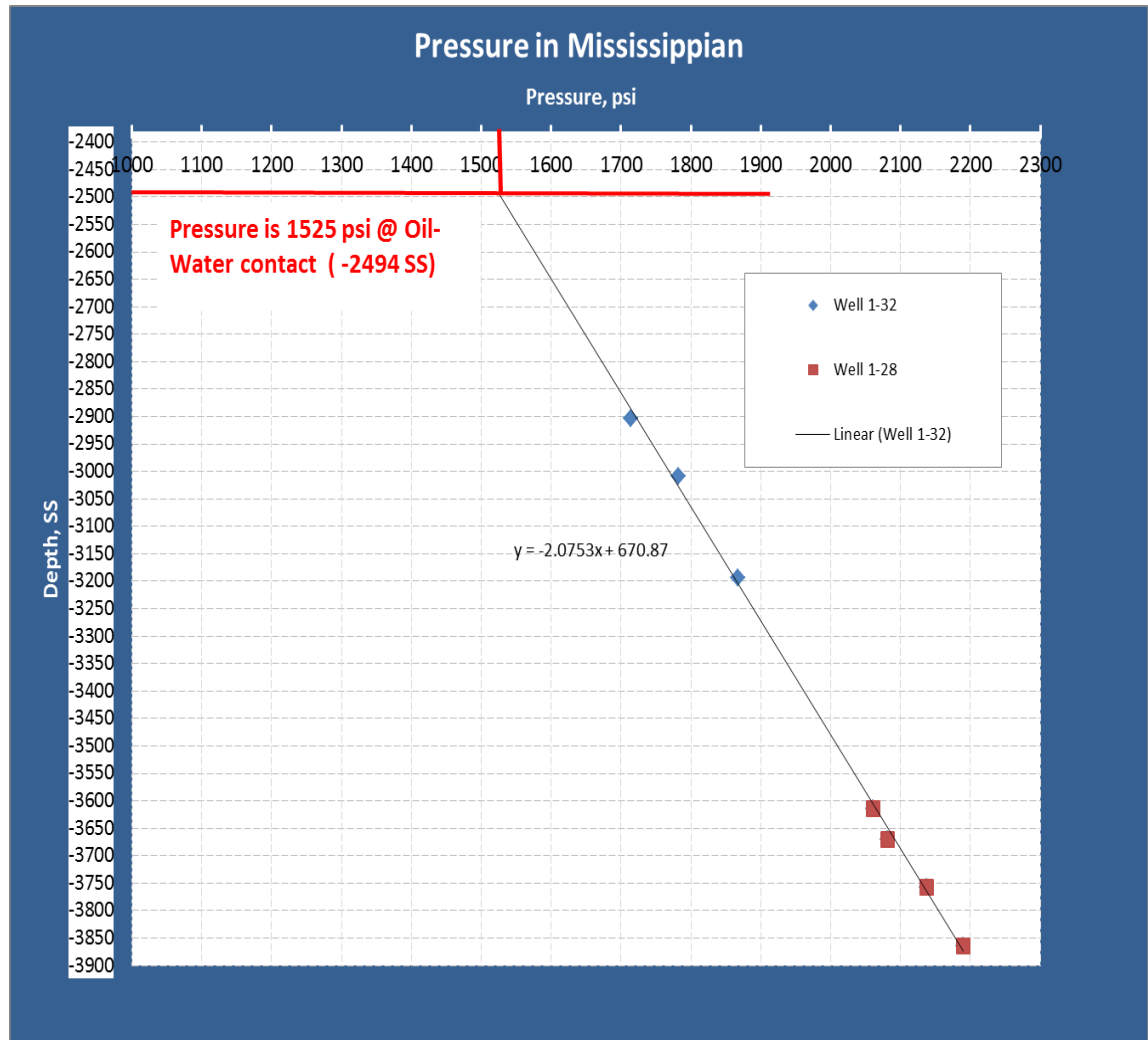


Initial Pressure in the Mississippian

-Mississippian initial pressure from extrapolation of Arbuckle pressure is 1525 psi at initial oil-water contact(-2494 SS)

-Old DST of well Lupton A1 dated 1955 in Sumner County is 1590 psi at the same depth

