



Solvent Inventory Economics

May 21, 2008



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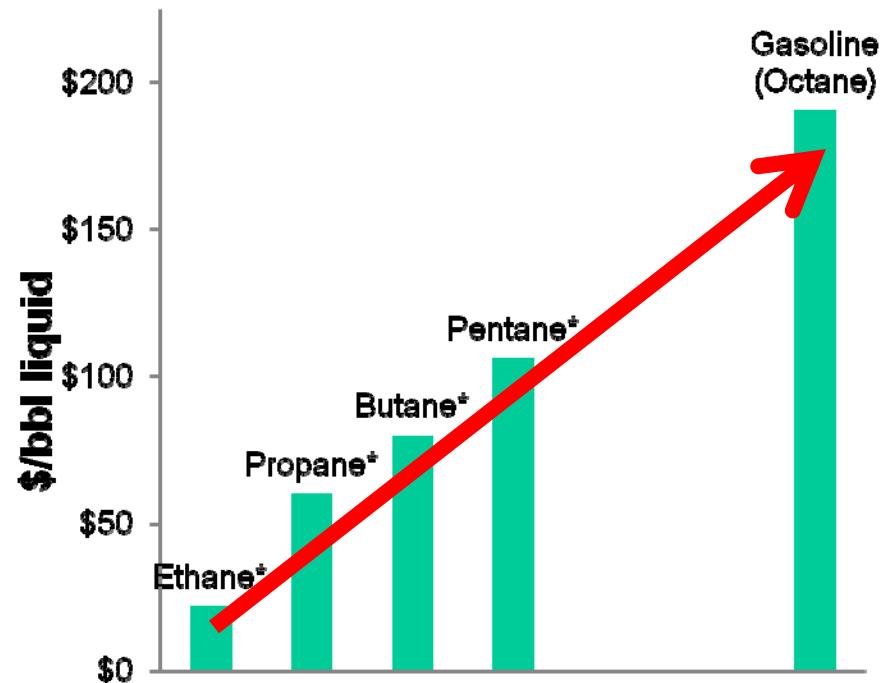




Cost of Solvents

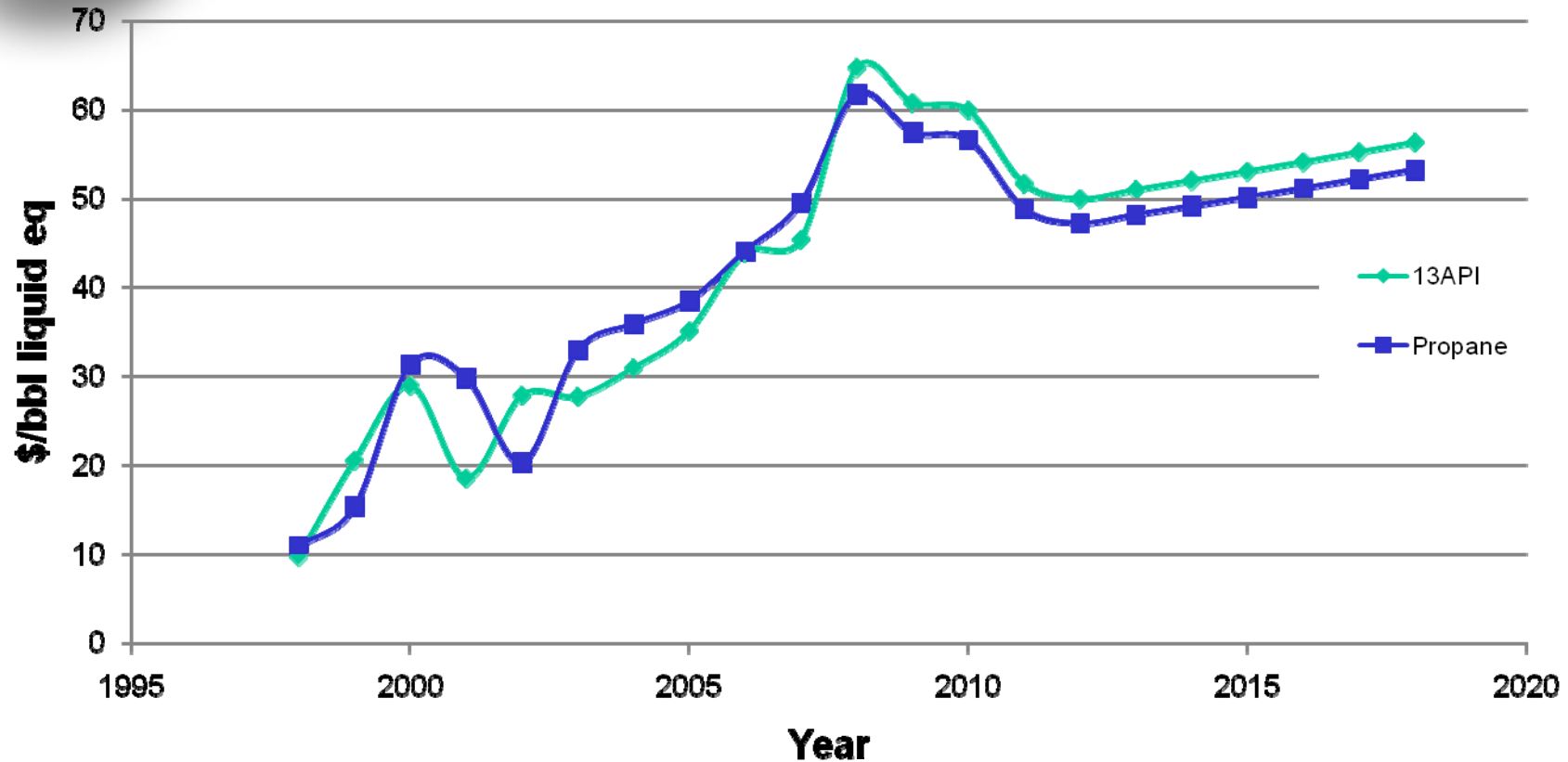
- Ethane price is based on heating value relative to natural gas
- Price of higher boiling point solvents is set by market for refined products.

