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

IN THE MATTER OF:
APPLICATION OF MERRION OIL & GAS CORPORATION FOR A HORIZONTAL DIRECTIONAL DRILLING PILOT PROJECT, SPECIAL OPERATING RULES THEREFOR, NONSTANDARD OIL SPACING AND PRORATION UNIT, AND AN UNORTHODOX OIL WELL LOCATION, McKINLEY COUNTY, NEW MEXICO

CASE NO. 10196

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: Michael E. Stogner, Examiner

February 7, 1991
8:40 a.m.
Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on February 7, 1991, at 8:40 a.m. at the Oil Conservation Conference Room, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Susan G. Ptacek, a Certified Court Reporter No. 124, State of New Mexico.

FOR: OIL CONSERVATION DIVISION

BY: SUSAN G. PTACEK
Certified Court Reporter
CCR No. 1224

I N D E X

February 7, 1991
Examiner Hearing
Case No. 10196

	PAGE
APPEARANCES	3
MERRION WITNESS:	
STEVEN DUNN	
Direct Examination by Mr. Roberts	4
Examination by Mr. Stovall	17
Examination by Examiner Stogner	18
REPORTER'S CERTIFICATE	27

* * *

E X H I B I T S

	ID	Admtd
MERRION EXHIBIT		
1	6	16
2	8	16
3	10	16
4	12	16
5	16	16

A P P E A R A N C E S

FOR THE DIVISION:	ROBERT G. STOVALL, ESQ. General Counsel Oil Conservation Division State Land Office Building Santa Fe, New Mexico 87504
FOR THE MERRION OIL & GAS CORPORATION	TOMMY ROBERTS, ESQ. Attorney at Law Farmington, New Mexico

* * *

EXAMINER STOGNER: Proceeding on now to the second page, we will call Case No. 10196.

MR. STOVALL: Application of Merrion Oil & Gas Corporation for a horizontal directional drilling pilot project, special operating rules therefor, nonstandard oil spacing proration unit, and an unorthodox oil well location, McKinley County, New Mexico.

EXAMINER STOGNER: Calling for appearances.

MR. ROBERTS: Mr. Examiner, I'm Tommy Roberts. I'm an attorney in Farmington, New Mexico, and I'm appearing on behalf of the applicant, Merrion Oil & Gas Corporation. I have one witness to be sworn.

EXAMINER STOGER: Are there any other appearances in this matter? Will the witness please stand to be sworn.

EXAMINER STOGNER: Mr. Roberts, you may proceed.

STEVEN DUNN,

the Witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. ROBERTS:

Q. Would you please state your name and residence?

A. Steven Dunn, Farmington, New Mexico.

Q. What is your occupation?

A. I am a petroleum engineer and operations manager for the Merrion Oil & Gas Corporation.

Q. How long have you been employed by Merrion Oil & Gas Corporation?

A. Approximately 10 years.

Q. Are you familiar with the operations of Merrion in the area which is the subject of this application?

A. Yes, I am.

Q. Have you testified before the Oil Conservation Division on prior occasions?

A. Yes, I have.

Q. In what capacity?

A. As a petroleum engineer.

Q. Are you familiar with the application of Merrion Oil & Gas Corporation that is before the Oil Conservation Division today?

A. Yes, I am.

MR. ROBERTS: Mr. Examiner, I would tender Mr. Dunn as an expert in the field of petroleum engineering.

EXAMINER STOGNER: Mr. Dunn is so qualified.

Q. (By Mr. Roberts) Mr. Dunn would you briefly explain the purpose of this application?

A. Merrion Oil & Gas seeks approval for a horizontal directional drilling pilot project in the Ojo Encino-Entrada fields in McKinley County, New Mexico. Along with that approval we also seek authority or approval for an unorthodox surface and bottomhole well location for

the same well, namely the Federal 28 No. 1 well. We seek approval for a nonstandard 80-acre spacing and proration unit for the same well, and for a target window in which to drill. We also seek approval for a special allowable provision for a double-sized proration unit, and finally we seek approval to produce both the vertical and/or horizontal wellbores.

