )  
 CORPORATION FOR AN UNORTHODOX GAS WELL )  
 LOCATION, EDDY COUNTY, NEW MEXICO )

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

December 19th, 1996

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, December 19th, 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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## I N D E X

December 19th, 1996  
 Examiner Hearing  
 CASE NO. 11,671

## PAGE

APPEARANCES

3

APPLICANT'S WITNESS:

MICHAEL HAYES (Geologist)

Direct Examination by Mr. Kellahin

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Examination by Examiner Catanach

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REPORTER'S CERTIFICATE

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## E X H I B I T S

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## A P P E A R A N C E S

FOR THE DIVISION:

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Santa Fe, New Mexico 87505

FOR THE APPLICANT:

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Santa Fe, New Mexico 87504-2265  
By: W. THOMAS KELLAHIN

\* \* \*

1                   WHEREUPON, the following proceedings were had at  
2   10:20 a.m.:

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7                   EXAMINER CATANACH: At this time we'll call Case  
8   11,671.

9                   MR. CARROLL: Application of Yates Petroleum  
10 Corporation for an unorthodox gas well location, Eddy  
11 County, New Mexico.

12                  EXAMINER CATANACH: Are there appearances in this  
13 case?

14                  MR. KELLAHIN: Yes, Mr. Examiner, I'm Tom  
15 Kellahin of the Santa Fe law firm of Kellahin and Kellahin,  
16 appearing on behalf of the Applicant, and I have one  
17 witness to be sworn.

18                  EXAMINER CATANACH: Additional appearances?  
19 Please swear in the witness, Mr. Carroll.  
20 (Thereupon, the witness was sworn.)

21                  MR. KELLAHIN: Mr. Examiner, my witness this  
22 morning is Michael Hayes.

23                  Mr. Hayes is a petroleum geologist, and he's  
24 currently employed with Yates Petroleum Corporation, and he  
25 has five exhibits to present.

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MICHAEL HAYES,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. For the record, sir, would you state your name and occupation?

A. Michael Hayes, geologist.

Q. On prior occasions, Mr. Hayes, have you testified before the Division as a petroleum geologist, had your qualifications accepted and made a matter of record?

A. Yes, I have.

Q. Pursuant to your employment by Yates Petroleum Corporation, have you made a geologic study of this particular area, and based upon that study now have conclusions and opinions?

A. Yes, I do.

MR. KELLAHIN: We tender Mr. Hayes as an expert petroleum geologist.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Before we look at the display specifically, Mr. Hayes, if this well is successful, the primary target, I believe, is one of the Morrow sand packages down in the Burton Flat-Morrow Gas Pool?

A. That's correct.

1 MR. KELLAHIN: Mr. Examiner, for the record,  
2 you'll find that the Application as advertised proposes the  
3 original unorthodox location which was 990 out of the north  
4 and west corner of this particular section. The spacing  
5 unit will be the west half. Burton Flat-Morrow Gas Pool  
6 rules are 320 gas spacing with the well locations 1980 from  
7 the end line, 660 from the side boundary.

8 Because the well encroached upon OXY USA's  
9 operations in 17 and 18 to the north, they have requested  
10 us to reconsider our location, and we have done so.

11 Mr. Hayes will present to you what he considers  
12 to be the maximum distance he can move back from the north  
13 boundary, and we are requesting, therefore, to change this  
14 to 1650 from the end line, and so we are still unorthodox  
15 for a couple hundred feet.

16 EXAMINER CATANACH: Mr. Kellahin, would that be  
17 1650 feet from the north?

18 MR. KELLAHIN: Yes, sir.

19 EXAMINER CATANACH: And 990 from the west?

20 MR. KELLAHIN: Yes, sir.

21 EXAMINER CATANACH: Okay.

22 Q. (By Mr. Kellahin) Let's talk about the Morrow  
23 here in general, Mr. Hayes, before we look at the displays.

24 The primary target within the Morrow interval, in  
25 your opinion, is what, sir?

1           A.    What I consider the upper Morrow clastic unit.

2           Q.    And is this a sand reservoir?

3           A.    Yes, it is.

4           Q.    And describe for us the deposition. How is this  
5 deposited, and what kind of reservoir system do we have  
6 here?

7           A.    It's essentially a complex fluvial and marine  
8 deposit, sands that we're chasing, a combination of  
9 shoreline sands and some distributary sands of a fluvial  
10 environment.

