NEW MEXICO
PETROLEUM RECOVERY RESEARCH CENTER
A Division of New Mexico Tech Socorro, NM

Date: October 25, 1993

To: Bill LeMay
Jamie Bailey

From: Bill Weiss WWW

Subject: Case 10796, Manzano vs. Marathon,
Unorthodox well location penalty

At the conclusion of the subject hearing, I volunteered to review the exhibits and testimony to determine flow rates appropriate for a no-flow boundary between the two wells at the lease line. Unfortunately, the data required for the engineering calculations are not available.

I do believe that the reservoir encompasses the two Marathon wells and the Manzano well. Also, it is my opinion that Manzano deserves an unorthodox location penalty. Perhaps the proper penalty is best based on geology.

WWW:kb

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October 29, 1993

Mr. William J. LeMay — HAND DELIVERED
Oil Conservation Commission
310 Old Santa Fe Trail, Room 219
Santa Fe, New Mexico 87501

Mr. William Weiss — VIA REGULAR MAIL
New Mexico Petroleum Recovery
Research Center, Kelly Building
New Mexico Tech Campus
Socorro, New Mexico 87801

Mrs. Jamie Bailey — HAND DELIVERED
Office of the Commissioner of
Public Lands,
310 Old Santa Fe Trail
Santa Fe, New Mexico

Re: NMOCC Case 10796 (DeNovo)
Order R-9974-A
Application of Manzano Oil Corporation
for an Unorthodox Gas Well Location,
Lea County, New Mexico

Dear Commissioners:

In accordance with Chairman LeMay's direction at the hearing held on October 14, 1993, and on behalf of Marathon Oil Company, please find enclosed our proposed order for entry by the Commission in the referenced case. This proposed order affirms the Examiner's decision set forth in Order R-9974 (copy enclosed).

Very truly yours,

W. Thomas Kellahin

cc: Dow Campbell, Esq (Marathon Oil Company)
cc: William F. Carr, Esq. (attorney for Manzano)

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

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

CASE NO. 10796 (DeNovo)
Order No. R-9974-A

APPLICATION OF MANZANO OIL CORPORATION
FOR AN UNORTHODOX GAS WELL LOCATION,
LEA COUNTRY, NEW MEXICO.

MARATHON OIL COMPANY'S
PROPOSED
ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 a.m. on October 14, 1993, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this ___day of November, 1993, the Commission, a quorum being present and having considered the testimony, the exhibits received at said hearing, and being fully advised in the premises,

FINDS THAT:

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

(2) The applicant, Manzano Oil Company ("Manzano"), seeks approval of an unorthodox gas well location 660 feet from the North and 1650 feet from the East line (Unit B) of Section 14, T20S, R35E, NMPM, Lea County, New Mexico for its Neuhaus Federal Well No 2 which has been drilled to and completed in the Lea-Wolfcamp Gas Pool with an E/2 dedication for production from the Wolfcamp formation in said pool.

(3) Marathon Oil Company ("Marathon"), operator of the Jordan "B" No 1 Well located 660 feet from the South line and 1980 feet from the East line of Section 11, T20S, R35E, NMPM, Lea County, New Mexico with a S/2 dedication, which is currently producing from the Wolfcamp formation in the Lea-Wolfcamp Gas Pool, appeared at the hearing in opposition to the application.

(4) In December, 1991, Marathon's Jordan "B" No. 1 Well was recompleted as a Wolfcamp gas producer and as of August 19, 1993 had the capacity to produce 3,900 MCFPD.

(5) On January 21, 1993, Manzano filed an application for permit to drill its Sims State Well
No.1 660 feet from the South and West lines of Section 12, T20S, R35E, NMPM, Lea County New Mexico as a Strawn oil well on 40-acre statewide oil spacing to be drilled to a total depth of 12,100 feet.

(6) However, instead of drilling its Sims State Well No.1 to its proposed target in the Strawn, when the well reached the Wolfcamp formation at 11,532 feet (some 600 feet above the Strawn formation) it was determined that the Wolfcamp was not productive, and Manzano abandoned this well.

(7) The Sims State Well No.1 would have been the direct eastern offset to the Marathon Jordan B Well No 1.

(8) The closest established Strawn oil pool is some 7 miles to the southeast of this area while the nearest established Wolfcamp gas production is that operated by Marathon in the next section to the west.

(9) Having failed to obtain commercial Wolfcamp production in the Sims State Well No 1, Manzano then filed on April 20, 1993 an application for permit to drill its Neuhaus "14" Federal Well No 2 in the section immediately to the south of the Marathon Jordan "B" No 1 well.

(10) Manzano had the choice and opportunity to dedicate the N/2 of said Section 14 to the Neuhaus Federal Well No 2 which would have placed the well at a standard location as to Marathon's spacing unit, but Manzano voluntarily elected not to do so.

(11) Again, rather than file for an unorthodox Wolfcamp gas well location, Manzano applied for a standard Strawn oil well location for its Neuhaus "14" Federal Well No 2 in Unit B of Section 14 to be drilled to a total depth of 12,400 feet.