Prices: March 2008 Sproule*





N-Solv Oil Value \approx Propane Price



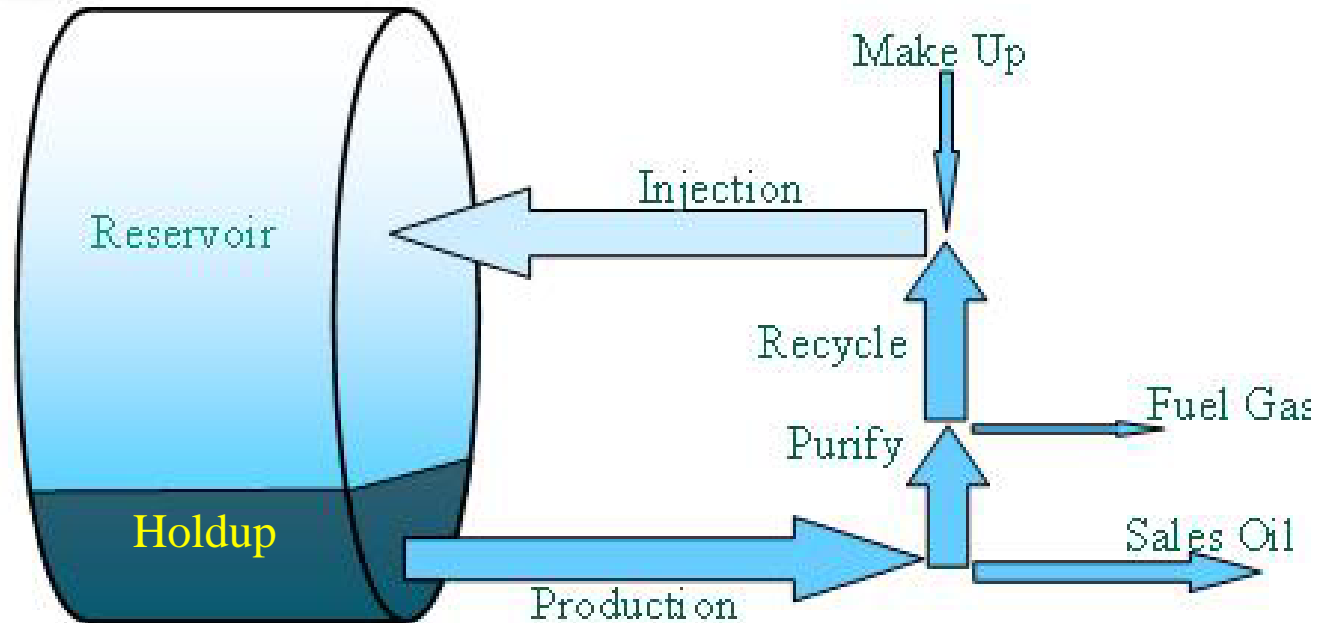
Notes: 13 API price interpolated from Hardisty Heavy at 12 API and Hardisty Lloyd Blend at 22.3 API ; Propane priced at Edmonton; Data from sproule.com, historical and forecast prices March 31, 2008