11          Q.    As you study the geology, is it a matter of  
12 significance to you to make structural decisions or  
13 decisions based upon structural interpretations for this  
14 particular location?

15          A.    It's a consideration, but in the upper Morrow  
16 clastics it tends to be a stratigraphic trap with --  
17 Generally structure is not a consideration to a large  
18 degree for that upper package.

19          Q.    Do you and other geologists with Yates share a  
20 common strategy for exploring Morrow gas in this particular  
21 interval?

22          A.    Yes, we do.

23          Q.    That strategy is based upon maximizing the  
24 thickness of a potential location and to drill a well in  
25 close proximity to the greatest thickness?

1           A.    That's correct.

2           Q.    The displays that you're about to present were  
3 not actually prepared by you, were they, sir?

4           A.    That's correct.

5           Q.    They were prepared by Mr. Bob --

6           A.    Ray Beck.

7           Q.    Oh, I'm sorry, Ray Beck prepared these exhibits.  
8                 Have you independently reviewed his work?

9           A.    Yes, I have.

10          Q.    Did you find any reason, based upon your  
11 independent review, to change any of the mapping?

12          A.    No, I did not.

13          Q.    You checked the contour lines and the values used  
14 on the various maps, and you came to the same conclusion  
15 that he did?

16          A.    That's correct.

17          Q.    Let's turn to the first display, then, and look  
18 at the cross-section which is Yates Exhibit Number 1. Give  
19 us a moment and look at the index map in the lower map,  
20 show us the proposed well location and the control wells  
21 that are shown on the cross-section.

22          A.    The index map shows the nine contiguous sections  
23 around the Section 20 that's in question. The cross-  
24 section is a stratigraphic cross-section, hung on the top  
25 of the lower clastics marker. The cross-section runs



1 essentially southwest-northeast. The cross-section I'm  
2 presenting is for a couple of reasons, primarily to show  
3 the horizons that I'm going to be mapping on subsequent  
4 maps that I'll be showing.

5 The lower Morrow clastics essentially divides the  
6 lower Morrow from the upper Morrow clastic interval, the  
7 heavier dashed line, and is also the datum on the  
8 stratigraphic cross-section.

9 Q. Pick one of the three wells and show us what  
10 causes you to place a point identifying the upper Morrow  
11 clastic.

12 A. Basically, it runs from the base at the lower  
13 Morrow clastic marker, which is a shale marker that's  
14 fairly universally recognized and used for mapping in this  
15 area, both for structure and for dividing the Morrow part.  
16 And then the cutoff for the top of the upper Morrow  
17 clastics is a fairly distinctive although interpretive  
18 marker at the top of the upper Morrow clastic interval.  
19 It's marked by a shale or a hot unit.

20 Q. Let's take that line across, the curved line on  
21 the upper Morrow clastic, and look at the well on the far  
22 left of the cross-section, the one at A, the Number 1 well.  
23 There is a slight area of potential productivity,  
24 apparently, that's above the upper Morrow clastic lines?

25 A. That's correct.

1 Q. What does that mean, and why is it up above the  
2 line?

3 A. The upper Morrow clastic marker or pick that I'm  
4 using is a general marker that's used more than just  
5 locally; it's a fairly consistent marker that can be used  
6 over an area. And occasionally up above the upper Morrow  
7 clastic interval, in a section that's generally a carbonate  
8 section, you can occasionally find some sand intervals.

9 Q. Okay, show us what has caused you as a geologist  
10 to define the lower Morrow clastic, the top of the lower  
11 Morrow clastic.

12 A. The lower Morrow clastic, the top of it is  
13 defined by that fairly continuous hot shale marker, which  
14 is fairly distinctive, and generally at least in this area  
15 fairly easy to recognize over a large area.

16 The base of it is marked by a Mississippian  
17 unconformity, with the Austin cycle, which is a more  
18 difficult marker to pick and quite subtle, and sometimes  
19 you use a whole suite of logs to determine that.

20 Q. It happens that at least Yates and OXY, on the  
21 wells on the map, have made the business decision to drill  
22 down to -- into and perhaps through this Mississippian  
23 unconformity?

24 A. It appears that way, yes.

25 Q. And why does that occur? Is there a geologic

1 rationale that causes that to happen?

2 A. That's based on the fact that the position of  
3 that Mississippian unconformity is useful to help determine  
4 prospective intervals, and so by drilling through that and  
5 beyond it, we can get a log across that so we can get a  
6 marker on it and actually use it for mapping purposes.

