

Shoe Pressure Failure Calculation

Based on the most conservative results from the Noble well LOT data, the calculated formation fracture pressure at the Dittmer surface casing shoes is 1,624 psi.

The details of that calculation are:

- Most conservative (lowest) Formation Frac Gradient from Noble wells = 0.9412 psi/ft (from the Seyler B15-69HNM well)
- Most conservative (shallowest) Casing Shoe Depth at the Dittmer pad = 1,725' on the Dittmer KE 20-034HC
- Formation Frac Pressure = (1,725 ft) x (0.9412 psi/ft) = 1,624 psi

Note that this is the pressure at the “formation face” when the rock initially breaks.

Calculated surface pressures required to achieve 1,624 psi at the formation face for fluids with different densities:

Fluid Type	Specific Gravity	Fluid Equivalent Mud Weight EMW (ppg)	Fluid Pressure Gradient (psi/ft)	<u>Surface</u> Pressure to Achieve 1,624 psi at Formation Face (psi)*
Produced Gas	0.30	2.50	0.1299	1,400
Produced Oil	0.90	7.50	0.3898	952
Freshwater	1.00	8.33	0.4332	877
Saltwater	1.03	8.58	0.4462	854
Drilling Mud	1.26	10.50	0.5458	683

*** Calculated Surface Leak Off Pressure Assumes a Full Column of Specified Fluid**