What Makes DUC's Fly ... How to Value DUC Wells

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The history of the oil industry in the US is riddled with large up and down swings. When times are good there is heavy investment in exploration, drilling, and asset development. When the industry starts heading towards a downturn operators often reverse course, slowing down the exploration and development. But these operations tend to have a momentum that doesn't allow for quick reactions to changing market conditions. The result is typically continuing to drill wells but waiting for more favorable market conditions to complete and start producing.

The standing inventory of these drilled and uncompleted (DUC) wells at any given time is a good indication of the market outlook. We've recently seen up-close how rapid changes in market conditions and slow responses from operators has led to oversupply, lack of storage, and, very briefly, negative oil prices. Another benefit of DUC's is that they are essentially long-term, partially funded, storage of supply in the ground. However, our analysis shows that, as a general observation, the amount of time wells remain in the ground uncompleted has a negative impact on overall performance, both in terms of IP90 as well as ultimate recovery. As such, whether you are contemplating drilling DUC wells, or looking to acquire assets with already drilled DUC's, it's important to understand their potential value, and how that value can vary based on a number of environmental, financial, and strategic factors. When DUC's are finally brought online, they may not yield the same production as a well completed immediately after drilling.

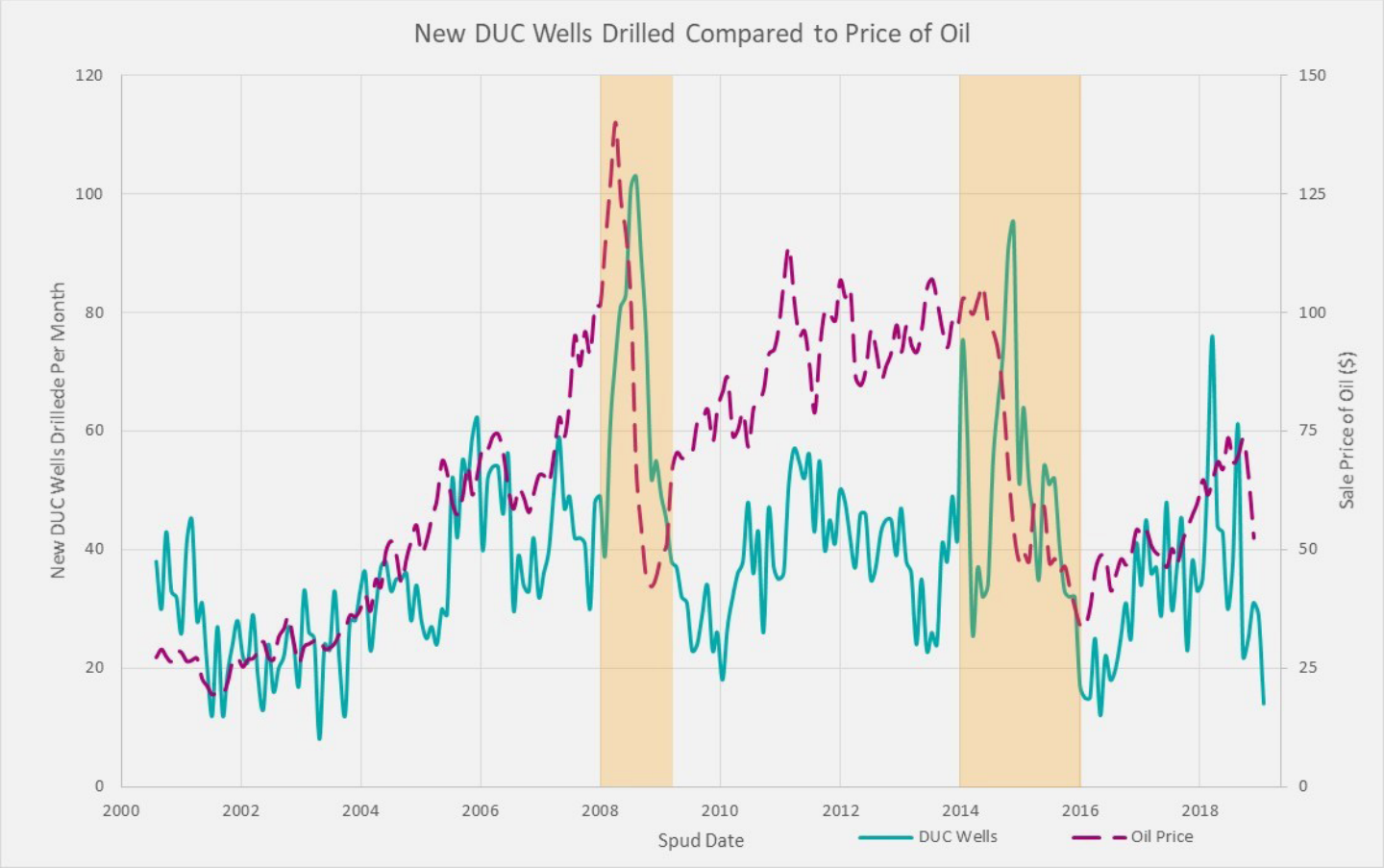