7 Q. As you map this area, it appears, at least on  
8 this cross-section, that there is an absence of  
9 perforations in the lower Morrow clastic interval?

10 A. That's correct.

11 Q. Why is that so?

12 A. In this area generally, most of the lower Morrow  
13 is wet, calculates wet, and has been tested wet.

14 Q. And you can make that determination by examining  
15 the logs and therefore choose not to perforate down in the  
16 wet portion of the reservoir?

17 A. That's correct, in addition to DST interval that  
18 you might have to -- DST information.

19 Q. All right. When we look at our best probability  
20 of production out of the Morrow in the northwest quarter of  
21 Section 20, then, what portion of the reservoir are we  
22 looking at?

23 A. We are essentially chasing the upper Morrow  
24 clastic interval.

25 Q. Within Section 20, then, let's turn to some of

1 the isopach maps and have you show us how the decision has  
2 been made to show a preference for drilling in the  
3 northwest quarter, and then we'll talk about the exact  
4 footages.

5 Let's turn to Exhibit Number 2. Identify that  
6 display for me.

7 A. That's upper Morrow clastics isopach.

8 Q. All right. As we look at Exhibit 1, demonstrate  
9 for the Examiner the interval that is being reduced to the  
10 contour map shown on Exhibit 2.

11 A. This isopach map shows the interval running --  
12 the total interval from the upper Morrow clastic marker to  
13 the lower clastic marker. It's the entire interval, shales  
14 and sands combined.

15 Q. When we look at Exhibit 2, there appears to be an  
16 orientation to the sand thickness as contoured; is that not  
17 true?

18 A. Yes, there is.

19 Q. And is there a geologic explanation that is  
20 reasonable as to that orientation?

21 A. It's primarily a map just of the total thickness  
22 of that interval, and it so happens that, yes, there is a  
23 bias, based on the fact that within reason it also  
24 approximates the strike position of the shoreline at that  
25 time, and may be indicative of shoreline sands

1 predominantly in that interval.

2 Q. That orientation, then, is consistent with the  
3 depositional conclusions reached by geologists as to the  
4 manner in which the sands were deposited?

5 A. In a general sense, yes.

6 Q. When we compare the proposed location to the two  
7 wells on each side within the cross-section --

8 A. Uh-huh.

9 Q. -- what do we see as we look at each of those  
10 wells?

11 A. Well, going from the southwest well in Section  
12 19, you have a thickness of 182 feet. Going though the  
13 proposed location, it appears that we have an opportunity  
14 to intersect perhaps greater than 200 feet of interval, and  
15 then going to 195 feet and then down to 162 feet at the  
16 northeast corner of the cross-section.

17 Q. There is not yet in Section 20 a producing Morrow  
18 gas well within the pool? Am I right or wrong about that?

19 A. In Section 20, yes, there is actually a well in  
20 the -- the red crosshatched markers there show wells that  
21 are productive from the upper Morrow clastic interval, on  
22 the southwest corner of Section 20.

23 Q. All right. When we look, then, at the  
24 opportunity for further development of potential reserves  
25 in Section 20, you've identified the northwest corner as

1 having good probability?

2 A. It appears to be the optimum location for this  
3 section, yes.

4 Q. By looking at this map, you cannot yet make a  
5 judgment about where to put the well, whether at a standard  
6 location or at some other point; is that not true?

7 A. To a general degree I think you can start zeroing  
8 in on the location. The next map might be a little better  
9 for helping to nail that down.

10 Q. Let's do that. Let's look at Exhibit 3 and have  
11 you describe for us what we're now looking at.

12 A. The next exhibit is an upper Morrow clastics  
13 isolith, and this is an isopach, essentially, of what is  
14 referred to as the clean sand, and the clean sand is  
15 defined by less than 50 API units on the logs.

16 Q. Why have you used that as a cutoff?

17 A. It's an attempt to try and determine reservoir  
18 quality using an API cutoff that helps determine the  
19 cleanliness of sand and may indicate better porosity and  
20 permeability.

21 Q. Having done so and then contoured that data, what  
22 does it now allow you to conclude with regards to where to  
23 put the well within the northwest quarter of 20?

24 A. It would appear that the best location in the  
25 northwest quarter would be something close to where we've

1 put it, perhaps a little bit farther north, but we had run  
2 into some opposition from OXY on that and decided to back  
3 it off, as far as we could reasonably back it off and feel  
4 comfortable with the location.

