



Saudi Arabian oil declines 8% in 2006

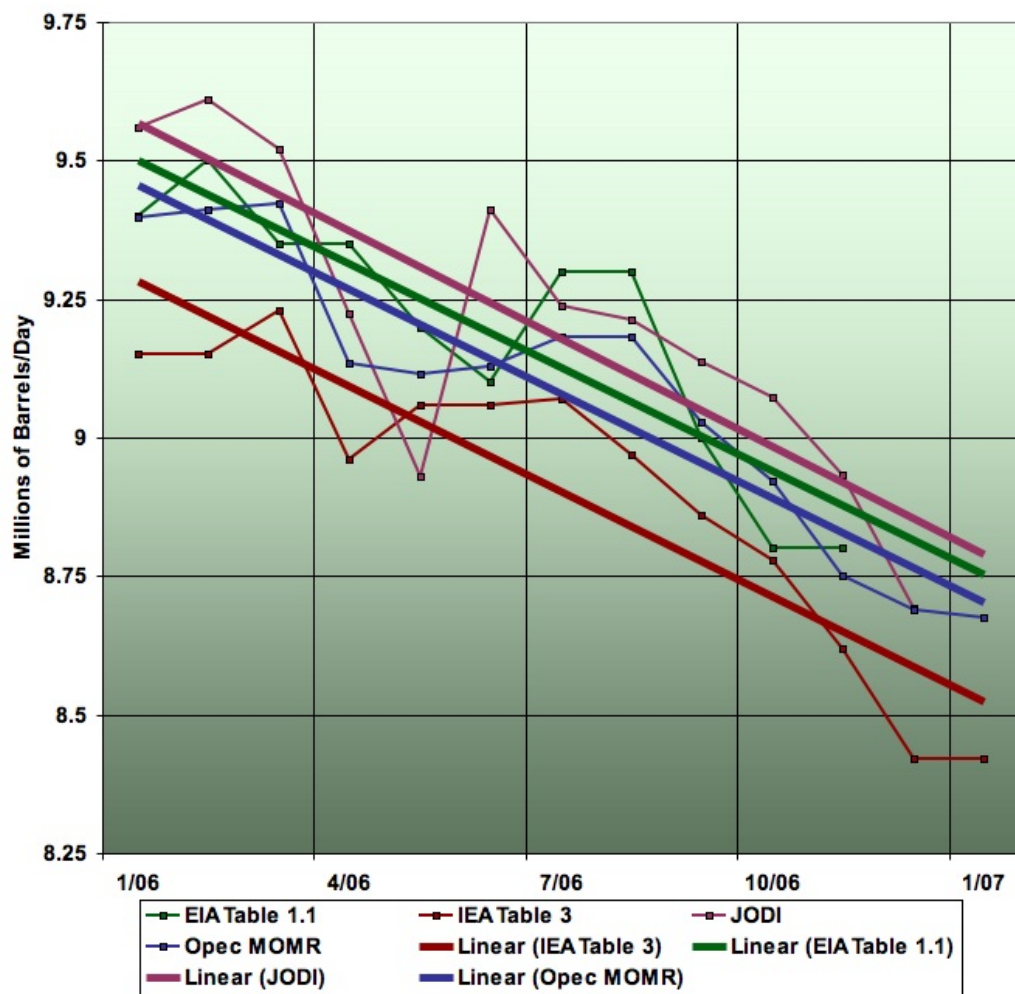
Posted by [Stuart Staniford](#) on March 2, 2007 - 11:10am

Topic: [Supply/Production](#)

Tags: [eia](#), [iea](#), [joint oil data initiative](#), [peak oil](#), [rig](#), [rig count](#), [saudi arabia](#) [[list all tags](#)]

