

**GAVILAN-MANCOS POOL
WEST PUERTO CHIQUITO-MANCOS POOL**
(Allowable and Gas-Oil Ratio)
Rio Arriba County, New Mexico

Order No. R-7407-G, and R-6469-F (Corrected), Amending Proration Unit Rule and Approving an Allowable and Gas-Oil Ratio Limit for the Gavilan-Mancos and West Puerto Chiquito-Mancos Pools, Rio Arriba County, New Mexico, August 1, 1988.

Reopening of Cases 7980, 8946 and 8950 for Further Testimony as Provided by Order R-7407-E in Regard to the Gavilan-Mancos Oil Pool and Order R-6469-D in Regard to the West Puerto Chiquito-Mancos Oil Pool in Rio Arriba County, New Mexico.

REOPENED CASES NOS. 7980
8946 and 8950
Order No. R-7407-G
Order No. R-6469-F

ORDER OF THE COMMISSION

BY THE COMMISSION: This cause came on for hearing at 9:00 a.m. on June 13, 1988, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

NOW, on this 5th day of August, 1988, the Commission, a quorum being present, having considered the testimony presented and 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 these causes and the subject matter thereof.

(2) At the time of the hearing, Cases 7980 (reopened), 8946 (reopened), 8950 (reopened), 9111 (reopened) and 9412 were consolidated for purposes of testimony. Separate orders are being entered in Cases 9111 and 9412.

(3) Case 7980 was called and reopened by the Commission to determine appropriate spacing and enter permanent orders establishing spacing and proration units in the Gavilan-Mancos Oil Pool (hereinafter "Gavilan") pursuant to Order R-7407-E, Rule 2a) which rule increased spacing from 320-acre to 640-acre spacing units.

(4) Case 8946 was re-opened to determine what top oil allowable and limiting gas-oil ratio should be established in the Gavilan-Mancos Oil Pool to provide waste and protect correlative rights.

(5) Case 8950 was re-opened to determine what top oil allowable and limiting gas-oil ratio should be established for the West Puerto Chiquito-Mancos Oil Pool (hereinafter "WPC").

(6) Orders R-7407-E and R-6469-C were entered by the Commission to direct operators within Gavilan and WPC, respectively, to conduct tests on wells within the pools to determine the optimal top allowable and limiting gas-oil ratio for each of the pools. Pursuant to those orders, the pools were produced with a top allowable of 1250 barrels of oil per day for a standard 640-acre proration unit with a limiting gas-oil ratio of 2,000 cubic feet of gas per barrel of oil for the period July 1 until November 20, 1987, referred to as the "high rate test period" and were produced with a top oil allowable of 800 barrels of oil per day for a 640-acre proration unit with a limiting gas-oil ratio of 600 cubic feet of gas per barrel of oil from November 20, 1987 until February 20, 1988, referred to as the "low rate test period". Operators were directed to take bottomhole pressure surveys in selected wells within both pools at the start of and end of each test period. Subsequent to the test period, the top oil allowable remained at 800 barrels of oil per day for a 640-acre proration unit with a limiting gas-oil ratio of 600 to 1.

(7) Data collected by the operators during the test period pursuant to Orders R-7407-E and R-6469-C were submitted to the Division's Aztec district office and were available to all parties in this matter. At the request of the Commission, Petroleum Recovery Research Center at Socorro, New Mexico, made an independent evaluation of the data as a disinterested, unbiased expert and its report was entered into evidence by testimony and exhibit.

(8) Mallon Oil Company, Mesa Grande Resources, Inc., Mobil Texas-New Mexico Producing et al, collectively called "proponents", advocate return to special allowable of at least 1250 barrels of oil per day for 640-acre units with limiting gas-oil ratio of 2000 cubic feet per barrel whereas Benson-Montin-Greer Drilling Co., Sun Exploration and Production Company, Dugan Production Corporation et al, collectively called "opponents", advocate allowable and gas limits no higher than the current special allowable of 800 barrels of oil per day for 640-acre units and limiting gas-oil ratio of 600 cubic feet per barrel.

(9) Proponents presented testimony and exhibits intended to demonstrate:

(a) Gavilan and WPC pools are separate sources of supply separated by a permeability barrier approximately two miles east of the line separating Range 1 West from Range 2 West which is the present common boundary between the two pools.

(b) Insignificant oil has moved across the alleged barrier.

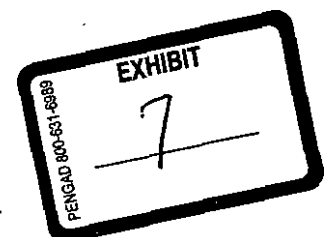
(c) Gas-oil ratio limitations are unfair to Gavilan operators.

(d) Wells were not shut in following the high rate testing period for sufficient time to permit accurate BHP measurement following the high rate testing period.

(e) The high-rate/low-rate testing program prescribed by Order R-7407-E demonstrated that high producing rates prevented waste as evidenced by lower gas-oil ratios during that phase of the test period.

