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

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

APPLICATION OF MERIDIAN OIL INC. FOR AN UNORTHODOX GAS WELL LOCATION AND DOWNHOLE COMMINGLING, RIO ARRIBA COUNTY, NEW MEXICO. *Case No. 10745*

APPLICATION OF MERIDIAN OIL INC. FOR AN UNORTHODOX GAS WELL LOCATION, NON-STANDARD GAS PRORATION UNITS, AND DOWNHOLE COMMINGLING, RIO ARRIBA COUNTY, NEW MEXICO. *Case No. 10754*

Order No. R-10002

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on July 1 and August 26, 1993, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this 25th day of October, 1993, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) At the time of the July first hearing Case Nos. 10745 and 10754 were consolidated for the purpose of presenting testimony, both cases were then taken under advisement. At the August 26, 1993 Division hearing Case Nos. 10721 through 10725 and Case Nos. 10745 and 10754 were reopened and consolidated for the purpose of presenting additional testimony.

(3) All seven of the aforementioned cases involve applications by Meridian Oil Inc. ("Meridian") for approval to initially drill, complete and produce each subject well as downhole commingled wells which would commingle production from the Pictured Cliffs formation with production from the Basin-Fruitland Coal Gas Pool.

(4) Due to the similarity, close proximity, and nature of both of the immediate cases, a single directive issued by the Division is deemed appropriate:

(a) in Case No. 10745 the applicant seeks approval to downhole commingle Choza Mesa-Pictured Cliffs Pool and Basin-Fruitland Coal (Gas) Pool production within the wellbore of its proposed Valdez Well No. 5 to be drilled at an unorthodox "off-pattern" coal gas well location for the Basin Fruitland Coal (Gas) Pool 1850 feet from the North line and 1820 feet from the West line (Unit F) of Section 16, Township 28 North, Range 4 West, NMPM, Rio Arriba County, New Mexico. Said well is to be dedicated to a standard 320-acre gas spacing and proration unit for the Basin-Fruitland Coal (Gas) Pool being the N/2 of said Section 16 and to a standard 160-acre gas spacing unit for the Choza Mesa-Pictured Cliffs Pool being the NW/4 of said Section 16; and,

(b) in Case No. 10754 the applicant seeks approval to downhole commingle Undesignated Gobernador-Pictured Cliffs Pool and Basin-Fruitland Coal (Gas) Pool production within the wellbore of its proposed San Juan 28-4 Unit Well No. 225 to be drilled at an unorthodox gas well location for both the Pictured Cliffs and the Fruitland Coal intervals, being 695 feet from the South line and 1375 feet from the West line (Unit N) of Section 7, Township 28 North, Range 4 West, NMPM, Rio Arriba County, New Mexico. Said well is to be dedicated to a non-standard 229.88-acre gas spacing and proration unit for the Basin-Fruitland Coal (Gas) Pool being all of irregular Section 7 and to a non-standard 114.60-acre gas spacing unit for the Undesignated Gobernador-Pictured Cliffs Pool being Lots 3, 4 and 5 and the SE/4 SW/4 (SW/4 equivalent) of said Section 7.

(5) Both the Choza Mesa and Gobernador Pictured Cliffs Pools are governed under the spacing provisions of the Division's General Rules and Regulations [Rule 104.C(3)] which provide for 160-acre drilling tracts. The Basin Fruitland Coal (Gas) Pool is spaced on 320-acre spacing, pursuant to the provisions of Rule 4 of the Special Rules and Regulations for the Basin Fruitland Coal (Gas) Pool, as promulgated by Division Order No. R-8768, as amended.

(6) The proposed unorthodox locations are caused by various topographic reasons and not geologic.

(7) The non-standard gas spacing and proration units being sought in Case No. 10754 results from a variation in the U. S. Public Lands Survey.