5 Q. As approximated, then, on this display, are we  
6 looking at the requested location which is the 990 from the  
7 west and the 1650 from the north?

8 A. Yes, that is the location on this map.

9 Q. And that, in your opinion, is a location that is  
10 preferable to the closest standard location, which is  
11 slightly farther to the south?

12 A. That's correct.

13 Q. Let's turn quickly, then, to the last two  
14 displays. You've turned your attention to the lower  
15 portion of what we've talked about previously as this lower  
16 Morrow clastic. If you'll look at Exhibit 4 with me,  
17 identify and describe that display.

18 A. Similar maps, I'm showing first of all a lower  
19 Morrow clastic isopach, which again is an attempt to map  
20 the entire interval of the lower Morrow clastics section  
21 from the lower Morrow clastic marker down to the base of  
22 the Mississippian unconformity.

23 Q. Okay. And then again as we move to 5, what are  
24 we now seeing and comparing?

25 A. Okay, Number 5, this is again the map of the

1 clean sand as identified by 50 API cutoff.

2 Q. And while this lower Morrow clastic is not likely  
3 to be productive because of its lower position, its being  
4 too wet in the reservoir, you at least have also confirmed  
5 that if there's a possibility of production, it may exist  
6 in its most probable fashion in the northwest quarter?

7 A. The lower Morrow, statistically, is not a very  
8 good producer. As you can see by the red hachures here,  
9 show the lower Morrow clastic producers on this map, and as  
10 it turns out, the northwest quarter is still an optimum  
11 location for the lower Morrow if it is productive.

12 Q. The code, then, for the wells, so that we are  
13 clear on your coding, how have you coded the wells by color  
14 so that we will know which ones are productive in the lower  
15 Morrow versus this upper Morrow?

16 A. In the upper Morrow, on the prior exhibits, the  
17 upper Morrow, they're colored in with a red hachure mark,  
18 for the upper Morrow interval. And on the lower Morrow  
19 maps I've colored them in the same colors for the lower  
20 Morrow interval.

21 The larger circles on there just show wells that  
22 have penetrated the Morrow interval.

23 Q. For the benefit of the Examiner, then, Mr. Hayes,  
24 would you summarize your geologic conclusions with regards  
25 to the issue in question?



1           A.    Isopach mapping of the gross interval, isopach  
2 mapping of the gross sand, clean sand interval, indicates  
3 to me that the optimum location for a well in the west half  
4 of Section 20 is in the position, in the northwest quarter  
5 of Section 20, and the position or location that we have  
6 proposed is an optimum location based on the mapping and a  
7 compromise with offset operators.

8           Q.    Within the upper Morrow clastic interval there  
9 are truly multiple reservoirs, if you will?

10          A.    Yes, there are.

11          Q.    And so the strategy, then, is to look for the  
12 greatest thickness and create therefore the best  
13 opportunity to access as many of these little reservoirs as  
14 you can?

15          A.    That's correct.

16               MR. KELLAHIN:  Okay, that concludes my  
17 examination of Mr. Hayes, Mr. Examiner.

18               We move the introduction of his Exhibits 1  
19 through 5.

20               EXAMINER CATANACH:  Exhibits 1 through 5 will be  
21 admitted as evidence.

22                               EXAMINATION

23           BY EXAMINER CATANACH:

24           Q.    Mr. Hayes, the well in the southwest quarter of  
25 Section 20 --

1 A. Yes.

2 Q. -- that's currently a producing Morrow well?

3 A. That's correct. It may be shut in. Let me check  
4 my notes on that. But that is correct, it's currently  
5 producing.

6 MR. KELLAHIN: I believe its --

7 THE WITNESS: Oh, no, it is shut in.

8 MR. KELLAHIN: -- status as of today is shut in?

9 THE WITNESS: Yes, it is shut in, excuse me.

10 MR. KELLAHIN: Yates would not produce them  
11 concurrently --

12 THE WITNESS: It is shut in.

13 MR. KELLAHIN: -- without special approval by the  
14 Division, Mr. Examiner.

15 THE WITNESS: It is shut in.

16 MR. KELLAHIN: It would stay shut in, and this  
17 would be a replacement well, if you will.

18 Q. (By Examiner Catanach) What's the name of that  
19 well? Do you know?

20 A. It's the Stonewall DD State Number 1, I believe,  
21 Mr. Examiner. Yes, DD Com Number 1.

22 Q. Is that well -- If you do encounter a commercial  
23 well in the Number 3 location, will the Number 1 well be  
24 plugged? Is that --

25 A. There are shallower zones in this -- productive

1 intervals out here, including some fairly shallow ones as  
2 far as the Yates, so it may have future potential in  
3 shallower zones.

