Iraq’s Huge Ambition – 12 million barrels/day by 2017
Is It Possible?

Presentation by:
Stan Harbison
Washington, DC

before
New York Energy Forum
New York City
April 28, 2010
At the end of an hour we saw a far-away town sleeping in a valley by a winding river, and beyond it on a hill, a vast grey fortress, with towers and turrets, the first I had seen out of a picture.

“Bridgeport,” said I pointing.

“Camelot,” said he.

A Connecticut in King Arthur’s Court
The Complete Novels of Mark Twain
I mean, if you add the numbers, it's almost unthinkable.

I find it astounding.

I would urge you to think about it in those terms.

Weatherford CEO, responding to an analyst’s question in mid-April.
Iraqi Production – 1920’s to 2020
Largest Historical 10 Year Crude Oil Production Increases

- Iraq Planned Volumes - 2010 - 2020
- Iraq @ 75% of Plan - 2010 - 2020
- Iraq @ 50% of Plan - 2010 - 2020
- Saudi Arabia - 1970's
- Iran - Mid 1960's to 1970's
- Russia - Mid 2000's
- North Sea
- Mexico - Early 1980's

million barrels per day

- Iraq Planned Volumes - 2010 - 2020
- Iraq @ 75% of Plan - 2010 - 2020
- Iraq @ 50% of Plan - 2010 - 2020
- Saudi Arabia - 1970's
- Iran - Mid 1960's to 1970's
- Russia - Mid 2000's
- North Sea
- Mexico - Early 1980's
BP and CNPC CEOs

First to Win an Iraqi Field in the 2009 Auctions
Ministry Expectations vs. Bid Volumes

<table>
<thead>
<tr>
<th>Field</th>
<th>Ministry Targets</th>
<th>Bid Volumes (Net of Current Production)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rumaila</td>
<td>1.750</td>
<td>1.850</td>
<td>0.100</td>
</tr>
<tr>
<td>Majnoon</td>
<td>0.600</td>
<td>1.754</td>
<td>1.154</td>
</tr>
<tr>
<td>W Qurna I</td>
<td>0.600</td>
<td>2.065</td>
<td>1.465</td>
</tr>
<tr>
<td>W Qurna II</td>
<td>0.560</td>
<td>1.800</td>
<td>1.240</td>
</tr>
<tr>
<td>Zubair</td>
<td>0.400</td>
<td>0.930</td>
<td>0.530</td>
</tr>
<tr>
<td>Halfaya</td>
<td>0.250</td>
<td>0.532</td>
<td>0.282</td>
</tr>
<tr>
<td>Gharaff</td>
<td>0.120</td>
<td>0.230</td>
<td>0.110</td>
</tr>
<tr>
<td></td>
<td><strong>4.280</strong></td>
<td><strong>9.161</strong></td>
<td><strong>4.881</strong></td>
</tr>
</tbody>
</table>

*If one adds the “upside surprise” to Oil Ministry expectations of 6 to 7 mm b/d it yields a production target of 11 to 12 mm b/d.*

*All of the upside surprise took place following Oct. 1.*
BP on Iraq

• BP CEO Tony Hayward said Iraqi production could rival Saudi Arabia’s by 2020:
  • “The resources there are relatively easy to bring onstream and there is no reason to believe that Iraq can’t be producing 10 million barrels per day by 2020 or so.”

• Cautioned that obstacles remained:
  • “The realities of the challenges of execution on the ground mean things will happen a little slower than all of us are perhaps planning for today.”
Justified Optimism
Iraq’s Reserves

• Iraq’s proven reserves of 115 billion bbls are spread across 80 fields.
  • The large majority of these reserves are found in 43 fields
  • 37 fields have been allocated 0.1 billions barrels, but these fields remain underexplored

• 440 structural anomalies possess hydrocarbon potential
  • Of these, only about 115 have been drilled

Source: Tariq Shafiq
Iraq’s Mathematical Potential

• Iraq can lift the 10 mm b/d plateau to 12 mm b/d if....
  • Depletion rate is limited to 4-5%
  • and 60 billion bbls of new reserves are added – these reserves would represent 28% of likely potential reserves

• Plateau could be maintained for 8 years if reserves are added at a rate of 3 billion bbls per year
• After 25 years, production would be 11 mm b/d with remaining reserves of 88 billion bbls.

Source: Tariq Shafiq
The (Rumaila) reservoir experiences a strong aquifer drive from the South West and there is evidence that the oil water contact is slightly tilted as a result of this. These conditions lead BP to be optimistic of achieving a very high recovery factor for the Rumaila Main Pay sands of the order of 65% to 70%.

Michael Daly, BP

Instead of 35% we talk about 50% recovery factor for the Mishrif and Main Pay, and instead of 45% we talk about 55-60% or even more of the oil in place to be recovered in the Main Pay

Thamir Ghadhban, May 2009
Strong Incentives to Move Quickly

The contract incentivizes the contractor to deliver rapid production growth, firstly to trigger cost recovery by exceeding the initial improved production target (IPT) and later to achieve the plateau production target (PPT) as early as possible. It also encourages sustaining that plateau for seven years.

So, to be successful a company needs to believe that the IPT can be achieved rapidly, preferably before major capital investment has been made. Also that sufficient incremental production can be achieved fast enough after major capital investment, so that the full remuneration fee and cost recovery can be paid and financial exposure limited.

Michael Daly, BP
BP is revolutionizing the way oil is produced in Iraq’s biggest and oldest field – reversing the trend of years of malpractice:

- Electrical submersible pumps
- Seismic – 3D and 4D
- Logging
- Modern perforating techniques
- Higher water injection rates

Source: Iraqi Oil Forum, April 24, 2008
“Timing is most important, not the price.”