(12) Manzano understood and appreciated the fact that the Division would subject this well location to a hearing and if opposed would impose a penalty on this well's producing capacity.

(13) And again, rather than drill to the permitted depth in the Strawn oil pool, when Manzano reached the Wolfcamp gas formation, it discovered it had encountered gas production correlative to that being produced by Marathon and elected to complete the subject well in the Wolfcamp.

(14) Manzano's Neuhaus "14" Federal Well No. 2 was completed at an unorthodox well location some two-third's closer to Marathon's spacing unit than permitted by Division rules.

(15) While Manzano recognized it would have to notify Marathon and obtain the Division's approval to produce the Wolfcamp formation after a hearing, Manzano sought an emergency order from the Division's Director to allow the illegal well to produce.

(16) On July 21, 1993, the Division Director granted Manzano's request for a temporary testing allowable which authorized Manzano to produce the subject well at a rate of 882 MCF/D until August 12, 1993, the date of the hearing in this matter.

(17) At the Commission hearing, Manzano confirmed that from July 25, 1993 until August 13, 1993 it had been producing the well at average rates in excess of 3,300 MCFPD which constitute violations of the Director's order letter of July 21, 1993.

(18) Thereafter, Manzano again sought and obtained an order from the Division Director without notice either to Marathon or the Division Examiner, this time seeking to obtain a testing allowable based upon a new 4-point test taken August 3, 1993 which indicated the well's CAOF of 35,240 MCFGPD. On August 13, 1993, the Division Director issued an order granting this request and approving production from August 13, 1993 to August 19, 1993 at a maximum daily rate of 11,740 MCFGPD.

(19) Marathon provided expert engineering data which was uncontested by Manzano, that the new four-point test used by the Director to approve the testing allowable was absolutely unreliable and inaccurate. In addition, the 4 points at which pressure data was taken for the four-point test failed to comply with the testing procedures set forth in the Division's 4-point well testing manual because they were taken too close to each other.

(20) Manzano testified at the Commission hearing that its well had been produced as high as 5,000 MCFPD and based upon a 4-point test dated September 27, 1993 had an CAOF capacity of 7,564 MCFPD. Thus the new testing allowable authorized by the Division Director did not in any way restrict the well's capacity to produce even though it was 1,320 feet closer to the Marathon spacing unit than allowed by Division rules.

(21) Based upon the foregoing, the Division issued a notice to Manzano dated August 19, 1993 directing that the illegal well be shut-in immediately and stay shut-in pending an order to be entered in this case.

(22) On September 21, 1993, the Division entered Order R-9974 which approved the Applicant's requested unorthodox gas well location BUT imposed a production penalty of 66.6 percent to be applied to the Neuhaus Federal No 2 well's ability to produce into the pipeline as determined from a deliverability test.

(23) On September 27, 1993 Manzano conducted a deliverability test resulting in a calculated absolute open flow potential of 7,564 MCFD BUT the calculation did not test the well's ability to deliver against pipeline pressure.

(24) On September 22, 1993, Manzano filed for a DeNovo hearing which was held by the Commission on October 14, 1993.

(25) As of the Commission hearing, Marathon had changed the tubing in it's Jordan "B" No. 1 Well from 2-3/8" to 3-1/2" thereby increasing the ability of this well to produce from 3,900 MCFPD to 4,900 MCFPD.

(26) The findings of the Division contained in Order R-9974 are well founded upon all of the evidence before the Commission and should be adopted by the Commission subject to the following modifications:

Engineering Findings

(a) the differences between Marathon and Manzano in estimates of original gas in place and the corresponding calculations of acre-feet per tract while reaching different results based upon different Z factors, do not form an adequate basis upon which to determine the location and position of the reservoir.

(b) However, the inclusion or exclusion of the Marathon's Jordan "B" Well No 2 (Unit G) in/from this Wolfcamp reservoir does make a material difference and is the point of greatest dispute between the parties and affects one of the factors to be used in calculating a penalty for the Manzano Well.

(c) By excluding Marathon's Jordan "B" Well No 2, Manzano's geologic interpretation allowed them to shift the entire reservoir farther south and more directly located over its spacing unit and still be consistent with their calculation of reservoir volume.

(d) By including Marathon's Jordan "B" Well No 2 in this same reservoir, Marathon's geologic interpretation located the entire reservoir farther north and more directly over its spacing unit and still provides a reservoir size which is consistent with their calculation of reservoir volume.

(e) Marathon's engineering witness provided uncontested evidence that the Jordan "B" Well No 2 was completed in 1985 with an initial pressure of 4700 psi; that when the Jordan "B" Well No 1 was completed in 1991 its initial pressure was 3800 psi; that the Jordan "B" Well No. 2 was the only well in the area which could have partially drained the reservoir and caused the pressure depletion measured in the Jordan "B" Well No 1; therefore these two wells are in fact in pressure communication and must be in the same reservoir.