Figure 1 – New DUC Wells against Oil Price

Figure 1 compares the historic oil price with the number of DUC's drilled per month and year. In the last 20 years there have been two periods of increased DUC well inventories, 2008-2009 and 2013-2015. These periods also correspond to a proportional drop in sale price of oil and gas, similar to what we are seeing in the current financial environment. However, although the number of DUC's drilled during the price troughs significantly increases, the data also shows that some DUC's are still being drilled even when the financial situation is favorable. This indicates that some operators will maintain DUC inventories for non-financial reasons. One possible explanation is that wells drilled for contractual or lease-related obligations in lower tier acreage may be put on hold for completions in favor of higher tier, more productive acreage. Another may the availability of frac crews or midstream infrastructure tie-ins.

This analysis looks at DUC wells drilled in the Anadarko basin in Oklahoma, the Permian basin in Texas and New Mexico, as well as hotspots in the Eagle Ford and Austin Chalk plays throughout Texas. This area of interest is by far not the only area where DUC's are typically drilled, and we have therefore compared the marginal performance of these DUC wells to an analogous set of nominally timely completed wells from the same plays and with similar well attributes. Using TGS Well Performance Statistics, this analysis compares 30-day IP and Estimated Ultimate Recovery of the DUC wells as a percentage increase or decrease over their respective analogue of normally drilled wells with the goal of extending these insights to other plays not specifically included in this analysis.

