

# SAUDI\_ARABIA – CAN IT DELIVER ?

*Jack Zagar*

MHA Petroleum Consultants,  
Golden, Colorado, USA  
Tel: +353 (0)28 28054 (Ireland)  
e-mail: jjzagar@eircom.net

## I. INTRODUCTION

Increasingly, the world is looking to OPEC and specifically to Saudi Arabia to increase oil exports to cool soaring oil prices and to foster continued growth in global economies. With perhaps as much as a quarter of the World's remaining conventional oil reserves, can Saudi Arabia provide the additional oil production?

## II. POLITICAL WILL AND ECONOMIC INCENTIVE ?

In the late 1970s during the final stages of the nationalization of the Arabian American Oil Company (ARAMCO), plans were in place to increase Saudi Arabia's daily oil production capacity from 10 million barrels to 16 million barrels. The oil minister at the time, Sheik Yamani, disagreed, stressing that "we are going to need oil for future generations of Saudis". Since that time nearly 30 years ago, the capacity of Saudi Arabia has remained about 10 million barrels of oil a day.

It is presumptuous of the rest of the World to assume that Saudi Arabia will produce additional oil to meet its needs. To do so must also meet the needs of the Saudi people and its government. It is a complex issue. For example, Saudi dollar-based oil revenues have increased more than 50% in the last 12 months without substantially increasing production. Why increase production to lower prices and realize the same or perhaps lower revenue? What is the incentive for Saudi Arabia?

## III. ACCESS TO TECHNICAL PEOPLE ?

From the earlier days up through the 1980s, life for a Western or Asian expatriate oil field engineer and his family was small town-like and safer than most major cities in the United States, Europe and Asia. The same cannot be said today. In the post-9/11, post-Iraq war world, there continues to be a volatile, and some times violent, climate for non-Arabs and non-Muslims within Saudi Arabia.

The willingness for people to live and work in the

country is directly related to their security. Attracting these people is extremely important for the future operations of ARAMCO. The "easy oil" in Saudi Arabia has already been developed in a few super giant fields. Now, these same world-class oil fields are reaching "middle-age" when the second half of their reserves demand much more work to mitigate natural decline and the onset of increasing water production. Any expansion in production will come from a host of smaller fields scattered among the oil province. Additional drilling, facilities and transport infrastructure—and people—will be required for all these new developments.

## IV. PUBLICLY QUOTED OIL RESERVES AND PRODUCTION POTENTIAL—HOW VALID ?

Unlike energy companies publicly traded on financial stock exchanges, ARAMCO does not conform to the rigors of SEC guidelines, for example, for oil and gas reserve reporting. Nor does ARAMCO submit its reserve estimates to the analyses of independent third party auditors.

In an extraordinary meeting hosted by CSIS in Washington D.C. last year, executives from ARAMCO rebutted concerns voiced by Matt Simmons, a leading world energy economist, regarding the sustained viability of Saudi's oil reserves.

While Messrs. Baqi and Saleri painted a "conservative" picture of ARAMCO's oil reserves, let's assume the role of devil's advocate to question whether or not estimates portrayed are indeed conservative.

### A. *Discovered OIIP of 700 Gb*

ARAMCO reports an oil initially in place (OIIP) value of 700 billion barrels (Gb) for all discovered fields. From 1982 to 2003, the OIIP uniformly increased at about 5 Gb/year from about 580 Gb to 700 Gb. During this same 20-year period, only 11 Gb of new reserves were reported by the industry.

Assuming a 50% recovery factor, the new reserves represent 22 Gb of OIIP versus the 120 Gb increase reported. Why the discrepancy? If the additional OIIP does not come from new discoveries, then it could come from re-evaluation of existing discoveries. Applying recovery factors of 50% to 60% to reserves reported to industry yields a reasonable OIIP close to 600 Gb.

Of the nearly 100 oil field discoveries reported to industry, only 17 have been produced and only perhaps eight have oil production in excess of 1 Gb. But, the 17 fields (most of the giants and super giants) that have been produced have a total OIIP of about 500 Gb. Given that the OIIP of an active field is typically known early in its life, most of the OIIP growth must have come from the undeveloped fields. Is this plausible? Has ARAMCO been actively evaluating undeveloped fields?

Or is ARAMCO under pressure like the rest of the industry to demonstrate reserve replacement?

#### *B. Recovery Factors of 60% to 75% OIIP*

Giants and Super Giants the major fields of Saudi Arabia may be; but there are many fields in the world that have the same or better reservoir quality. Recovery factors of 50% are reasonable for these reservoirs. Higher recoveries are possible and typically require many, many pore volumes of water throughput injected. In other words, many years of high water production after the onset of decline are required to achieve recovery factors approaching 60%. While the Ain Dar/Shedgum area has the best reservoir properties of Ghawar, it is unrealistic to assume an ultimate recovery factor of 75%.

#### *C. Proved Reserves of 260 Gb*

ARAMCO reports that its remaining proved reserves are 260 Gb, and that proved reserves are 28% depleted. Dividing the estimated cumulative oil production total of 100 Gb by 28% yields total proved reserves of 357 Gb which is consistent with the historical production and remaining reserves.

However, if one assumes a conservative OIIP of 600 Gb and a 50% recovery factor, total proved reserves are 300 Gb. Subtracting the 100 Gb of historical production gives a remaining proved reserve estimate 200 Gb, 60 Gb or 23% less ARAMCO's estimate. This difference is equivalent to 16 year's pro-

duction at 10 million barrels a day.

#### *D. Undiscovered OIIP of 200 Gb*

ARAMCO predicts 200 Gb OIIP for new discoveries in the next 20 years. Assuming a 50% recovery factor, gives an undiscovered reserve estimate of 100 Gb. This is equivalent to all the reserves reported for Saudi Arabia since the late 1950s. ASPO estimates undiscovered oil potential of 15 Gb which is equivalent to all reported reserves since 1979.

#### *E. Production Capacity Beyond 10 Million bbls/day*

ARAMCO has stated their long-term potential for 12 million barrels a day and perhaps 15 million barrels a day. While these production levels are technically possible, they may fall short of the suggested 50-year horizon based on the conservative analyses of this paper.

Will another 5 million barrels of oil a day ten years from now have any impact on today's rocketing oil prices? Production of oil and natural gas liquids is estimated at 82 million barrels a day (30 Gb/year) for 2004. Production demand is forecast to increase 2 million barrels a day in 2005 with production from existing fields declining at 5% or 4 million barrels a day. This means demand from new field production is 6 million barrels a day. Declining discoveries the last 10 years have averaged 12 Gb/year. Assuming an optimistic plateau rate of 10% of reserves per year equates to 1.2 Gb/yr or 3.3 million barrels per day. This still falls short of demand by 2.7 million barrels per day. With a declining oil discovery trend and an increasing demand trend, this running deficit of 27 million barrels a day ten years from now suggests a 5 million barrel a day increment from Saudi Arabia must be joined by similar, earlier production increases from several oil exporting countries to have any impact on slowing oil prices.

#### REFERENCES

- [1] Mahmoud M. Abdul Baqi & Nansen G. Saleri. Fifty-Year Crude Oil Supply Scenarios: Saudi Aramco's Perspective. CSIS, Washington D.C., February 24, 2004.
- [2] Matthew R. Simmons. The Saudi Arabian Oil Miracle. CSIS, Washington D.C., February 24, 2004.
- [3] Rex Tillerson, President Exxon Mobil Corporation. Taking on the World's Toughest Energy Challenges. IPAA/TIPRO Luncheon, Houston, December 8, 2004.