

1 STATE OF NEW MEXICO  
2 ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
3 OIL CONSERVATION DIVISION  
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7 EXAMINER HEARING  
8

9 IN THE MATTER OF:  
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12 Application of Pacific Case 9806  
13 Enterprises Oil Company for an  
14 unorthodox gas well location,  
15 Chaves County, New Mexico.  
16  
17  
18

19 TRANSCRIPT OF PROCEEDINGS  
20

21 BEFORE: VICTOR T. LYON, EXAMINER  
22

23 STATE LAND OFFICE BUILDING

24 SANTA FE, NEW MEXICO

25 November 1, 1989

CUMBRE COURT REPORTING  
(505) 984-2244

**ORIGINAL**

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

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BY: MR. W. THOMAS KELLAHIN

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Artesia, New Mexico 88210  
BY: MR. DAVID R. VANDIVER

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## RALPH MOORE

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## PAUL LERWICK

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## Certificate of Reporter

24

## E X H I B I T S

## Admitted

(Moore)

1. Ordovician Structure Map

15

2. Offset Operator Location Map

15

3. Structural Cross-Section Map

15

4. Ordovician Porosity Map Above Water

15

## Marked

5. Certificate of Mailing

22

1 HEARING EXAMINER: We'll call case 9806.

2 MR. STOVALL: Application of Pacific  
3 Enterprises Oil Company for an unorthodox gas well  
4 location, Chaves County, New Mexico.

5 MR. KELLAHIN: Mr. Examiner, I'm Tom  
6 Kellahin of the Santa Fe law firm of Kellahin,  
7 Kellahin & Aubrey. I'm appearing on behalf of the  
8 Applicant, and I have two witnesses to be sworn.

9 (Witnesses sworn.)

10 HEARING EXAMINER: Proceed, Mr. Kellahin.

11 MR. KELLAHIN: Mr. Examiner, I may have  
12 rushed the process. Mr. Vandiver is here on behalf of  
13 Yates, and perhaps he would like to enter his  
14 appearance.

15 MR. VANDIVER: Mr. Examiner, I'm David  
16 Vandiver with the firm of Fisk & Vandiver in Artesia,  
17 appearing on behalf of Yates Petroleum Corporation and  
18 in support of the application.

19 HEARING EXAMINER: Thank you, Mr. Vandiver.

20 MR. STOVALL: Is it safe to assume you have  
21 no witnesses, Mr. Vandiver?

22 MR. VANDIVER: No, sir, no witnesses.

23 MR. STOVALL: Apologies for not giving you  
24 the opportunity to appear.

25 HEARING EXAMINER: Proceed.

## 1 DIRECT EXAMINATION

2 BY MR. KELLAHIN:

3 Q. Mr. Moore, for the record would you please  
4 state your name and occupation.5 A. My name is Ralph Moore. I'm the geological  
6 manager for Pacific Enterprises Oil & Gas Company,  
7 Permian Basin Division.8 Q. Mr. Moore, on prior occasions have you  
9 testified before the Division as a petroleum  
10 geologist?

11 A. I've never had an opportunity to do that.

12 Q. Would you describe for the Examiner when  
13 and where you obtained your degree in geology.14 A. I got an undergraduate degree, a bachelor  
15 of science in geology from Stephen F. Austin in  
16 Nacogdoches, Texas, in 1972. I went on and did  
17 graduate work at the University of Oklahoma.18 I started my career with Sun Oil and worked  
19 for Hunt Oil as an independent geologist for the last,  
20 well, I guess through 1985. Then I became associated  
21 with Knox Industries, and I've been with Pacific  
22 Enterprises for two years.23 I've worked in the capacity of an  
24 exploration geologist, exploration manager, a  
25 geological manager and a vice president of

1 exploration.

2 Q. Do your years of geologic experience  
3 include practicing your profession in southeastern  
4 New Mexico?

5 A. Approximately half of my career has been  
6 working the geology of southeast New Mexico.

7 Q. Are you personally informed with the  
8 geology with regards to the South Dallas Unit No. 2  
9 Well proposed for Chaves County, New Mexico, that is  
10 the subject of this application?

11 A. I am.

12 Q. How are you familiar with that, Mr. Moore?

13 A. I became involved with the project when  
14 Terra Resources, the predecessor of Pacific  
15 Enterprises Oil & Gas, drilled the Terra State 35  
16 located just to the north in Section 35. That was  
17 January of 1989. And I've watched the development in  
18 the field Foor Ranch in Section 36, and also the Sunny  
19 Side No. 2 well. So I'm very familiar with the  
20 development of Foor Ranch.

