Entered January 21, 1983

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. 7735
Order No. R-7186

APPLICATION OF BASS ENTERPRISES
PRODUCTION CO. FOR DESIGNATION OF A
TIGHT FORMATION IN EDDY AND LEA
COUNTIES, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9:00 a.m. on November 23, 1982, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 21st day of January, 1983, 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 18 C.F.R. §271.703, applicant Bass Enterprises Production Company seeks the designation as a "tight formation" of a Morrow formation underlying the lands described on Exhibit "A" attached to this order.

(3) That the Morrow sediments within the proposed designated area are of Pennsylvanian Age.

(4) That the type log for the Morrow formation in the area proposed for designation is the Gamma Ray-Neutron log dated September 1, 1953 and March 27, 1954 run in the Richardson and Bass Federal Legg Well No. 1 in Unit B of Section 27, Township 22 South, Range 30 East, NMPM, Eddy County, New Mexico.

(5) That the top and bottom of the Morrow formation are found at depths of 13,445 feet and 14,742 feet, respectively, on said type log.

(6) That the Morrow formation in this area is characterized by three depositional stages being:

(A) A lower stage involving basinal shales and limey shales during early Morrow time;

(B) A central stage dominated by clastic turbidite environment of deposition; and

(C) An upper stage dominated by limestones and shales being deposited with sporadic influxes of clastic turbidites occurring.

(7) That the Morrow formation underlies all of the area under consideration; that the reservoir rocks in the area are dominantly very fine grained angular to subangular quartz-rich sands with abundant cementation due to silica, clays and calcite.

(8) That the common reservoir rocks are the sands deposited in said central and upper depositional stages.

(9) That the top of the Morrow formation underlying the area proposed for designation ranges from a vertical depth of 11,387 feet in the northwest to 14,710 feet in the southeast with the formation exhibiting a general northwest to southeast dip.

(10) That the known thickness of the Morrow formation in the proposed area varies from approximately 928 feet in the northwest to 1,475 feet in the southeast.

(11) That 101 wells have been drilled into or through the Morrow formation within the proposed area; of these, 37 wells were completed as gas wells in the Morrow formation as of June 1, 1982, 31 wells were completed in other formations, 26 wells were plugged and abandoned, and data was not available on the remaining 7 wells.

(12) That within the proposed area, 92 Morrow formation drill stem tests were performed which yielded an average flow of 468 MCF of gas per day.

(13) That pre-stimulated flow rates based on 104 tests averaged 197 MCF of gas per day.

(14) That the average depth to the top of the Morrow formation within the proposed area is 13,600 feet, and the maximum stabilized production rates for wells of this depth set forth in 18 C.F.R. §271.703(B)(2)(b) is 1913 MCF per day.

(15) That within the proposed area the average initial producing rate of wells put on line for production is 1250 MCF of gas per day.

(16) That thirteen wells within and immediately adjacent to the proposed area had been cored.

(17) That cores or core data from seven of these wells could not be used as the core and/or data were missing, older less accurate permeability test procedures were used, or the cores had become broken up and were no longer useful for permeability analysis.

(18) That of the remaining six cores, four displayed permeabilities of less than 0.1 millidarcy either when measured at the surface or when calculated overburden pressure was applied.

(19) That cores from the remaining two wells displayed permeabilities greater than 0.1 millidarcy, however, such cores are from wells in "window" areas not sought for tight formation designation.

(20) That 20 samples from three of the aforesaid cored wells, selected over a wide range of surface permeability corrected for an average overburden pressure of 5483 lbs. (range of 5200 to 5730) were used by the applicant to demonstrate a relationship between log derived porosity and permeability.

(21) That log derived porosity was found to be in good agreement with in situ core derived porosity; was determined for 76 wells within the proposed area of designation; and was converted, using the established trends determined by core analyses, to an in situ permeability.

(22) The arithmetic average in situ reservoir permeability of the Morrow Formation as determined from said core analysis-well log evaluation for the proposed area is 0.0684 md.

(23) That the following areas exhibited high permeabilities coupled with limited productive zones as evidenced, in many cases, by the rapid depletion of the reservoirs; hence, said areas have been properly "windowed" out of the proposed area for designation:

Township 20 South, Range 30 East, NMPM
Section 35: S/2

Township 21 South, Range 28 East, NMPM
Section 3: Lots 1, 2, 7, 8, 9, 10, 15 and 16
Section 21: E/2
Section 26: N/2
Section 29: N/2

Township 21 South, Range 29 East, NMPM
Section 8: S/2

Township 23 South, Range 29 East, NMPM
Section 13: E/2

Township 23 South, Range 30 East, NMPM
Section 18: N/2

Township 24 South, Range 30 East, NMPM
Section 8: S/2
Section 17: W/2

(24) That of the 37 wells in the proposed designated area which have been completed in the Morrow formation, none has produced crude oil.

