Case No.

7173

Application

Transcripts

Small Exhibits

ETC

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

March 13, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Case 7173

W. Thomas Kellahin
Kellahin & Kellahin,
Attorneys at Law
P. O. Box 1769
Santa Fe, New Mexico 87501

Dear Mr. Kellahin:

In response to your request by letter of February 27, 1981, a 52.90-acre non-standard oil proration unit consisting of all of Lot 1, Section 5, Township 16 South, Range 38 East, South Denton-Devonian Pool, Lea County, New Mexico, is hereby confirmed for V-F Petroleum Inc.

As oil allowables are adjusted for proration unit size under Rule 104 H, no special Division approval for odd size tracts is required for dedication and allowable purposes.

Sincerely,

JOE D. RAMEY,
Director

JDR/RLS/dr

cc: Mr. Ray Graham
Oil & Gas Division
State Land Office

KELLAHIN and KELLAHIN
Attorneys at Law
500 Don Gaspar Avenue
Post Office Box 1769
Santa Fe, New Mexico 87501

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

Telephone 982-4285
Area Code 505

February 27, 1981

Mr. Dan Nutter
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: V-F Petroleum Inc.

Dear Mr. Nutter:

Our firm represents V-F Petroleum Inc. On February 25, 1981, you heard their application in Case 7173 for approval of an unorthodox well location in the South Denton-Devonian Pool.

On behalf of V-F Petroleum, and in accordance with Commission Rule 104D I am herein applying for administrative approval of a 52.90 acre non-standard proration unit for the well to be drilled in accordance with the application in Case 7173.

The subject tract contains 52.90 acres as a result of an oversized governmental section shown on that plat delivered to you by Mr. Ray Graham of the State Land Office. The tract is being described as follows:

Township 16 South, Range 38 East, NMPM

Section 5: Lot 1
Lea County, New Mexico

This tract is part of State of New Mexico Oil & Gas Lease No. L-5352.

Please advise me if anything further is required.

Very truly yours,

W. Thomas Kellahin

WTK:jm
cc: Mr. Ray Graham
Mr. J. M. Fullinwider

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

March 10, 1981

Re: CASE NO. 7173
ORDER NO. R-6608

Mr. Thomas Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Applicant:

V-F Petroleum Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 7173
Order No. R-6608

APPLICATION OF V-F PETROLEUM
INC. FOR AN UNORTHODOX WELL
LOCATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 25, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 6th day of March, 1981, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, V-F Petroleum Inc., seeks approval of an unorthodox oil well location 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East, NMPM, to test the Devonian formation, South Denton-Devonian Pool, Lea County, New Mexico.

(3) That the NE/4 NE/4 of said Section 5 is to be dedicated to the well.

(4) That a well at said unorthodox location will better enable applicant to produce the oil underlying the proration unit.

(5) That no offset operator objected to the proposed unorthodox location.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 7173
Order No. R-6608

APPLICATION OF V-F PETROLEUM
INC. FOR AN UNORTHODOX WELL
LOCATION, LEA COUNTY, NEW MEXICO.

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(2) That the applicant, V-F Petroleum Inc., seeks approval of an unorthodox oil well location 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East, NMPM, to test the Devonian formation, South Denton-Devonian Pool, Lea County, New Mexico.

(3) That the NE/4 NE/4 of said Section 5 is to be dedicated to the well.

(4) That a well at said unorthodox location will better enable applicant to produce the oil underlying the proration unit.

(5) That no offset operator objected to the proposed unorthodox location.

(6) That approval of the subject application will afford the applicant the opportunity to produce its just and equitable share of the oil in the subject pool, will prevent the economic loss caused by the drilling of unnecessary wells, avoid the augmentation of risk arising from the drilling of an excessive number of wells, and will otherwise prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the application of V-F Petroleum Inc., for an unorthodox oil well location for the Devonian formation is hereby approved for a well to be located at a point 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East, NMPM, South Denton-Devonian Pool, Lea County, New Mexico.

(2) That a 52.90-acre non-standard oil proration unit comprising the NE/4 NE/4 of said Section 5 shall be dedicated to the above-described well.

(3) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY,
Director

S E A L

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
25 February 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of V-F Petroleum, Inc. for an unorthodox well location, Lea County, New Mexico.

CASE 7173

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: Call next Case Number 7173.

MR. PADILLA: Application of V-F Petroleum, Inc., for an unorthodox well location, Lea County, New Mexico.

MR. KELLAHIN: I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant and I have one witness to be sworn.

(Witness sworn.)

JACK G. ELAM

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

MR. KELLAHIN: Mr. Nutter, before beginning Mr. Elam's testimony we'd desire to amend the application and then to allow Mr. Elam to testify as to both provisions we'd request in the application.

First of all, in checking the State of New Mexico lease, which is Lease L-5352, with Mr. Graham today we have discovered that the tract to be dedicated to the well contains 52.9 acres in a sufficiently oversized 40

that at least in his opinion he felt that it was necessary for us to request a non-standard proration unit for the well, and if you concur in that opinion, then we would like to amend our application and have the case readvertised, but hear our testimony on both points today.

MR. NUTTER: Well, it's unorthodox because of correction, or non-standard because of a correction in the surveys.

MR. KELLAHIN: It will still be unorthodox --

MR. NUTTER: It's -- the unit is over-sized and non-standard because of a correction in the surveys.

MR. KELLAHIN: It's over-sized because the section itself in which this is a 40-acre tract is an oversize section.

MR. NUTTER: That's what I mean.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Well, we can handle that administratively without necessity for readvertising.

MR. KELLAHIN: Fine, we'd prefer to do that.

The other point is that even though the unit itself is 52.9 acres now, it is still closer to the west boundary than 330 feet.

MR. NUTTER: Right.

MR. KELLAHIN: So we will still need a hearing order for the location.

MR. NUTTER: For the location, but under Rule 104-F, is it, you can file the application for the unorthodox location and it doesn't even require a waiting period or notification of offsets. It's 104-D II.

MR. KELLAHIN: All right, sir, we'll proceed to handle the size of the unit, then, through that order, I mean that rule number.

MR. NUTTER: Right.

MR. KELLAHIN: The other thing is we have an expiring lease that expires on March 1st. The well will be spudded tomorrow with the consent and agreement of Mr. Graham of the Land Office, and certainly subject to the approval of the Commission.

We would like to subsequent to the testimony have you confirm whether or not we can have conditional approval to commence the well.

(There followed discussion off the record.)

Q. Mr. Elam, would you please state your name and occupation?

A. My name is Jack G. Elam. I'm a consulting

geologist and an independent operator in Midland, Texas.

Q. Mr. Elam, have you ever testified before the Oil Conservation Division as a geologist?

A. No, I have not.

Q. Would you describe for Mr. Nutter your educational background, please?

A. I have a Bachelor's and Master's degree in geology from UCLA and a PhD in geology from Rensselaer Polytechnic Institute in Troy, New York. I've -- I have also all but one quarter of a degree in engineering from the University of Wyoming, thanks to the U. S. Army, and I have taught reservoir engineering. I taught reservoir engineering at RPI for four years while I was working on my PhD.

Q. Would you summarize for Mr. Nutter your experience subsequent to graduation in the fields of geology and engineering?

A. I've been in the oil business since 1946. I've been on my own as a consulting geologist since 1951, except for the four years 1956 until '60 when I was teaching as an assistant professor at Rensselaer Polytechnic Institute, and also working on my PhD.

I've been on my own ever since.

Q. Mr. Elam, have you made a study of the facts surrounding this particular application by V-F Petro-

leum, Inc.?

A. Yes, I have.

Q. And you have been retained as a consultant for that purpose?

A. Yes, that's right.

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

MR. NUTTER: Yes. I only have one question. How long does it take to get thawed out after four years at Rensselaer?

MR. ELAM: Just one summer in Midland.

Q. Let me direct your attention, Mr. Elam, to Applicant's Exhibit Number One, and first of all, describe to me generally what the applicant is seeking to accomplish in this case?

A. Well, the South Denton Field has produced a little over 3-1/2 million barrels of oil. When it was originally developed they used very, very bad protection practices. They drilled down very close to the oil/water contact and flowed those wells at very, very high allowable rates, which caused a very premature coning in those wells. Some of those wells had water increase as early as a year and a half after completion. And they continued to produce these wells at a maximum rate possible to this day and as

a consequence, they've only recovered a small fraction of the oil they should theoretically have been recovered from the water drive field, such as the Denton South -- South Denton-Devonian Field.

Q. Your Exhibit Number One shows the location of all the wells that have produced from the South Denton-Devonian Pool?

A. Yes, that's right.

Q. And shaded in yellow is what appears to be a portion of Section 5. Would you generally locate for us the unit upon which your proposed well is going to be located?

A. The well will be Tract 1 of this Section 5, which is a 52.90 acre tract, located in the northeast of the northeast of that particular over-sized section.

The well is located 1150 feet from the east line and 330 feet from the west line -- from the north line of Section Five, which puts us within 100-or-so feet of the west line of that particular Tract 1.

Q. The Exhibit Number One shows a Devonian well located within Lot 1 of Section 5, does it not, Mr. Elam?

A. Yes, it does. That was the Signal No. 2 Tekell State, which was completed in the mid-'50s as a

flowing Devonian well.

Q. What's the status of that well now?

A. It was plugged in about 1970.

Q. What are you seeking to accomplish by moving to the northwest at an unorthodox location from the first well in this unit?

A. Well, this is a contour map contoured on the top of the Devonian on 50-foot contour intervals. According to my best calculation the well will encounter the Devonian approximately 63 feet high to that producer; however, that's only part of a problem. That producer was drilled fown fairly close to the oil/water contact and produced -- or completed from open hole at the bottom and they coned the water in after about a month -- a year and a half and that well produced a great deal of water to its death, when it had produced about 976,000 barrels. I mean, pardon me, 776,000 barrels.