21 Q. Have you made a geologic study to reach  
22 certain conclusions with regards to the location of  
23 the subject well that is part of the application in  
24 this case?

25 A. I have.

1 MR. KELLAHIN: Mr. Examiner, we tender  
2 Mr. Moore as an expert petroleum geologist.

3 HEARING EXAMINER: Mr. Moore is qualified.

4 Q. (BY MR. KELLAHIN) Mr. Moore, let me direct  
5 your attention, sir, to what is marked as Exhibit  
6 No. 1., and before you explain the display and the  
7 conclusions, would you simply identify it for us.

8 A. It's an Ordovician structure map in the  
9 South Dallas Unit area.

10 Q. Is the geology interpreted on this exhibit  
11 an interpretation that you have made?

12 A. Yes, it is.

13 Q. And you have made the balance of the  
14 interpretations using the other geologic displays that  
15 we will introduce to the Examiner?

16 A. That's correct.

17 Q. Let's orient the Examiner as to what we're  
18 proposing to accomplish. Will you, first of all,  
19 identify for us the proposed well location that you  
20 are seeking approval for?

21 A. The proposed well is located in Section 2,  
22 660 feet from the north line, 1400 feet from the east  
23 line of Township 10 South, 26 East, Chaves County,  
24 New Mexico.

25 Q. The proposed spacing unit to dedicate to

1 the well for production at this depth would be what,  
2 sir?

3 A. Say that again.

4 Q. Yes. What is the spacing unit you would  
5 propose to dedicate to the well?

6 A. 320 acres.

7 Q. And what would be the orientation of that  
8 spacing unit within Section 2?

9 A. It would be the North 1/2 the Section 2.

10 Q. The Examiner heard earlier this morning a  
11 presentation by Yates with regard to their request for  
12 an unorthodox well location in case 9795. Is that  
13 area shown as a portion of your Exhibit No. 1?

14 A. Yes. It's represented in the South 1/2 of  
15 Section 2.

16 Q. Do you have a geologic opinion about the  
17 proposed unorthodox well location?

18 A. I have.

19 Q. And what is that, sir?

20 A. We have picked the best location in the  
21 North 1/2 of Section 2 to exploit the oil and gas  
22 that's trapped in the Ordovician rocks. We have  
23 picked the location based on seismic as well as  
24 subsurface control. And it is as close to geological  
25 good location as we can get to a standard location.



1           Q.     Let's compare geologically the information  
2 you see between the closest standard location and the  
3 proposed unorthodox location, and so that you and I  
4 are talking on the same wave length, it would appear  
5 with a North 1/2 dedication the closest standard  
6 location to your well location would be 1980 from the  
7 east line and 660 from the north line. Do you and I  
8 agree?

9           A.     That's correct.

10          Q.     If we spot a well at that closest standard  
11 location, what does it tell you as a geologist when  
12 you look at the structure map?

13          A.     Well, we're moving towards the -- if we get  
14 an orthodox location, we're moving towards -- down to  
15 the west fault, and we want to stay away from this  
16 fault as best we can.

17          Q.     In addition, looking at the structure map,  
18 I see a line in blue that says gas/water contact?

19          A.     Yes. The gas/water contact for the field  
20 has been established somewhere between 2236 subsea  
21 datum and 2250.

22          Q.     A standard location would put you in closer  
23 proximity to your interpretation of a gas/water  
24 contact in the North 1/2 of 2?

25          A.     Right.

1           Q.       Describe for us the information available  
2 in a general way that helped you interpret the  
3 location of the fault as you have depicted it here.

4           A.       Well, the control for the fault is -- we  
5 have seen it and we know that the well in the West 1/2  
6 of the Northwest -- I'm sorry -- the West 1/2 of the  
7 North 1/2 , the South Dallas No. 1, is a dry hole in  
8 the Ordovician. It is wet. It is, obviously, on the  
9 on the downthrown side. We have shot some additional  
10 seismic work in there to help us confirm the location  
11 of that fault. And the seismic lines are noted in  
12 dashed lines with their approximate seismic datum  
13 associated with it.

14                 I might add that the datum represents the  
15 Ordovician top, the actual seismic reflector is the  
16 unconformity, and we have just adjusted the Ordovician  
17 Structure to represent taking out the Mississippian.  
18 So we have a true Ordovician Structure map; we have  
19 created one. So, basically, we have seismic control  
20 of the fault and subsurface control of fault.

21           Q.       Do you have a geologic opinion as to  
22 whether or not geologically there is a necessity to  
23 have two wells in the East 1/2 Section 2, the Yates  
24 well in the Southeast 1/4 and the Pacific well in the  
25 Northeast 1/4?