Q. Would you refer to what's marked as Exhibit No. 1 and identify that exhibit?

A. Exhibit No. 1 is a well and lease ownership map in the vicinity of the Ojo Encino field, McKinley County, New Mexico, namely Sections 21 and 28 of Township 20 North, Range 5 West.

Q. Would you briefly summarize the data illustrated on this exhibit?

A. The exhibit shows the outline of the Ojo Encino field as a dashed line and the wells therein, also neighboring wells in the vicinity of the field, and the proposed horizontal well, the Federal 28 No. 1, along with its proposed 80-acre proration unit, and the leases that are located in the vicinity of this project and their ownership.

Q. Mr. Dunn, would you describe or indicate what the ownership of the pertinent leases is? Particular reference to the interest of Merrion Oil & Gas Corporation

and those leases.

A. Shown in yellow are all leases in which Merrion Oil & Gas holds an interest, and you will note that all wells located on the exhibit and in the field are operated by Merrion Oil & Gas Corporation; and the ownership -- the ownership under the project area is within a single lease is common and drilling on this project area is directed within the lease or away from the exterior boundaries of the lease.

Q. The proposed location of the Federal 28-1 well is outside the boundaries of the Ojo Encino-Entrada oil pool. Are you treating this as an extension of that pool?

A. Yes, we are.

Q. What is standard spacing in the Ojo Encino-Entrada oil pool?

A. 40-acre spacing, statewide spacing is standard.

Q. What is the surface location -- or what is the surface ownership of the surface at which the well is located?

A. I believe it is federal.

Q. And do you have all necessary permits to commence drilling activities there?

A. We have filed our federal permits, and they're in the process of working through their system. They will approve those permits once we receive state approval for

the project.

Q. Is ownership of the Entrada formation common within the proposed spacing unit?

A. Yes, it is.

Q. Are there offset leases to the proposed location which are not owned by Merrion Oil & Gas?

A. There is one lease in particular shown as the east half of the east half of Section 21, lease NM8582 which is owned by Yates Petroleum. That is an offset lease to the proposed project unit.

Q. Now, turn to what's been marked as Exhibit No. 2 and identify that exhibit?

A. Exhibit No. 2 is an Entrada structure map covering the same sections as in Exhibit No. 1 in the vicinity of the Ojo Encino field.

Q. Would you summarize the data illustrated on this exhibit?

A. Again shown on this map is the outline of the existing Ojo Encino field and also the proposed project area. The outline of the project area or within the outline of the project area shown are proposed target area which comprises a rectangle 1320 feet wide by 1200 feet long. The proration unit comprises the west half of the northeast quarter of Section 28, and the purpose of the -- of showing the structure is to identify the reason we wish

to locate the horizontal well where it is shown. And that is namely to drill on the top of the structure of the Entrada.

Q. That's the reason for locating the surface position of the well as you have proposed it to be located?

A. That's correct.

Q. How was the target area defined?

A. The target area was defined basically to give us as much flexibility as possible to stay within our proration -- proposed proration unit and still allow us to -- for some flexibility in the direction that we may end up going. The control of directional drilling is not an absolute thing so we need some flexibility there.

Q. Why do you ask for 80-acre spacing?

A. The proposed configuration of the wellbore will leave the 40-acre tract, that is the northern half of that proposed 80, and enter into the southern half and therefore we feel it's appropriate to dedicate 80 acres.

Q. As illustrated on Exhibit No. 2, it would appear that the bottomhole location would be nonstandard. Is that the case?

A. That is the case. Both the surface and bottomhole locations are nonstandard.

Q. Why do you select a nonstandard bottomhole location?

A. The purpose of selecting the bottomhole location nonstandard is -- well, I guess should say it's the result of trying to optimize the location of the wellbore within the structure. An unorthodox bottomhole location is the result of that.

