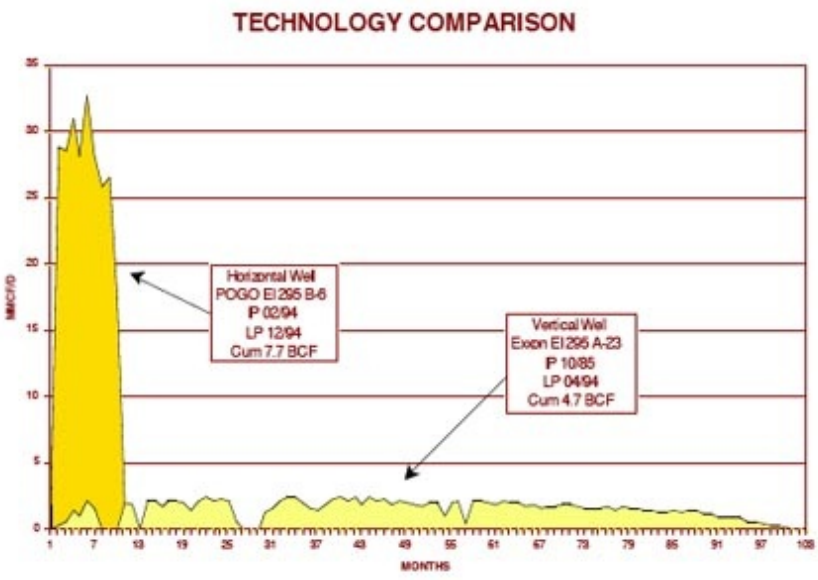
The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Horizontal and Vertical Well Production

Posted by Heading Out on January 18, 2007 - 10:15am
Topic: Supply/Production
Tags: aramco, horizontal wells, natural gas production, ucsb [list all tags]

This post, in a way, is in homage to Connections, which I have just started to watch. I noted today that Leanan had posted that Matt Simmons is giving a talk at UCSB tonight, and I suggested to the Engineer that he might go downstairs and listen. (His report – among other things that the room was too small, but also that Matt did say that we at TOD do "an excellent job" – why thank you, kind sir).

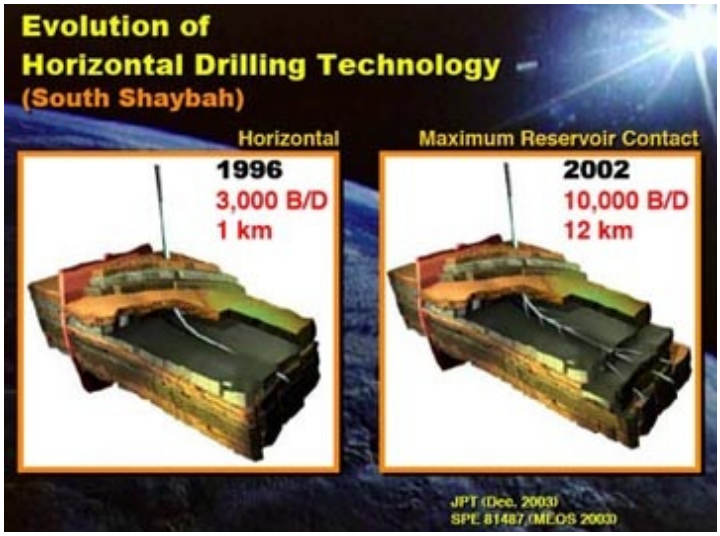
And then I got a bit more curious about the program and found that there is a Conference coming up there on February 9-10 dealing with the need to transition from carbon fuels to renewables. While the current program looks fairly interesting, it is the second in the series. And so I went back to see what they had on the program last year. And there I found a paper on Natural Gas by Chris McGill, from which I took the following graph.



This is the first time that I have seen a comparison of relative production rates between horizontal and vertical wells that were relatively close, so I thought I would pass it on. More under the fold.

One of the topics that has been a matter of some considerable debate on these pages, is the relative changes in well performance when the more advanced technology of horizontal well drilling is used, rather than more conventional extraction using vertical wells. Aramco have noted the considerable increase in relative production rates, which, as they showed in the presentation

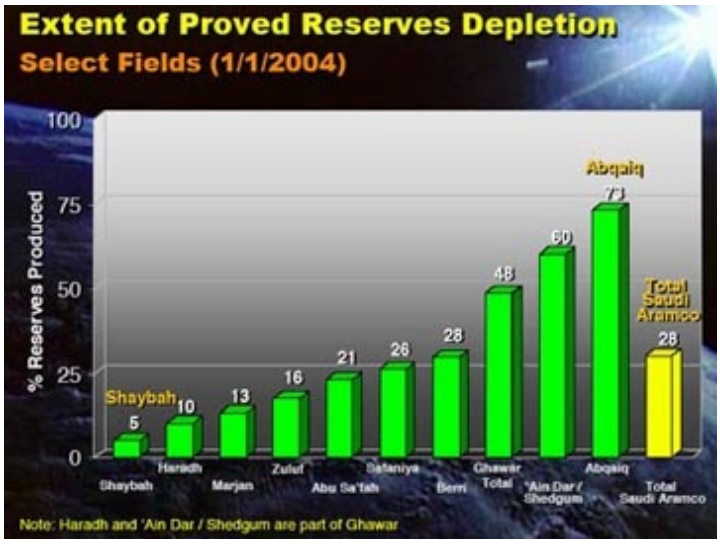
to CSIS can be raised from perhaps 600 bd from a single vertical well, through 3,000 bd for a normal horizontal well, to some 10,000 bd with the newer maximum reservoir contact wells. To borrow one of their pictures, that shows this:



Now this is the positive side of the coin. By using an increased distribution of well laterals out from the main flow (and subsequently adding valves along the line) Aramco have been able to considerably increase the short-term production from a field, using a limited number of wells.

However, the question has to be, for how long can that production be sustained, given that there is only a limited quantity of fuel down there? And do you get the same amount of oil out in both cases? The plot from Chris McGill would seem to suggest that it might be possible to double the amount of oil coming from an individual well (though it might beg the question as to whether the company might otherwise have sunk two wells rather than one). But it also shows the dramatically shorter life at the higher production rate, in this case (bearing in mind it is a gas well) from almost 100 months of production down to 10.

This would probably be a good place to stop, except that there continues to be debate as to the amount of recoverable oil in the different fields within Saudi Arabia, so I thought I would also post the figures that Aramco gave at the CSIS presentation, since a number of you may not have seen them.



And the Connections twist? Well James Burke always seemed to start with one thing, wander around a whole host of related topics that all led back, in the end to the same thing. And so, if Matt Simmons had not challenged Saudi Aramco, then they would not have produced the above graphs, which would not have led me to wonder about the change in well lifetimes, which would not have got me interested in the UCSB site and the fact that Matt happened to be talking there tonight.

(Yeah, I know - I should probably go back to reading books!)