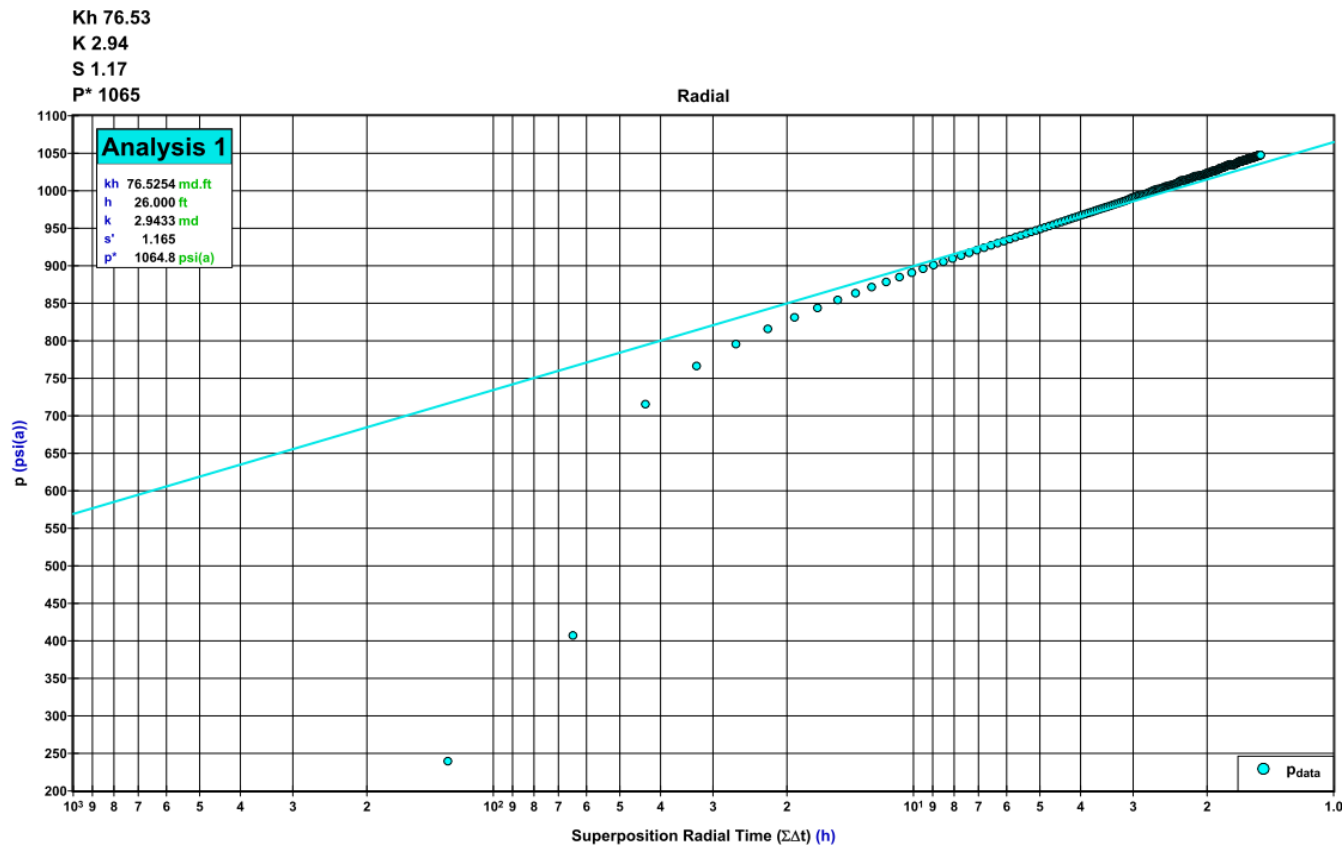
- Pressure of well Lupton A1 is higher than the extrapolated pressure and maybe more accurate