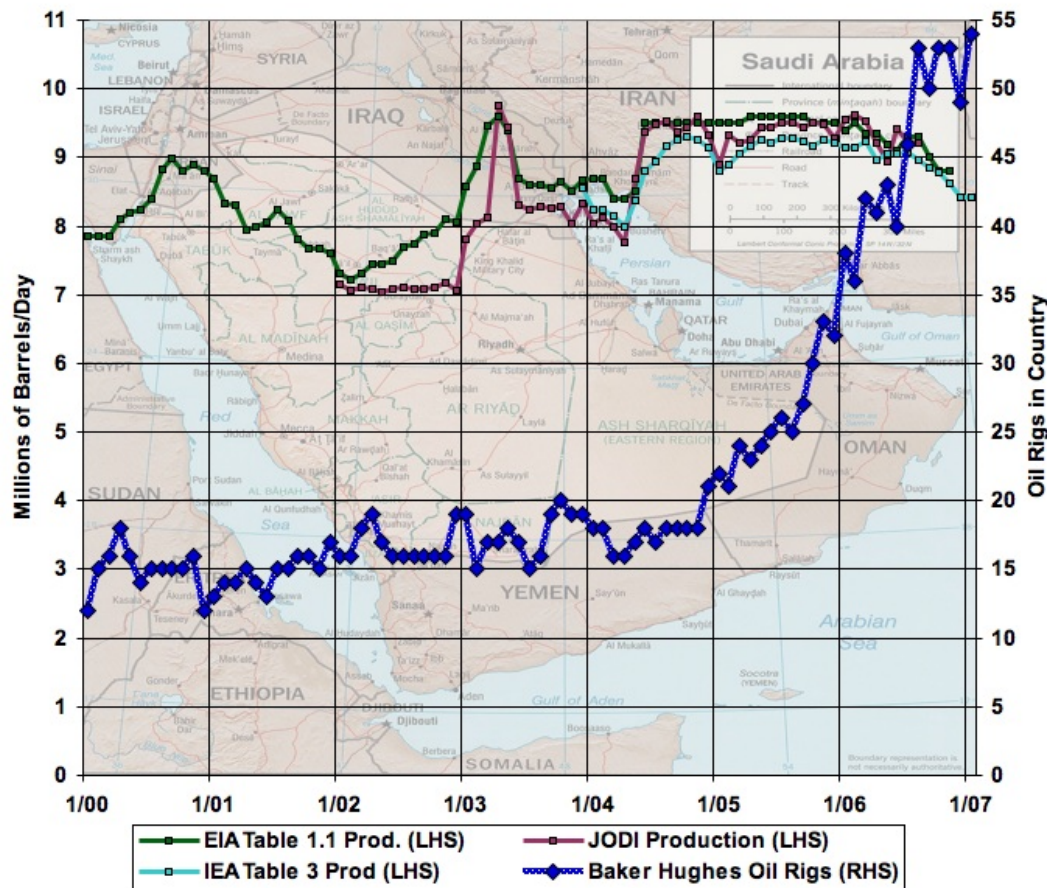
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Saudi Arabian oil production, Jan 2006-Jan 2007, from four different sources. Linear trends fitted to each series. Graph is not zero-scaled to better show changes. Click to enlarge. Source: [US EIA International Petroleum Monthly Table 1.1](#), [IEA Oil Market Report Table 3](#), [Joint Oil Data Initiative](#), [OPEC Monthly Oil Market Report, Table 17](#) (or similar) on [OPEC Supply](#).

For a talk I was meant to give, I updated my graphs of Saudi oil production, which I hadn't done in a few months. What I found was pretty interesting, and I'm starting to draw stronger conclusions. [Last time I looked at this](#), I made an earlier version of this graph:



Saudi Arabian oil production (left scale) and oil rigs in country (right scale), Jan 2000-Jan 2007. Click to enlarge. Source: [USEIA International Petroleum Monthly Table 1.1](#), [IEA Oil Market Report Table 3](#), and [Joint Oil Data Initiative](#) for oil supply. [Baker Hughes](#) for rig counts.