But that only calculates to be about 55 percent of the oil that should have been recovered from that location, according to reservoir calculations. It appears that there's still remaining undrained on that tract several hundred thousand barrels of oil yet to be recovered by good completion practices.

What we intend to do now is to drill

down to the top of the porosity, only penetrate the porosity approximately ten feet. If after we have a satisfactory test we will complete at that point and we also plan to produce the well at a very low rate, say 100 or 200 barrels a day, not over 200, probably nearer the 100 barrel range, in order to prevent the water from coning in from below, and also coming in from the adjacent cone of the nearby well.

Q. All right. Do you have an opinion as to whether or not the proposed location is the optimum location within this proposed unit to again test this particular Devonian Pool?

A. Yes, I have attempted to do two things here. One is to get as high as possible structurally, and this is the optimum location from that point of view.

I've also attempted to move as far away from the former producer as possible to avoid the interference of that cone of water that rose as that well was produced.

Q. All right, sir. Can you identify for us on your contour map where we would generally find the oil/water contact?

A. The oil/water contact in this field, we can use two different ways of calculating it. One I have to qualify is the zero capillary pressure oil/water contact.

In other words, that's the point below which we don't find any oil at all.

The No. 3, the Signal No. 3 Gulf State Well, which is located in Section 4, in other words, two locations to the east of this proposed location, encountered porosity at 9548 and they tested a show of oil in water below -9548, which indicates that the zero capillary pressure oil/water contact is approximately 9550.

Now, the porosity varies in the reservoir from place to place. Where the rock if very tight you will encounter water at a higher point, but on the cross section, which I have, Section X-X', the No. Thornton and Parrish No. 1 SDA WEll in Section 36 encountered water below -9490, and that's the oil/water contact that I'm using. It tested oil down to 9490 and water below 9490. So that's --

MR. NUTTER: Which well is that, Mr. Elam?

A. That's the southwest of the southwest of Section 36.

MR. NUTTER: Okay.

A. And, as I say, the oil/water contact varies according to the capillary pressure characteristics of the rock, but that's the best calculation I can come up with.

MR. NUTTER: Where did you figure the oil/water contact is, now?

A. -9490. That's the top of the transition zone, is what I'm saying.

MR. NUTTER: And under these individual wells, then, this oil/water contact rose in the form of a cone.

A. Yes, that's right. I have a cross section.

MR. KELLAHIN: We have a subsequent exhibit that shows some of the coning effect --

A. Yes.

Q. -- that you have anticipated from those existing wells.

All right, let me ask you one further question about this exhibit before we leave it, Mr. Elam. Is -- describe generally how you've located this north/south fault line.

A. Okay. This -- this fault line happens to be exceptionally well controlled because it occurs to the west of the Thornton and Parrish No. 1 Kelly State in the southeast of the southeast of Section 35. It goes east of the T. P. Cohen Oil 1-Q State, which is located in the southeast of the northeast of Section 35, and goes west of

Hamon and (unintelligible) No. 1 Continental State, which is located in the northwest of the northwest of Section 25. You can just barely get a straight line between those wells.

Now those wells probably are not perfectly straight holes, although I did investigate the T.P. Cohen Oil 1-Q State to find out whether it did migrate or not. It did migrate possibly 200 feet to the northwest. They attempted to whipstock that and get on the other side of the fault and by the time they did that the dip was so steep it just slid down the dip and they couldn't do that.

Q. All right, sir, let's go to Exhibit Number Two, which is your cross section, Mr. Elam. All right, sir, on Exhibit Number Two, would you commencing from left to right, if you'll identify and describe each of the wells on your cross section.

A. All right. The section X-X', the well on the left is the most southerly well on the line of section. That's the Signal Oil and Gas No. 1 Tekell State and the well north of that is the Signal Oil and Gas No. 2 Tekell State. I have then shown --

Q. Excuse me, now the Signal Oil and Gas No. 2 Tekell State, this is the well that exists on the proration unit for which we now desire to drill at the unorthodox location?

A. Yes, that's right. And that well recovered 756,190 barrels prior to watering out.

Q. All right, let's take this well for a moment and describe for us generally what you think is wrong in the completion or the production techniques for this well, and how you have gone ahead and estimated the additional reserves to be recovered from the new well.

A. All right. First I determined the reservoir parameters for this particular field and I used these reservoir parameters that I've listed on the section here, a formation volume factor of 1.3; a porosity of 8 percent; salt water saturation of 35 percent; recovery factor of 35 percent, and I for my calculation I just used 40 acres.

I've calculated -- that calculated out to give a recovery of 1,450,387 barrels, and that would be a good recovery for a well properly produced, completed and produced from that 40-acre tract. The well actually only made 52 percent of that amount. The 756,000 is only 52 percent of the amount of oil that should have been recovered from that field given these reservoir parameters if it had been properly completed by not penetrating too close to that oil/water contact and not producing at too high a rate. Both of those things did hurt.

In addition to that, the original com-

pletion was from the open hole from -9306 to -9367. I might mention that one of the wells up to the north, the Mobil 1-M State Well actually in a fairly tight interval equivalent to that depth, actually recovered salt water from that interval because of the poor capillary pressure characteristics. As I say, the capillary pressure characteristics are variable. This is not a uniform reservoir all the way through.

But anyway, they completed that well for 744 barrels a day and they produced it at about 12 to 13,000 barrels a month. Within a year and a half they had coned the water in on that well, and so the vast majority of this oil was produced after it began to make a great deal of water.

At some later date they perforated higher. I don't have the exact date, but they perforated higher in the section. By that time it didn't do any good and you can't see any water break on the decline to indicate when the higher perforations were made.

In other words, what happens is if you pull a well too hard and pull the water up, as you move on up the hole and perforate higher in the section you pull the water up with you, and so they probably had a very sharp restricted cone of drainage when they first -- when the water first hit, but you -- as you continue to pull that

well, and they had it on a Kobe pump, then you pull a lot of oil with -- along with the water into the borehole until you -- they did get about 52 percent of the oil they should have gotten.

Had they not drilled to that depth, but had gone into the top of the porosity and produced the well at a much lower rate, the recovery factor should have been in the range of 35 percent, and that was my calculation.

Q. Based upon your calculation what are the remaining estimated reserves that could be produced from this proration unit from the proposed location?

A. Well, in order -- if we're putting the well between the two wells, I really have to talk about the Thornton and Parrish No. 1 Kelly State, which is 1100 feet north of the proposed location. It is the highest well in the field and approximately flat with how I expect this well to run, according to my contouring.

Now this particular well was also drilled to approximately to -9345, almost to the same total depth as the Tekell State. It was completed for 1944 barrels a day flowing. In other words, they really did open those wells up in those days, and it also produced 11 to 12 -- I mean 12 to 13,000 barrels a month. Because it was a little higher and had a little bit better porosity, the water didn't

hit on that well until they had produced about 350,000 barrels of oil; about 300,000 barrels of water.

It continued to produce with a high water cut until 1969, at which Signal plugged back to perforations up near the top of the Devonian and they recompleted the well water free for 320 barrels a day.

It so happens I talked to the Signal engineer who was in charge of the well at that time and he begged the exploration manager not to pull the well too hard, but he produced it even at a higher rate than it was produced initially about nearly 14,000 barrels a month, and in four months they pulled the water in.

So that's a classic example of gutting the well by poor production practices.

Okay. Now that well has made 1,100,000 barrels of oil after it began to make a high water cut. So you can make quite a bit of oil after you start making a lot of water.

According to my calculations, using the same reservoir parameters, I come up with 1 800 000 -- a little over 1,800,000 barrels of recoverable oil, or with a 35 percent recovery factor. That particular location has recovered 77 percent of that amount.

If we drill a well in between -- and

I might mention first that I have put my cone on there. In other words, this is geometrically related to the recovery, so you can see at least my perspective of what I think we're dealing with. The oil/water contact in the whole field has risen some, but in between these wells it probably hasn't risen very much. Most of the oil has actually come because of the water -- the oil produced in this coning of water entry.

According to my calculations I believe that -- that we can recover half of the oil that wasn't recovered from the Tekell State because of its improper completion practices. We can also recover,probably will also recover about half the oil that was --- that will still be recoverable from the Kelly State tract. This calculates out to be 586,000 barrels of oil still to be recovered from this particular spacing unit.

But most all the oil will be coming from the -- from this Lot 1.

Q. The Thornton Parrish Kelly State No. 1 Well, is that still being produced from this pool?

A. Yes, that well is still being produced and it's still producing in the range of 1000 to 2000 a month. It makes over 100,000 barrels of water a month, but they have a very good disposal system there and they have

been able to handle it.

MR. NUTTER: While you're on that, Mr. Elam, which are the remaining producing wells in the pool?

A. The two wells, the Thornton and Parrish No. 1 Kelly State, and Thornton and Parrish No. 1 State SDA.

MR. NUTTER: That's the well directly east of the --

A. Yes, that's right, and that well is actually low to the well that was plugged out by Signal, the No. 2 Tekell State. That well encountered the top of the Devonian 50 feet low to the top of the Devonian in the No. 2 Tekell State, but in this particular case it perforated only the top of the section and that's why, even though it was in an inferior position, it is overall a better well.

MR. NUTTER: That's the last well on your cross section.

A. Yes, that's the last well on the cross section. It's produced 656,000 barrels of oil from a lower structural position but it is still producing.

But this is a pretty good proof that if you did complete the well properly, it didn't go to water so fast, either.

The real thing, the main two things, the wells were completed too low in the section, but the

main thing is they were pulled too hard; and that interfered, that gave less than an optimum recovery.