Q. Now refer to what you have marked as Exhibit 3 and identify that Exhibit.

A. Exhibit No. 3 is a horizontal wellbore schematic of the proposed well.

Q. Would you summarize the data illustrated on this exhibit?

A. This exhibit shows the basic configuration that we expect will result when we drill this well. We have considered several options. This is the most likely scenario. It depicts our plans to drill the well in two phases. Phase 1 would involve drilling a vertical wellbore through the Entrada to confirm the geology. Along with confirming the geology, we want to make sure the oil is there, and it will help us define our target.

Phase 2 will encompass plugging back, milling a casing section, drilling our curve and our lateral across the structure in a southeasterly direction. The purpose there, of course, is to maximize the development and drainage of that structure.

Q. Subsequent to the time that you penetrate the

Entrada formation with your vertical drilling would it be possible upon evaluation that you would decide not to continue with to phase 2 of the project?

A. That is possible if we should find that either the structure does not exist or that there is no oil present, we would obviously not continue with the project beyond that point.

Q. What would be the horizontal distance of the wellbore?

A. The total or gross horizontal distance is approximately 1252 feet across the structure of which approximately 880 feet would be within the Entrada pay zone.

Q. How do you propose to monitor the direction of the hole as drilling occurs?

A. The directional control will be with a wire line steering tool setup that will be provided by the directional drilling company or contractor.

Q. Is there anything else reflected in Exhibit No. 3 that you would want to call to the examiner's attention?

A. I would mention that the footage or the surface locations are shown, and they are 750 feet from the north line and 2,450 feet from the east line of Section 28.

Q. Now refer to what you have marked as Exhibit No.

4 and identify that exhibit.

A. Exhibit No. 4 is a listing of reasons supporting the drilling of the Federal 28 No. 1 horizontal well.

Q. Would you summarize those reasons?

A. The first reason for drilling the well is to maximize oil recovery for one well and the field, and what I have shown on the exhibit is a simple table comparing horizontal to vertical wellbores. We believe we can get a threefold increase in potenttial recoverable reserves from 200,000 barrels on average from a vertical well up to 600,000 barrels of oil. We believe the drilling costs will be less than twofold. Estimate a rough cost for the horizontal well of $700,000. A vertical well of approximately $400,000, and those are completed costs ready to produce. The basis for those estimates of reserves, in the vertical case I looked at our experience in the existing fields that we operate, and on average that is the calculated reserve number. In the case of the horizontal wellbore, that was a volumetric calculation of the reserves -- or actually the oil in place and then using a 34 percent recovery factor and an estimated drainage area.

Q. What is the basis for your cost estimates?

A. In the case of the vertical well, that's actual experience. In the case of the horizontal well, we have drilled one horizontal well and it -- although not

identical to this proposal, it costs somewhat in that range.

Q. Is there -- do you anticipate any problem with water production in the vertical drilling phase?

A. Well, one of the purposes, which is listed as number two -- one of the purposes of this project is to reduce water production, and and the Entrada reservoir is a bottom-water-drive reservoir wherein the oil is very thick, viscous and there is a -- no free gas. And when you drill a vertical well and perforate into the oil zone, the mobility of the oil is so poor that the water tends to cone up through the oil and you have to produce water with the oil. The oil bleeds in as you produce the water. So you have to handle large volumes of water along with the oil.

By changing the configuration from a vertical wellbore to a horizontal wellbore you accomplish a couple of things. One, you reduce the pressure tendencies to pull the water up in the wellbore, and thereby help the water/oil ratio or the water cut, and therefore you have to handle less water. And by handling less water you don't have to dispose of as much water which cuts the operating cost, extends the economic life and thereby the recovery of the oil. So it increases the reserves indirectly.

The third reason that we feel this project is important, we operate several other Entrada fields. As I

said earlier, we have alredy drilled one horizontal well and are encouraged. However, this project being the first time we have used it as somewhat of an exploration tool, had -- has a lot of applicability in our other Entrada fields for stepout-type drilling and perhaps developing additional reserves. So the project will help us assess that viability.