1           A.       I do have an opinion, and that opinion is  
2 simply that one well located in the East 1/2 of  
3 Section 2 will not drain all the gas in place in  
4 Section 2 as an East 1/2 unit.

5                   The reason why we think that is, is that  
6 there is a north-south seismic line running through  
7 there, as I've noted. There is a saddle or a low in  
8 about the midline of the East 1/2 of Section 2.

9           Q.       Let's find the seismic line for the  
10 Examiner that runs north-south. It's the one that's  
11 JQ-10?

12          A.       JQ-10.

13          Q.       Your interpretation of that seismic  
14 information tells you what, sir?

15          A.       We think that the North 1/2 of Section 2 is  
16 related to the Terra 35 State No. 1 located in  
17 Section 35. It's part of the southern end of that  
18 structure. We think that the South 1/2 where Yates is  
19 talking about drilling their well is related to a  
20 independent feature. And no well placed anywhere in  
21 that East 1/2 will drain the entire 320.

22          Q.       Let me have you identify for the record  
23 Exhibit No. 2 for us.

24          A.       Exhibit No. 2 is an acreage plat showing  
25 the different acreage and the units within the area.

1 Q. Let me invite your attention on Exhibit  
2 No. 2, north of the area shaded in yellow, and if you  
3 will move north two sections with me and look at  
4 Section 26?

5 A. Right.

6 Q. We see two laid down 320 gas spacing units  
7 and both wells in the eastern side of the section, do  
8 we not?

9 A. We do.

10 Q. Can you draw any comparisons to how the  
11 working interest owners have determined the best way  
12 to develop 26 as it relates to Section 2?

13 A. Section 26 is very similar geologically to  
14 Section 2 in that it is -- the reservoir exists  
15 primarily in the East 1/2 of the section. And one  
16 well would not drain the entire 320, so two wells were  
17 drilled in there to prevent waste.

18 Q. And there are other examples, then, of  
19 unorthodox well locations within this particular area  
20 of the pool?

21 A. That's correct.

22 Q. The two wells in 26, the two well that  
23 we're talking about today in Section 2. Are you aware  
24 of any others?

25 A. Not offhand.

1 Q. I guess those would be the four principal  
2 unorthodox locations, would they not?

3 A. Yes, that's correct.

4 Q. Let's go to your structural cross-section,  
5 if you will.

6 A. I would like to come back to Section 35, if  
7 I could. The Terra State 35 was drilled as a standard  
8 location. The reason why it was is that the lease is  
9 going to expire January 1st, 1989. We did not have  
10 time to go through the normal process of an unorthodox  
11 location, or we would have developed Section 36 in the  
12 same manner that Section 26 has been developed, and as  
13 we're talking about Section ~~2~~<sup>2</sup>. So Section 35 and the  
14 Terra State 35, as it relates to that section is the  
15 exception.

16 Q. Let me direct your attention now,  
17 Mr. Moore, to Exhibit No. 3, which is your structural  
18 cross-section?

19 A. That's correct.

20 Q. Before you describe your interpretation  
21 would you take a moment and identify for us the line  
22 of the cross-section and the wells that are shown on  
23 the cross-section?

24 A. The line runs from Section 35. The Terra  
25 35 well is on the right-hand side of the

1 cross-section. The Harper Oil Company, which we now  
2 operate as Pacific Enterprises Oil & Gas, South Dallas  
3 No. 1 is on the extreme left. We've got the proposed  
4 location located between the wells.

5 Q. What's your major geologic conclusion from  
6 the examination of the cross-section show on  
7 Exhibit No. 3?

8 A. Well, I would draw your attention to the  
9 Terra State 35, and you can see where it is perforated  
10 and the known gas/water contact. As we move move  
11 southwestern through our location down to the Harper  
12 South Dallas No. 1 Well, the South Dallas No. 1 Well  
13 is definitely on the downthrown side of the fault.  
14 And you can see I have the drill stem test  
15 information. It was clearly wet with a show of gas.  
16 It is now producing from the Penn and Abo comingled --  
17 well, it's presently shut in.

18 But as the illustration shows, we will be  
19 rapidly losing Ordovician pay above water as we move  
20 to the southwest, and that's why picked the location  
21 where we have.

22 Q. Would you turn now to Pacific  
23 Exhibit No. 4, Mr. Moore, and would you identify any  
24 that display for us.

25 A. That is an Ordovician Porosity Map Above

1 Water. What that simply means is that we've tried to  
2 take the net pay with porosity above six percent in  
3 each particular well bore, and this is what we think  
4 the actual reservoir looks like in each well bore and  
5 have tried to connect those points to come up with the  
6 geometry of the reservoir in this area.

