

Surfactant Flushing

Jeff Harwell, University of Oklahoma
Ben Shiau, Surbec Environmental, LLC



Flushing Works*

- >95% of mass in 2-3 weeks
- Doesn't reach MCLs -- but puts them in reach for other technologies
- Great in combination with “polishing” step, MNA, ENA, ISCO, etc.



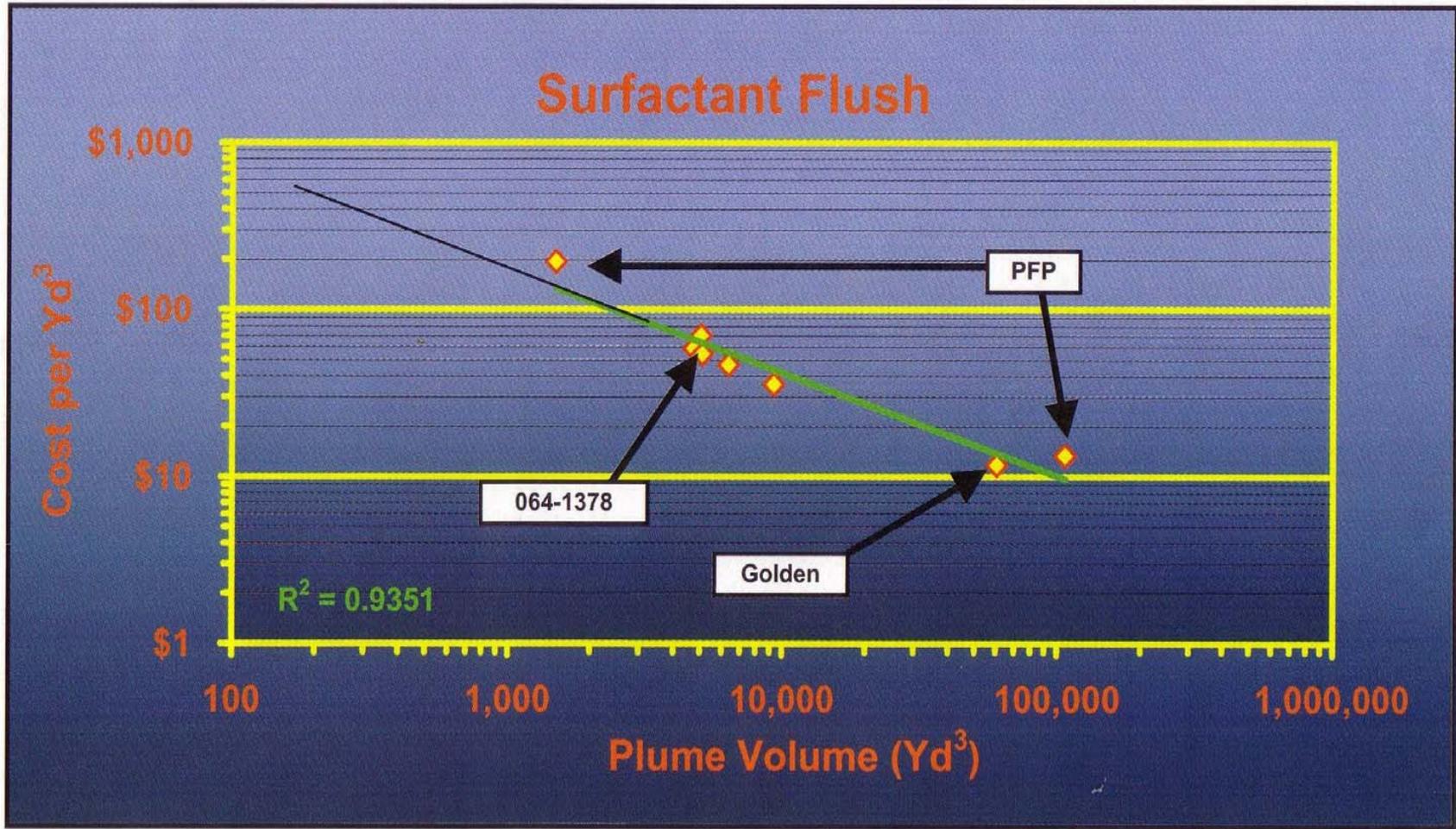
•most of the time; low permeabilites, as in tight clays, are not economical