DST 1 in 1-32

Test date: 2011

Mississippian at -2393 SS



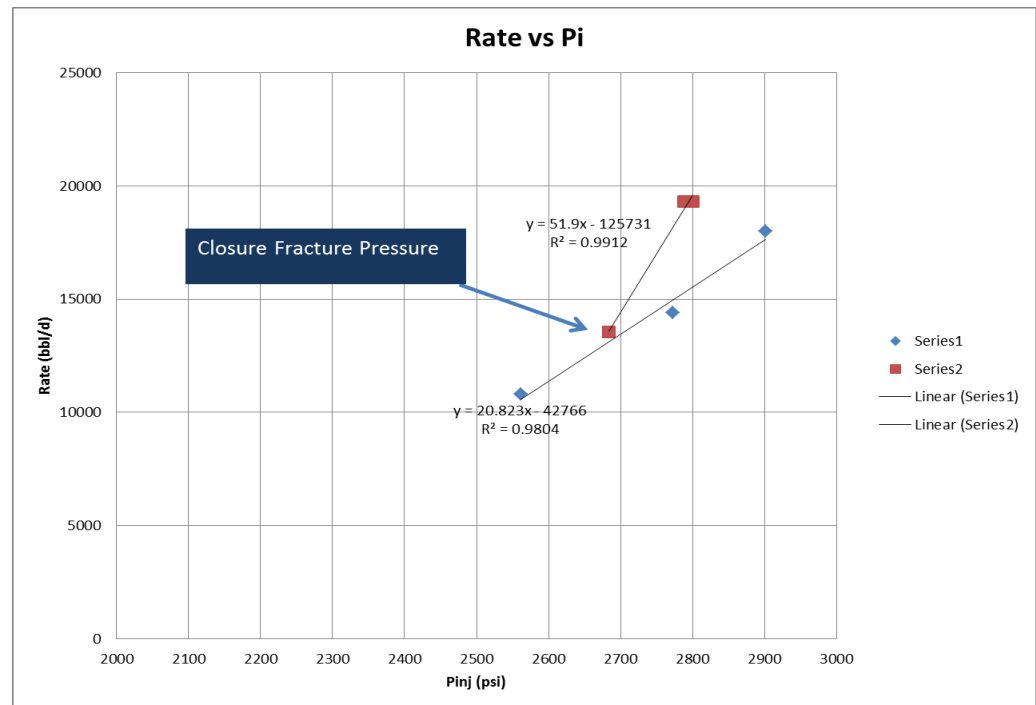
Decline in Mississippian Reservoir Pressure

- Initial pressure: 1590 psi at -2494 SS
- Present (2011) pressure: 1113 psi at -2494 SS
- Decline in pressure: 477 psi

Fracture Pressure in Mississippian Based on Arbuckle Step-Rate Test and Eaton Equation

Inj	Pinj(psi)	Rate (bbl/d)	InJ Index
1	2160	2880	57.6
2	2321	7200	34.12
3	2562	10800	23.89
4	2773	14400	21.72
5	2901	18000	22.76
6	2800	19296	27.97
7	2788	19296	28.46
8	2684	13536	23.58

Arbuckle	
2666	closure pressure (psi)
2900	breakdown pressure (psi)
4869	Gauge depth,ft
0.55	Closure Fracture gradient (psi/ft)
0.60	breakdown Fracture gradient (psi/ft)



Using Eaton's equation to estimate fracture pressure gradient in the Mississippian @ -2424 SS

$$F = \left[\left(\frac{S - P}{D} \right) \left(\frac{v}{1 - v} \right) \right] + P / D$$

