The Oil Drum
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Saudi Arabia - opening the tap?

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One wonders, sometimes, why folk would want to get into political office these days, given the pervasive problems starting to arise from the end of cheap and easy to produce oil and natural gas. The rising costs of providing fuel for everything from school buses to emergency responders eats away at one end of a budget. The demands for wage increases to help employees cope with rising fuel and food prices nibbles away both at another part of the budget, but also at public and labor relations. And then there is the cost to repair and maintain the existing infrastructure, let alone make provision for future alternate choices for power and transportation. Sectors of the population, such as truckers, are becoming less shy in complaining about their problems, as unemployment bites into their numbers.

Fortunately there are legislators and candidates for office that do understand both the problems and the complexity in finding answers where options are not immediately responsive or popular. For the rest it often becomes easier to try and unify a constituency by invoking an enemy –someone who can, by their actions, be blamed for constituents' problems. Sadly the world's history has been filled with stories of such scapegoats, as an easy way of switching attention. Today it is possible that as oil prices rise, both OPEC and Saudi Arabia may become the villain in articles and political slogans. Given the possible outcomes of such positioning, it is perhaps not surprising that, as another American election swings into the beginning of the end game, that oil suppliers, perhaps sensing this, are indicating the chance of a greater flexibility in supply.

Categorizing the response of Saudi Arabia and OPEC to market pressures is not an easy undertaking, and has been the subject of considerable debate here and elsewhere. To begin there are the different grades of crude that are available. And while the initial impression of the latest Saudi offer is that this will be sweet, light crude (i.e. easy to refine) that has been the historic quality Saudi product, this is not necessarily the case. Bear in mind that the Kingdom also produces a heavier crude, that is frequently sour (i.e. having a high sulfur content) and this has not been easy to market .

> Asian refiners want increased supplies of the lighter grades of crude to produce more expensive cleaner-burning fuels while Saudi Arabia is offering more of the heavy, high-sulphur grades. . . . . Saudi Aramco is understood to have only more of the heavier grades at its disposal.

Iran's state-owned National Iranian Oil Co has been unable to offload about 25mn barrels of crude stored in tankers in the Arabian Gulf, mostly of heavy sour Soroosh and Norooz, despite

steep OSP cuts.
The question therefore that needs to be resolved is as to whether the Saudi's are going to make more of the lighter oil available (which is suggested by the reference to the new production from Khursaniyah which is Arabian light.)

The problem is compounded by reducing levels of production from existing fields, which, in large measure, have been also the lighter crudes, and which decline must be made up either by increased production from within those fields, or by adding new production from fields such as Khursaniyah, if the overall mix that is offered for sale is not to start to swing heavily towards the heavier and sourer crudes that are less popular in the marketplace.

We have been fortunate here at TOD to have had quite detailed analyses from folks such as Euan Mearns , Stuart Staniford , Khebab, Ace and JoulesBurn , to name but a few. Much of the recent discussion has been focused on the state of Saudi reserves, rather than the amount that can be produced at one time (the size of the tap). Yet it is in the short term size of that tap that allows the potential increase in Saudi production, and a possible consequent drop in the price of oil (Not that such a drop is a certainty).

Back when Matt Simmons debated Mahmoud Baqi and Nansen Saleri of Aramco at CSIS in 2004, one of the solutions that Aramco put forward was the increasing use that they were making of horizontal wells, particularly in new fields, and also of the introduction of the Maximum Reservoir Contact (MRC) wells where the initial horizontal well is supplemented by secondary laterals that are offshoots from the main initial drive. Further, with the introduction of down-hole valves that allowed segments of the well to be closed down, while segments on either side continued to produce, as a way of overcoming localized water breakthrough, smart wells were developed that would allow production to continue from wells that historically would have closed. In 2004, however, this was a technique that was being widely used in new fields, but not yet used exclusively in older ones. The difference is fairly significant, since a horizontal well can produce thousands of barrels a day, over the hundreds that can come from a vertical well in the same place. (The reason is that the length of the well in the productive rock that holds the oil controls how much oil can flow into a well at a given time, and the horizontal wells can run kilometers through oil-bearing rock, while vertical wells rarely run even a hundred meters.)

The consequence of change from one to the other is therefore the equivalent of opening a larger tap into the field, and one of the issues that we have debated at this site has been the limitation on tap size that goes along with the other debate we have on the absolute size of the resources. Leaving aside that latter debate at the moment, I would suggest that, in the short term the increasing use of horizontal and MRC wells in the older fields will give some little leeway to Aramco to potentially reduce the drop in production by changing to the MRC wells (Saleri quoted a gain from 3,000 bd to 10,000 bd with the change from horizontal to Maximum Reservoir Contact, since in the latter case the use of a number of side horizontals or laterals running out from the main horizontal well, can increase the exposure of the well to the rock to more than 12 kilometers).

The first horizontal wells were drilled in 1991 in the KSA, and. by 1993 there had been a total of 21 completed. It was then anticipated that horizontal drilling would take half the Aramco drilling budget for the next ten years. (But it should also be noted, as was commented in the post on shales, that such wells can cost ten times the price of a conventional vertical well – and Aramco were not drilling that many new wells a year (only around a couple of hundred – almost sounds like a puzzle from Car Talk!)

When the debate over Saudi production began, probably with the CSIS presentations, there may

have been a tendency to over estimate the relative number of these wells. Horizontal wells installed in new field developments, such as Shaybah, Harradh III and Kursiniyah and integrated into sophisticated water flooding programs, were needed to obtain the high individual well production numbers that the program called for in these new areas. At the same time these wells minimized the problems of water cut in the oil produced. There was, however, perhaps too much of an assumption that this also applied to the existing production from existing fields and that they too had switched to the same technology. This is not likely to have been true however. As demand rose, and existing well production declined, Saudi Arabia realized that it could no longer get by with the 30 – 40 rigs that it had, historically, been using. It was willing to competitively invest so as to get the number of rigs, for both exploration and development, up to about 120. Now initially not all of these would drill horizontal wells, in fact for some purposes such wells are both unnecessary and not desired (water injection for example). And in the historic plan for in-field development the initial means for holding production declines to target levels had called for vertical wells.

What I would like to suggest is that as production demands have continued to rise, so what we are now seeing is a greater switch from vertical wells in the old fields to the use of horizontal ones. As the switch is made one can anticipate not only that individual well production rates will, at least initially, substantially increase over vertical, particularly as Aramco learn to drill longer wells. One should also expect that the water cut in the older fields should also decline somewhat as the overall percentage of vertical wells declined, and horizontal becomes paramount in all fields.

Changing from vertical dominant to horizontal well dominance in older fields has short term benefits – a gain in the amount of oil that can be recovered from a given number of wells in a shorter time interval, and a longer term down-side in that declines (as we have seen in the North Sea, Oman and other places where horizontal wells now have become common) which come earlier and at faster rates.

My concern therefore, as Saudi now has made a sufficient number of well changes to give the greater percentage of horizontal wells in the their historic fields, that it will meet the short-term need for higher production, but that this will, concurrently mean that when their production does peak, that the decline will be much faster than the 4 -5% that folk now talk of, and instead will exceed 10%.

It has been some time, for example, since Aramco admitted that their decline rate from existing wells was at a level of around 800,000 bd/year, and increasing the size of the tap will have an impact on that value also – making the target production increase each year increasingly higher (and thereby more difficult to attain) . Thus I worry a little that should there now be an acceleration in the production from the older fields that this will in turn shorten their productive lives and steepen the decline curve later - but then that gets me into a discussion on reserves and resources and that is the other debate we have.