Q. V-F Petroleum, Inc.'s proposed location crowds only the west line of the proration unit, does it not, Mr. Elam?

A. That's right. It's a standard 330 from the north line.

Q. All right. So we're not encroaching upon the Thornton and Parrish Kelly State tract?

A. No, and we have talked to Thornton and Parrish and they have no objection to our drilling the well.

Q. All right, sir. Would you turn now to Exhibit Number Three.

A. Okay, Exhibit Number Three is section B-B', and this was constructed just to show the data obtained from the three wells,the No. 2 Signla State, which was the actually it's the northwest of the northwest of Section 4, and then through the Kelly State and then through the Texas Pacific Coal and Oil No. 1-Q, and it -- this was just to show you the magnitude of the fault offset. This fault, we don't have a well that penetrated the Devonian on the downthrown side, but it looks like it would be at least a 1500-foot fault. The TP Coal and Oil No. 1-Q State drilled only to the Barnett and it was running so low, it was below the oil/

water contact in the -- it was obvious it was going to be below the oil/water contact in the South Denton Field. They did attempt a whipstock at that time but they couldn't -- they couldn't make it go because, as you can see from the cross section, the dips are very, very steep and it just slid down the dip. So they had to plug the well.

Q. The proration unit immediately to the west of this proration unit is also operated by V-F Petroleum is it not?

A. Yes, that's right.

Q. And the two units are generally separated by this north/south fault, aren't they?

A. Well, yes. We are -- we're trying to get the optimum location as high as we can without crowding the fault too closely. We're still about 300 feet from where we think the fault is, but this -- these structures, these tilted fault block structures usually roll over into the fault and it looks to me like the crest of the structure is actually sitting a little bit to the east of the No. 1 Kelly State, and the reason I say that, is if you'll look at this cross section X-X',you can see that the interval from the Woodford to the top of the Devonian is abnormally thick is that particular well. That indicates it's going in at a fairly steep dip. So it looks like it's already rolled over

and dropping back down again, and we believe that we drilled a little bit to the east of that on the crest we will end up even high to that particular well.

MR. NUTTER: You are in a pretty precarious location, though. You're going to have to keep a straight hole to avoid migrating too far to the west and cutting the fault or migrating too far to the north and crossing the --

A. Well,yes, we're aware of that but we're prepared to -- we're really going to watch that direction all the way down, yes.

Q. All right, sir, would you turn to Exhibit Number Four and tell us what that is?

A. Okay, this Exhibit Number Four, the first decline curve that I plotted here is for the Signal No. 1 Tekell State, which is on the spacing unit that we will be drilling a substitute well for, and you can see here that this well produced in 1956, it produced up to 15,000, 13-14,000 barrels a month for about a year, a little over a year, and it produced 374,000 barrels by that time, but it was completed in the middle of 1956. By the middle of 1957 they began to get some water encroachment. It originally was water free, and by the time that they put the well on the Kobe the water cut was making 20-30,000 barrels a month

on up to almost as high as 100,000 a month, and we had a slow decline. It produced about 350,000 barrels of oil after it began to make a high water cut.

MR. NUTTER: Is the solid line the oil production and the dashed line the water?

A. Yes, that's right, and you can see that there was a relatively slow decline but what I'm saying is if they had not produced that at that rate, that curve would have probably been a flat line for four or five years and they would have recovered a great deal more oil.

Q. Okay, would you identify Exhibit Number Five for us?

A. Okay, Exhibit Number Five is the decline curve on the Thornton and Parrish No. 1 Kelly State. It was originally drilled by Signal and taken over by Thornton and Parrish.

Q. You'll have to help me with the lines on this one, which is the oil and which is the water?

A. Okay. It's not dashed quite as well, but the upper line -- the dashed line is the water production and the solid line is the oil production.

And you can see on this particular well here, they actually did not pull this well as hard as they did the 1-SDA. The maximum production here was about 10,500

on up to almost as high as 100,000 a month, and we had a slow decline. It produced about 350,000 barrels of oil after it began to make a high water cut.

MR. NUTTER: Is the solid line the oil production and the dashed line the water?

A. Yes, that's right, and you can see that there was a relatively slow decline but what I'm saying is if they had not produced that at that rate, that curve would have probably been a flat line for four or five years and they would have recovered a great deal more oil.

Q. Okay, would you identify Exhibit Number Five for us?

A. Okay, Exhibit Number Five is the decline curve on the Thornton and Parrish No. 1 Kelly State. It was originally drilled by Signal and taken over by Thornton and Parrish.

Q. You'll have to help me with the lines on this one, which is the oil and which is the water?

A. Okay. It's not dashed quite as well, but the upper line -- the dashed line is the water production and the solid line is the oil production.

And you can see on this particular well here, they actually did not pull this well as hard as they did the 1-SDA. The maximum production here was about 10,500

barrels a month and they were able to produce 278,000 barrels of oil over a three year period before they actually began to make a lot of water.

They put the well on the Kobe and they still able to keep this well producing at a better than 8000 barrels a month until about 60 -- 1967, when it began to go into a rather rapid decline.

In 1969 Signal decided to go back and perforate higher in the section. They perforated the top of the Devonian porosity at that particular time and the well came back in flowing, water free, and -- but you see at that time they produced it better than 11,000, 11,500 barrels a month, a higher rate than they did initially. It only took about four months for them to pull the water in, and as I say, this was against the advice of their own production engineer at the time.

What happened is the Division manager was having trouble making the amount of production his West Texas area, West Texas - New Mexico area was supposed to produce, and he, whenever he needed the extra oil, he pulled it out of this well, and that caused a great deal of damage.

But even so, it's impressive that this well has produced 1,100,000 barrels of oil after it already made a lot of water.

But it's an expensive way to do it. It would have been much better to have completed shallow, not to deeply into the Devonian and not produce it at this rate.

Q. All right, sir, let's turn to Exhibit Number Six and have you describe that for us.

A. Okay, this -- the reason I have this in here, this is the Shell State No. 1 SDA, now operated by Thornton and Parrish, and this well is 50 feet lower than the well of interest on our spacing unit, the No. 2 Tekell State.

You can see here that again this well produced consistently at a lower rate, only about two months did it produce over 10,000 barrels a month, but the main thing was that this, even though it's 50 feet lower, was actually completed higher in the section by perforating the top of the Devonian porosity, and that well was able to produce four years water free before the water entry, and overall it has produced making less water to this day than the No. 1, No. 2 Tekell State.

This is a little bit more representative of what we should expect to find in the proposed location, except that we expect to be 50 to 60, 70 feet higher than this particular well, but even with the drainage we're probably going to be as high above the present oil/water contact

as this well was at the time it was drilled. This is the type of production I would expect us to be able to get on this proposed location, but we do not plan to produce it at this rate.

Q. Were Exhibits One through Six compiled by you or compiled under your direction and supervision?

A. Yes, they were done by me and my -- some of my associates.

Q. In your opinion, Mr. Elam, will approval of this application be in the best interests of conservation, prevention of waste, and the protection of correlative rights?

A. It certainly will be.

MR. KELLAHIN: We move the introduction of Exhibits One through Six.

MR. NUTTER: Exhibits One through Six will be admitted in evidence.

Are there any questions of the witness? He may be excused.

Do you have anything further, Mr, Kellahin?

MR. KELLAHIN: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 7173? We'll take the case under advisement.

STATEMENT OF DOCUMENT CERTIFICATION

All microphotgraphics images of documents following this certificate are of authorized documents in the possession of this Agency. These documents are routinely microfilmed as a necessary operation in the generation of an inviolate document file.

R. David Ortiz
SUPERVISOR

STATE OF NEW MEXICO)
) SS.
COUNTY OF VALENCIA)

Sworn and Subscribed to me, A Notary Public,

This 1st day of November, 1993

Lynni Aragon
NOTARY PUBLIC

MY COMMISSION EXPIRES: 10-2-96

- -

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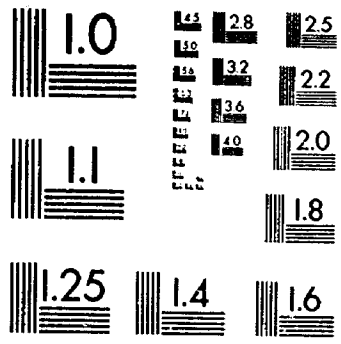

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BEGINNING DOCUMENT CASE 7173 / V-F PETROLEUM INC.

March 13, 1981

Case No.

7173

Application

Transcripts

Small Exhibits

ETC

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

March 13, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Case 7173

W. Thomas Kellahin
Kellahin & Kellahin,
Attorneys at Law
P. O. Box 1769
Santa Fe, New Mexico 87501

Dear Mr. Kellahin:

In response to your request by letter of February 27, 1981, a 52.90-acre non-standard oil proration unit consisting of all of Lot 1, Section 5, Township 16 South, Range 38 East, South Denton-Devonian Pool, Lea County, New Mexico, is hereby confirmed for V-F Petroleum Inc.

As oil allowables are adjusted for proration unit size under Rule 104 H, no special Division approval for odd size tracts is required for dedication and allowable purposes.

Sincerely,

JOE D. RAMEY,
Director

JDR/RLS/dr

cc: Mr. Ray Graham
Oil & Gas Division
State Land Office

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

KELLAHIN and KELLAHIN
Attorneys at Law
500 Don Gaspar Avenue
Post Office Box 1769
Santa Fe, New Mexico 87501

Telephone 982-4285
Area Code 505

February 27, 1981

Mr. Dan Nutter
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: V-F Petroleum Inc.

Dear Mr. Nutter:

Our firm represents V-F Petroleum Inc. On February 25, 1981, you heard their application in Case 7173 for approval of an unorthodox well location in the South Denton-Devonian Pool.

On behalf of V-F Petroleum., and in accordance with Commission Rule 104D I am herein applying for administrative approval of a 52.90 acre non-standard proration unit for the well to be drilled in accordance with the application in Case 7173.

The subject tract contains 52.90 acres as a result of an oversized governmental section shown on that plat delivered to you by Mr. Ray Graham of the State Land Office. The tract is being described as follows:

Township 16 South, Range 38 East, NMPM
Section 5: Lot 1
Lea County, New Mexico

This tract is part of State of New Mexico Oil & Gas Lease No. L-5352.

Please advise me if anything further is required.