(f) Manzano's engineering evidence sought to validate the Manzano geology based upon Manzano's conclusion that the Jordan "B" Well No 2 was not in the same reservoir as the Jordan "B" Well No 1.

(g) Manzano's engineer sought to exclude the Jordan "B" Well No. 2 from the reservoir based upon a P/Z plot which showed the pressure point from the Jordan "B" Well No 2 to be located off of the pressure decline plotted for the Neuhaus Federal Well No 2 Well and the Jordan "B" No 1 Well. However, Marathon's engineer testified that such a conclusion is flawed because liquid production from the Jordan "B" No 2 Well would affect the P/Z plot.

(h) Manzano failed to explain how the Jordan "B" Well No 1 could have an initial reservoir pressure of about 1,000 psi less than expected.

(i) The Commission finds that Marathon's engineering understanding and interpretation of the reservoir is more reliable than that presented by Manzano and therefore adopts Marathon's engineering conclusions.

Geologic Findings

(j) In addition to the inclusion or exclusion of the Jordan "B" Well No 2 from the reservoir, the parties had a substantial difference of geologic opinion concern the nature of the Wolfcamp deposition

(k) Marathon concluded that the Wolfcamp formation in this area was a deep water debris flow deposit with the thickest portion of the reservoir being influenced by a structure low while Manzano concluded that this was a shallow water carbonate buildup reef deposit.

(l) Marathon's conclusion that the Wolfcamp formation in this area is a deep water debris deposit was based upon: the regional deep water setting, the analysis of the drill cuttings above and below the Wolfcamp debris zone that exhibit basinal characteristics, and the fining upward character of the log at the top of the Wolfcamp which indicates transport deposition.

(m) The Commission finds that in a basinal setting such as exists for this immediate area, a deep water debris flow deposit is more probable than a shallow water carbonate buildup deposit.

(n) The Commission finds that Marathon's geologic interpretations of the reservoir more accurately reflects the reservoir's deposition, shape and orientation and therefore the representation of the reservoir as interpreted by Marathon should be considered a more accurate representation than that presented by Manzano.

penalty adjustment

(o) Based upon Marathon's geologic mapping, the reservoir occupies 6,748 ac-ft with 2,488 ac-ft underlying the E/2 of Section 14 and 3,953 ac-ft underlying the S/2 of Section 11.

(p) Based upon Marathon's material balance data, there are 3,158 MMCF left to be recovered from the reservoir.

(q) The remaining recoverable reserves for each tract should be proportional to the reservoir volume under each tract

(r) Allocating the remaining reserves utilizing the ratio of reservoir volume under each tract, the Neuhaus 14 Federal No 2 Well should be allowed to recover 37% of the remaining gas or 1,168 MMCF.

(s) In the absence of any penalty, the Manzano well would recover 55% of the remaining recoverable gas when in fact it is entitled to only 37%.

(t) With a 66.6% penalty, the Manzano well will recover 1,277 MMCF or 40% of the remaining recoverable gas.

(u) Therefore in order to protect the correlative rights of both Marathon and Manzano a production penalty of 66.6% imposed by the Neuhaus 14 Federal Well No 2 would allow both Marathon and Manzano to each recover their respective share of the remaining recoverable gas in the reservoir.

IT IS THEREFORE ORDERED THAT:

(1) Division Order No R-9974 is hereby affirmed and adopted as the order of the Commission with the inclusion of the above supplemental findings and with the exception of the changes ordered below:

(2) That Manzano is hereby ordered and directed to submit a new production test for the subject well to test the well's actual ability to deliver into the pipeline, such test to be witnessed by both the Oil Conservation Division and by personnel of Marathon Oil Company.

(3) The 66.6% penalty shall be applied to the subject well from the date of first production. In the event the well has been overproduced its production limitation factor allowable on a monthly basis (30 days being a month) then and in that event, the well shall be shut-in until that over production has been made up with a portion of the next month's production allowable.

(4) Jurisdiction of this cause is retained for the entry of such further orders as the Division and/or Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JAMI BAILEY, Member

WILLIAM W. WEISS, Member

WILLIAM J. LEMAY, Chairman and
Secretary

SEAL

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W. THOMAS KELLAHIN*
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JASON KELLAHIN (RETIRED 1991)

TELEPHONE (505) 982-4285
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November 1, 1993

2 1993

Mr. William Weiss
New Mexico Petroleum Recovery
Research Center, Kelly Building
New Mexico Tech Campus
Socorro, New Mexico 87801

Re: NMOCC Case 10796 (DeNovo) Order R-9974-A
Application of Manzano Oil Corporation
for an Unorthodox Gas Well Location,
Lea County, New Mexico

Dear Commissioner Weiss:

At the Commission hearing of the referenced case held on October 14, 1993, you questioned Mr. Craig Kent, Marathon's petroleum engineer, if it was feasible to establish a "no flow boundary" between the Manzano well and the Marathon well such that each well would then produce its "share of the reservoir" regardless of the reservoir volume under the two spacing units. Mr. Kent responded that it could not be done in the absence of knowing the reservoir volume per spacing unit.