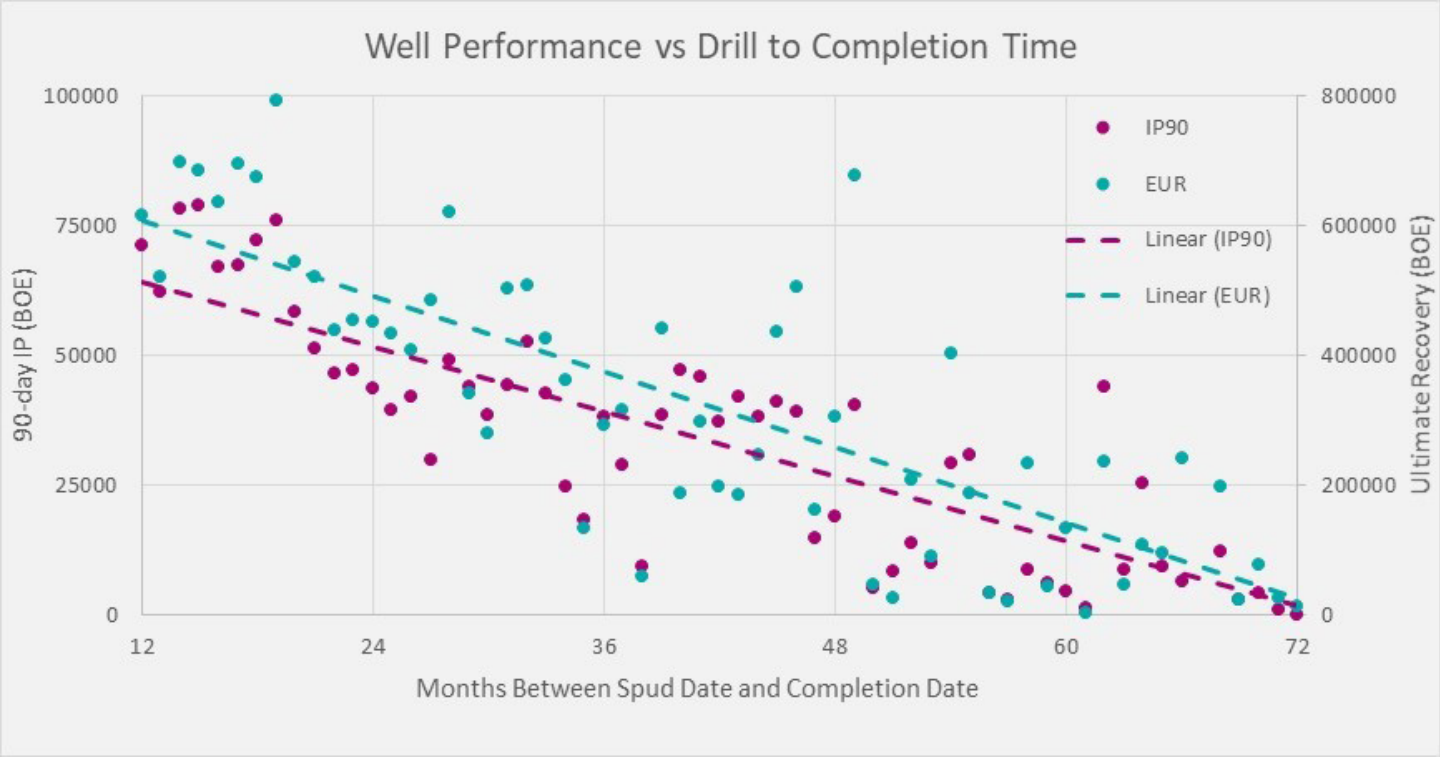
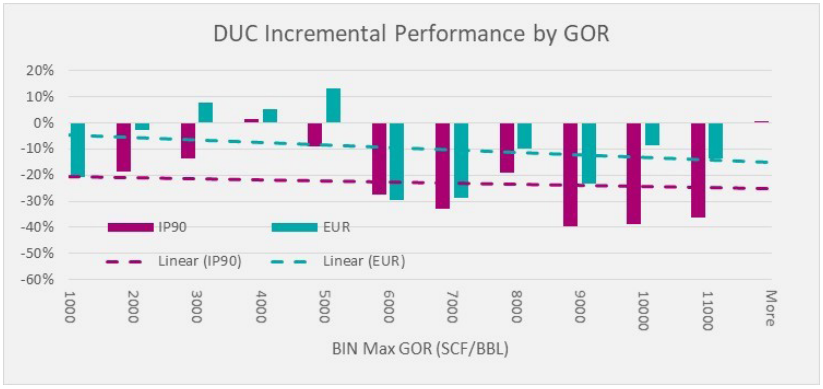
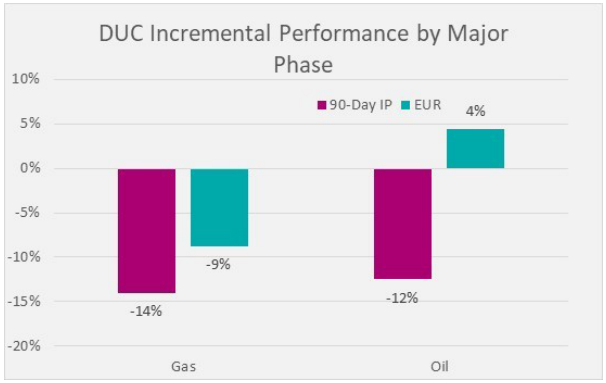
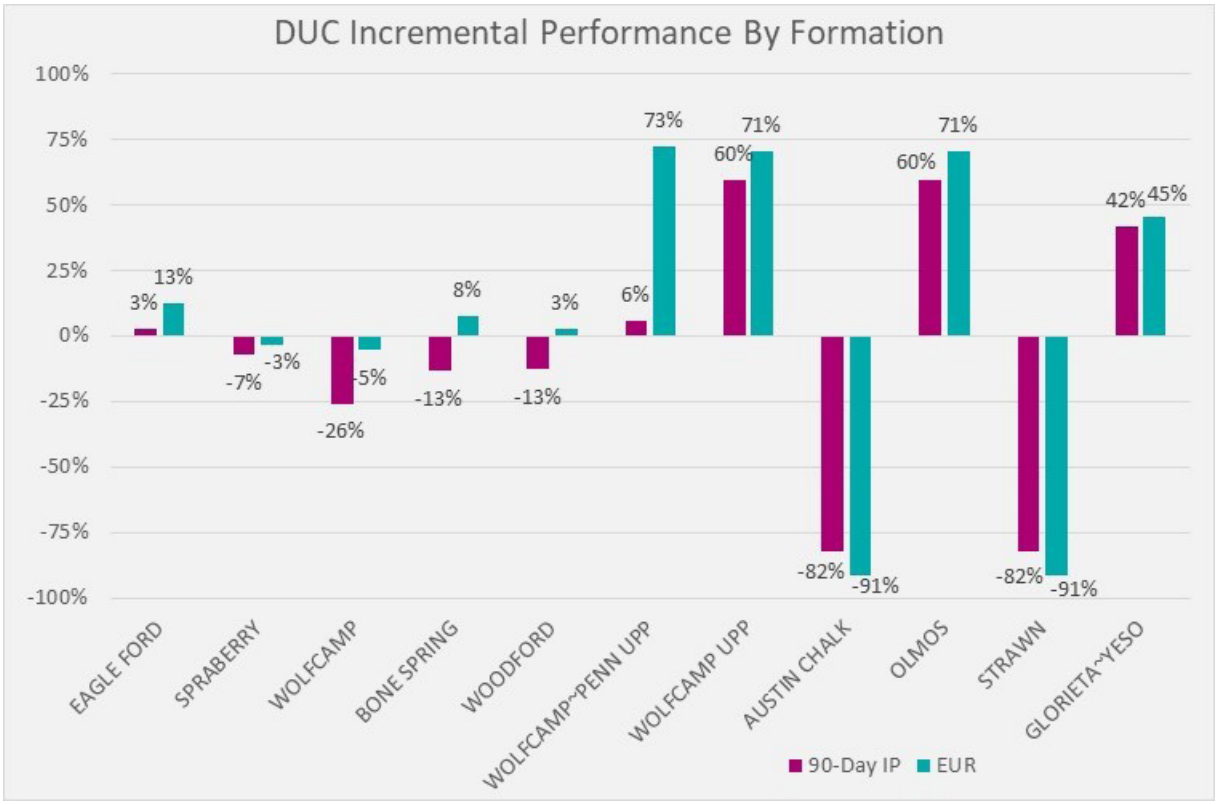


Figure 2 – Well Performance against Time to Completion

A significant indicator of overall performance, as shown in figure 2, is the time between drilling and completing a well. There are a number of technical factors that may be at play with regards to changes in well performance based on time between drilling and completion, but the geology, well design, or eventual completion design may also play a factor.







Figures 3 to 5 – DUC Incremental Performance against gas-oil-ratio, dominant phase and formation

There are 3 other attributes (fig 3-5) that were also compared across this dataset. When comparing the impact of each of these attributes between DUC and concurrently completed wells, all other attributes were held constant. Initial results indicate that, beyond time to completion, the major differentiator of marginal performance and value of DUC's versus their analogues is the dominant phase and gas-oil-ratio. This attribute yields the clearest relationship with marginal performance, while the formation comparison is likely acting as dependent indicators of in-situ GOR. There is room for continued analysis in future studies by correlating different well attributes, or by including other major plays and basins where a significant number of DUC wells were drilled.