7 We have allowed the structural  
8 interpretation to influence the contour profiles and  
9 how it's oriented.

10 It's a combination map, basically, of  
11 porosity that's been influenced by structure, which  
12 was Exhibit No. 1.

13 Q. In your opinion, Mr. Moore, as a geologist,  
14 is the proposed unorthodox location the optimum  
15 location within the spacing unit for which Pacific  
16 Enterprises should be allowed the opportunity to drill  
17 an Ordovician well to recover the share of the  
18 reserves underlying the North 1/2 of Section 2?

19 A. It's the best place to drill a well in the  
20 North 1/2.

21 MR. KELLAHIN: That concludes my  
22 examination of Mr. Moore. Mr. Lyon, we move the  
23 introduction of his Exhibit 1 through 4.

24 HEARING EXAMINER: Is there objection?

25 Exhibits 1 through 4 will be admitted.

## EXAMINATION

BY HEARING EXAMINER:

Q. Mr. Moore, referring to your Exhibit 2, you mentioned that Section 26 had two wells. It appears to me that Section 26 has three wells?

A. Section 26 has three -- two wells that relate to the Ordovician. I don't believe the well in the northwest corner is an Ordovician well.

Q. No way I can tell from your map.

A. That's true.

HEARING EXAMINER: That's all I have.

The witness maybe excused.

MR. KELLAHIN: Mr. Lyon, my next witness is reservoir engineer, Paul Lerwick is an engineer with Pacific Enterprises.

HEARING EXAMINER: Spell that please.

THE WITNESS: L-E-R-W-I-C-K.

HEARING EXAMINER: Thank you.

## DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Lerwick, on prior occasions have you testified as an engineer before the Division?

A. I've not had that opportunity.

Q. Would you summarize for us what your educational background is.



1           A.       I graduated with a bachelor of science  
2 degree in petroleum engineering in December of 1974  
3 from the University of Wyoming.

4           Q.       Subsequent to graduation have you performed  
5 your profession as a petroleum engineer in  
6 southeastern New Mexico and west Texas?

7           A.       Yes, I have.

8           Q.       Summarize your employment experience for  
9 us.

10          A.       I worked six years for ARCO, five of them  
11 were in Alaska, and the last year was in the Permian  
12 Basin. I then worked, beginning in 1981 through 87,  
13 with Clayton Williams, who is an independent operator  
14 in Midland, Texas. And that did include his  
15 operations in New Mexico and Texas, as well as the  
16 other states he operates in.

17                 In 1987 I took a job with Terra, which is  
18 the predecessor of Pacific Enterprises. And I have  
19 worked the last 10 months, I would guess, back in  
20 New Mexico and Texas again. So I have a fair amount  
21 of experience in that area.

22          Q.       Have you specifically applied any of the  
23 disciplines of your profession to the subject matter  
24 of this application?

25          A.       Yes, I have.

1           Q.     And what specifically have you done,  
2 Mr. Lerwick?

3           A.     I looked at the North 1/2 of Section 2,  
4 first of all, to determine that there were sufficient  
5 reserves underlying that half section to justify  
6 drilling a well.

7           Q.     And having done that, have you reached  
8 certain conclusions about the reserves in place as  
9 well as the recoverable reserves within the spacing  
10 unit that is proposed?

11          A.     Yes, I have.

12                 MR. KELLAHIN: We tender Mr. Lerwick as an  
13 expert petroleum engineer.

14                 HEARING EXAMINER: Mr. Lerwick is  
15 qualified.

16          Q.     (BY MR. KELLAHIN) Mr. Lerwick, before you  
17 discuss for us your specific conclusions, describe for  
18 the Examiner the methodology that you applied in order  
19 to come to the conclusion about the recoverable  
20 reserves underlying the North 1/2 of Section 2.

21          A.     I'd like to draw your attention to  
22 Exhibit 4, which was in the last exhibit that  
23 Mr. Moore presented, which was essentially a net pay  
24 isopach of Ordovician here.

25                 I used an average porosity that we would

1 expect based on the offset wells for the proposed  
2 location. I used the bottom hole pressure as  
3 determined from pressure build-ups that were done on  
4 the Terra State 35 in Section 35 and in the Sunny Side  
5 No. 2 in Section 1, both of which we have a working  
6 interest in.

7 I also used a water saturation that is  
8 consistent with those that we see in both of those  
9 offset wells.

10 And then I used standard volumetric  
11 calculations, I planimetered the areas under this net  
12 pay isopach and applied the bottom hole pressures, the  
13 water saturations, and the porosities, to come up with  
14 a volume of gas that I felt was in place, based on  
15 this geologic interpretation, and applied a recovery  
16 factor to that.