Because your suggestion, if feasible, would provide the perfect solution for this dispute, I have asked Mr. Kent to again consider his answer. In response, he has provided me a letter dated October 29, 1993 in which he reaffirms his opinion. I have enclosed a copy of his letter for your information.

Very truly yours,

W. Thomas Kellahin

cc: Commissioners LeMay and Bailey
cc: Dow Campbell, Esq (Marathon Oil Company)
cc: William F. Carr, Esq. (attorney for Manzano)

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

October 29, 1993

Mr. W. T. Kellahin
Kellahin and Kellahin
Attorneys at Law
El Patio Building
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Santa Fe, New Mexico 87504

Via Fax (505) 982-2047

Dear Tom,

Concerning Commissioner Weiss's question about establishing a "no flow boundary" between the Marathon Jordan "B" No. 1 and the Manzano Neuhaus 14 Federal No. 2, I have made some additional investigations as you requested. At the hearing I responded to the question by Commissioner Weiss by saying that such a calculation could not be made unless the geology (and geometry) of the reservoir was known. A discussion of such a calculation is contained in Chapter 4 of SPE Monograph Number 1, *"Pressure Buildup and Flow Tests in Wells"* by Matthews and Russell. Section 2 entitled *"Determining Drainage Volumes of Wells"* states that "each well in a reservoir drains a volume proportional to its production rate." To make this calculation for the Lea Wolfcamp Reservoir, the reservoir would be divided into two pieces at the common lease line between the two wells and the volume of each piece calculated. The problem is that the geometry of the reservoir must be known to calculate the volume of each piece.

Using Marathon's geologic interpretation of the reservoir, 37% of the reservoir volume is located on Manzano's tract and 63% is located on Marathon's tract. To establish a no flow boundary at the lease line, the Manzano Neuhaus 14 Federal No. 2 could produce at a rate equal to 37% of the total rate from the two wells or 59% of the rate of the Jordan "B" No. 1. Using the current rate of 4.9 MMCFD from the Marathon Jordan "B" No. 1, the Manzano Neuhaus 14 Federal No. 2 could produce only 2.9 MMCFD to maintain the no flow boundary at the lease line. This represents 38% of their reported deliverability. The calculation of a specific rate applies at only one point in time. In order to utilize this method the calculation would have to be made continuously. To make the method manageable, the rate for the Jordan "B" No. 1 would have to be estimated for some future point in time (say one year) and the rate for the Manzano well would be based on the average rate of the Jordan "B" No. 1 for the period. Essentially that is what was presented in Marathon Exhibit Numbers 18-20. As shown on Exhibit 20

using an allowable of 33% of the deliverability of the Neuhaus 14 Federal No. 2 well, Manzano would be allowed to recover approximately 40% of the remaining reserves. However, as I stated earlier, to make either of these calculations the reservoir geometry and geology must be known.

I hope this additional information will be of help. If there is any additional information you need please let me know.

Sincerely,

C. T. Kent
Reservoir Engineer

xc: D. L. Campbell
D. R. Petro
T. N. Tipton

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& SHERIDAN, P.A.
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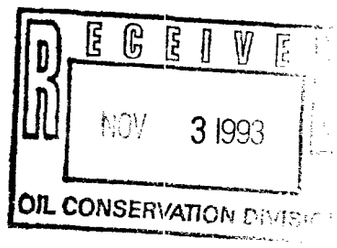
November 3, 1993



HAND-DELIVERED

William J. LeMay, Director
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
State Land Office Building
Santa Fe, New Mexico 87503

Re: Application of Manzano Oil Corporation for an Unorthodox Gas Well Location, Lea County, New Mexico

Dear Mr. LeMay:

Pursuant to the Oil Conservation Commission's request, I am enclosing for your consideration the proposed order of Manzano Oil Corporation in the above-referenced case.

If the Commission needs any additional information from Manzano to proceed with its consideration of this application, please advise.

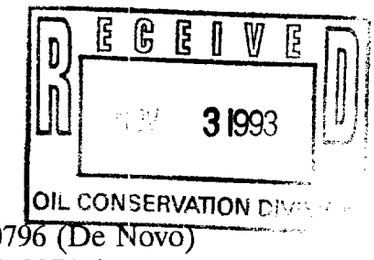
Very truly yours,

WILLIAM F. CARR

WFC:mlh
Enclosure
cc: W. Thomas Kellahin, Esq. (w/enclosure)

Mr. Ken Barbe (w/enclosure)
Manzano Oil Corporation
Post Office Box 2107
Roswell, NM 88202-2107

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



IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF
NEW MEXICO FOR THE PURPOSE OF
CONSIDERING:

Case No. 10796 (De Novo)
Order No. R-9974-A

APPLICATION OF MANZANO OIL CORPORATION
FOR AN UNORTHODOX GAS WELL LOCATION,
LEA COUNTY, NEW MEXICO.