4 Q. Okay, but it won't be produced in the Morrow; is  
5 that right?

6 A. That's correct.

7 Q. Okay. And you're also proposing a location in  
8 the east half; is that --

9 A. Yes, and that's part of a separate case that  
10 we'll be addressing today.

11 Q. Okay. By moving the -- or by locating the well  
12 at 1650 from the north, you're going to encounter about 55  
13 feet of clean sand; is that right? Looking at Exhibit 3?

14 A. Just refer to my exhibit.

15 MR. KELLAHIN: Looking at Exhibit 3?

16 THE WITNESS: Yes. That appears to be what our  
17 -- Yes, that seems to be the best estimate at this time.

18 Q. (By Examiner Catanach) Moving south to a  
19 standard location probably puts you in the area of the 50  
20 feet?

21 A. Yeah, perhaps a little past 50, but  
22 approximately, that's correct.

23 Q. Do you feel like that would make a big  
24 difference?

25 A. I -- Honestly, I'd rather have it a little bit

1 farther to the north, if I could, and backing it off -- The  
2 minimum amount that was acceptable to OXY was kind of  
3 compromise at that time.

4 But yes, I think we need to do everything we can  
5 to improve our position based on the risk that's associated  
6 with this reservoir.

7 Q. It looks like there's multiple wells on this  
8 exhibit that penetrate -- or that encountered less than 40  
9 feet of sand in that reservoir?

10 A. Yes.

11 Q. Are most of these wells commercial wells, as far  
12 as you know?

13 A. No, in a nutshell, overall, no, most of the wells  
14 in here are not commercial from the Morrow. My  
15 understanding, if I check through my notes, I believe it's  
16 approximately 7 of the 18 wells in this contiguous area are  
17 commercial in the Morrow. I can check on that. Just a  
18 second. Seven of the 18 wells are considered uneconomic  
19 from all horizons, all perforated horizons, I might add, at  
20 this time.

21 Q. So you feel like you need that extra bit of sand  
22 to maybe make the well a commercial success?

23 A. I think it can help us. There seems to be a fair  
24 correlation between the amount of net clean sand versus the  
25 gross interval, gross thickness, yes.

1           Q.    Again, the prospects in the lower Morrow are --  
2   Can you summarize what those are?

3           A.    As can be seen in Exhibit -- I believe that is  
4   Number 5, there are only four wells in this ten-section  
5   area that are productive from the lower Morrow at all, and  
6   that -- I'm not entirely certain, but I believe that's only  
7   one of those or two of those that are actually commercial  
8   or economic.

9                   The lower Morrow out here generally needs  
10   structural closure of some kind.

11          Q.    The well in the southwest quarter wasn't  
12   producing from the lower interval?

13          A.    It did test some gas from the lower interval, but  
14   it's not productive from it, commercial -- economically  
15   commercial.

16          Q.    So you feel like your location in the northwest  
17   quarter would be wet in the lower interval?

18          A.    Yes, but it will be in an updip position, so its  
19   chances are better because of that. But yes, statistically  
20   it appears that that would be wet. Can't rule it out.

21          Q.    Do you know where OXY's acreage lies?

22          A.    Excuse me?

23          Q.    OXY's acreage?

24          A.    I don't know precisely at this time.

25               MR. KELLAHIN: Mr. Examiner, they're the operator

1 in 16, 17 and 18.

2 EXAMINER CATANACH: 16, 17 and 18, okay.

3 I have nothing further of the witness.

4 MR. KELLAHIN: Mr. Examiner, the last exhibit is  
5 16 [sic]; it's my certificate of notice. The only party to  
6 notify is OXY, and it shows mailing and receipt by that  
7 company.

8 With the introduction of Exhibit 6, that  
9 concludes our presentation.

10 EXAMINER CATANACH: Exhibit 6 will be admitted as  
11 evidence.

12 And there being nothing further in this case,  
13 Case 11,671 will be taken under advisement.

14 (Thereupon, these proceedings were concluded at  
15 10:45 a.m.)

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CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL December 26th, 1996.

\_\_\_\_\_  
 STEVEN T. BRENNER  
 CCR No. 7

My commission expires: October 14, 1998

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11671, heard by me on December 19, 1996.  
David R. Cabral, Examiner  
 Oil Conservation Division

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