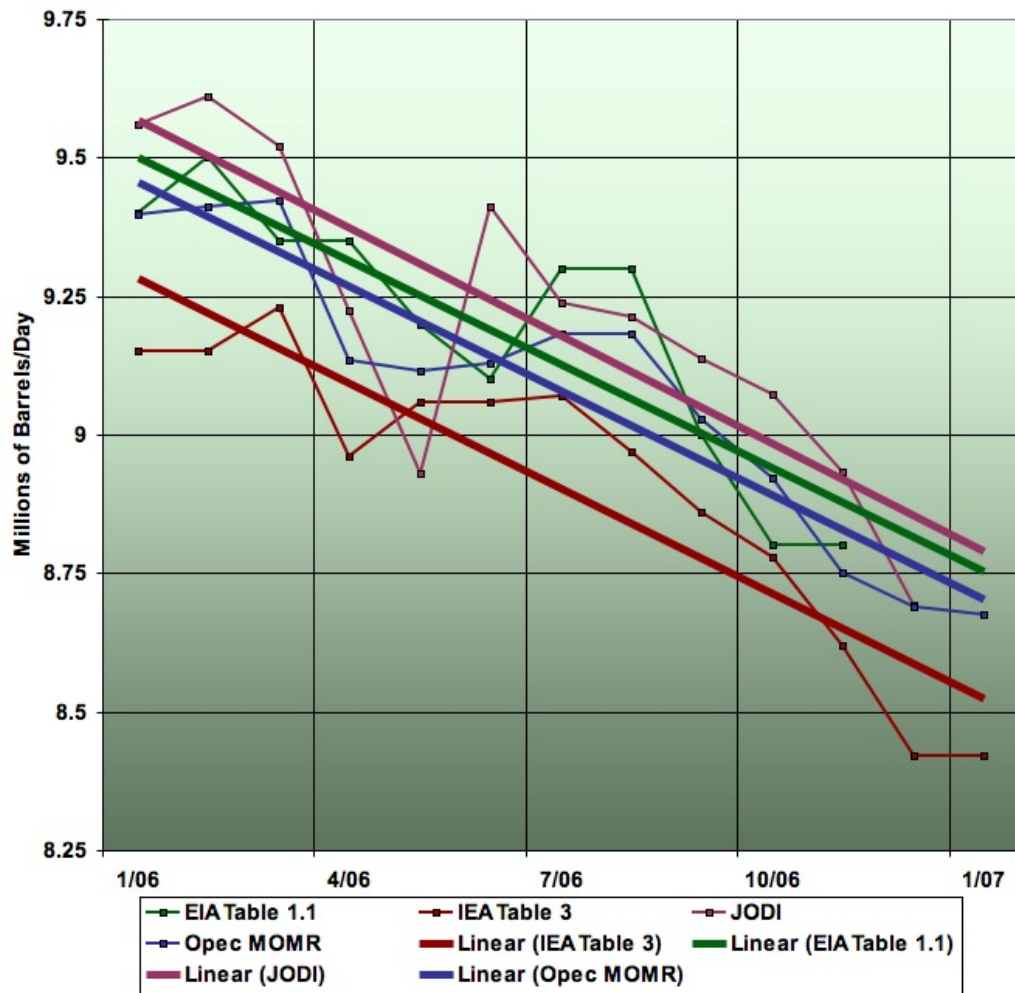
At that time, while the conjunction of declining production and rising rig counts was striking, I wasn't ready to draw firm conclusions on the data through August-October (depending on agency). Recently, Jim Hamilton [raised the same questions](#):

The first possibility is that the Saudis could still pump 10 mbd or more today if they wanted to, but they are cutting back production and exploring like mad because they put an extremely high value on having 2-3 mbd of excess capacity. If so, the recent price behavior suggests that the reason they would seek such capacity is not because they want to stabilize the price, but because it puts them in an incredibly powerful negotiating position. For example, the ability at any time to flood the market could be used at an opportune moment to undercut expensive alternatives such as oil sands that require an oil price over \$50.

The second and more natural interpretation is even more disturbing: the mighty Ghawar oil field is already in decline, and the Saudis don't want anyone to know.

What I did in this post was to look in more detail at what happened from the beginning of 2006

on, which is when the apparent decline begins. I added data from a fourth source (the OPEC Monthly Oil Market Review), and for each of the four sources of data, I fit a linear trend:



Saudi Arabian oil production, Jan 2006-Jan 2007, from four different sources. Linear trends fitted to each series. Graph is not zero-scaled to better show changes. Click to enlarge. Source: [US EIA International Petroleum Monthly Table 1.1](#), [IEA Oil Market Report Table 3](#), [Joint Oil Data Initiative](#), [OPEC Monthly Oil Market Report, Table 17 \(or similar\) on OPEC Supply](#).