Very truly yours,

W. Thomas Kellahin

WTK:jm
cc: Mr. Ray Graham
Mr. J. M. Fullinwider

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

March 10, 1981

Re: CASE NO. 7173
ORDER NO. R-6608

Mr. Thomas Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Applicant:

V-F Petroleum Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 7173
Order No. R-6608

APPLICATION OF V-F PETROLEUM
INC. FOR AN UNORTHODOX WELL
LOCATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 25, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 6th day of March, 1981, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, V-F Petroleum Inc., seeks approval of an unorthodox oil well location 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East, NMPM, to test the Devonian formation, South Denton-Devonian Pool, Lea County, New Mexico.

(3) That the NE/4 NE/4 of said Section 5 is to be dedicated to the well.

(4) That a well at said unorthodox location will better enable applicant to produce the oil underlying the proration unit.

(5) That no offset operator objected to the proposed unorthodox location.

(6) That approval of the subject application will afford the applicant the opportunity to produce its just and equitable share of the oil in the subject pool, will prevent the economic loss caused by the drilling of unnecessary wells, avoid the augmentation of risk arising from the drilling of an excessive number of wells, and will otherwise prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the application of V-F Petroleum Inc., for an unorthodox oil well location for the Devonian formation is hereby approved for a well to be located at a point 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East, NMPM, South Denton-Devonian Pool, Lea County, New Mexico.

(2) That a 52.90-acre non-standard oil proration unit comprising the NE/4 NE/4 of said Section 5 shall be dedicated to the above-described well.

(3) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year herein-above designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY,
Director

S E A L

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
25 February 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of V-F Petroleum, Inc. for an unorthodox well location, Lea County, New Mexico.

CASE 7173

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:

Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: Call next Case Number 7173.

MR. PADILLA: Application of V-F Petroleum, Inc., for an unorthodox well location, Lea County, New Mexico.

MR. KELLAHIN: I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant and I have one witness to be sworn.

(Witness sworn.)

JACK G. ELAM

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

MR. KELLAHIN: Mr. Nutter, before beginning Mr. Elam's testimony we'd desire to amend the application and then to allow Mr. Elam to testify as to both provisions we'd request in the application.

First of all, in checking the State of New Mexico lease, which is Lease L-5352, with Mr. Graham today we have discovered that the tract to be dedicated to the well contains 52.9 acres in a sufficiently oversized 40

that at least in his opinion he felt that it was necessary for us to request a non-standard proration unit for the well, and if you concur in that opinion, then we would like to amend our application and have the case readvertised, but hear our testimony on both points today.

MR. NUTTER: Well, it's unorthodox because of correction, or non-standard because of a correction in the surveys.

MR. KELLAHIN: It will still be unorthodox --

MR. NUTTER: It's -- the unit is over-sized and non-standard because of a correction in the surveys.

MR. KELLAHIN: It's over-sized because the section itself in which this is a 40-acre tract is an oversize section.

MR. NUTTER: That's what I mean.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Well, we can handle that administratively without necessity for readvertising.

MR. KELLAHIN: Fine, we'd prefer to do that.

The other point is that even though the unit itself is 52.9 acres now, it is still closer to the west boundary than 330 feet.

MR. NUTTER: Right.

MR. KELLAHIN: So we will still need a hearing order for the location.

MR. NUTTER: For the location, but under Rule 104-F, is it, you can file the application for the unorthodox location and it doesn't even require a waiting period or notification of offsets. It's 104-D II.

MR. KELLAHIN: All right, sir, we'll proceed to handle the size of the unit, then, through that order, I mean that rule number.

MR. NUTTER: Right.

MR. KELLAHIN: The other thing is we have an expiring lease that expires on March 1st. The well will be spudded tomorrow with the consent and agreement of Mr. Graham of the Land Office, and certainly subject to the approval of the Commission.

We would like to subsequent to the testimony have you confirm whether or not we can have conditional approval to commence the well.

(There followed discussion off the record.)

Q. Mr. Elam, would you please state your name and occupation?

A. My name is Jack G. Elam. I'm a consulting

geologist and an independent operator in Midland, Texas.

Q. Mr. Elam, have you ever testified before the Oil Conservation Division as a geologist?

A. No, I have not.

Q. Would you describe for Mr. Nutter your educational background, please?

A. I have a Bachelor's and Master's degree in geology from UCLA and a PhD in geology from Rensselaer Polytechnic Institute in Troy, New York. I've -- I have also all but one quarter of a degree in engineering from the University of Wyoming, thanks to the U. S. Army, and I have taught reservoir engineering. I taught reservoir engineering at RPI for four years while I was working on my PhD.

Q. Would you summarize for Mr. Nutter your experience subsequent to graduation in the fields of geology and engineering?

A. I've been in the oil business since 1946. I've been on my own as a consulting geologist since 1951, except for the four years 1956 until '60 when I was teaching as an assistant professor at Rensselaer Polytechnic Institute, and also working on my PhD.

I've been on my own ever since.

Q. Mr. Elam, have you made a study of the facts surrounding this particular application by V-F Petro-

leum, Inc.?

A. Yes, I have.

Q. And you have been retained as a consultant for that purpose?

A. Yes, that's right.

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

MR. NUTTER: Yes. I only have one question. How long does it take to get thawed out after four years at Rensselaer?

MR. ELAM: Just one summer in Midland.

Q. Let me direct your attention, Mr. Elam, to Applicant's Exhibit Number One, and first of all, describe to me generally what the applicant is seeking to accomplish in this case?

A. Well, the South Denton Field has produced a little over 3-1/2 million barrels of oil. When it was originally developed they used very, very bad protection practices. They drilled down very close to the oil/water contact and flowed those wells at very, very high allowable rates, which caused a very premature coning in those wells. Some of those wells had water increase as early as a year and a half after completion. And they continued to produce these wells at a maximum rate possible to this day and as

a consequence, they've only recovered a small fraction of the oil they should theoretically have been recovered from the water drive field, such as the Denton South -- South Denton-Devonian Field.

Q. Your Exhibit Number One shows the location of all the wells that have produced from the South Denton-Devonian Pool?

A. Yes, that's right.

Q. And shaded in yellow is what appears to be a portion of Section 5. Would you generally locate for us the unit upon which your proposed well is going to be located?

A. The well will be Tract 1 of this Section 5, which is a 52.90 acre tract, located in the northeast of the northeast of that particular over-sized section.

The well is located 1150 feet from the east line and 330 feet from the west line -- from the north line of Section Five, which puts us within 100-or-so feet of the west line of that particular Tract 1.

Q. The Exhibit Number One shows a Devonian well located within Lot 1 of Section 5, does it not, Mr. Elam?

A. Yes, it does. That was the Signal No. 2 Tekell State, which was completed in the mid-'50s as a

flowing Devonian well.

Q. What's the status of that well now?

A. It was plugged in about 1970.

Q. What are you seeking to accomplish by moving to the northwest at an unorthodox location from the first well in this unit?

A. Well, this is a contour map contoured on the top of the Devonian on 50-foot contour intervals. According to my best calculation the well will encounter the Devonian approximately 63 feet high to that producer; however, that's only part of a problem. That producer was drilled fown fairly close to the oil/water contact and produced -- or completed from open hole at the bottom and they coned the water in after about a month -- a year and a half and that well produced a great deal of water to its death, when it had produced about 976,000 barrels. I mean, pardon me, 776,000 barrels.

But that only calculates to be about 55 percent of the oil that should have been recovered from that location, according to reservoir calculations. It appears that there's still remaining undrained on that tract several hundred thousand barrels of oil yet to be recovered by good completion practices.

What we intend to do now is to drill

down to the top of the porosity, only penetrate the porosity approximately ten feet. If after we have a satisfactory test we will complete at that point and we also plan to produce the well at a very low rate, say 100 or 200 barrels a day, not over 200, probably nearer the 100 barrel range, in order to prevent the water from coning in from below, and also coming in from the adjacent cone of the nearby well.

Q. All right. Do you have an opinion as to whether or not the proposed location is the optimum location within this proposed unit to again test this particular Devonian Pool?

A. Yes, I have attempted to do two things here. One is to get as high as possible structurally, and this is the optimum location from that point of view.

I've also attempted to move as far away from the former producer as possible to avoid the interference of that cone of water that rose as that well was produced.

Q. All right, sir. Can you identify for us on your contour map where we would generally find the oil/water contact?

A. The oil/water contact in this field, we can use two different ways of calculating it. One I have to qualify is the zero capillary pressure oil/water contact.

In other words, that's the point below which we don't find any oil at all.

The No. 3, the Signal No. 3 Gulf State Well, which is located in Section 4, in other words, two locations to the east of this proposed location, encountered porosity at 9548 and they tested a show of oil in water below -9548, which indicates that the zero capillary pressure oil/water contact is approximately 9550.

Now, the porosity varies in the reservoir from place to place. Where the rock if very tight you will encounter water at a higher point, but on the cross section, which I have, Section X-X', the No. Thornton and Parrish No. 1 SDA WEll in Section 36 encountered water below -9490, and that's the oil/water contact that I'm using. It tested oil down to 9490 and water below 9490. So that's --

MR. NUTTER: Which well is that, Mr. Elam?

A. That's the southwest of the southwest of Section 36.

MR. NUTTER: Okay.

A. And, as I say, the oil/water contact varies according to the capillary pressure characteristics of the rock, but that's the best calculation I can come up with.

MR. NUTTER: Where did you figure the oil/water contact is, now?

A. -9490. That's the top of the transition zone, is what I'm saying.

MR. NUTTER: And under these individual wells, then, this oil/water contact rose in the form of a cone.

A. Yes, that's right. I have a cross section.

MR. KELLAHIN: We have a subsequent exhibit that shows some of the coning effect --

A. Yes.

Q. -- that you have anticipated from those existing wells.

All right, let me ask you one further question about this exhibit before we leave it, Mr. Elam. Is -- describe generally how you've located this north/south fault line.

