Distributed by Rep. Seaton for amendments (1) and (3)

House Resources Committee

Requested Analysis for Rep. Paul Seaton

April 3 2013

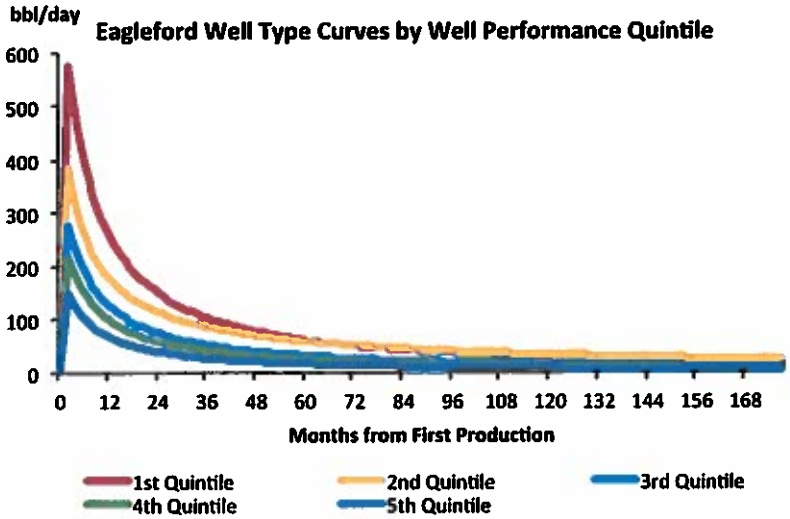
Janak Mayer
Manager, Upstream
PFC Energy

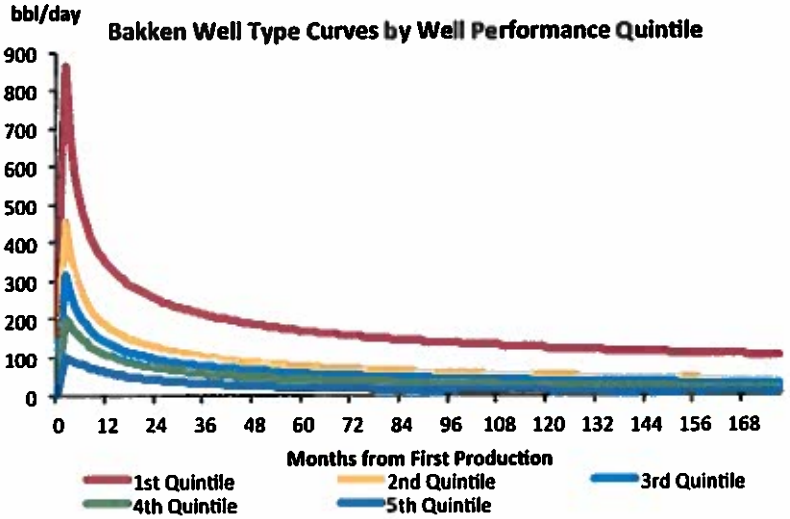
PFC Energy

Analysis of Well Type Curves for Shale Oil Production

PFC Energy

Shale Oil Type Curves for Eagleford & Bakken

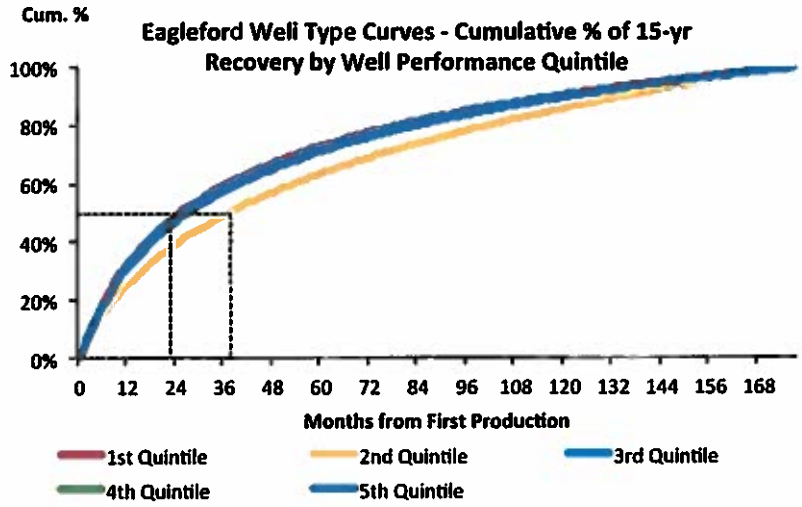


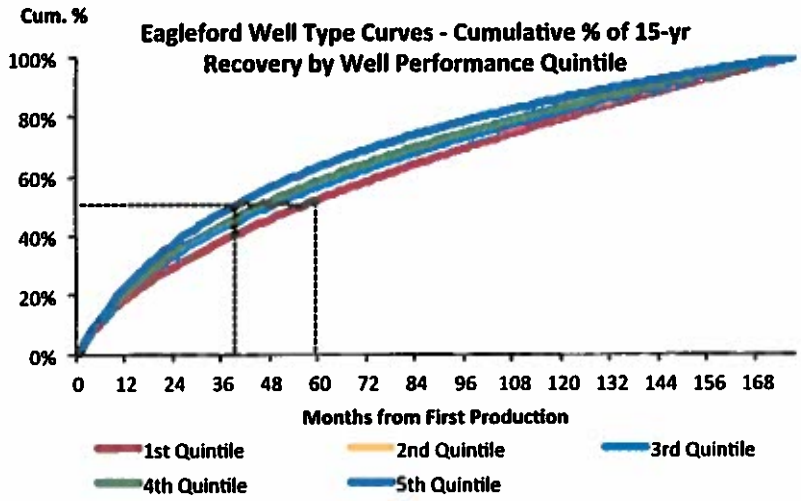


- Productivity and production profiles vary greatly from well to well
- A type curve is a statistical abstraction of well performance from a particular region or play that seeks to draw generalizations about the nature of well performance
- These type curves were generated by PFC Energy by analyzing large volumes of well-by-well production data from the Bakken and Eagleford plays
- Because well performance varies dramatically within shale plays, PFC Energy categorizes wells by quintile within each play, based on their Initial Production (IP)
- Top quintile wells in both plays are dramatically more productive than lower quintile wells
- The nature of well decline can vary substantially between different plays, and even between performance quintiles with a play

PFC Energy

Time taken to reach 50% of ultimate recovery





- PFC Energy type curves have been only modeled to 15 years of production, because of the limited time series data available to enable a longer forecast
- In reality, many shale wells will likely produce for much longer than 15 years, and particularly after workovers may end up having a dramatically longer productive life
- As a result, this analysis will tend to understate the time required to reach 50% of ultimate recovery from the well
- What the analysis does make clear is that the time taken to reach 50% recovery varies dramatically by play and by well productivity. A top quintile well in the Bakken may take as long as 5 years to recover 50% of its forecast 15-yr recovery, while a less productive Bakken well may take only a little over 3 years. Wells in the Eagleford Shale will likely take between 2 and 3 years
- Very little is currently known about the likely production profiles of Shale wells in Alaska, which could likely differ substantially from these examples
- If Gross Value Reduction (GVR) benefits were to be granted at the well-level, putting a time-limit on this benefit seems likely to create perverse incentives to shut a well in early and drill anew, rather than maintain or work-over, since any reduction in support would also come at a time that well economics were becoming more challenged. This would not be a desirable effect.
- If GVR were to be applied at a well-level, it may thus be better to limit the fiscal exposure from the GVR through limiting its overall level, then through a time limit.

PFC Energy