The resulting graph is extremely striking, I think. The four different sources all estimate Saudi production slightly differently - they fluctuate in different ways month to month, and disagree over the absolute level (that last may be differences in exactly what is defined as oil). However, the regressions make clear that all four sources are in strong agreement about the nature of the decline. The slopes of the lines are very similar.

The implied decline rate through the year is $8\% \pm 0.1\%$. (Note that the year on year decline from 2005 to 2006 will only be about half that, as the decline only began at the beginning of 2006). As far as I know, there are no known accidents or problems that would explain any restrictions on oil supply, and the Saudis themselves have maintained publicly that their production is unproblematic and they intend to increase it.

It's interesting to note the pattern in the underlying data where declines start, are interrupted in the middle of the year, and then resume. I take this to be due to the coming onstream of the 300kbpd of liquids from the [Haradh III](#) megaproject:

HARADH, February 08, 2006 -- In a record 21 months from approval of funding, oil started flowing through the new Haradh gas-oil separation plant (GOSP) from several of 32 new wells that will feed the facility.

...

Full production will be attained by the new plant within the second quarter of 2006.

It seems this did not do more than briefly interrupt the declines. We can get a clearer picture as follows. What I did was average the EIA, IEA, and JODI series for 2005 and 2006 into a single estimate. Onto that, I've hand drawn a couple of guidelines that are 300 kbpd apart vertically:

Saudi Arabian oil production, Jan 2005-Jan 2007, from EIA, IEA, and JODI averaged together. Black lines are handplaced guidelines that are 300kbpd apart (the advertised capacity of Haradh III). Graph is not zero-scaled to better show changes. Click to enlarge. Source: [US EIA International Petroleum Monthly Table 1.1](#), [IEA Oil Market Report Table 3](#), and [Joint Oil Data Initiative](#).

My interpretation is that the bump in the middle of the year that separates the two lines is due to the impact of Haradh III coming on stream. So that tells us that, given some extra production capacity, Saudi Aramco immediately threw it into the production mix. And the effect of that? It lifted the plummeting production curve up by 300kbpd, but did nothing to change the gradient of the plummet. That suggests that the Saudis had nothing else to throw at the problem.

It also suggests that last year's underlying Type II decline rate, before megaprojects like Haradh III, was 14%.

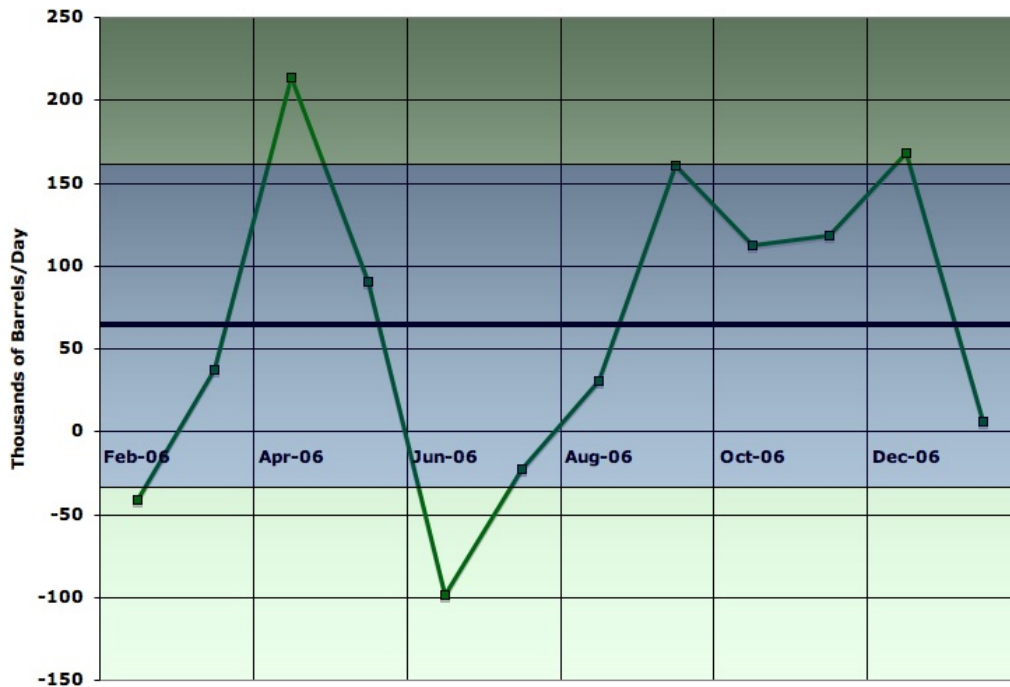
Overall, I feel this data is clear enough that I'm willing to go out on a limb and conclude the following:

- Saudi Arabian oil production is now in decline.
- The decline rate during the first year is very high (8%), akin to decline rates in other places developed with modern horizontal drilling techniques such as the North Sea.
- Declines are rather unlikely to be arrested, and may well accelerate.
- Matt Simmons appears to be right in [Twilight in the Desert](#), but the warning did not come until after declines had actually begun.

[**Update:** Steve Andrews of ASPO-USA correctly points out to me in email that Matt Simmons began warnings about Saudi Arabia as early as December 2003, significantly before the publication of the hardback version of the book in mid 2005. I relied on an over-hasty check of Amazon which has the paperback publication date - mea culpa.]

I suggest that this is likely to place severe political strains on Saudi Arabia within a year or two at most.

I also looked at the question of whether there is any evidence for the idea claimed by OPEC that the Saudi's deliberately [cut production](#) starting in November. Specifically, I constructed a series that represents the average decrease, month-over-month, in the four series. That data looks like this (the blue box is one sample deviation up or down from the mean - the heavy black line).



Month-on-prior-month decline in oil production, Feb 2006-Jan 2007, from four different sources (averaged). The heavy black line is the mean decline, and the blue box represents plus or minus one sample deviation. Where not all sources were available, drops were computed from all available in both months. Graph is not zero-scaled. Click to enlarge. Source: [US EIA International Petroleum Monthly Table 1.1](#), [IEA Oil Market Report Table 3](#), [Joint Oil Data Initiative](#), [OPEC Monthly Oil Market Report Table 17 \(or similar\) on OPEC Supply](#).

As you can see, November and December are statistically indistinguishable from the collection of other months. There is no statistically significant evidence for the idea of any cut in those months other than whatever ongoing process controls the production declines. The most notable feature of the graph, the large jag downwards in the middle of the year, again appears to be due to the impact of 300k bpd of new production from Haradh III. The production data simply don't support the narrative that the Saudis were going along producing fine and then deliberately cut production in November to help support prices.

This raises the question of whether OPEC, taken as a whole, deliberately cut production in November/December.

OPEC oil production, Jan 2005-Jan 2007. Includes NGLs, but excludes Angola. Graph is not zero-scaled to better show changes. Click to enlarge. Source: [US EIA International Petroleum Monthly Table 1.4](#), [IEA Oil Market Report Table 3](#).

There is some evidence of a very slight acceleration in November of a process of declining production that was ongoing throughout the second half of 2006 (and in to January of this year). This excess decline does not exceed 200 thousand barrels per day. On the whole, media coverage of OPEC production cuts appears to be almost completely unmoored from the data the agencies are reporting. The entire "production cut" may be a public relations exercise to disguise other processes.

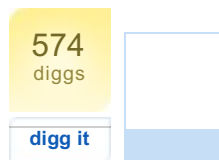
Finally, it's interesting to note this [Saudi Aramco press release](#) celebrating their achievements in 2006:

2006 was a year of outstanding accomplishment. That was the message coming from the Feb. 21 meeting of the Executive Committee (Excom) of the Board of Directors in Dhahran. "The company reacted rapidly to changes in global crude oil supply and demand during the year," said president and CEO Abdallah S. Jum'ah, relaying the results of that meeting in a teleconference Feb. 25. "Ambitious programs were proposed to expand future crude oil production and gas processing capabilities, and for increasing refining capacity both in the Kingdom and overseas."

and

Among 2006 accomplishments were the optimization of upstream operations, and development and depletion strategies to meet crude demand and increase maximum sustained capacity to 10.7 million barrels per day (bpd).

I'll bet \$1000 with the first person who cares to take me up on it that the international oil agencies will never report sustained Saudi production of crude+condensate of 10.7 million barrels or more.



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