A. Okay. This -- this fault line happens to be exceptionally well controlled because it occurs to the west of the Thornton and Parrish No. 1 Kelly State in the southeast of the southeast of Section 35. It goes east of the T. P. Cohen Oil 1-Q State, which is located in the southeast of the northeast of Section 35, and goes west of

Hamon and (unintelligible) No. 1 Continental State, which is located in the northwest of the northwest of Section 25. You can just barely get a straight line between those wells.

Now those wells probably are not perfectly straight holes, although I did investigate the T.P. Cohen Oil 1-Q State to find out whether it did migrate or not. It did migrate possibly 200 feet to the northwest. They attempted to whipstock that and get on the other side of the fault and by the time they did that the dip was so steep it just slid down the dip and they couldn't do that.

Q. All right, sir, let's go to Exhibit Number Two, which is your cross section, Mr. Elam. All right, sir, on Exhibit Number Two, would you commencing from left to right, if you'll identify and describe each of the wells on your cross section.

A. All right. The section X-X', the well on the left is the most southerly well on the line of section. That's the Signal Oil and Gas No. 1 Tekell State and the well north of that is the Signal Oil and Gas No. 2 Tekell State. I have then shown --

Q. Excuse me, now the Signal Oil and Gas No. 2 Tekell State, this is the well that exists on the proration unit for which we now desire to drill at the unorthodox location?

A. Yes, that's right. And that well recovered 756,190 barrels prior to watering out.

Q. All right, let's take this well for a moment and describe for us generally what you think is wrong in the completion or the production techniques for this well, and how you have gone ahead and estimated the additional reserves to be recovered from the new well.

A. All right. First I determined the reservoir parameters for this particular field and I used these reservoir parameters that I've listed on the section here, a formation volume factor of 1.3; a porosity of 8 percent; salt water saturation of 35 percent; recovery factor of 35 percent, and I for my calculation I just used 40 acres.

I've calculated -- that calculated out to give a recovery of 1,450,387 barrels, and that would be a good recovery for a well properly produced, completed and produced from that 40-acre tract. The well actually only made 52 percent of that amount. The 756,000 is only 52 percent of the amount of oil that should have been recovered from that field given these reservoir parameters if it had been properly completed by not penetrating too close to that oil/water contact and not producing at too high a rate. Both of those things did hurt.

In addition to that, the original com-

pletion was from the open hole from -9306 to -9367. I might mention that one of the wells up to the north, the Mobil 1-M State Well actually in a fairly tight interval equivalent to that depth, actually recovered salt water from that interval because of the poor capillary pressure characteristics. As I say, the capillary pressure characteristics are variable. This is not a uniform reservoir all the way through.

But anyway, they completed that well for 744 barrels a day and they produced it at about 12 to 13,000 barrels a month. Within a year and a half they had coned the water in on that well, and so the vast majority of this oil was produced after it began to make a great deal of water.

At some later date they perforated higher. I don't have the exact date, but they perforated higher in the section. By that time it didn't do any good and you can't see any water break on the decline to indicate when the higher perforations were made.

In other words, what happens is if you pull a well too hard and pull the water up, as you move on up the hole and perforate higher in the section you pull the water up with you, and so they probably had a very sharp restricted cone of drainage when they first -- when the water first hit, but you -- as you continue to pull that

well, and they had it on a Kobe pump, then you pull a lot of oil with -- along with the water into the borehole until you -- they did get about 52 percent of the oil they should have gotten.

Had they not drilled to that depth, but had gone into the top of the porosity and produced the well at a much lower rate, the recovery factor should have been in the range of 35 percent, and that was my calculation.

Q. Based upon your calculation what are the remaining estimated reserves that could be produced from this proration unit from the proposed location?

A. Well, in order -- if we're putting the well between the two wells, I really have to talk about the Thornton and Parrish No. 1 Kelly State, which is 1100 feet north of the proposed location. It is the highest well in the field and approximately flat with how I expect this well to run, according to my contouring.

Now this particular well was also drilled to approximately to -9345, almost to the same total depth as the Tekell State. It was completed for 1944 barrels a day flowing. In other words, they really did open those wells up in those days, and it also produced 11 to 12 -- I mean 12 to 13,000 barrels a month. Because it was a little higher and had a little bit better porosity, the water didn't

hit on that well until they had produced about 350,000 barrels of oil; about 300,000 barrels of water.

It continued to produce with a high water cut until 1969, at which Signal plugged back to perforations up near the top of the Devonian and they recompleted the well water free for 320 barrels a day.

It so happens I talked to the Signal engineer who was in charge of the well at that time and he begged the exploration manager not to pull the well too hard, but he produced it even at a higher rate than it was produced initially about nearly 14,000 barrels a month, and in four months they pulled the water in.

So that's a classic example of gutting the well by poor production practices.

Okay. Now that well has made 1,100,000 barrels of oil after it began to make a high water cut. So you can make quite a bit of oil after you start making a lot of water.

According to my calculations, using the same reservoir parameters, I come up with 1 800 000 -- a little over 1,800,000 barrels of recoverable oil, or with a 35 percent recovery factor. That particular location has recovered 77 percent of that amount.

If we drill a well in between -- and

I might mention first that I have put my cone on there. In other words, this is geometrically related to the recovery, so you can see at least my perspective of what I think we're dealing with. The oil/water contact in the whole field has risen some, but in between these wells it probably hasn't risen very much. Most of the oil has actually come because of the water -- the oil produced in this coning of water entry.

According to my calculations I believe that -- that we can recover half of the oil that wasn't recovered from the Tekell State because of its improper completion practices. We can also recover,probably will also recover about half the oil that was --- that will still be recoverable from the Kelly State tract. This calculates out to be 586,000 barrels of oil still to be recovered from this particular spacing unit.

But most all the oil will be coming from the -- from this Lot 1.

Q. The Thornton Parrish Kelly State No. 1 Well, is that still being produced from this pool?

A. Yes, that well is still being produced and it's still producing in the range of 1000 to 2000 a month. It makes over 100,000 barrels of water a month, but they have a very good disposal system there and they have

been able to handle it.

MR. NUTTER: While you're on that, Mr. Elam, which are the remaining producing wells in the pool?

A. The two wells, the Thornton and Parrish No. 1 Kelly State, and Thornton and Parrish No. 1 State SDA.

MR. NUTTER: That's the well directly east of the --

A. Yes, that's right, and that well is actually low to the well that was plugged out by Signal, the No. 2 Tekell State. That well encountered the top of the Devonian 50 feet low to the top of the Devonian in the No. 2 Tekell State, but in this particular case it perforated only the top of the section and that's why, even though it was in an inferior position, it is overall a better well.

MR. NUTTER: That's the last well on your cross section.

A. Yes, that's the last well on the cross section. It's produced 656,000 barrels of oil from a lower structural position but it is still producing.

But this is a pretty good proof that if you did complete the well properly, it didn't go to water so fast, either.

The real thing, the main two things, the wells were completed too low in the section, but the

main thing is they were pulled too hard; and that interfered, that gave less than an optimum recovery.

Q. V-F Petroleum, Inc.'s proposed location crowds only the west line of the proration unit, does it not, Mr. Elam?

A. That's right. It's a standard 330 from the north line.

Q. All right. So we're not encroaching upon the Thornton and Parrish Kelly State tract?

A. No, and we have talked to Thornton and Parrish and they have no objection to our drilling the well.

Q. All right, sir. Would you turn now to Exhibit Number Three.

A. Okay, Exhibit Number Three is section B-B', and this was constructed just to show the data obtained from the three wells,the No. 2 Signla State, which was the actually it's the northwest of the northwest of Section 4, and then through the Kelly State and then through the Texas Pacific Coal and Oil No. 1-Q, and it -- this was just to show you the magnitude of the fault offset. This fault, we don't have a well that penetrated the Devonian on the downthrown side, but it looks like it would be at least a 1500-foot fault. The TP Coal and Oil No. 1-Q State drilled only to the Barnett and it was running so low, it was below the oil/

water contact in the -- it was obvious it was going to be below the oil/water contact in the South Denton Field. They did attempt a whipstock at that time but they couldn't -- they couldn't make it go because, as you can see from the cross section, the dips are very, very steep and it just slid down the dip. So they had to plug the well.

Q. The proration unit immediately to the west of this proration unit is also operated by V-F Petroleum is it not?

A. Yes, that's right.

Q. And the two units are generally separated by this north/south fault, aren't they?

A. Well, yes. We are -- we're trying to get the optimum location as high as we can without crowding the fault too closely. We're still about 300 feet from where we think the fault is, but this -- these structures, these tilted fault block structures usually roll over into the fault and it looks to me like the crest of the structure is actually sitting a little bit to the east of the No. 1 Kelly State, and the reason I say that, is if you'll look at this cross section X-X',you can see that the interval from the Woodford to the top of the Devonian is abnormally thick is that particular well. That indicates it's going in at a fairly steep dip. So it looks like it's already rolled over

and dropping back down again, and we believe that we drilled a little bit to the east of that on the crest we will end up even high to that particular well.

MR. NUTTER: You are in a pretty precarious location, though. You're going to have to keep a straight hole to avoid migrating too far to the west and cutting the fault or migrating too far to the north and crossing the --

A. Well,yes, we're aware of that but we're prepared to -- we're really going to watch that direction all the way down, yes.

Q. All right, sir, would you turn to Exhibit Number Four and tell us what that is?

A. Okay, this Exhibit Number Four, the first decline curve that I plotted here is for the Signal No. 1 Tekell State, which is on the spacing unit that we will be drilling a substitute well for, and you can see here that this well produced in 1956, it produced up to 15,000, 13-14,000 barrels a month for about a year, a little over a year, and it produced 374,000 barrels by that time, but it was completed in the middle of 1956. By the middle of 1957 they began to get some water encroachment. It originally was water free, and by the time that they put the well on the Kobe the water cut was making 20-30,000 barrels a month

on up to almost as high as 100,000 a month, and we had a slow decline. It produced about 350,000 barrels of oil after it began to make a high water cut.

