Entered July 11, 1984

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. 7750
Order No. R-7589

APPLICATION OF SUPERIOR OIL
COMPANY FOR DESIGNATION OF
A TIGHT FORMATION, LEA
COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on December 1, 1982, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this 11th day of July, 1984, 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, pursuant to Section 107 of the Natural Gas Policy Act of 1978, and C.F.R. §271.703, the applicant, Superior Oil Comapny, seeks the designation of a "tight formation" of the Morrow formation underlying the following described lands:

LEA COUNTY, NEW MEXICO

TOWNSHIP 24 SOUTH, RANGE 33 EAST, NMPM
Sections 11 through 14: All
Sections 23 through 26: All
Sections 35 and 36: All

TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM

Section 7:	S/2
Section 8:	S/2
Section 9:	S/2
Section 14:	W/2
Sections 15 through 17:	All
Section 18:	W/2
Sections 19 through 22:	All
Section 23:	W/2
Section 26:	W/2
Sections 27 through 34:	All
Section 35:	W/2

containing 18,560 acres, more or less, of State, Federal, and Fee lands.

(3) That the type log for the Morrow formation in the area proposed for "tight formation" designation is the Bore Hole and Compensated Sonic Log run in the applicant's Government "L" Well No. 1 located 1980 feet from the North and East lines of Section 18, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico.

(4) That although said well is located in the E/2 of said Section 18 which is a "windowed area" in the proposed designated area, it is the only well in the area that penetrates the entire Morrow formation.

(5) That the top and bottom of the Morrow formation is found at depths of approximately 13,845 feet and 15,180 feet, respectively, on said type log.

(6) That the Morrow formation underlies all of the area under consideration; that the dominant reservoir rocks in the area are fine to course grained, well sorted and predominantly quartzose; calicite and dolomite cements are dominant in the finer grain clastics; and silica and clay cements are dominant in the courser clastics.

(7) That the Morrow sandstone within the proposed designated area is of Pennsylvanian age and consists of progradational phases of Morrowan clastic sequences alternated with marine transgressions which formed numerous onlap and offlap sequences upon and above the Late Mississippian unconformity. The lithology of the described carbonate sequence is that of shallow marine grainstones, silts, and marine shelf mudstones. The clastic sequence is made up of marine shelf shales interbedded with offshore bar sands, silts and barrier bar sands.

(8) That the top of the Morrow formation underlying the lands described in Finding Paragraph No. (2) above ranges from an estimated 11,500 feet below sea level to 9,500 feet below sea level, thus demonstrating a regional relief in said formation of approximately 2,000 feet, dipping from North to South in the area of interest.

(9) That the applicant excluded from consideration a small area or "window," as previously alluded to in Finding Paragraph No. (4) above, consisting of the E/2 of Section 28, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico.

(10) That this "window" was excluded from consideration by the applicant due to its anomalous reservoir and production characteristics and to the high permeabilities which are exhibited in this area.

(11) That ten wells have been drilled into or through the Morrow formation within the proposed designated area; of these, seven were completed as gas wells in the Morrow formation as of October 25, 1982, and three have been plugged and abandoned.

(12) That the applicant presented testimony that the weighted arithmetic average in situ reservoir permeability of the Morrow formation in the proposed designated area, as derived from either core analysis, pressure buildup utilizing the Horner method, Odeh and Jones back pressure test calculations, or Holditch and Lee one rate transient calculations, said methods or calculations being derived from various technical data available on each of the said ten wells within the proposed designated area, is 0.0893 millidarcies.

(13) That the evidence presented and technical data available on said three plugged and abandoned wells is insufficient to either calculate or show the permeability of the Morrow formation around their respective wellbores, and should therefore be excluded from the weighted arithmetic average in situ reservoir permeability calculation, as described above.

(14) That the resulting weighted arithmetic average in situ reservoir permeability of the Morrow formation as determined from the technical data available on the remaining seven wells in the proposed designated area is 0.1338 millidarcies.

(15) That said resulting *in situ* permeability of the Morrow formation in the proposed designated area is slightly above the 0.1 millidarcy minimum set forth in part in 18 C.F.R. §271.703(C)(2)(I)(B)(c) and (d).

(16) That the applicant's Government "L" Com Well No. 2 located 1980 feet from the South line and 1800 feet from the West line of Section 18, Township 24 South, Range 34 East, NMPM, South Bell Lake-Morrow Gas Pool, Lea County, New Mexico, is within an area of high permeability and should therefore be excluded from the weighted arithmetic average *in situ* reservoir permeability calculation, referred to in Finding Paragraph No. (14) above.