(25) The data available indicates that the Morrow formation in the proposed area for designation meets all the criteria set forth in 18 C.F.R. §271.703(C)(2)(I)(B)(c), and (d), to wit:

(a) Estimated average in situ permeability throughout the pay section is expected to be less than 0.1 millidarcy;

(b) Stabilized gas production rate, against atmospheric pressure, of wells completed for production in the formation, without stimulation, is not expected to exceed 1,913 Mcf per day (the average depth to the top of the formation is 13,600 feet);

(c) No well drilled into the formation is expected to produce more than 5 barrels of crude oil per day; and

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

(26) In order to secure a commercial flow of gas from Morrow wells within the proposed designated area, stimulation is generally required and often consists of two types; the first being treatment with from 250 to 10,000 gallons of acid, and the

second consisting of fracture treatment with from 3,000 gallons to 300,000 gallons of gelled water and sand.

(27) That the usually required casing and cementing programs for oil and gas wells in the area provide for surface casing to be set below the fresh water sands with cement circulated to the surface. Most wells also have a string of intermediate casing set at an average depth of 3647 feet with cement circulated to the surface.

(28) 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 in the proposed area will not adversely affect the fresh water aquifers during either hydraulic fracturing or waste disposal operations.

(29) That the Morrow formation underlying the lands described in Exhibit A attached hereto and made a part hereof 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 approximately 319,000 acres, more or less, in Eddy and Lea Counties, New Mexico, as described in Exhibit A attached hereto and made a part hereof, be designated as a tight formation.

(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

S E A L

BASS ENTERPRISES MORROW FORMATION PROPOSED
TIGHT FORMATION DESIGNATION AREA,
EDDY AND LEA COUNTIES, NEW MEXICO

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
Section 27: S/2
Section 33: E/2
Section 34 and 35: All

TOWNSHIP 20 SOUTH, RANGE 30 EAST, NMPM
Sections 25 and 26: All
Sections 31 through 34: All
Section 35: N/2
Section 36: All

TOWNSHIP 20 SOUTH, RANGE 31 EAST, NMPM
Sections 1 through 36: All

TOWNSHIP 20 SOUTH, RANGE 32 EAST, NMPM
Sections 2 through 11: All
Sections 14 through 23: All
Sections 26 through 35: All

TOWNSHIP 21 SOUTH, RANGE 28 EAST, NMPM
Sections 1 and 2: All
Section 3: Lots 3, 4, 5, 6, 11, 12, 13 and 14, and S/2
Sections 4 through 20: All
Section 21: W/2
Sections 22 through 25: All
Section 26: S/2
Sections 27 and 28: All
Section 29: S/2
Sections 30 through 36: All

TOWNSHIP 21 SOUTH, RANGE 29 EAST, NMPM
Sections 1 through 7: All
Section 8: N/2
Sections 9 through 36: All

TOWNSHIP 21 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 12: All
Sections 14 through 23: All
Sections 27 through 34: All

TOWNSHIP 21 SOUTH, RANGE 31 EAST, NMPM
Sections 1 through 12: All

Exhibit "A"
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TOWNSHIP 22 SOUTH, RANGE 28 EAST, NMPM
Sections 1 through 28: All
Sections 33 through 36: All

TOWNSHIP 22 SOUTH, RANGE 29 EAST, NMPM
Sections 1 through 36: All

TOWNSHIP 22 SOUTH, RANGE 30 EAST, NMPM
Sections 3 through 10: All
Section 13: W/2 W/2 and NE/4 NW/4
Sections 14 through 23: All
Section 24: W/2 NW/4
Sections 26 through 36: All

TOWNSHIP 23 SOUTH, RANGE 29 EAST, NMPM
Sections 1 through 3: All
Sections 10 through 12: All
Section 13: W/2
Sections 14 and 15: All
Sections 22 through 27: All
Sections 34 through 36: All

TOWNSHIP 23 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 17: All
Section 18: S/2
Sections 19 through 36: All

TOWNSHIP 23 SOUTH, RANGE 31 EAST, NMPM
Section 19: All
Sections 30 and 31: All

TOWNSHIP 24 SOUTH, RANGE 29 EAST, NMPM
Sections 1 and 2: All
Sections 11 through 14: All
Sections 23 through 26: All
Sections 35 and 36: All

TOWNSHIP 24 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 7: All
Section 8: N/2
Sections 9 through 16: All
Section 17: E/2
Sections 18 through 36: All

Exhibit "A"
Order No. R-7186

TOWNSHIP 24 SOUTH, RANGE 31 EAST, NMPM
Sections 6 and 7: All
Sections 15 through 22: All
Sections 27 through 34: All

TOWNSHIP 25 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 36: All

TOWNSHIP 25 SOUTH, RANGE 31 EAST, NMPM
Sections 3 through 10: All
Sections 15 through 22: All
Sections 27 through 34: All

TOWNSHIP 26 SOUTH, RANGE 30 EAST, NMPM
Sections 1 through 12: All

TOWNSHIP 26 SOUTH, RANGE 31 EAST, NMPM
Sections 3 through 10: All

being 319,000 acres, more or less.

Exhibit "A"
Order No. R-7186