17 Q. Is that a standardly accepted methodology  
18 for determining reserves in place and recoverable  
19 reserves used by engineers such as you in the  
20 industry?

21 A. Certainly for a proposed drilling location.  
22 What you have with the data we have, yes, it is.

23 Q. Making that calculation and applying those  
24 parameters to this particular spacing unit, what did  
25 you come up with for the gas in place?

1           A.       I came up with 1.7 bcf of recoverable  
2 reserves.

3           Q.       That's the recoverable reserves number, 1.7  
4 bcf of recoverable reserves?

5           A.       Yes. That's correct.

6           Q.       And what percentage recovery factor did you  
7 apply to get that volume?

8           A.       I used 70 percent.

9           Q.       And what is the basis for using or  
10 selecting a 70 percent recovery factor?

11          A.       It's an accepted -- 70 to 80 percent is  
12 generally for a depletion drive gas reservoir with  
13 essentially very little condensate. That's a standard  
14 recovery.

15          Q.       Mr. Moore has shown a gas/water contact on  
16 his structure map. Do you we see the influence of  
17 production by any water drive mechanism in the  
18 reservoir?

19          A.       No. And I didn't check in the surrounding  
20 area to see if you had a large enough aquifer. If it  
21 occurred down structure to the east, down dip to the  
22 east, then there's, essentially, not a large enough  
23 aquifer to provide any substantial water, water drive  
24 to this reservoir. I wouldn't expect water drive to  
25 be an influence in determining reserves.

1           Q.       What would be an estimated cost for a  
2 drilling of this type of well at this location?

3           A.       The cost, we've got a couple of AFE numbers  
4 and they are 334,000 to \$400,000.

5           Q.       When you apply costs in those ranges to  
6 recoverable gas of 1.7 bcf, can you as an engineer  
7 justify the economics for a well at that location with  
8 those reserves?

9           A.       Those reserves provide very attractive  
10 economics.

11          Q.       Can you ultimately conclude as an engineer  
12 that the reserves underlying the North 1/2 of  
13 Section 2 are sufficient in order to support that well  
14 without adverse consequences on the offsetting  
15 interest owners?

16          A.       Yes, I can.

17          Q.       And what is your conclusion?

18          A.       My conclusion is that there are more than  
19 adequate reserves to justify a well at the proposed  
20 location out of the North 1/2 of Section 2.

21          Q.       In absence of approval of this location and  
22 approval of the spacing unit, then what will happen to  
23 those reserves?

24          A.       They would more than likely be drained by  
25 the offset wells.

1           MR. KELLAHIN: That concludes my  
2 examination of Mr. Lerwick. That completes our  
3 preparation, Mr. Examiner.

4           HEARING EXAMINER: He didn't have any  
5 exhibits, did he?

6           MR. KELLAHIN: No, sir.

7                           EXAMINATION

8 BY HEARING EXAMINER:

9           Q.     What porosity did you use?

10          A.     I used 11 percent.

11          Q.     And your water saturation?

12          A.     20 percent.

13          HEARING EXAMINER: I believe that's all I  
14 have.

15          MR. KELLAHIN: The last matter,  
16 Mr. Examiner, is what I will mark as Pacific  
17 Exhibit No. 5. It's my Certificate of Mailing, that  
18 we've notified the offset operators.

19                 You may recall from the prior case that  
20 Yates presented, as well as looking at Exhibit No. 2,  
21 that, in fact, Yates Petroleum Corporation as operator  
22 of the offsetting unit is the party to notify, and we  
23 have done that pursuant to the rules.

24          HEARING EXAMINER: Fine.

25                 Anything further, Mr. Kellahin?

1 MR. KELLAHIN: No, sir.

2 HEARING EXAMINER: We'll take this case  
3 under advisement. The witness may be excused.  
4  
5  
6  
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12

13 I do hereby certify that the foregoing is  
14 a complete record of the proceedings in  
15 the Examiner hearing of Case No. 7106,  
16 heard by me on November 1 19 69.

17 Victor Z. Lyon, Examiner  
18 Oil Conservation Division  
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25

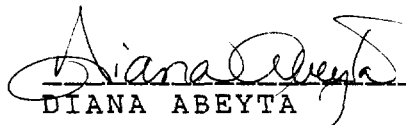
## 1 CERTIFICATE OF REPORTER

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

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

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

17  
18 WITNESS MY HAND AND SEAL January 3, 1990.

19  
20  
21   
22 DIANA ABEYTA  
CSR No. 267

23 My commission expires: May 7, 1993  
24  
25