ROPCO GW 15 "A" PC, "B" FC No. 1

MONTHLY GAS PRODUCTION ALLOCATION FORMULA

GENERAL EQUATION

$$Qt = Q\ ftc + Qpc$$

Where: Qt = Total Monthly Production (MCF/MO)

Qftc = Fruitland Coal Monthly Production

Qpc = Pictured Cliffs Monthly Production

REARRANGING THE EQUATION TO SOLVE FOR Qftc:

$$Qftc = Qt - Qpc$$

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

PICTURED CLIFFS FORMATION PRODUCTION FORMULA IS:

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

Where: Qpci = Initial Pictured Cliffs monthly flow rate (calculated from flow test)

Dpc = Pictured Cliffs monthly decline rate calculated from

(Qpci-Qpcabd)/Np

See Determination of Qpci and PC Estimated Ultimate Recovery (EUR)
Qpcabd = 300 MCF/mo

Where: Np = Pictured Cliffs estimated ultimate recovery (EUR)
P* x 9.5 MMCF/PSI * * x Rf
P* = initial reservoir pressure (7 day SIBHP)
Rf = recovery factor (field analogy) = 0.85
**Determined from material balance (field analogy) and volumetric reserves (log analysis)

By calculating PC EUR from SIBHP and determining PC initial flow rate, Dpc can then be estimated utilizing the previously described parameters.

THUS: $Qftc = Qt - Qpci * e^{(Dpc)*(t)}$
WHERE: (t) is in months

BEFORE THE
OIL CONSERVATION DIVISION
Case No. 11570 Exhibit No.
Submitted By:
Richardson Oil Company
Hearing Date: July 11,1996

27

ROPCO GW 15 "A" PC, "B" FC No. 1

SAMPLE
DETERMINATION OF Qpci:

(INITIAL PICTURED CLIFFS MONTHLY PRODUCTION)

$$Qpci = Qt\,(1) \times Qpc\,(p) / \{Qpc\,(p) + Qftc\,(p)\}$$

WHERE:

Qt (1) = First month's total production (MCF)	**=**	**14,718 MCF**
Qpc (p) = Final Pictured Cliffs Flow Test (MCFD)	**=**	**398 MCFD**
Qftc (p) = Final Fruitland Coal Flow Test (MCFD)	**=**	**50 MCFD**

THUS:

$$Qpci = 14{,}718\ MCF * [\ 398\ MCFD / (\ 398 + 50\ MCFD)\ ] = 13{,}075\ MCFD$$

ROPCO GW 15 "A" PC, "B" FC No. 1

SAMPLE DETERMINATION OF Np (PC):

Np (PC) = 9.5 MMCF/PSI x P* x Rf

P* = 241 PSI

Np (PC) = 9.5 x 241 x 0.85 = 1946.1 MMCF

Qpci = 13,075 MCF

DETERMINATION OF Dpc:

Dpc = (Qpci-Qpcabn)/Npc

Dpc = (13,075 MCF - 300 MCF) / 1,946,100 MCF = 0.006564

THUS:

Qftc = Qt (MCF/mo) - [13,075 x e^{-(0.006564 x (t))}]