(17) That the resulting weighted arithmetic average *in situ* reservoir permeability of the Morrow formation as determined from the technical data available on the remaining six wells in the proposed designated area is now 0.0882 millidarcies.

(18) That said Government "L" Com Well No. 2, as described above, is located in the W/2 of said Section 18 and is immediately adjacent to the "windowed area," comprising the E/2 of said Section 18.

(19) That the evidence presently available does not adequately show that the "anomalous area," as described in Finding Paragraph No. (10) above, is confined to the "windowed area" comprising the E/2 of said Section 18 and due to its proximity to the northern boundary of the proposed designated area, where little evidence was presented on any wells outside said designated area, the "windowed area" should therefore be expanded to include the W/2 of Section 18 and the S/2 of Section 7, both in Township 24 South, Range 34 East, NMPM, Lea County, New Mexico.

(20) That the lands with which this order will hereinafter be concerned are described as follows:

LEA COUNTY, NEW MEXICO

TOWNSHIP 24 SOUTH, RANGE 33 EAST, NMPM
Sections 11 through 14: All
Sections 23 through 26: All
Sections 35 and 36: All

TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM
Section 8: S/2
Section 9: S/2
Section 14: W/2
Sections 15 through 17: All
Sections 19 through 22: All
Section 23: W/2
Section 26: W/2
Sections 27 through 34: All
Section 35: W/2

containing 17,920 acres, more or less, of State, Federal, and Fee lands.

(21) That of the six wells in the proposed designated area which have been completed in the Morrow formation, none has produced crude oil.

(22) That within the proposed area, as described in Finding Paragraph No. (20) above, a pre-stimulated flow rate data is available on only one well, the applicant's Government "M" Well No. 2 located 1980 feet from the North line and 660 feet from the East line of Section 17, Township 24 South, Range 34 East, NMPM, South Bell Lake-Morrow Gas Pool, Lea County, New Mexico, and was at 720 MCF of gas per day.

(23) That the average depth to the top of the Morrow formation within said proposed designated area is 14,287 feet, and the maximum stabilized production rates for wells of this depth set forth in part in 18 C.F.R. §271.703(B)(2)(b) is 2,212 MCF per day.

(24) That the stimulation required to produce a commercial flow of gas from Morrow wells in the proposed area of designation often consists of two separate treatments, the first consisting of an acid treatment of from 3,000 to 5,000 gallons of acid, and the second consisting of a 2% to 5% mixture of KCL water with 350 to 1,000 SCF/bbl of nitrogen.

(25) That the data available indicates that the Morrow formation within the proposed designated area, as described in Finding Paragraph No. (20) above, meets all the criteria set forth in 18 C.F.R. §271.703(C)(2)(a), (b), (c), and (d), viz:

(a) The estimated average in situ permeability throughout the pay section is expected to be less than 0.1 millidarcies;

(b) The stabilized production rate, against atmospheric pressure, for wells completed for production in the Morrow formation, without stimulation, is not expected to exceed 2,212 MCF per day (the average depth to the top of the formation is 14,287 feet);

(c) No well drilled into the formation is expected to produce more than five barrels of crude oil per day; and

(d) The Division has not authorized the formation or any portion thereof to be developed by infill drilling.

(26) That the usually required casing and cementing programs for oil and gas wells in the area require surface casing to be set at approximately 580 feet with cement circulated to the surface, and a string of intermediate casing to be set approximately 5,200 feet (which is below the uppermost of water sands) with cement circulated to the surface. Production casing is usually set at a total depth and cemented back to the intermediate casing.

(27) That the above described casing and cementing programs for oil and gas wells drilled in the area are in conformance with existing state and federal regulations and will assure that development of the Morrow formation within the proposed area of designation, as described in Finding Paragraph No. (20) above, will not adversely affect any fresh water aquifers (during both hydraulic fracturing and waste disposal operations) that are or are expected to be used as a domestic or agricultural water supply.

(28) That the Morrow formation underlying the lands described in Finding Paragraph No. (20) above should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703, that the Morrow formation underlying the following described lands in Lea County, New Mexico, be designated as a tight formation:

TOWNSHIP 24 SOUTH, RANGE 33 EAST, NMPM
Sections 11 through 14: All
Sections 23 through 26: All
Sections 35 and 36: All

TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM

Section 8: S/2
Section 9: S/2
Section 14: W/2
Sections 15 through 17: All
Sections 19 through 22: All
Section 23: W/2
Section 26: W/2
Sections 27 through 34: All
Section 35: W/2

containing 17,920 acres, more or less, of State, Federal, and Fee lands.

(2) 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

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