MR. NUTTER: Is the solid line the oil production and the dashed line the water?

A. Yes, that's right, and you can see that there was a relatively slow decline but what I'm saying is if they had not produced that at that rate, that curve would have probably been a flat line for four or five years and they would have recovered a great deal more oil.

Q. Okay, would you identify Exhibit Number Five for us?

A. Okay, Exhibit Number Five is the decline curve on the Thornton and Parrish No. 1 Kelly State. It was originally drilled by Signal and taken over by Thornton and Parrish.

Q. You'll have to help me with the lines on this one, which is the oil and which is the water?

A. Okay. It's not dashed quite as well, but the upper line -- the dashed line is the water production and the solid line is the oil production.

And you can see on this particular well here, they actually did not pull this well as hard as they did the 1-SDA. The maximum production here was about 10,500

barrels a month and they were able to produce 278,000 barrels of oil over a three year period before they actually began to make a lot of water.

They put the well on the Kobe and they still able to keep this well producing at a better than 8000 barrels a month until about 60 -- 1967, when it began to go into a rather rapid decline.

In 1969 Signal decided to go back and perforate higher in the section. They perforated the top of the Devonian porosity at that particular time and the well came back in flowing, water free, and -- but you see at that time they produced it better than 11,000, 11,500 barrels a month, a higher rate than they did initially. It only took about four months for them to pull the water in, and as I say, this was against the advice of their own production engineer at the time.

What happened is the Division manager was having trouble making the amount of production his West Texas area, West Texas - New Mexico area was supposed to produce, and he, whenever he needed the extra oil, he pulled it out of this well, and that caused a great deal of damage.

But even so, it's impressive that this well has produced 1,100,000 barrels of oil after it already made a lot of water.

But it's an expensive way to do it. It would have been much better to have completed shallow, not to deeply into the Devonian and not produce it at this rate.

Q. All right, sir, let's turn to Exhibit Number Six and have you describe that for us.

A. Okay, this -- the reason I have this in here, this is the Shell State No. 1 SDA, now operated by Thornton and Parrish, and this well is 50 feet lower than the well of interest on our spacing unit, the No. 2 Tekell State.

You can see here that again this well produced consistently at a lower rate, only about two months did it produce over 10,000 barrels a month, but the main thing was that this, even though it's 50 feet lower, was actually completed higher in the section by perforating the top of the Devonian porosity, and that well was able to produce four years water free before the water entry, and overall it has produced making less water to this day than the No. 1, No. 2 Tekell State.

This is a little bit more representative of what we should expect to find in the proposed location, except that we expect to be 50 to 60, 70 feet higher than this particular well, but even with the drainage we're probably going to be as high above the present oil/water contact

as this well was at the time it was drilled. This is the type of production I would expect us to be able to get on this proposed location, but we do not plan to produce it at this rate.

Q. Were Exhibits One through Six compiled by you or compiled under your direction and supervision?

A. Yes, they were done by me and my -- some of my associates.

Q. In your opinion, Mr. Elam, will approval of this application be in the best interests of conservation, prevention of waste, and the protection of correlative rights?

A. It certainly will be.

MR. KELLAHIN: We move the introduction of Exhibits One through Six.

MR. NUTTER: Exhibits One through Six will be admitted in evidence.

Are there any questions of the witness? He may be excused.

Do you have anything further, Mr, Kellahin?

MR. KELLAHIN: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 7173? We'll take the case under advisement.

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7173. heard by me on 2/25 19 81.

_____, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
25 February 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of V-F Petroleum, Inc. for an unorthodox well location, Lea County, New Mexico.

CASE 7173

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: Call next Case Number 7173.

MR. PADILLA: Application of V-F Petroleum, Inc., for an unorthodox well location, Lea County, New Mexico.

MR. KELLAHIN: I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant and I have one witness to be sworn.

(Witness sworn.)

JACK G. ELAM

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

MR. KELLAHIN: Mr. Nutter, before beginning Mr. Elam's testimony we'd desire to amend the application and then to allow Mr. Elam to testify as to both provisions we'd request in the application.

First of all, in checking the State of New Mexico lease, which is Lease L-5352, with Mr. Graham today we have discovered that the tract to be dedicated to the well contains 52.9 acres in a sufficiently oversized 40

that at least in his opinion he felt that it was necessary for us to request a non-standard proration unit for the well, and if you concur in that opinion, then we would like to amend our application and have the case readvertised, but hear our testimony on both points today.

MR. NUTTER: Well, it's unorthodox because of correction, or non-standard because of a correction in the surveys.

MR. KELLAHIN: It will still be unorthodox --

MR. NUTTER: It's -- the unit is over-sized and non-standard because of a correction in the surveys.

MR. KELLAHIN: It's over-sized because the section itself in which this is a 40-acre tract is an oversize section.

MR. NUTTER: That's what I mean.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Well, we can handle that administratively without necessity for readvertising.

MR. KELLAHIN: Fine, we'd prefer to do that.

The other point is that even though the unit itself is 52.9 acres now, it is still closer to the west boundary than 330 feet.

MR. NUTTER: Right.

MR. KELLAHIN: So we will still need a hearing order for the location.

MR. NUTTER: For the location, but under Rule 104-F, is it, you can file the application for the unorthodox location and it doesn't even require a waiting period or notification of offsets. It's 104-D II.

MR. KELLAHIN: All right, sir, we'll proceed to handle the size of the unit, then, through that order, I mean that rule number.

MR. NUTTER: Right.

MR. KELLAHIN: The other thing is we have an expiring lease that expires on March 1st. The well will be spudded tomorrow with the consent and agreement of Mr. Graham of the Land Office, and certainly subject to the approval of the Commission.

We would like to subsequent to the testimony have you confirm whether or not we can have conditional approval to commence the well.

(There followed discussion off the record.)

Q. Mr. Elam, would you please state your name and occupation?

A. My name is Jack G. Elam. I'm a consulting

geologist and an independent operator in Midland, Texas.

Q. Mr. Elam have you ever testified before the Oil Conservation Division as a geologist?

A. No, I have not.

Q. Would you describe for Mr. Nutter your educational background, please?

A. I have a Bachelor's and Master's degree in geology from UCLA and a PhD in geology from Rensselaer Polytechnic Institute in Troy, New York. I've -- I have also all but one quarter of a degree in engineering from the University of Wyoming, thanks to the U. S. Army, and I have taught reservoir engineering. I taught reservoir engineering at RPI for four years while I was working on my PhD.

Q. Would you summarize for Mr. Nutter your experience subsequent to graduation in the fields of geology and engineering?

A. I've been in the oil business since 1946. I've been on my own as a consulting geologist since 1951, except for the four years 1956 until '60 when I was teaching as an assistant professor at Rensselaer Polytechnic Institute, and also working on my PhD.

I've been on my own ever since.

Q. Mr. Elam, have you made a study of the facts surrounding this particular application by V-F Petro-

leum, Inc.?

A. Yes, I have.

Q. And you have been retained as a consultant for that purpose?

A. Yes, that's right.

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

MR. NUTTER: Yes. I only have one question. How long does it take to get thawed out after four years at Rensselaer?

MR. ELAM: Just one summer in Midland.

Q. Let me direct your attention, Mr. Elam, to Applicant's Exhibit Number One, and first of all, describe to me generally what the applicant is seeking to accomplish in this case?

A. Well, the South Denton Field has produced a little over 3-1/2 million barrels of oil. When it was originally developed they used very, very bad protection practices. They drilled down very close to the oil/water contact and flowed those wells at very, very high allowable rates, which caused a very premature coning in those wells. Some of those wells had water increase as early as a year and a half after completion. And they continued to produce these wells at a maximum rate possible to this day and as

a consequence, they've only recovered a small fraction of the oil they should theoretically have been recovered from the water drive field, such as the Denton South -- South Denton-Devonian Field.

Q. Your Exhibit Number One shows the location of all the wells that have produced from the South Denton-Devonian Pool?

A. Yes, that's right.

Q. And shaded in yellow is what appears to be a portion of Section 5. Would you generally locate for us the unit upon which your proposed well is going to be located?

A. The well will be Tract 1 of this Section 5, which is a 52.90 acre tract, located in the northeast of the northeast of that particular over-sized section.

The well is located 1150 feet from the east line and 330 feet from the west line -- from the north line of Section Five, which puts us within 100-or-so feet of the west line of that particular Tract 1.

Q. The Exhibit Number One shows a Devonian well located within Lot 1 of Section 5, does it not, Mr. Elam?

A. Yes, it does. That was the Signal No. 2 Tekell State, which was completed in the mid-'50s as a

flowing Devonian well.

Q. What's the status of that well now?

A. It was plugged in about 1970.

Q. What are you seeking to accomplish by moving to the northwest at an unorthodox location from the first well in this unit?

A. Well, this is a contour map contoured on the top of the Devonian on 50-foot contour intervals. According to my best calculation the well will encounter the Devonian approximately 63 feet high to that producer; however, that's only part of a problem. That producer was drilled fown fairly close to the oil/water contact and produced -- or completed from open hole at the bottom and they coned the water in after about a month -- a year and a half and that well produced a great deal of water to its death, when it had produced about 976,000 barrels. I mean, pardon me, 776,000 barrels.

But that only calculates to be about 55 percent of the oil that should have been recovered from that location, according to reservoir calculations. It appears that there's still remaining undrained on that tract several hundred thousand barrels of oil yet to be recovered by good completion practices.

What we intend to do now is to drill

down to the top of the porosity, only penetrate the porosity approximately ten feet. If after we have a satisfactory test we will complete at that point and we also plan to produce the well at a very low rate, say 100 or 200 barrels a day, not over 200, probably nearer the 100 barrel range, in order to prevent the water from coning in from below, and also coming in from the adjacent cone of the nearby well.

Q All right. Do you have an opinion as to whether or not the proposed location is the optimum location within this proposed unit to again test this particular Devonian Pool?