(f) Irreversible imbibition of oil into the matrix during shut-in or low-rate production causes waste from reduced recovery of oil.

(g) Pressure maintenance in Gavilan would recover no additional oil and would actually reduce ultimate recovery.



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RATIO) POOL - Cont'd.)

(h) The most efficient method of production in Gavilan would be to remove all production restrictions in the pool.

(10) Opponents presented testimony and exhibits intended to demonstrate:

(a) There is pressure communication throughout the Gavilan-WPC pools which actually comprise a single reservoir.

(b) Directional permeability trending north-south with limited permeability east-west, together with gas reinjection, has worked to improve oil recovery in the COU located wholly within the WPC pool.

(c) Success of the pressure maintenance project is shown by the low gas-oil ratio performance of structurally low wells in the unit.

(d) Oil has moved across the low permeability area east of the Proposed Pressure Maintenance Expansion Area to the Canada Ojitos Unit as pressure differentials have occurred due to fluid withdrawal or injection.

(e) Although lower gas-oil ratios were observed during the high-rate production test period, reservoir pressure drop per barrel of oil recovered increased indicating lower efficiency.

(f) Gravity segregation was responsible for the lower GOR performance during high-rate production.

(g) The effects of the pressure maintenance project were shown, not only in the expansion area but even into the Gavilan pool.

(h) The reservoir performance during the test period shows pronounced effects of depletion.

(i) The higher allowables advocated by proponents would severely violate correlative rights.

(11) Substantial evidence indicated, and all parties agreed, that 640 acres is the appropriate size spacing and proration unit for Gavilan.

(12) Eminent experts on both sides interpreted test data including gas-oil ratios, bottomhole pressures, and pressure build-up tests with widely differing interpretations and conclusions.

(13) The preponderance of the evidence demonstrates the Gavilan and WPC pools constitute a single source of supply which can continue to be regulated effectively as two separate pools within uniform rules for spacing and allowables.

(14) No well produced the top oil allowable during any month of the test period; no well produced the gas limit during the high rate test period; 30 wells produced the gas limit at the beginning of the low rate test period but eight wells produced that limit at the conclusions of the test period.

(15) There is substantial evidence that lower gas-oil ratios observed during the high-rate test period are due to a number of factors including reduced oil re-imbibition, gravity segregation of

fluids within the reservoir, and greater pressure differential between fractures and matrix reservoir rock.

(16) A preponderance of evidence shows that both Gavilan and WPC exhibit a very high degree of communication between wells, particularly in north-south directions, and as a result the 72-hour shut in prior to BHP tests may not have been sufficient to permit pressures to completely stabilize. However, such pressure measurements were adequate to provide useful data for reservoir evaluation.

(17) Substantial evidence shows that some wells demonstrated a reduced gas-oil ratio with a high rate of production and that increased production limits should prevent waste.

(18) Substantial evidence also demonstrated that high deliverability wells have intersected a high capacity fracture system and therefore drain distant tracts better than low deliverability wells which have been drilled on those distant tracts. The evidence also indicates that high production rates result in the reduced oil recovery per pound of pressure drop. As a result a top oil allowable and limiting gas-oil ratio is necessary to prevent waste and protect correlative rights.

(19) A top oil allowable of 800 barrels per day per 640-acres with a limiting gas-oil ratio of 2,000 to 1 will enable high productivity wells to produce at more efficient rates without significantly impairing correlative rights.

IT IS THEREFORE ORDERED THAT:

(1) Rule 2 (a) of the temporary special rules and regulations for the Gavilan-Mancos Oil Pool as promulgated by Order R-7407 is hereby amended as follows:

Rule 2. (a) A standard proration unit shall consist of between 632 and 648 acres consisting of a governmental section with at least one and not more than two wells drilled or recompleted thereon; provided that if the second well is drilled or recompleted on a standard unit it shall not be located in the same quarter section, nor closer than 1650 feet to the first well drilled on the unit; and provided further that proration units formed prior to the date of this order are hereby approved as non-standard, provided however, that operators have the option to file Form C-102 to form standard units.

(2) Effective August 1, 1988 the allowable for a standard 640-acre spacing and proration unit in the Gavilan-Mancos Oil Pool shall be 800 barrels of oil per day and the limiting gas-oil ratio shall be 2000 cubic feet of gas per barrel of oil. Non-standard units shall receive allowables in the same proportion of 800 barrels of oil per day that the acreage in the spacing and proration unit bears to 640 acres.

(3) Effective August 1, 1988, the allowable for a standard 640-acre spacing and proration unit in the West Puerto Chiquito-Mancos Oil Pool shall be 800 barrels of oil per day and the limiting gas-oil ratio shall be 2000 cubic feet of gas per barrel of oil. Non-standard units shall receive allowables in the same proportion of 800 barrels of oil per day that the acreage in the spacing and proration unit bears to 640 acres.

(4) Jurisdiction of these causes is retained for entry of such further orders as the Commission deems necessary.

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