(8) Applicant's geologic evidence indicates that gas production capabilities from both the Pictured Cliffs and Fruitland Coal intervals in this general area of the San Juan Basin is expected to be marginal in nature, thereby making it an uneconomical venture to drill either a stand alone Pictured Cliffs or Fruitland Coal Gas well or a dual producer in this area. The downhole commingling of both zones would therefore be a practical and acceptable alternative in recovering Basin-Fruitland Coal gas and conventional Pictured Cliffs gas reserves underlying each respective proration unit.

(9) An economic limit should however be imposed or set if either well encounters economically viable production from either zone.

(10) Meridian presented engineering testimony and economic analysis which supports the adoption of an "Economic Limit" for downhole commingling in these wells with such Economic Limit being based upon the relationship of costs to rate and estimated ultimate gas recovery from either the Pictured Cliffs formation or the Basin Fruitland Coal Gas Pool.

(11) In addition, Meridian presented a graph which may be utilized by the Division as an accurate and reliable means by which to establish an Economic Limit for the downhole commingling of production from either of these pools in this area. Said graph, hereby attached and included in this order as Exhibit "A", is based upon either the Pictured Cliff formation or Basin Fruitland Coal Gas Pool well costs with three individual curves representing the minimum estimated cost of:

(a) a single well ($320,000.00);
(b) a dual completed well ($270,000.00); or,
(c) a downhole commingled well ($200,000.00).

(12) As established by Exhibit "A", if the combination of initial rate and estimated ultimate gas recovery ("EUR") for each of the subject wells falls below the curve plotted for the dual completed cost example, then and in that event downhole commingling may be allowed as an alternative economic means by which to produce either pool. For example, if the initial rate of a well is 500 MCFPD and an EUR has been calculated for the well to be 400 MMCF, then as indicated on Exhibit "A" the example well's Economic Limit will be below the dual completion economic limit curve and therefore the example well is entitled to be downhole commingled.

(13) The applicant further demonstrated through its evidence and testimony that:

a) there will be no crossflow between the two commingled pools;

b) neither commingled zone exposes the other to damage by produced liquids;

c) the fluids from each zone are compatible with the other;

d) the bottomhole pressure of the lower pressure zone should not be less than 50 percent of the bottomhole pressure of the higher pressure zone adjusted to a common datum; and,

e) the value of the commingled production is not less than the sum of the values of the individual production.

(14) The ownership within the Basin-Fruitland Coal (Gas) Pool and the Choza Mesa or Undesignated Gobernador Pictured Cliffs Pools underlying each respective proration unit is common.

(15) The applicant has notified all interest owners owning an interest in either the Pictured Cliffs or Fruitland formation within the subject proration units of its proposed downhole commingling.

(16) No offset operator and/or interest owner appeared at the hearing in opposition to the proposed downhole commingling and/or unorthodox well locations.

(17) In the interest of prevention of waste and protection of correlative rights, both of the subject applications should be approved.

(18) Due to the nature of gas production from the Basin-Fruitland Coal (Gas) Pool, straight allocation of gas volumes from both zones is not appropriate. The applicant therefore seeks the adoption of a monthly allocation formula, based on initial production test and known/assumed parameters from the Pictured Cliffs zone whereby its initial rate, estimated ultimate recovery, and decline rate can be determined. Any production rate over what is calculated for the Pictured Cliffs utilizing the applied formula can be attributed to the Fruitland coal gas interval. See Exhibit "B" attached hereto and made a part hereof for additional reference.

(19) The operator should consult with the Supervisor of the Aztec Office of the Division to insure the validity and accuracy of the initial test on each well. Further, as part of the procedure for obtaining authorization to produce the subject well as a downhole commingled well, the operator should submit to the Supervisor of the Aztec Office of the Division a sworn certificate verifying the cost, the Initial Rate and the EUR for that well. The Supervisor of the Aztec Office of the Division may approve the downhole commingling and authorize the operator to produce the well if the Economic Limit for production from either pool in that well is less than the curve for the dual completion case as plotted on Exhibit "A". In the event the well initially fails to qualify for downhole commingling, the well can still qualify at some future date if and when the Economic Limit in that well for production from either pool drops below the dual completion case curve plotted on said Exhibit "A".