Solvent Material Balance

- Makeup
- Recycle
- Injection
- Holdup
- Losses to sales oil
- Purification losses to fuel gas
- Blowdown and recovery





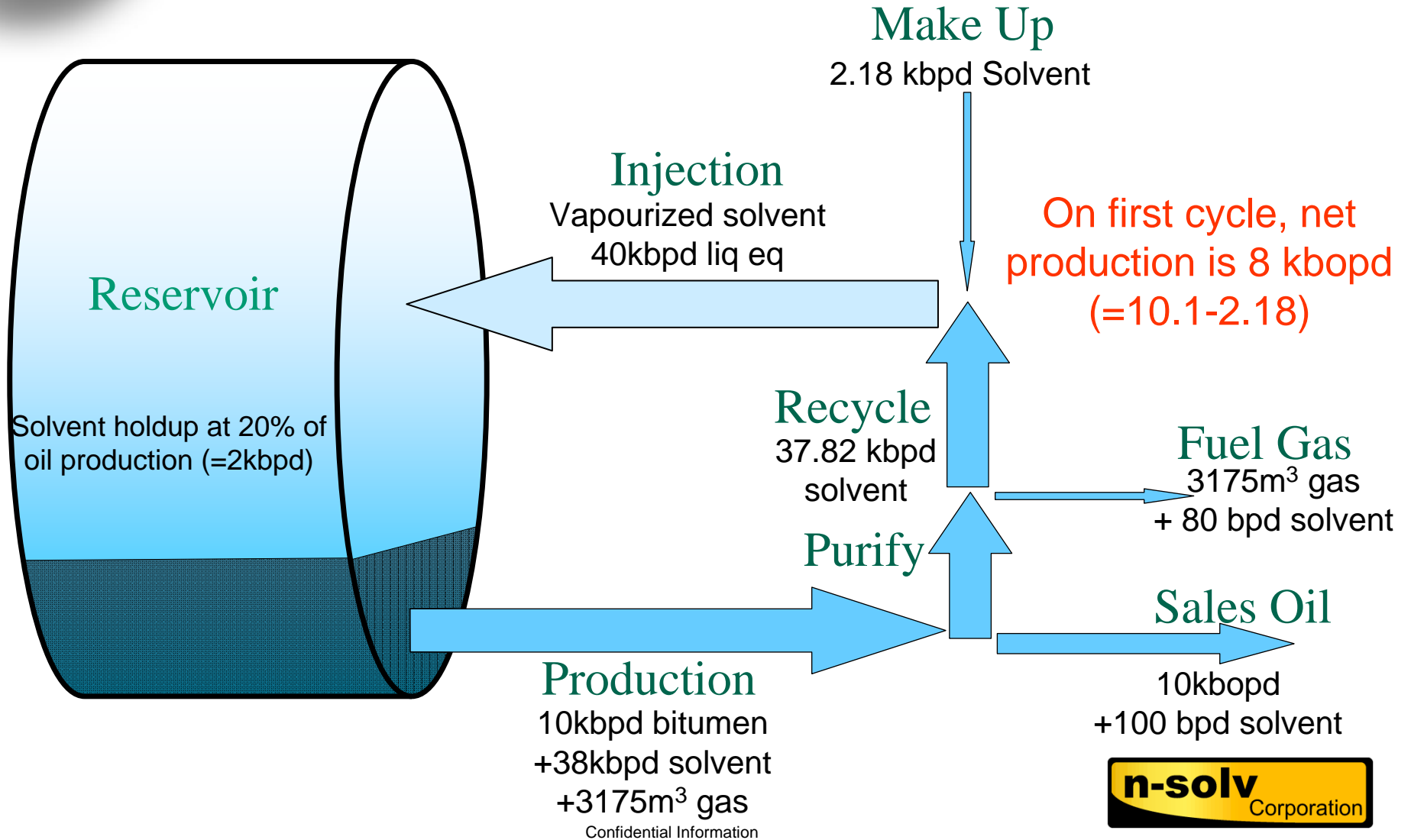
How Much Holdup?