Q. What depth bracket allowable has been established for wells drilled in the Ojo Encino-Entrada oil pool?

A. The depth bracket allowable is 750 barrels of oil per day.

Q. Do you have a recommendation for a depth bracket allowable for this 80-acre nonstandard proration unit?

A. Yes, we would recommend a double depth bracket allowable.

Q. What's the basis for that recommendation?

A. The proration unit -- the special proration unit would comprise double the normal proration unit.

Q. Is there anything else illustrated in Exhibit 4 that you wish to call to the attention of the examiner?

A. No.

Q. In your opinion will the granting of this application be in the interest of conservation and result in the protection of correlative rights?

A. Yes, it will.

Q. Are you familiar with the notice requirements of the rules that have been established by the Oil Conservation Division?

A. Yes, I am.

Q. Have those requirements been satisfied in this case?

A. Yes, they have.

Q. How have they been satisfied?

A. We have notified the offset lease owners in this case by certified mail prior to -- 20 days prior to this hearing of our proposed project, and advised them that they may enter an appearance in this case.

Q. Do you have return receipts indicating receipt of that notification?

A. Yes, I do.

Q. Were Exhibits 1 through 4 either prepared by you or at your direction and under your supervision?

A. Yes, they were.

MR. ROBERTS: Mr. examiner, I move the admission of Exhibits 1 through 4.

EXAMINER STOGNER: Exhibits 1 through 4 will be admitted into evidence.

(Merrion Exhibits 1 through 4

were admitted in evidence.)

MR. ROBERTS: I have no other questions of this witness.

EXAMINER STOGNER: Would you please pass forward the notification, since I don't believe those were handed to us, were they?

MR. STOVALL: They're not part of the exhibits that you submitted, are they?

THE WITNESS: No, they're not.

MR. STOVALL: Would you like to mark this as Exhibit 5?

MR. ROBERTS: Yes.

EXAMINER STOGNER: I will mark this as Exhibit 5.

MR. ROBERTS: We will move the admission of Exhibit 5.

MR. STOVALL: Do you have the originals?

MR. ROBERTS: Do you have the original receipts?

THE WITNESS: Let me look. Yes, I do.

MR. STOVALL: Do you mind submitting those?

EXAMINER STOGNER: I will return to you the copy.

MR. STOVALL: Let me ask you a couple questions while we're getting all this taken care of.

(Merrion Exhibit 5 was admitted in evidence.)

EXAMINATION

BY MR. STOVALL:

Q. One question is, do you know whether the federal leases or lease upon which you are drilling is a sliding scale royalty lease?

A. I do not know that.

Q. Looking at your Exhibit 4, on your increased production, out of curoisity, how do you rate your production comparing horizontal versus vertical?

A. As I said, we've drilled one well so we've got very limited experience. In that case we were drilling in a depleted reservoir which is not the case here. We expect the rates of production will be fixed by the size of the pump we put in the well, but the oil production should probably approximate a threefold increase.

Q. The rate as well as the total recovery?

A. Right. In other words, I guess what I am saying is if we normally produce 200 barrels a day in a vertical well, we would be in the 600-barrel a day range in a horizontal well. That is kind of a guess based on my experience in this other wellbore. We don't know exactly.

Q. You actually shorten your payout -- even though you increase your cost, you reduce your payout because of the higher production rates?

A. That's correct, acceleration economics are very attractive.

MR. STOVALL: I don't have any other questions.

EXAMINER STOGNER: Thank you, Mr. Stovall.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Dunn, for clarification what did you say the depth bracket allowable was for this pool?

A. 750 barrels a day.

Q. Is that a special depth bracket allowable?

A. Yes, it is.

Q. Could you relate to me what order or is that in a special pool rule? If you don't have an order.

A. It's order No. R-5420, approving a special depth bracket allowable for the Ojo Encino-Entrada oil pool, McKinley County, New Mexico, May 1, 1977.