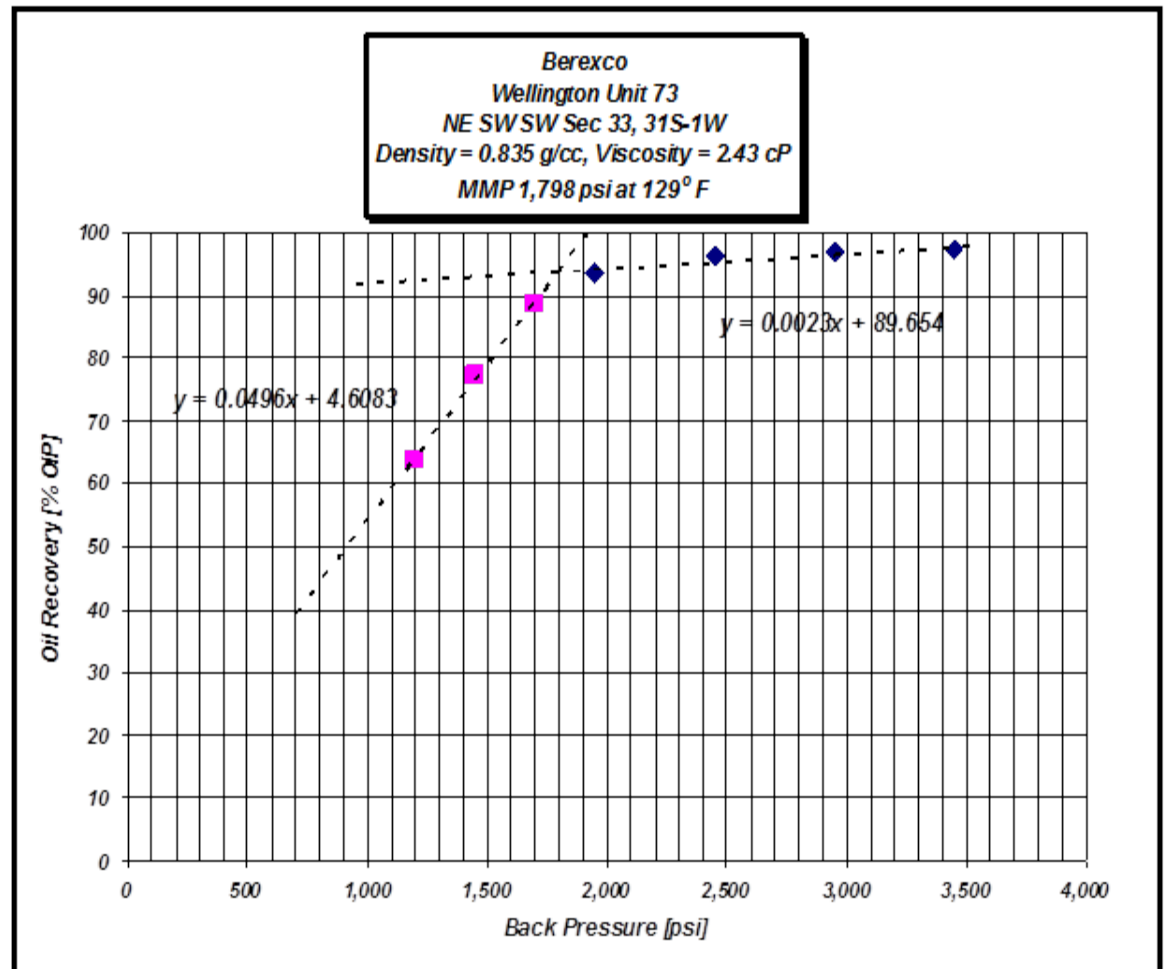
- Pore pressure: 1079 psi
- Overburden pressure: 4038 psi
- Poisson's ratio: 0.25
- Fracture pressure gradient is **0.56** psi/ft

Using fracture pressure gradient in Arbuckle to estimate fracture pressure in the Mississippian:

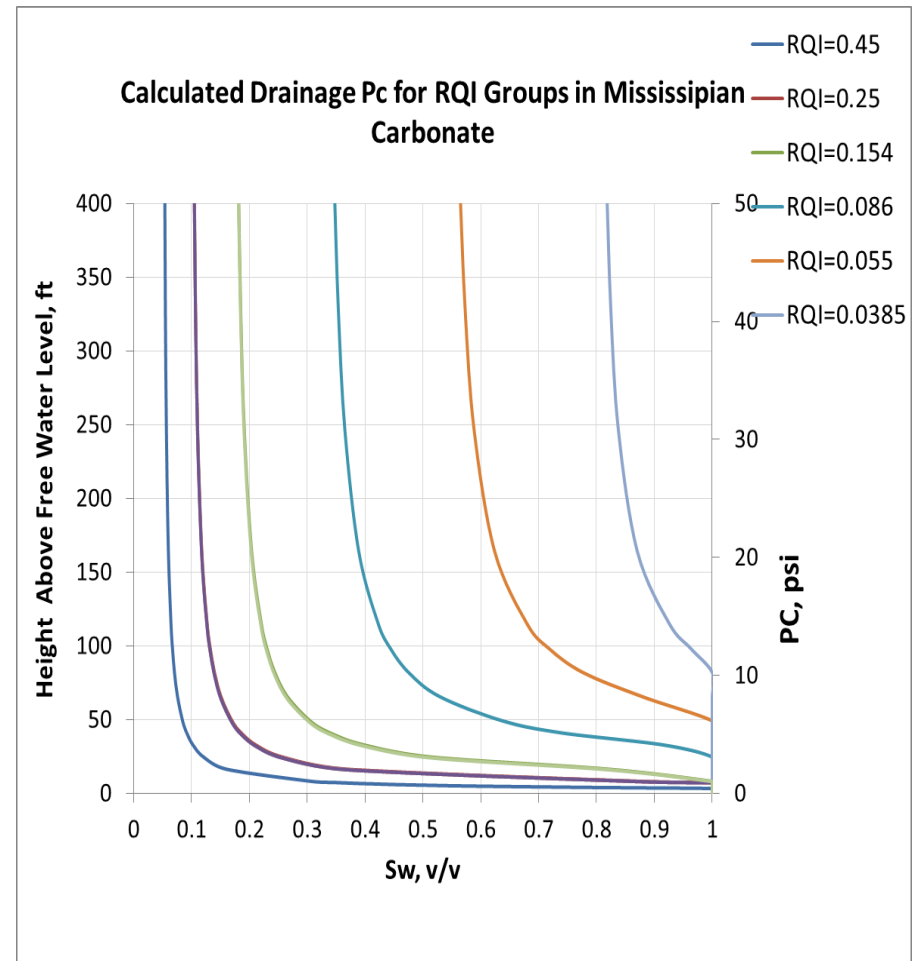
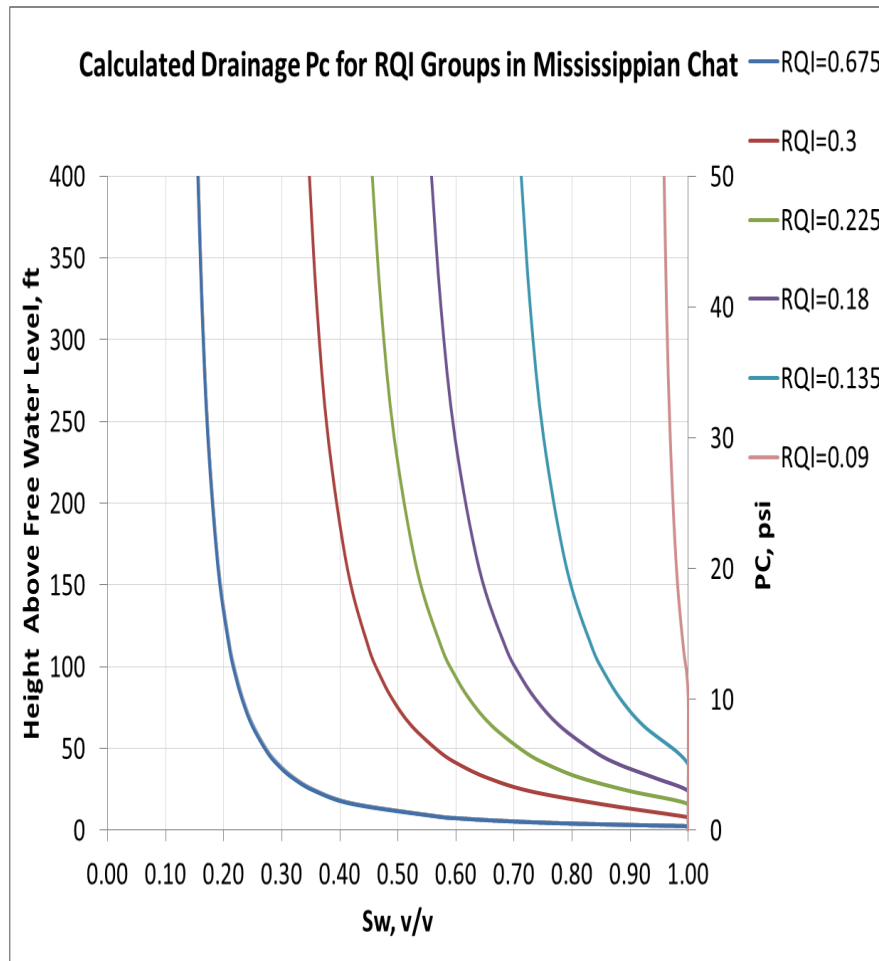
- Closure fracture pressure in Mississippian is 2033 psi @ -2424 SS
- Breakdown fracture pressure is 2218 psi @ -2424 SS

Miscibility Pressure

- Laboratory Miscibility pressure was 1798 psi at 129 F
- The Miscibility pressure was adjusted by empirical correlations to a correct temperature of Mississippian (121 F)
- Miscibility pressure at correct temperature is 1660 psi



Drainage Capillary Pressure Curves for Each RQI Range in the Mississippian



Relative Permeability Curves for Each RQI Range in the Mississippian