- 6% holdup is required to replace 1m³ oil with 1m³ solvent vapour at 40C (Best case scenario)
- On 20m pay, 20% holdup is 4m of liq solvent (4.4m at 40C)
- SOR of 4 also carries 1m of oil (i.e. 5.4m total liquid height)
- With target submergence of 2.5m of liquids, the injector is at risk of being flooded
- After accounting for solvent vapour (=1m liq eq) and draining liquids (residual saturations) in vapour chamber, 20% holdup seems reasonable





Indicative Solvent Balance for 10kbpd at SOR=4, GBR=2 and 20% holdup





Solvent Inventory

- Accumulate solvent over life of pad as oil is produced
- Net (in-out) cost is equivalent to achieving an 80% production rate for the first depletion cycle
- Subsequent cycles will be 90-95% if we achieve 50-75% solvent recovery from depleted pads
- Solvent is recovered by
 - *Pressure blowdown*
 - *Stripping with methane/flue gas*
- Inventory cost can be monetized as up front losses + bank interest on recovered inventory
- If futures are contango inventory could be profitable



Pricing the Solvent Inventory

Scenario #1

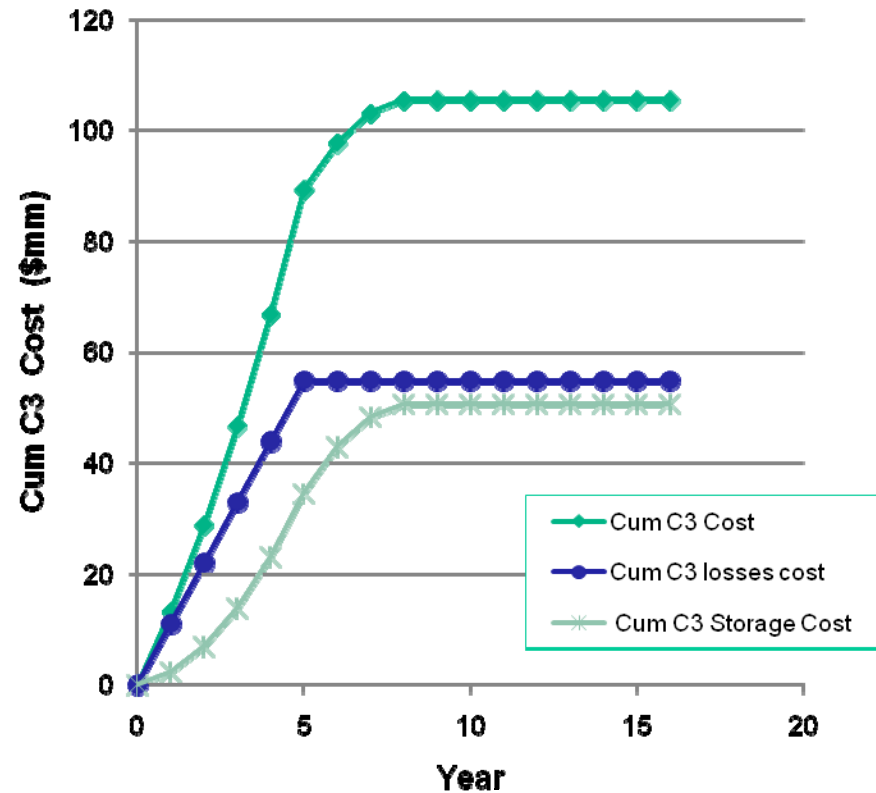
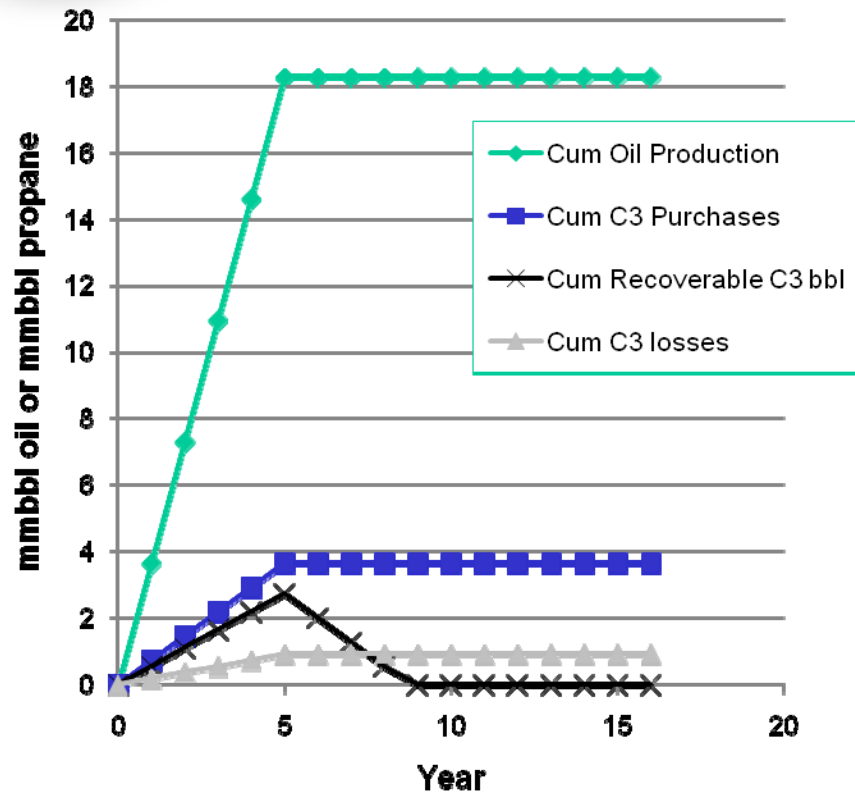
- Assume holdup is lost
- Reduce revenue by 20%
- Solvent cost is \$12/bbl