(20) The operator should be responsible for reporting the monthly gas production from each of the subject wells by utilizing the proposed allocation formula.

(21) An annual report should be submitted by the operator for each well to both the Aztec and Santa Fe offices of the Division showing the complete computations for each month.

(22) Any condensate production should be allocated entirely to the Pictured Cliffs interval. Water production should be reported in a manner acceptable to the supervisor of the Aztec district office of the Division.

(23) Any change in the method of gas allocation between the two pools for any of the subject wells should be made only after due notice and hearing.

(24) To afford the Division an opportunity to assess the potential of waste and to expeditiously order the appropriate remedial action, the operator should notify the Aztec district office of the Division any time one of the five subject wells is shut-in for seven consecutive days.

IT IS THEREFORE ORDERED THAT:

(1) The applicant in Case Nos. 10745 and 10754, Meridian Oil Inc., is hereby authorized:

(a) to downhole commingle Choza Mesa-Pictured Cliffs Pool and Basin-Fruitland Coal (Gas) Pool production within the wellbore of its proposed Valdez Well No. 5 to be drilled at an unorthodox "off-pattern" coal gas well location for the Basin Fruitland Coal (Gas) Pool 1850 feet from the North line and 1820 feet from the West line (Unit F) of Section 16, Township 28 North, Range 4 West, NMPM, Rio Arriba County, New Mexico. Said well shall be dedicated to a standard 320-acre gas spacing and proration unit for the Basin-Fruitland Coal (Gas) Pool being the N/2 of said Section 16 and to a standard 160-acre gas spacing unit for the Choza Mesa-Pictured Cliffs Pool being the NW/4 of said Section 16; and,

(b) to downhole commingle Undesignated Gobernador-Pictured Cliffs Pool and Basin-Fruitland Coal (Gas) Pool production within the wellbore of its proposed San Juan 28-4 Unit Well No. 225 to be drilled at an unorthodox gas well location for both the Pictured Cliffs and the Fruitland Coal intervals, being 695 feet from the South line and 1375 feet from the West line (Unit N) of Section 7, Township 28 North, Range 4 West, NMPM, Rio Arriba County, New Mexico.

Further, said well shall be dedicated to a non-standard 229.88-acre gas spacing and proration unit for the Basin-Fruitland Coal (Gas) Pool being all of irregular Section 7 and to a non-standard 114.60-acre gas spacing unit for the Undesignated Gobernador-Pictured Cliffs Pool being Lots 3, 4 and 5 and the SE/4 SW/4 (SW/4 equivalent) of said Section 7.

PROVIDED HOWEVER, in the event the Economic Limit plotted for production from either pool in a well is less than the curve for the dual completion case as plotted on Exhibit "A" [being a plot of costs compared to both maximum average daily producing rate against pipeline pressure ("Initial Rate") and an estimated ultimate gas recovery ("EUR")] attached hereto and made a part hereof, then downhole commingling shall be allowed in the effected well. In the event the Economic Limit plotted for production from both pools in a well initially exceeds the curve for the dual completion case, then downhole commingling shall not be allowed in the well until such time as the Economic Limit in that well for production from either pool drops below the dual completion curve plotted on Exhibit "A".

(2) The allocation of gas produced from the Pictured Cliffs and Fruitland Coal intervals in both of the subject wells shall be in accordance with the adopted allocation formula, as further referenced in Exhibit "B" attached hereto and made a part hereof.