Q. Do you know if any of these wells ever produced or pumped close to that particular allowable?

A. In the early days of these wells they did. The limit on producing the oil volumes is the production equivalent which you put in the well. It's not the ability of the reservoir to give up the fluid. It will give up literally thousands of barrels a day. It's a very high permeability reservoir, especially by San Juan Basin standards, 400 to 500 millidarcy sand with porosities in the range of 26 to 30 percent. It's very clean sand and it will give up a lot of fluid.

Usually the early fields, they would put a pumping unit on it and produce until they started making so much water that they had to put in submersible pumps, electric pumps, and then they would start moving thousands of barrels of water per day. And they were making large volumes of oil along with it. So you are really limited by casing size and the production equipment.

In a horizontal well of this nature, we would put in a submersible pump shortly after completion, and we would anticipate approaching depth bracket allowable that we propose.

Q. 1500 barrels of oil per day?

A. Yes.

Q. And on that, like you said, 40 acres has 750, and essentially since you have two 40 acres put together you are wishing to reflect an acreage factor of 2, thereby giving you 1500 barrels of oil; is that correct?

A. That's correct.

Q. You said you were going to run a submersible pump?

A. Yes.

Q. Where would that be located? I'm referring to your Exhibit 3.

A. That would be located in the vertical portion of the wellbore. The reservoir pressures in these wells are

high enough to where you can run the pump back in the vertical portion, in fact quite a ways up the hole, and still unrestricted volumes of fluid.

Q. When I refer to both your Exhibits 1 and 2, there is another rectangular box represented in Section 21. Was that where your previous horizontal project was?

A. No. That rectangular box -- you are referring to the dashed line?

Q. Yes, I am.

A. That is the outline of the Ojo Encino-Entrada oil pool as I determine from looking in the nomenclature rules.

Q. Merrion has -- and I believe you were in here for that hearing for a horizontal project similar to this several months ago; is that correct?

A. Yes, I was here.

Q. Is that in this area?

A. It's about eight miles south of here. It's close.

Q. But not in the same pool?

A. Not in the same pool, no.

Q. On Exhibit No. 2, could you please explain a little more about the geology of this area and what the deposit is and such?

A. The Entrada formation is a windblown sand dune

deposit, and what we're dealing with here are the remnants of these ancient sand dunes. They're of Jurassic geologic age. The oil is trapped in the tops of these old sand dune features and underlaying by waters that is moving through that formation like an aquifer. And we have tilted oil water contacts, and what we look for is a dune feature that is high enough to overcome the hydrodynamic radiant and trap that oil in place.

Q. Again, referring to Exhibit No. 3, I show that the horizontal portion is not really horizontal but actually slanting a little bit. Does this contour with the top or the crest of your sand dune being dipped, or what is the reason you don't go pure horizontal?

A. The reason is that what we're trying to do is maximize the amount of horizontal wellbore within the pay zone and it's kind of a process where we've set ourselves a limited target at the top. We're going to go in about seven-foot below the top of the sand, which should be level, and we want to stay at an angle that will approximate intersecting roughly a 40-foot oil column at the terminous of wellbore, and that will be about the point where we leave the Entrada.

In other words, we would expect to drill out of the Entrada at the some point into the overlying Tadilto (phonetic approximation) limestone, that's where we will

quit but we don't want to be -- we don't wnat to be in an oil column thickness less than 40 feet.

Based on our experience in these fields, if you get down to 20-foot of oil column thickness, they're uneconomic. The water comes through so badly that you have very short lives on the wells, and 40 feet is a good compromise. We're anticipating 60-foot of total oil column. So I've slanted the wellbore to try to maximize the amount of wellbore in the Entrada and yet stay above that 40-foot cutoff.

Q. Also with Exhibit 3, that's where I'm staying on now, the curve portion of the hole, you have an external packer cement fill. Are you proposing once you get the curved portion and the casing -- or the liner I should say for the curved portion of the well, will that be cemented back to the point of the start of your directional drilling operation?