MANZANO OIL CORPORATION'S PROPOSED
ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 a.m. on October 14, 1993, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this _____ day of November, 1993, the Commission, a quorum being present and having considered the testimony, the exhibits received at said hearing, and being fully advised in the premises,

FINDS THAT:

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

(2) The applicant, Manzano Oil Corporation ("Manzano") seeks approval of an unorthodox gas well location 660 feet from the North line and 1650 feet from the East line (Unit B) of Section 14, Township 20 South, Range 35 East, NMPM, Lea County, New Mexico for its Neuhaus Federal Well No. 2 which has been drilled and completed in the Wolfcamp formation, Lea-Wolfcamp Pool. A federal tract comprised of the E/2 of said Section 14 is dedicated to the well forming a standard 320-acre gas spacing and proration unit.

(3) At the time of the hearing, Marathon Oil Company ("Marathon"), a direct offset operator to the north of the subject acreage and operator of the standard 320-acre gas spacing and proration unit comprising the S/2 of Section 11, Township 20 South, Range 35 East, Lea-Wolfcamp Pool, appeared at these proceedings in opposition to this application and tendered witnesses and offered evidence in support of its protest. A fee tract comprised of the S/2 of said Section 11 is currently dedicated to Marathon's Jordan "B" Well No. 1 located 660 feet from the South line and 1980 feet from the East line of Section 11.

(4) The Marathon Jordan "B" No. 1 Well was drilled in 1984 and completed in the Morrow formation as a commercial producer. In 1991 the well was abandoned in the Morrow, plugged back and completed in the Wolfcamp formation, Lea-Wolfcamp Pool. It first produced from the Wolfcamp formation in January, 1992. The Marathon well produces at a rate of approximately 4.9 MMCF per day and through August, 1993 had cumulative gas production of more than 2.7 BCF and 274,000 barrels of condensate.

(5) The Manzano Neuhaus Federal No. 2 Well was originally proposed and permitted as an oil test at a standard oil well location for the Strawn formation. This area contains multiple zones with potential for commercial hydrocarbon production and the Wolfcamp formation as well as the Strawn was a factor in selecting this location.

(6) The Manzano and Marathon wells are each set back 660 feet from the common spacing unit boundary between the wells. However, the Manzano well is at an unorthodox location under Division rules because Manzano was unable to reach a voluntary agreement with the owner of the NW/4 of Section 14 for development of this acreage with the N/2 unit and, instead, an E/2 spacing unit was dedicated to the well.

(7) The Manzano well was spud on June 3, 1993. After drilling into the Wolfcamp formation, a drill stem test was run which showed an excellent reservoir that had been partially drained. The well was drilled an additional 169 feet and then drilling ceased and the well was completed in the Wolfcamp formation because (a) drainage was occurring in the Wolfcamp (initial reservoir pressure of approximately 3800 pounds had declined to an initial pressure of 2,129 pounds in the Manzano well); (b) the 9.2 gallon mud system created a hydrostatic mud column of 5429 psi resulting in a wellbore that was over balanced by 3300 psi; (c) the reservoir had high permeability and had already undergone significant skin damage; (d) the well was taking fluid; and (e) continued drilling could cause extensive damage to the Wolfcamp reservoir.

(8) Manzano sought and was given permission by the Division Director to produce a temporary testing allowable pending a hearing to obtain approval of the well's location. Manzano was required to provide daily production data to the Division at the end of the temporary testing allowable period. This period ended on August 19, 1993 and the required

data was provided to the Division on August 20 and 24, 1993. The well was shut-in on August 20, 1993 and remained shut-in until Order No. R-9974 was entered on September 21, 1993.

(9) Both Manzano and Marathon presented geologic and engineering evidence in this case.

(10) The geologic evidence presented by Manzano shows:

(a) The Lea-Wolfcamp Pool is a carbonate buildup which is a small localized mound or pod feature which flanks off quickly. This was confirmed by cross-sections of the gross Wolfcamp interval which were presented by both parties which show: 1) little variation in the thickness from the Base of the Middle Wolfcamp Pay Interval to the Top of the Wolfcamp across the area of interest; and 2) significant wedging of the sediments directly overlying the buildup (67 feet in the Manzano well, 108 feet in the Jordan B #1 and 136 feet in the Jordan B #2) which is indicative of a carbonate buildup and in direct conflict with a debris flow model (see Manzano Exhibits 3 through 5, Brown Tr. at ___, compare Marathon Exhibits 7 through 9);

(b) The Middle Wolfcamp Pay Interval is 131 feet thick with 126 feet of clean dolomite in the Manzano well becoming substantially thinner and dirtier moving toward the Marathon well, which is 63 feet thick and has only 40 feet of clean dolomite (Manzano Exhibit 7, Tr. p. ___); and

(c) The Manzano well has more than twice as much pay as the Marathon well.

(1) clean dolomite porosity greater than 4% in each well: 115 feet v. 39 feet.
(Manzano Exhibits 7, 9 and 11, Tr. at __);

(2) porosity greater than 10%: 43 feet v. 11 feet.
(Manzano Exhibit 7, Tr. at __);

(3) porosity greater than 15%: 21 feet v. 4 feet.
(Manzano Exhibit 7, Tr. at __);

(4) net porosity feet in each well (no cut off):
11.6 feet v. 5.3 feet.