(3) The operator shall consult with the Supervisor of the Aztec Office of the Division to insure the validity and accuracy of the initial test on each well. Further, as part of the procedure for obtaining authorization to produce the subject well as a downhole commingled well, the operator shall submit to the Supervisor of the Aztec Office of the Division a sworn certificate verifying the cost, the Initial Rate and the EUR for that well. The Supervisor of the Aztec Office of the Division shall approve the downhole commingling and authorize the operator to produce the well if the Economic Limit for production from either pool in that well is less than the curve for the dual completion case as plotted on Exhibit "A". In the event the well initially fails to qualify for downhole commingling, the well can still qualify at some future date if and when the Economic Limit in that well for production from either pool drops below the dual completion case curve plotted on said Exhibit "A".

(4) Further, the operator is responsible for reporting the monthly gas production from both wells to the Division utilizing said allocation formula. An annual report for each well shall be submitted by the operator to both the Aztec and Santa Fe offices of the Division showing the complete computations for the previous twelve month period.

(5) Any condensate production from a well shall be allocated entirely to the appropriate Pictured Cliffs Pool. Water production shall be reported in a manner acceptable to the supervisor of the Aztec district office of the Division.

(6) Any variance in the method of gas allocation between the two pools for either of the subject wells shall be made only after due notice and hearing.

(7) The operator shall immediately notify the supervisor of the Aztec District Office of the Division any time one of the subject wells has been shut-in for seven consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(8) Jurisdiction of this cause 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 DIVISION

WILLIAM J. LEMAY
Director

S E A L

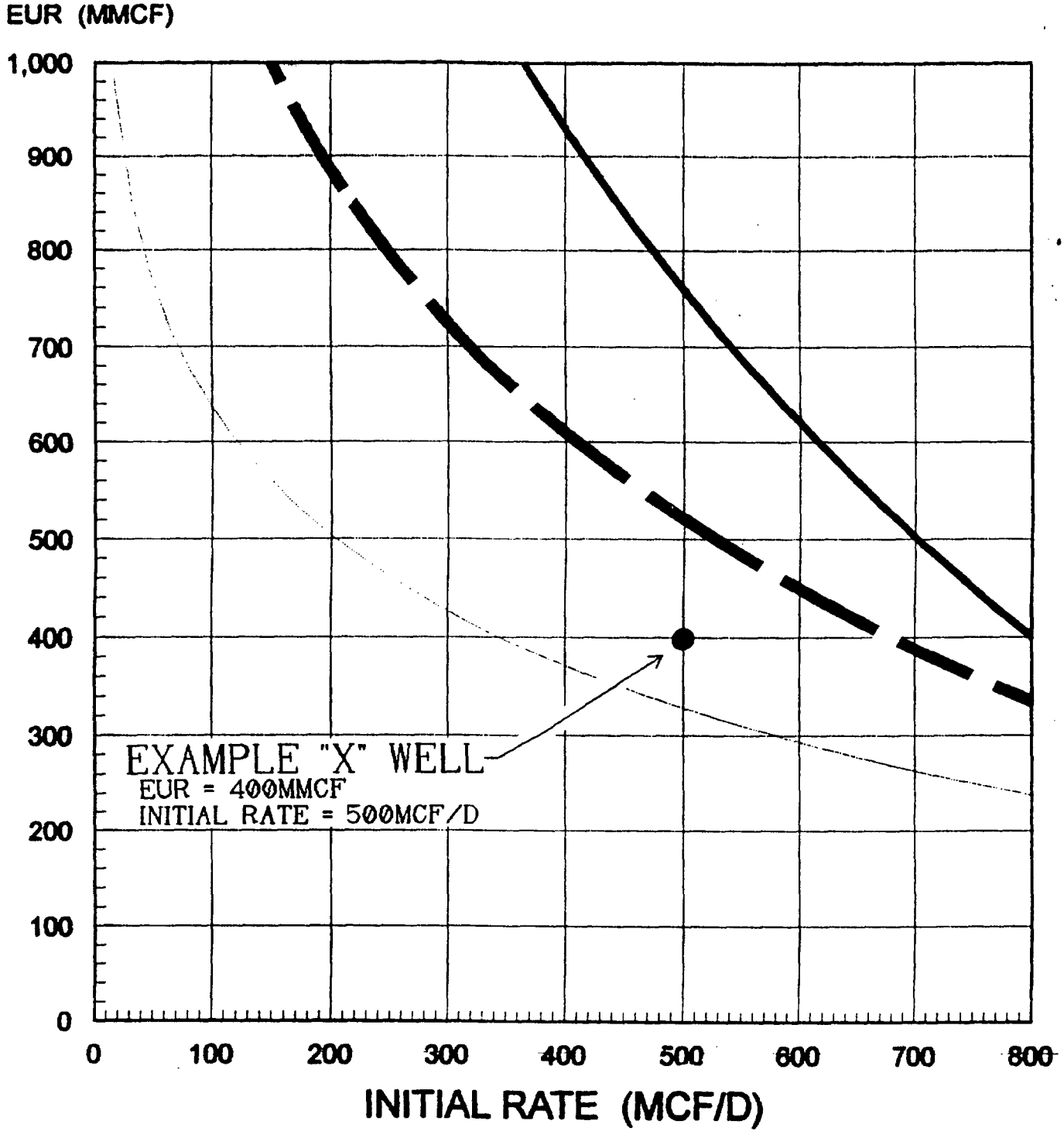
Consolidated Case Nos.
10745 and 10754.