A. Yes, I have attempted to do two things here. One is to get as high as possible structurally, and this is the optimum location from that point of view.

I've also attempted to move as far away from the former producer as possible to avoid the interference of that cone of water that rose as that well was produced.

Q All right, sir. Can you identify for us on your contour map where we would generally find the oil/water contact?

A. The oil/water contact in this field, we can use two different ways of calculating it. One I have to qualify is the zero capillary pressure oil/water contact.

In other words, that's the point below which we don't find any oil at all.

The No. 3, the Signal No. 3 Gulf State Well, which is located in Section 4, in other words, two locations to the east of this proposed location, encountered porosity at 9548 and they tested a show of oil in water below -9548, which indicates that the zero capillary pressure oil/water contact is approximately 9550.

Now, the porosity varies in the reservoir from place to place. Where the rock if very tight you will encounter water at a higher point, but on the cross section, which I have, Section X-X', the No. Thornton and Parrish No. 1 SDA WEll in Section 36 encountered water below -9490, and that's the oil/water contact that I'm using. It tested oil down to 9490 and water below 9490. So that's --

MR. NUTTER: Which well is that, Mr. Elam?

A. That's the southwest of the southwest of Section 36.

MR. NUTTER: Okay.

A. And, as I say, the oil/water contact varies according to the capillary pressure characteristics of the rock, but that's the best calculation I can come up with.

MR. NUTTER: Where did you figure the oil/water contact is, now?

A. -9490. That's the top of the transition zone, is what I'm saying.

MR. NUTTER: And under these individual wells, then, this oil/water contact rose in the form of a cone.

A. Yes, that's right. I have a cross section.

MR. KELLAHIN: We have a subsequent exhibit that shows some of the coning effect --

A. Yes.

Q. -- that you have anticipated from those existing wells.

All right, let me ask you one further question about this exhibit before we leave it, Mr. Elam. Is -- describe generally how you've located this north/south fault line.

A. Okay. This -- this fault line happens to be exceptionally well controlled because it occurs to the west of the Thornton and Parrish No. 1 Kelly State in the southeast of the southeast of Section 35. It goes east of the T. P. Cohen Oil 1-Q State, which is located in the southeast of the northeast of Section 35, and goes west of

Ramon and (unintelligible) No. 1 Continental State, which is located in the northwest of the northwest of Section 25. You can just barely get a straight line between those wells.

Now those wells probably are not perfectly straight holes, although I did investigate the T.P. Cohen Oil 1-Q State to find out whether it did migrate or not. It did migrate possibly 200 feet to the northwest. They attempted to whipstock that and get on the other side of the fault and by the time they did that the dip was so steep it just slid down the dip and they couldn't do that.

Q All right, sir, let's go to Exhibit Number Two, which is your cross section, Mr. Elam. All right, sir, on Exhibit Number Two, would you commencing from left to right, if you'll identify and describe each of the wells on your cross section.

A. All right. The section X-X', the well on the left is the most southerly well on the line of section. That's the Signal Oil and Gas No. 1 Tekell State and the well north of that is the Signal Oil and Gas No. 2 Tekell State. I have then shown --

Q Excuse me, now the Signal Oil and Gas No. 2 Tekell State, this is the well that exists on the proration unit for which we now desire to drill at the unorthodox location?

A. Yes, that's right. And that well recovered 756,190 barrels prior to watering out.

Q. All right, let's take this well for a moment and describe for us generally what you think is wrong in the completion or the production techniques for this well, and how you have gone ahead and estimated the additional reserves to be recovered from the new well.

A. All right. First I determined the reservoir parameters for this particular field and I used these reservoir parameters that I've listed on the section here, a formation volume factor of 1.3; a porosity of 8 percent; salt water saturation of 35 percent; recovery factor of 35 percent, and I for my calculation I just used 40 acres.

I've calculated -- that calculated out to give a recovery of 1,450,387 barrels, and that would be a good recovery for a well properly produced, completed and produced from that 40-acre tract. The well actually only made 52 percent of that amount. The 756,000 is only 52 percent of the amount of oil that should have been recovered from that field given these reservoir parameters if it had been properly completed by not penetrating too close to that oil/water contact and not producing at too high a rate. Both of those things did hurt.

In addition to that, the original com-

pletion was from the open hole from 9306 to 9367. I might mention that one of the wells up to the north, the Mobil 1-M State Well actually in a fairly tight interval equivalent to that depth, actually recovered salt water from that interval because of the poor capillary pressure characteristics. As I say, the capillary pressure characteristics are variable. This is not a uniform reservoir all the way through.

But anyway, they completed that well for 744 barrels a day and they produced it at about 12 to 13,000 barrels a month. Within a year and a half they had coned the water in on that well, and so the vast majority of this oil was produced after it began to make a great deal of water.

At some later date they perforated higher. I don't have the exact date, but they perforated higher in the section. By that time it didn't do any good and you can't see any water break on the decline to indicate when the higher perforations were made.

In other words, what happens is if you pull a well too hard and pull the water up, as you move on up the hole and perforate higher in the section you pull the water up with you, and so they probably had a very sharp restricted cone of drainage when they first -- when the water first hit, but you -- as you continue to pull that

well, and they had it on a Kobe pump, then you pull a lot of oil with -- along with the water into the borehole until you -- they did get about 52 percent of the oil they should have gotten.

Had they not drilled to that depth, but had gone into the top of the porosity and produced the well at a much lower rate, the recovery factor should have been in the range of 35 percent, and that was my calculation.

Q. Based upon your calculation what are the remaining estimated reserves that could be produced from this proration unit from the proposed location?

A. Well, in order -- if we're putting the well between the two wells, I really have to talk about the Thornton and Parrish No. 1 Kelly State, which is 1100 feet north of the proposed location. It is the highest well in the field and approximately flat with how I expect this well to run, according to my contouring.

Now this particular well was also drilled to approximately to -9345, almost to the same total depth as the Tekell State. It was completed for 1944 barrels a day flowing. In other words, they really did open those wells up in those days, and it also produced 11 to 12 -- I mean 12 to 13,000 barrels a month. Because it was a little higher and had a little bit better porosity, the water didn't

hit on that well until they had produced about 350,000 barrels of oil; about 300,000 barrels of water.

It continued to produce with a high water cut until 1969, at which Signal plugged back to perforations up near the top of the Devonian and they recompleted the well water free for 320 barrels a day.

It so happens I talked to the Signal engineer who was in charge of the well at that time and he begged the exploration manager not to pull the well too hard, but he produced it even at a higher rate than it was produced initially about nearly 14,000 barrels a month, and in four months they pulled the water in.

So that's a classic example of gutting the well by poor production practices.

Okay. Now that well has made 1,100,000 barrels of oil after it began to make a high water cut. So you can make quite a bit of oil after you start making a lot of water.

According to my calculations, using the same reservoir parameters, I come up with 1 800 000 -- a little over 1,800,000 barrels of recoverable oil, or with a 35 percent recovery factor. That particular location has recovered 77 percent of that amount.

If we drill a well in between and

I might mention first that I have put my cone on there. In other words, this is geometrically related to the recovery, so you can see at least my perspective of what I think we're dealing with. The oil/water contact in the whole field has risen some, but in between these wells it probably hasn't risen very much. Most of the oil has actually come because of the water -- the oil produced in this coning of water entry.

According to my calculations I believe that -- that we can recover half of the oil that wasn't recovered from the Tekell State because of its improper completion practices. We can also recover,probably will also recover about half the oil that was -- that will still be recoverable from the Kelly State tract. This calculates out to be 186,000 barrels of oil still to be recovered from this particular spacing unit.

But most all the oil will be coming from the -- from this Lot 1.

Q The Thornton Parrish Kelly State No. 1 Well, is that still being produced from this pool?

A Yes, that well is still being produced and it's still producing in the range of 1000 to 2000 a month. It makes over 100,000 barrels of water a month, but they have a very good disposal system there and they have

been able to handle it.

MR. NUTTER: While you're on that, Mr. Elam, which are the remaining producing wells in the pool?

A. The two wells, the Thornton and Parrish No. 1 Kelly State, and Thornton and Parrish No. 1 State SDA.

MR. NUTTER: That's the well directly east of the ---

A. Yes, that's right, and that well is actually low to the well that was plugged out by Signal, the No. 2 Tekell State. That well encountered the top of the Devonian 50 feet low to the top of the Devonian in the No. 2 Tekell State, but in this particular case it perforated only the top of the section and that's why, even though it was in an inferior position, it is overall a better well.

MR. NUTTER: That's the last well on your cross section.

A. Yes, that's the last well on the cross section. It's produced 656,000 barrels of oil from a lower structural position but it is still producing.

But this is a pretty good proof that if you did complete the well properly, it didn't go to water so fast, either.

The real thing, the main two things, the wells were completed too low in the section, but the

main thing is they were pulled too hard; and that interfered, that gave less than an optimum recovery.

Q. V-F Petroleum, Inc.'s proposed location crowds only the west line of the proration unit, does it not, Mr. Elam?

A. That's right. It's a standard 330 from the north line.

Q. All right. So we're not encroaching upon the Thornton and Parrish Kelly State tract?

A. No, and we have talked to Thornton and Parrish and they have no objection to our drilling the well.

Q. All right, sir. Would you turn now to Exhibit Number Three.

A. Okay, Exhibit Number Three is section B-B', and this was constructed just to show the data obtained from the three wells,the No. 2 Signla State, which was the actually it's the northwest of the northwest of Section 4, and then through the Kelly State and then through the Texas Pacific Coal and Oil No. 1-Q, and it -- this was just to show you the magnitude of the fault offset. This fault, we don't have a well that penetrated the Devonian on the downthrown side, but it looks like it would be at least a 1500-foot fault. The TP Coal and Oil No. 1-Q State drilled only to the Barnett and it was running so low, it was below the oil/

water contact in the -- it was obvious it was going to be below the oil/water contact in the South Denton Field. They did attempt a whipstock at that time but they couldn't -- they couldn't make it go because, as you can see from the cross section, the dips are very, very steep and it just slid down the dip. So they had to plug the well.