(Manzano Exhibit 7, Tr. at __);

(5) net hydrocarbon feet in each well (no cut off):
10.3 feet v. 4.6 feet.
(Manzano Exhibit 7, Tr. at __); and

(6) clean dolomite porosity feet greater than 4% in each well:
10.9 feet v. 3.3 feet.
(Manzano Exhibits 7, 10 and 12, Tr. at __).

(11) Marathon presented a geologic interpretation which:

(a) characterized the Wolfcamp formation in the Lea-Wolfcamp Pool as a debris flow deposit in direct conflict with the observed wedging of the overlying sediments and the lack of isopach thickness variations from the Base of the Middle Wolfcamp Pay Interval to the Top of the Wolfcamp typical of carbonate buildups (see Marathon Exhibits 7 through 9 and compare Manzano Exhibits 3 through 5);

(b) extended the Wolfcamp formation to the north to include the Jordan "B" No. 2 Well: an abandoned well in the Middle Wolfcamp located in Unit G of Section 11;

(c) extended the thickest portion of the pay to the north from the Neuhaus Federal No. 2 Well although the following data shows it should extend to the south;

(1) there are only 39 feet of clean porosity greater than 4% in the Marathon well and where there are 90 feet in the Manzano well. (Marathon dropped 10 feet of pay within the main body of the pay interval and cut off the lower 15 feet of clean dolomite porosity in the Manzano well even though the porosity logs show greater than 4% porosity and the resistivity log shows a profile which is indicative of reservoir quality rock in this section). (Marathon Exhibit 8, Gholston, Tr. at __);

(2) the crest of the structural deflection seen at the Base of the Middle Wolfcamp Pay Interval is located south of the Neuhaus Fed. #2 and would be the likely depocenter under either the carbonate buildup or debris flow models, which disagrees with

the thickening of the pay north of the Neuhaus well as shown by Marathon. (Manzano Exhibit 10, Gholston, Tr. at __);

(d) showed a thickening of the pay to the east of the Marathon well in the SE/4 of Section 11 based on broad contour spacing on the Marathon acreage, tight contour spacing on the Manzano acreage with no control points or geologic evidence to support this interpretation. (Marathon Exhibit 10).

(12) Although there is general disagreement between the two parties regarding the exact shape and thickness of the reservoir, the evidence presented in this case by Manzano and Marathon is in general agreement that:

(a) the Wolfcamp formation in the Lea-Wolfcamp Pool is a small localized geologic feature with the productive reservoir limited to portions of the SE/4 of Section 11 and portions of the NE/4 of Section 14, Township 20 South, Range 35 East. (Manzano Exhibits 9 through __; Marathon Exhibits 9 and 10);

(b) the Manzano and Marathon wells are equal distance from the common spacing unit boundary between their spacing units;

(c) the Manzano well is 60 feet structurally high to the Marathon well on the top of the Middle Wolfcamp pay interval;

(d) the Middle Wolfcamp pay interval is more than twice as thick in the Manzano well as in the Marathon well; and

(e) there is more than twice as much pay in the Manzano well as in the Marathon well.

(13) Marathon's interpretation of the shape and orientation of the reservoir is based on its inclusion of the Jordan "B" Well No. 2 located 1980 feet from the North line and 2310 feet from the East line (Unit G) of Section 11 within the Lea-Wolfcamp Pool. (Marathon Exhibits 9 and 10, Gholston Tr. at __). Although Manzano excludes the Jordan "B" Well No. 2 from the pool, it presented evidence which showed that even if the Jordan "B" Well No. 2 was in this reservoir, the majority of the remaining recoverable reserves are under the Manzano tract in the NE/4 of Section 14. (Compare, Manzano Exhibit 9 which includes the Jordan "B" Well No. 2 and shows 2378 acre feet (31%) under Section 11 and 5404 acre feet (69%) under Section 14 and Manzano Exhibit 11 which excludes the Jordan

"B" Well No. 2 and shows 1689 acre feet (18%) under Section 11 and 7728 acre feet (82%) under Section 14).

(14) The shape and orientation of the reservoir as interpreted by Manzano should be considered a more accurate representation than that presented by Marathon, for Manzano's interpretation correctly describes the Lea-Wolfcamp reservoir as a carbonate buildup, honors all data on the reservoir, uses consistent and symmetrical contour spacing patterns, and does not arbitrarily exclude part of the Middle Wolfcamp Pay Interval.

(15) The engineering evidence presented by Manzano shows:

(a) material balance calculations, P/Z curves, pressure-time curves, and pressure decline gradients demonstrate that the Jordan "B" Well No. 2 is not in the same reservoir with the Jordan "B" Well No. 1 and the Neuhaus Federal Well No. 2. (Manzano Exhibits 13 through 17, Ausburn, Tr. at __);

(b) there are approximately 9,296 net acre feet in this reservoir (Manzano Exhibit 20, Ausburn, Tr. at __) which confirms Manzano's geologic interpretation for a two well pool of 9417 acre feet. (Manzano Exhibit 11).

