# STANDARD DELIVERABILITY EQUATION FOR GAS WELLS

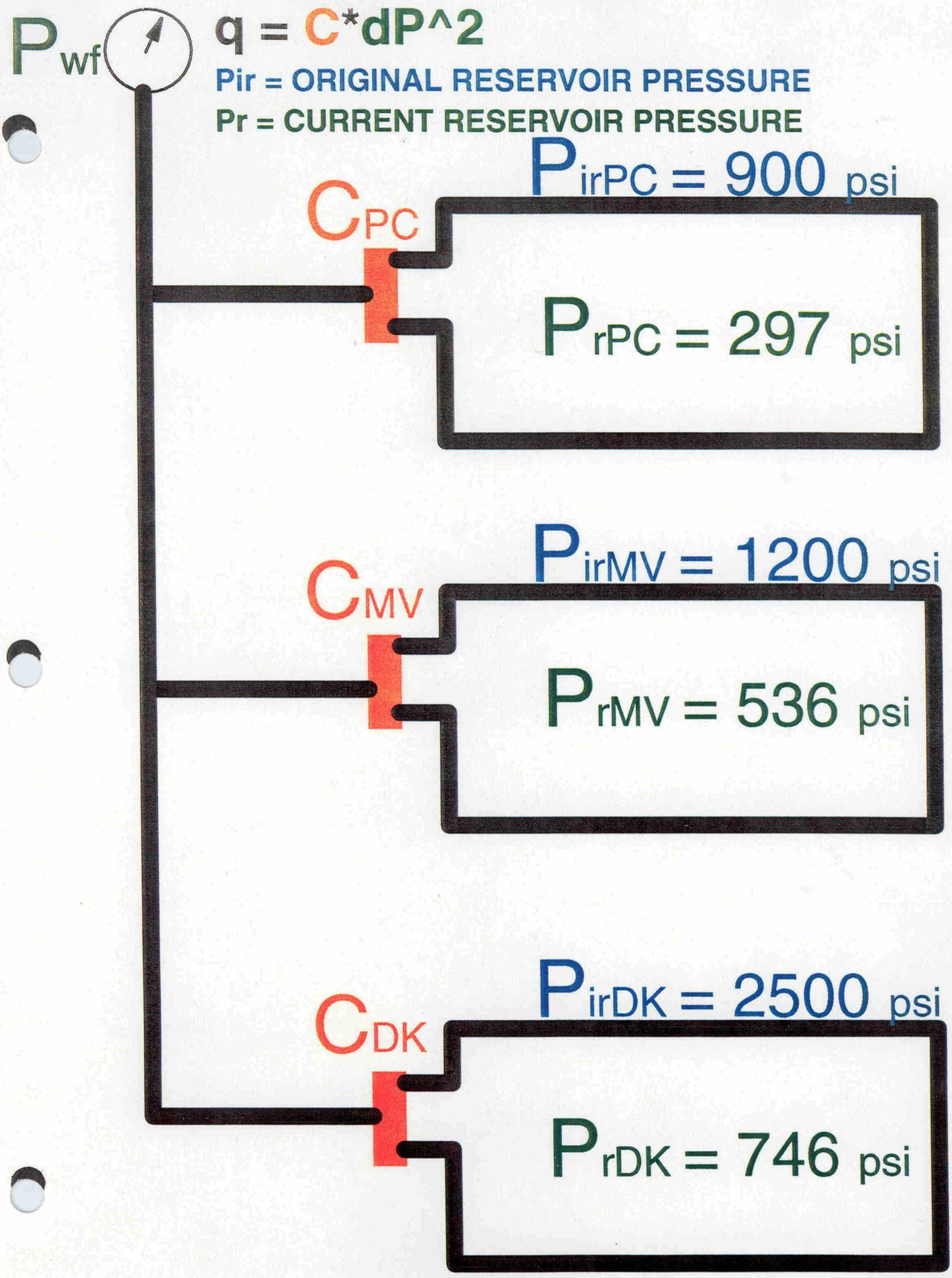
("Worldwide Practical Petroleum Reservoir Engineering Methods",H. C. "Slip" Slider, 1983 pgs 300-310,eqs 5.44 - 5.47)

$$q = \frac{0.703*h*k*(Pr^2-Pwf^2)^n}{u*Tr*z*\ln(0.606\ re/rw)}$$

$$C = \frac{0.703*h*k}{u*Tr*z*\ln(0.606\ re/rw)}$$

$$dP^2 = (Pr^2-Pwf^2)^n$$

$$q = C*dP^2$$


$P_{wf}$
$q = C*dP^2$
Pir = ORIGINAL RESERVOIR PRESSURE
Pr = CURRENT RESERVOIR PRESSURE
$C_{PC}$
$P_{irPC} = 900$ psi
$P_{rPC} = 297$ psi
$C_{MV}$
$P_{irMV} = 1200$ psi
$P_{rMV} = 536$ psi
$C_{DK}$
$P_{irDK} = 2500$ psi
$P_{rDK} = 746$ psi

# NMOCD RULE 303

## C = f(303Cb(iii,iv))

**303Cb(iii)** "That any zone which is producing from fluid-sensitive sands, which may be subject to damage from water or other produced liquids, is protected from contact from such liquids produced from other zones in the well."

**303Cb(iv)** "The fluids from each zone are compatible with the fluids from the other(s), and combining the fluids will not result in the formation of precipitates which might damage any of the reservoirs."

## C is not f(303Cb(vi)) ?

## dP^2 = f(Pr,Pwf,Pri)

**303Cb(vi)** "The bottom hole pressure of the lower pressure zone is not less than 50 percent of the bottom hole pressure of the higher pressure zone adjusted to a common datum."

**303Cb(vi) REVISED** "The pressure of the **HIGHER** pressure zone **DOES NOT EXCEED** the **ORIGINAL PRESSURE** of the **LOWER** pressure zone adjusted to a common datum."

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## VARIABLE DEFINITIONS:

q = PRODUCTION RATE (MCF/D)

h = RESERVOIR THICKNESS (FT)

k = AVG. EFFECTIVE PERMEABILITY (MILLIDARCYS)

Pr= AVG. RESERVOIR PRESSURE (PSI)

Pwf= BOTTOM-HOLE PRESSURE FLOWING (PSI)

n= BACK-PRESSURE CURVE EXPONENT (.5 - 1.25)

u = GAS VISCOSITY (CENTIPOISE)

Tr = AVERAGE RESERVOIR PRESSURE (DEGREES)

z = GAS COMPRESSIBILITY FACTOR (.9 - 1.05

re = RESERVOIR DRAINAGE RADIUS (FEET)

rw = WELLBORE RADIUS (FEET))