Q The proration unit immediately to the west of this proration unit is also operated by V-F Petroleum, is it not?

A. Yes, that's right.

Q And the two units are generally separated by this north/south fault, aren't they?

A. Well, yes. We are -- we're trying to get the optimum location as high as we can without crowding the fault too closely. We're still about 300 feet from where we think the fault is, but this -- these structures, these tilted fault block structures usually roll over into the fault and it looks to me like the crest of the structure is actually sitting a little bit to the east of the No. 1 Kelly State, and the reason I say that, is if you'll look at this cross section X-X',you can see that the interval from the Woodford to the top of the Devonian is abnormally thick is that particular well. That indicates it's going in at a fairly steep dip. So it looks like it's already rolled over

and dropping back down again, and we believe that we drilled a little bit to the east of that on the crest we will end up even high to that particular well.

MR. NUTTER: You are in a pretty precarious location, though. You're going to have to keep a straight hole to avoid migrating too far to the west and cutting the fault or migrating too far to the north and crossing the --

A. Well,yes, we're aware of that but we're prepared to - we're really going to watch that direction all the way down, yes.

Q. All right, sir, would you turn to Exhibit Number Four and tell us what that is?

A. Okay, this Exhibit Number Four, the first decline curve that I plotted here is for the Signal No. 1 Tekell State, which is on the spacing unit that we will be drilling a substitute well for, and you can see here that this well produced in 1956, it produced up to 15,000, 13-14,000 barrels a month for about a year, a little over a year, and it produced 374,000 barrels by that time, but it was completed in the middle of 1956. By the middle of 1957 they began to get some water encroachment. It originally was water free, and by the time that they put the well on the Kobe the water cut was making 20-30,000 barrels a month

on up to almost as high as 100,000 a month, and we had a slow decline. It produced about 350,000 barrels of oil after it began to make a high water cut.

MR. NUTTER: Is the solid line the oil production and the dashed line the water?

A. Yes, that's right, and you can see that there was a relatively slow decline but what I'm saying is if they had not produced that at that rate, that curve would have probably been a flat line for four or five years and they would have recovered a great deal more oil.

Q. Okay, would you identify Exhibit Number Five for us?

A. Okay, Exhibit Number Five is the decline curve on the Thornton and Parrish No. 1 Kelly State. It was originally drilled by Signal and taken over by Thornton and Parrish.

Q. You'll have to help me with the lines on this one, which is the oil and which is the water?

A. Okay. It's not dashed quite as well, but the upper line -- the dashed line is the water production and the solid line is the oil production.

And you can see on this particular well here, they actually did not pull this well as hard as they did the 1-SDA. The maximum production here was about 10,500

barrels a month and they were able to produce 278,000 barrels of oil over a three year period before they actually began to make a lot of water.

They put the well on the Kobe and they still able to keep this well producing at a better than 8000 barrels a month until about 60 -- 1967, when it began to go into a rather rapid decline.

In 1969 Signal decided to go back and perforate higher in the section. They perforated the top of the Devonian porosity at that particular time and the well came back in flowing, water free, and -- but you see at that time they produced it better than 11,000, 11,500 barrels a month, a higher rate than they did initially. It only took about four months for them to pull the water in, and as I say, this was against the advice of their own production engineer at the time.

What happened is the Division manager was having trouble making the amount of production his West Texas area, West Texas -- New Mexico area was supposed to produce, and he, whenever he needed the extra oil, he pulled it out of this well, and that caused a great deal of damage.

But even so, it's impressive that this well has produced 1,100,000 barrels of oil after it already made a lot of water.

But it's an expensive way to do it. It would have been much better to have completed shallow, not to deeply into the Devonian and not produce it at this rate.

Q. All right, sir, let's turn to Exhibit Number Six and have you describe that for us.

A. Okay, this -- the reason I have this in here, this is the Shell State No. 1 SDA, now operated by Thornton and Parrish, and this well is 50 feet lower than the well of interest on our spacing unit, the No. 2 Tekell State.

You can see here that again this well produced consistently at a lower rate, only about two months did it produce over 10,000 barrels a month, but the main thing was that this, even though it's 50 feet lower, was actually completed higher in the section by perforating the top of the Devonian porosity, and that well was able to produce four years water free before the water entry, and overall it has produced making less water to this day than the No. 1, No. 2 Tekell State.

This is a little bit more representative of what we should expect to find in the proposed location, except that we expect to be 50 to 60, 70 feet higher than this particular well, but even with the drainage we're probably going to be as high above the present oil/water contact

as this well was at the time it was drilled. This is the type of production I would expect us to be able to get on this proposed location, but we do not plan to produce it at this rate.

Q Were Exhibits One through Six compiled by you or compiled under your direction and supervision?

A. Yes, they were done by me and my -- some of my associates.

Q In your opinion, Mr. Elam, will approval of this application be in the best interests of conservation, prevention of waste, and the protection of correlative rights?

A. It certainly will be.

MR. KELLAHIN: We move the introduction of Exhibits One through Six.

MR. NUTTER: Exhibits One through Six will be admitted in evidence.

Are there any questions of the witness? He may be excused.

Do you have anything further, Mr, Kellahin?

MR. KELLAHIN: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 7173? We'll take the case under advisement.

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7173, heard by me on 2/25 19 81.

_____, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

for Tom Kellahin.

Gas Treating Chemicals, Inc.
P. O. Box 609
Hobbs, New Mexico 88240 505 393-3141

TOWNSHIP 16 SOUTH, RANGE 38 EAST OF THE [illegible]

116 38

c>-c 371.60A 52.98 AC 1745.57' 1745.57'

1320'

32-199

c>-c 200.00A

SS 5 D/C

SS 1 D/C

IL 32-20[illegible] D/C

6 5 4

535301 D/C

240865 D/C

9+6.15'

32-192, 193

c>-c 320.00A 32-195

c>-c 1,012.00A 32-201, 203, 204, 205

475607 D/C

SS 1 D/C

1203697 D/C

372 D/C

307353 D/C

SS 10 D/C

c>-c 320.00A 32-177

7 8 9 10

SS 1 D/C

c>-c 280.00A 32-178

140295 D/C

760 D/C

339221 D/C

323064 D/C

101167 D/C

101171 D/C

410002 D/C

c>-c 485.00A

N.S.

Dockets Nos. 8-81 and 9-81 are tentatively set for March 11 and 25, 1981. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 25, 1981

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

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KELLAHIN and KELLAHIN
Attorneys at Law
500 Don Gaspar Avenue
Post Office Box 1769
Santa Fe, New Mexico 87501

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

Telephone 982-4285
Area Code 505

February 5, 1981

Mr. Joe Ramey
Oil Conservation DIvision
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: V-F Petroleum Inc.

Case 7173

Dear Joe:

Please set the enclosed application for hearing on February 25, 1981.

Very truly yours,

W. Thomas Kellahin

WTK:jm
Enclosure
cc: Jerry Fullenwider

STATE OF NEW MEXICO

DEPARTMENT OF ENERGY AND MINERALS

OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION OF V-F PETROLEUM INC., FOR APPROVAL OF AN UNORTHODOX WELL LOCATION SOUTH DENTON-DEVONIAN POOL, LEA COUNTY, NEW MEXICO.

Case 7173

A P P L I C A T I O N

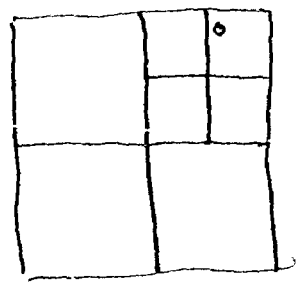
COMES NOW V-F PETROLEUM INC., by and through its attorneys, Kellahin & Kellahin and applies to the New Mexico Oil Conservation Division for approval of an unorthodox well location 1150 feet from the East line and 330 feet from the North line of Section 5, T16S, R38E, Lea County, New Mexico and in support thereof would show:

1. Applicant proposes to drill a Devonian test at the proposed unorthodox well location within said Section 5.

2. That there is a plugged Devonian well at the center of the subject forty acre unit and it is necessary for applicant to move to the proposed location to avoid the plugged Devonian well.

3. That approval of the application is in the best interest conservation, the prevention of waste and the protection of correlative rights.

WHEREFORE, applicant requests that this application be set for hearing and that after notice and hearing the application be granted as requested.



KELLAHIN & KELLAHIN

BY _____
W. Thomas Kellahin
P.O. Box 1769
Santa Fe, New Mexico 87501
(505) 982-4285

ATTORNEYS FOR V-F PETROLEUM INC.

DRAFT

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 7173

ORDER NO. R- 6608

APPLICATION OF V-F PETROLEUM INC.

FOR AN UNORTHODOX WELL LOCATION,

LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 25, 19 81, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of _____, 19 81, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, V-F Petroleum Inc., seeks approval of an unorthodox oil well location 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East, NMPM, to test the Devonian formation, South Denton-Devonian Pool, Lea County, New Mexico.

(3) That the NE/4 NE/4 of said Section 5 is to be dedicated to the well.

(4) That a well at said unorthodox location will better enable applicant to produce the oil underlying the proration unit.

(5) That no offset operator objected to the proposed unorthodox location.

(6) That approval of the subject application will afford the applicant the opportunity to produce its just and equitable share of the oil in the subject pool, will prevent the economic loss caused by the drilling of unnecessary wells, avoid the augmentation of risk arising from the drilling of an excessive number of wells, and will otherwise prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the application of V-F Petroleum, Inc., for an unorthodox oil well location for the Devonian formation is hereby approved for a well to be located at a point 330 feet from the North line and 1150 feet from the East line of Section 5, Township 16 South, Range 38 East NMPM, South Denton-Devonian Pool, Lea County, New Mexico.

(2) That a 52.90-acre non-standard oil proration unit comprising the NE/4 NE/4 of said Section 5 shall be dedicated to the above-described well.

(3) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.