e) Exlog (1980)

$$F = \sigma_t + \sigma_1' \left(\frac{\mu}{1-\mu}\right) + P$$

Where F = fracture pressure

D = depth

S = overburden pressure

P = pore pressure

ki = matrix stress coefficient

μ = Poisson's Ratio

σ_t = superposed horizontal tectonic stress

σ_1' = maximum compressive effective stress = S – P

The stress ratios, ki and μ in equation (b) and (c) may be backcalculated with measured formation breakdown ("Leak-off") pressures or taken from curves derived in Gulf Coast. It should be noted that Eaton's Poisson's ratio is not a function of the rock itself but of the regional stress field (i.e. the horizontal-to-vertical stress ratio); Anderson's Poisson's ratio is a function of the shaliness of the sand; Exlog's Poisson's ratio is a function of the rock and the values obtained by sonic testing. Exlog's method also requires a "leak-off" test to calculate the superposed tectonic stress, if present.

With known overburden pressure (from density data) and pore pressure (from drilling and log plots), fracture pressure can thus be predicted for any depth using one of the above equations. However, returns may be lost in vugular or naturally fractured formations regardless of the fracture gradient in the overlying formation.