Division Order No. R- 10002

PICTURED CLIFFS / FRUITLAND COAL

ECONOMIC EVALUATION

COMPLETION TECHNIQUE SENSITIVITY



SINGLE	DUAL	COMMINGLE
15% ROR	15% ROR	15% ROR

INITIAL RATE VS EUR

Exhibit "B"

CONSOLIDATED CASES 10745 AND 10754

DIVISION ORDER NO. R-10002

Case No. 10745 — Valdez Well No. 5
Case No. 10754 — San Juan 28-4 Unit Well No. 225

MONTHLY GAS PRODUCTION ALLOCATION FORMULA

GENERAL EQUATION

Qt = Qftc + Qpc

WHERE:

Qt = TOTAL MONTHLY PRODUCTION FROM WELL (MCF/MONTH)
Qftc = FRUITLAND COAL (FTC) MONTHLY PRODUCTION (MCF/MONTH)
Qpc = PICTURED CLIFFS (PC) MONTHLY PRODUCTION (MCF/MONTH)

REARRANGING THE EQUATION TO SOLVE FOR Qftc:

Qftc = Qt - Qpc

ANY PRODUCTION RATE OVER WHAT IS CALCULATED FOR THE PICTURED CLIFFS (PC) USING THE APPLIED FORMULA IS FRUITLAND COAL (FTC) PRODUCTION.

PICTURED CLIFFS (PC) FORMATION PRODUCTION FORMULA IS:

Qpc = Qpci * e^{-(Dpc)*(t)}

WHERE:

Qpci is the INITIAL PC MONTHLY FLOW RATE (CALCULATED FROM FLOW TEST)

OR

Qpci = Qt(1) * Qpc(p) \ {Qpc(p) + Qftc (p)}

WHERE:

Qt(1) = FIRST MONTH TOTAL PRODUCTION (MCF)
Qpc(p) = FINAL PICTURED CLIFFS FLOW TEST (MCFPD)
Qftc(p) = FINAL FRUITLAND COAL FLOW TEST (MCFPD)

AND WHERE:

Dpc is the calculated Pictured Cliffs Monthly Decline Rate Determined.

Dpc = (Qpci-Qpcabd)/Np(pc)

Where: Qpcabd = Pictured Cliffs Production Rate At Abandonment (300 MCF/Mo.); and, Np(pc) is the Pictured Cliffs Estimated Ultimate Recovery.

THUS: **Qftc = Qt - Qpci * e^{-(Dpc)*(t)}**

WHERE: (t) = TIME (MONTHS) FROM INITIAL PRODUCTION