Will work as well for DNAPLS as it has for LNAPLS

- Remember vertical migration occurs with LNAPLS, also
- Mobilization must be an option for economics
- Usually not a serious problem
- Multiple options for addressing when must
 - Neutral buoyancy
 - Well spacings/capture zone
 - Gradient approach (solubilize as released)

Cost is Central*

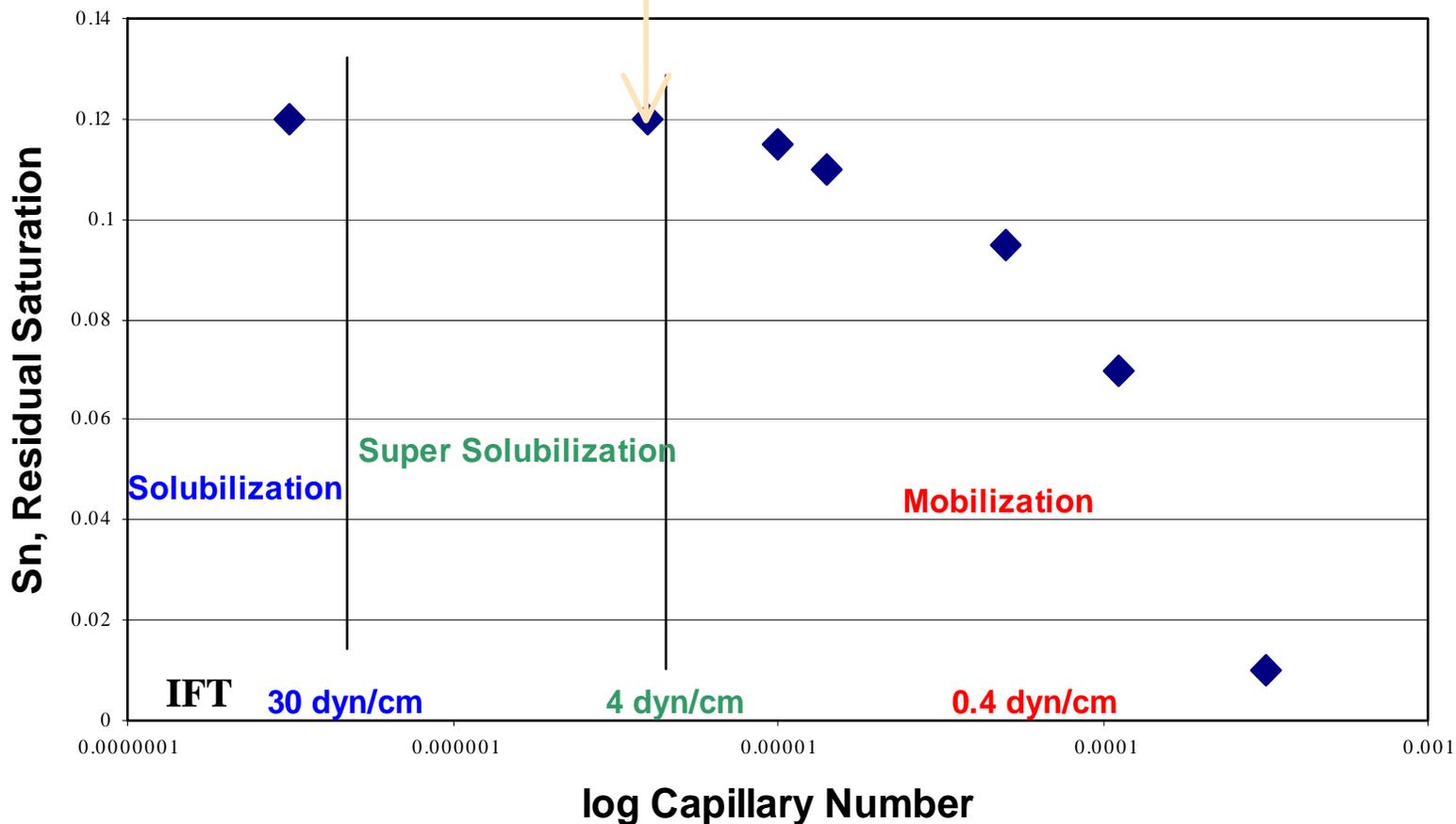


*plot from Oklahoma Corporation Commission



Supersolubilization

High efficiency without uncontrolled mobilization



Gradient Approach

Start Here solubilize as you mobilize