(c) the Marathon Jordan "B" Well No. 1 is capable of producing at an average maximum rate of 4.9 MMCF per day, a rate comparable to that of the Manzano Neuhaus Federal No. 2 Well which has produced at a maximum rate of 5.0 MMCF per day. (See testimony of Ausburn, Tr. at __);

(d) with the Jordan "B" Well No. 1 and the Neuhaus Federal No. 2 Well producing at comparable rates, the drainage boundary between these wells would extend 123 feet across the common lease line into the Manzano tract. (Manzano Exhibit 21, Calculated Drainage Area Boundary, Tr. at __).

(16) The engineering data presented by Marathon showed only 6842 acre feet in the reservoir (Marathon Exhibit 12, Kent Tr. at __) compared to the 9296 acre feet calculated by Manzano ((Manzano Exhibit 20, Ausburn, Tr. at __). This difference in calculating reservoir volume is attributable to two factors:

(a) Manzano's calculations for a two well pool included all pressures and all gas and condensate volumes for the Jordan "B" No. 2 Well and the

Neuhaus Federal No. 2 Well. Marathon interpreted the Lea-Wolfcamp Pool to contain three wells and, although it included the Jordan "B" No. 2 Well in the reservoir, it did not include in its calculations any pressure or production data from this well nor did it include the condensate production from the Jordan "B" No. 1 Well nor the Neuhaus Federal No. 2 Well (Marathon Exhibits 11 and 12, Kent, Tr. at __). The omission of 317,374 bbls of condensate in its original gas form in the reservoir made Marathon's calculations of the original gas in place and therefore acre-feet considerably smaller than actual;

(b) the Z factor or compressibility factor, used by Marathon was based on Pressure-Volume Relations for a Constant Composition Expansion from its Osudo Reservoir Fluid Study for the Jordan "B" No. 1 Well (Marathon Exhibit 21, Kent, Tr. at __) whereas Manzano used a Constant Volume Depletion Study adjusted for two phases in the reservoir from Marathon's Osudo Reservoir Fluid Study for the Jordan "B" No. 1 Well. (Marathon Exhibit 21, Manzano Exhibit 14, Ausburn, Tr. at __).

(17) Manzano's use of a Constant Volume Depletion Study adjusted for a two phase reservoir more accurately reflects what occurs in this reservoir than the Z factor used by Marathon. (See Ausburn, Tr. at __; Kent, Tr. at __). Technical References: (a) SPE 16984, Vo, Jones and Raghavan 1987; (b) Craft and Hawkins; (c) Engineering Applications of Phase Behavior of crude Oil and Condensate Systems by Phillip L. Moses. Journal of Petroleum Technology, July 1986.

(18) The evidence also established that Marathon's use of a Z factor based upon Constant Composition Expansion can result in a 20% reduction in the net acre feet calculated for a reservoir (Kent, Tr. at __).

(19) Failure to use the correct Z factor and the gas equivalent volume of liquid condensate resulted in Marathon calculating a reservoir size that was too small by an error factor in excess of 20%.

(20) The size of the subject reservoir as calculated by Manzano should be considered a more accurate representation than that presented by Marathon.

(21) The evidence presented by both Manzano and Marathon is in agreement that if the Manzano well was at a standard location 1980 feet from the North line of Section 14 it would either be outside the reservoir or could not efficiently drain the reserves under the NE/4 of Section 14. (See, Brown, Tr. at __; Marathon Exhibit 14; Kent, Tr. at __).

(22) The unorthodox well location of the Manzano Neuhaus Federal Well No. 2 is not only at a better geologic position than the nearest standard well location in the Lea-Wolfcamp Pool, it is necessary if Manzano is to be afforded the opportunity to produce its just and equitable share of the reserves underlying the NE/4 of Section 14 thereby protecting its correlative rights and therefore this well location should be approved.

(23) Whenever an unorthodox location is approved, the Division may take such action as will offset any advantage which the person securing the exception may obtain over other producers by reason of the unorthodox location. (See, Oil Conservation Division Rule 104G).

(24) Marathon presented evidence based on its geological interpretation and reservoir calculations which showed that if the Manzano Neuhaus Federal Well No. 2 was permitted to produce at unrestricted rates it could recover 55% of the remaining recoverable reserves in the Lea-Wolfcamp Pool and recommended a penalty on the Manzano well equal to 67% of the well's deliverability. Manzano's more accurate representation of the reservoir which shows that 82% of the acre-feet are under Section 14 if the Jordan "B" No. 2 is excluded, and 69% of the acre-feet are under Section 14 if the Jordan "B" No. 2 is included clearly does not create an advantage if Manzano only recovers 55% of the remaining reserves. (Marathon Exhibit 19, Kent, Tr. at __).