Scenario #2

- Assume 75% recovery
- 5 years of oil prod, 4 years of solvent recovery
- Expense the unrecoverable 25% of inventory
- Use bank debt at 7% to finance the recoverable 75% of inventory



Scenario #2: 75% recovery, 20% holdup, 7% bank debt, \$60/bbl, 5 year oil production cycle, 10kbopd



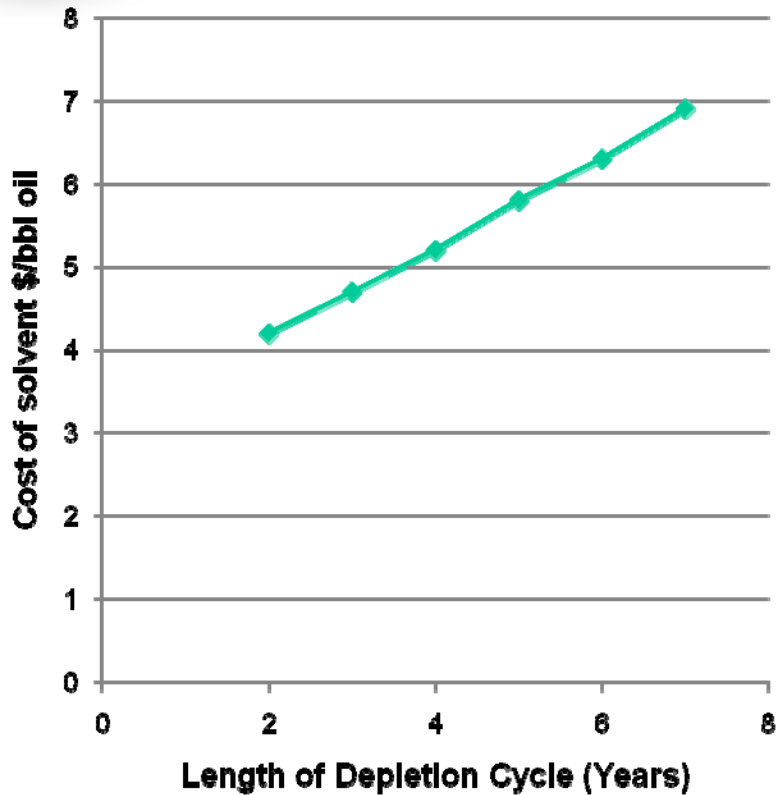
Solvent cost is \$5.8/bbl (=105\$mm/18.2mmbbl)