A. What we're proposing to do is to inflate the external packer with cement at the top of the Entrada where it intersects with the Tadilto line, the overlying limestone. And by inflating that packer we will create a seal between our pay zone which will be uncemented with a preperforated liner running through it. We will be isolating that from anything above. We are proposing to set a packoff liner hanger back inside the seven-inch

casing, which will provide a seal at the top. And we're proposing to leave blank liner uncemented through the Morrison.

The kickoff point shown on Exhibit 3 at 5,480 feet is in the Morrison formation, and the only interval that would be uncemented and exposed in the backside would be the Morrison, the only interval of any porosity. The Tadilto lime and high dry sequence immediately above the Entrada has no porosity or permeability.

Q. Are there any production or water bearing zones in that Morrison formation?

A. There are no production zones. There are some sands that have porosity and probably would make some produced water.

Q. Do you know if that would be fresh, or is there any history of fresh waters?

A. It would be saline water.

Q. Brings me up to once this well reaches its economic limits and the well is plugged and abandoned, could you please discuss how such a well would be permanently plugged back?

A. What we would do -- it would be a simple matter to place cement down in the wellbore in the horizontal section. One of the options that we would like to have as part of this application, and one of the reasons we've

configured it the way we have, is that we can place -- we can cut off the four-and-a-half blank liner inside the seven-inch casing, and then cement off our lateral; clean that cement back out and actually have a cement casing that would allow us to produce the vertical well or even use it for some sort of enhanced recovery project or injection. It would give us maximum flexibility.

Q. When you say "produced from the vertical portion," the Entrada would be permanently plugged, both the vertical and the horizontal portion. You're talking about producing possible formations back up hole?

A. I'm talking about producing the Entrada itself. There's a number of possibilities here. One possibility is to drill the vertical well, produce vertical portion in the Entrada. You could produce it to an economic limit and then do the horizontal project.

Another option that we thought about was to produce it long enough to test it, then plug back and do the horizontal wellbore. The final option would be rather than produce it at all, set casing through it, leave it, drill the horizontal wellbore, produce that to depletion and then plug back the horizontal wellbore and produce the vertical portion.

The reason for that being that the build interval requires distance out from the vertical well

before you actually intersect the Entrada. So there would remain an area around the vertical wellbore that would not necessarily be drained by the horizontal well. That would give us the option to come back and get that oil later.

Q. Notwithstanding, you're in the middle of this -- what appears to be a dune when I look at Exhibit No. 2. Could it be possible to come back up and drill another horizontal in a northerly direction?

A. We believe that another well will be required. If this one pans out, I think we will be drilling either another new well, or another option that we've discussed is the Federal 21-4 shown in the southeast of the southwest of 21, using that wellbore as a candidate for horizontal drilling. If we did so, then we would be crossing lease lines of different ownership and some sort of cooperative or unitization would be required.

EXAMINER STOGNER: I have no other questions of this witness. Are there any other questions?

MR. ROBERTS: No.

MR. STOVALL: If not, Mr. Dunn, you may be excused. Is there anything further this in case? Case No. 10196 will be taken under advisement.

(Whereupon, the hearing was concluded at the approximate hour of 9:15 a.m.)

* * *

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

REPORTER'S CERTIFICATE

I, Susan G. Ptacek, a Certified Court Reporter and Notary Public, do HEREBY CERTIFY that I stenographically reported the proceedings before the Oil Conservation Division, and that the foregoing is a true, complete and accurate transcript of the proceedings of said hearing as appears from my stenographic notes so taken and transcribed under my personal supervision.

I FURTHER CERTIFY that I am not related to nor employed by any of the parties hereto, and have no interest in the outcome thereof.

DATED at Santa Fe, New Mexico, this 11th day of March, 1991.

SUSAN G. PTACEK
Certified Court Reporter
Notary Public

My Commission Expires:
December 10, 1993

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10196, heard by me on 7 February 1991.

, Examiner
Oil Conservation Division