(25) Although there is a general disagreement between the two parties regarding the size and orientation of the reservoir, the Commission must act to protect the correlative rights of the parties and Manzano's geologic interpretation and reservoir calculations have been shown to be a more accurate representation than that presented by Marathon.

(26) Although the Oil Conservation Commission is allowed to impose a penalty on a well to offset the advantage gained on other producers by reason of the unorthodox location, the Commission would not protect the correlative rights if it imposed a penalty on a well that has not gained an advantage because of its unorthodox location but instead has merely encountered better reservoir on a tract under which there are more remaining recoverable reserves.

(27) Since the Manzano well is no closer than the Marathon well to the common boundary between the subject spacing units, since it would be at a standard set back from this boundary if a N/2 spacing unit could have been dedicated to the well, and since there is no drainage from the Marathon tract by the Manzano well, no advantage is gained on Marathon by reason of this unorthodox location.

(28) the Middle Wolfcamp formation in the Manzano Neuhaus Federal Well No. 2 is more than twice as thick and of better quality than this formation in the Marathon Jordan "B" No. 1 Well.

(29) The evidence demonstrates that the Marathon well is draining reserves from underneath the Manzano acreage and will continue to drain reserves even if no penalty is imposed on the Manzano well, thereby making the Manzano well necessary to offset this drainage within the limited confines of this reservoir.

(30) A penalty in this case would impair the correlative rights of Manzano since the unorthodox location of the Manzano Neuhaus Federal No. 2 Well was necessary to capture production now being drained from the Manzano acreage by the Marathon Jordan "B" No. 1 Well and to enable Manzano to produce the recoverable reserves under its tract.

IT IS THEREFORE ORDERED THAT:

(1) The application of Manzano Oil Corporation for an unorthodox gas well location 660 feet from the North line and 1650 feet from the East line (Unit B) of Section 14, Township 20 South, Range 35 East, NMPM, Lea County, New Mexico is hereby approved for its Neuhaus Federal Well No. 2 which has been drilled and completed in the Wolfcamp formation, Lea-Wolfcamp Pool.

(2) The E/2 of said Section 14 shall be dedicated to the above-described well forming a standard 320-acre gas spacing and proration unit.

(3) No limitation or penalty on any gas production from the Middle Wolfcamp formation by this well shall be imposed.

(4) Jurisdiction is hereby 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 COMMISSION

JAMI BAILEY, Member

WILLIAM W. WEISS, Member

WILLIAM J. LeMAY
Chairman

S E A L

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& SHERIDAN, P.A.
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November 10, 1993

HAND-DELIVERED

William J. LeMay, Director
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
State Land Office Building
Santa Fe, New Mexico 87503

Re: Application of Manzano Oil Corporation for an Unorthodox Gas Well Location, Lea County, New Mexico

Dear Mr. LeMay:

By letter dated November 3, 1993 we provided Manzano's proposed Order in the above-referenced case.

We have discovered that Finding Paragraph 16 (a) on page 6 of the proposed Order confuses the Jordan "B" No. 2 Well with the Jordan "B" No. 1 Well. The first sentence of this sub-paragraph should read as follows: (a) "Manzano's calculations for a two well pool included all pressures and all gas and condensate volumes for the Jordan "B" No. 1 Well and the Neuhaus Federal No. 2 Well."

Your attention to this matter is appreciated.

Very truly yours,

WILLIAM F. CARR

WFC:mlh

cc: Mr. Ken Barbe
Manzano Oil Corporation
Post Office Box 2107
Roswell, NM 88202-2107

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

December 27, 1993

RE: CASE NO. 10796
Order No. R-9974-A

Mr. William F. Carr
Campbell, Carr, Berge & Sheridan
Attorneys at Law
Post Office Box 2208
Santa Fe, New Mexico 87504-2208

Dear Mr. Carr:

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

Sincerely,

Florene Davidson

Florene Davidson
OC Staff Specialist

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD
Thomas Kellahin

STATE OF NEW MEXICO OIL CONSERVATION DIVISION

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION '94 JUN 6 AM 8 50
HOBBS DISTRICT OFFICE

BRUCE KING
GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88241-1980
(505) 393-6161

Case 10796

June 2, 1994

Manzano Oil Corp.
ATT: Charles Hicks
P O Box 2107
Roswell, NM 88202

RE: ANNUAL DELIVERABILITY TEST (R-9974-A)
Neuhaus Federal #2-B,
Sec.14, T-20S, R-35E

Gentlemen:

Please schedule your annual deliverability test on the Neuhaus Federal #2-B, Sec. 14, T-20S, R-35E for October 1994. This will be one (1) year from the deliverability test that is now being used to assess the 50% production penalty that order R-9974 requires.

It should also be noted that Marathon and the OCD District I Supervisor be notified of the date and time of the test so it can be witnessed by both Marathon and the Oil Conservation Division.

Yours very truly,

OIL CONSERVATION DIVISION

Jerry Sexton
District I, Supervisor

JS:dp
cc:Bill LaMay
Steve Guidry, Marathon

cc/m Kellahin

New Mexico DRUG FREE It's a State of Mind!