notes: no adjustments for taxes, inflation, royalties

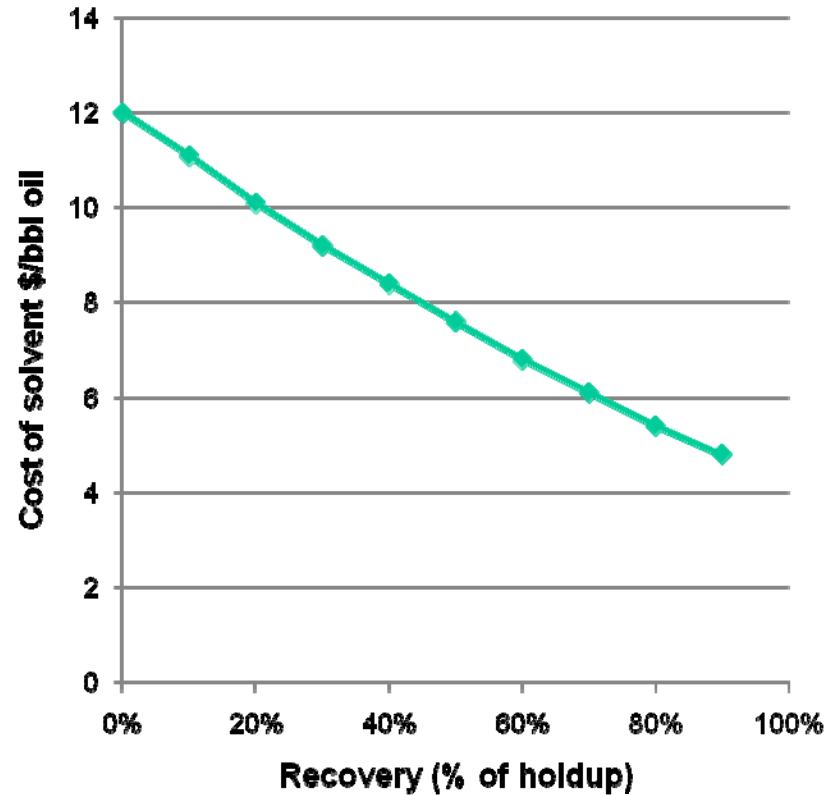




Solvent Cost Sensitivities



Assumptions: 75% recovery, 20% holdup, 7% bank debt, \$60/bbl, variable production cycle, 10kbopd

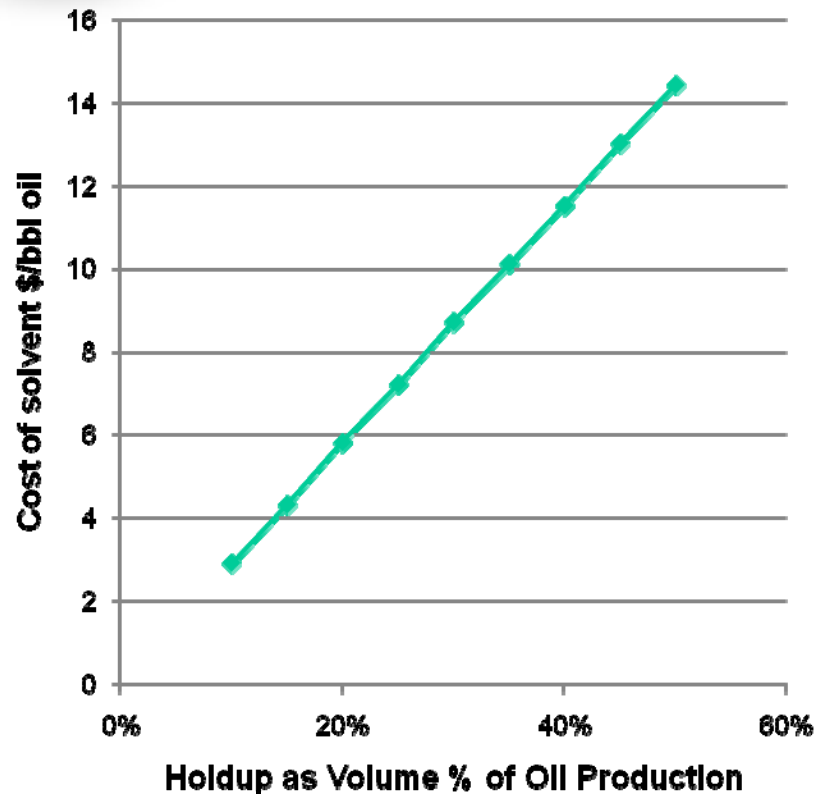


Assumptions: variable recovery, 20% holdup, 7% bank debt, \$60/bbl, 5 year production cycle, 10kbopd





Solvent Cost Sensitivities



- Expect solvent cost to be significantly less than the SAGD fuel cost (at SOR=3, the SAGD fuel cost is \$16/bbl)
- Have oil upgrade value, diluent savings, Capex and Opex savings, GHG savings, etc. to enhance bottom line

Assumptions: 75% recovery, variable holdup, 7% bank debt, \$60/bbl, 5 year production cycle, 10kbopd



Thank you!