- $1.7 billion budget for 2010
- Tenders for drilling
- Target to add 150-200 tbd by December, 2010
- Rehabilitate gas – oil separation plants to handle 1.3 mm b/d
- 2010 Work Program – 52 new wells, 30 workovers
- 2011 Plan: +10 rigs, drill 200 wells, output to 1.5 mm b/d
- Supplying all 12 production units and 10 water injection plants with an internet connection
Service Companies in Basrah

• Weatherford International is increasing its workforce in Iraq to more than 1000 employees by July.
• Schlumberger is finishing up work on a 40-acre compound near Basrah where it expects to have 300 employees by July and nearly double that by the end of the year.
• Baker Hughes said it has about 30 employees in Iraq and expects a 30-acre base to be finished by the end of April.
• Halliburton expects its slightly smaller base to be complete soon after.
• If security improves further and oilfield work increases, a $3 billion to $4 billion market annually is possible by the middle of the decade, according to Schlumberger.

Source: Upstreamonline
Exxon Leading Iraq Water Injection Project

US supermajor ExxonMobil has been picked to lead a "multibillion-dollar" water-injection project on behalf of international oil companies that won contracts in southern Iraqi oilfields, according to reports.

The cost of the project would be distributed among those majors that won development contracts for southern oilfields in the two auctions Iraq held last year, Abdul-Mahdy al-Ameedi, director of the Oil Ministry's licensing office told Reuters.
The Iraqi Federal Government and Kurdistan – A New Era

...the proceeds emanating from the sale of oil produced in the Kurdish region would go to central government coffers and which would eventually “be beneficial to the (Kurdish) region”.

Oil Ministry Undersecretary Muatasim Ahmad said the new initiative had come from the Kurdish leader Massoud Barzani.

Iraqi English Language Newspaper Azzaman
Airlines

• Lufthansa announces 4 weekly flights to Erbil

• Abu Dhabi National Airline to commence flights to Baghdad

• First Scheduled London to Baghdad Flight on April 26, 2010
The private sector is gearing up to cater for the demands of the international oil companies and a number of service companies have been established. New hotels have been and are being built. The construction of an oil or energy base is underway. There are numerous contactors who are ready to pick subcontracts for civil works, transports, catering, etc. The port of Khor Al-Zubair is being rehabilitated to increase its offloading capacity.

... of course they can [also] sponsor sports clubs, for which Basrah is well known, SOC Football Club being in the top first division in Iraq!

Former Iraqi Oil Minster on the IOCs and the Basrah community
February 6th, 2010
Iraqi Production Growth Under Several Scenarios

- **Contracted Volumes - First Bid Scenario**: 75% of Targets in 2015 and 100% in 2020
- **Contracted Volumes - Second Bid Scenario**: 50% of Targets in 2015 and 75% in 2020
- **Expected Growth Excluding Bid Rounds**
- **Base**
# Field Info and Company Shares

<table>
<thead>
<tr>
<th>Field</th>
<th>Companies and Shares</th>
<th>Reserves - Billion Bbls</th>
<th>Bid Production Plateau - mm b/d</th>
<th>Current Production - mm b/d</th>
<th>Production Growth Required - mm b/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rumaila</td>
<td>CNPC 37%, BP 38%</td>
<td>17.000</td>
<td>2.850</td>
<td>1.046</td>
<td>1.804</td>
</tr>
<tr>
<td>W Qurna I</td>
<td>XOM 60%, Shell 15%</td>
<td>12.900</td>
<td>1.800</td>
<td>0.260</td>
<td>1.540</td>
</tr>
<tr>
<td>Zubair</td>
<td>ENI 53%, Oxy 23.3 %, Kogas 23.3%</td>
<td>12.600</td>
<td>1.200</td>
<td>0.186</td>
<td>1.014</td>
</tr>
<tr>
<td>Majnoon</td>
<td>Shell 45%, Petronas 10%</td>
<td>8.600</td>
<td>2.325</td>
<td>0.046</td>
<td>2.279</td>
</tr>
<tr>
<td>W Qurna II</td>
<td>LUKoil 67.5%, Statoil 7.5%</td>
<td>4.400</td>
<td>1.800</td>
<td>0.000</td>
<td>1.800</td>
</tr>
<tr>
<td>Halfaya</td>
<td>CNPC 37.5 Petronas 18.8%, Total 18.8%</td>
<td>4.100</td>
<td>0.535</td>
<td>0.003</td>
<td>0.532</td>
</tr>
<tr>
<td>Gharaf</td>
<td>Petronas 45%, Japex 30%</td>
<td>0.863</td>
<td>0.230</td>
<td>0.000</td>
<td>0.230</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>60.463</strong></td>
<td><strong>10.740</strong></td>
<td><strong>1.541</strong></td>
<td><strong>9.199</strong></td>
</tr>
</tbody>
</table>
Big Problems
The Cost of......

What costs $600 per day per person?
Politics

- Deadlocked Election
- Inter-Regional and Religious Conflict
- Intra-Shia Conflict
- Rampant Corruption
- Very Poor Government Infrastructure
Current Export Capacity

• Maximum existing export capacity no more than 3 mm b/d
  • 1.4+ mm b/d from the south
  • 1.5 mm b/d from the north
• With planned construction projects in the Gulf a maximum of 4 mm b/d might be possible by 2013

• Iran recently claimed that KAAT falls within Iranian territorial waters
  • Similar claim may be used by Kuwait and Iran regarding BOT
  • If Iraq must withdraw further into territorial waters, there will be lesser water depth at terminals and ULCCs will not be able to berth
• IPSA – Saudi gov’t decided in mid-200 to confiscate IPSA facilities
  • IPSA was a $1 billion project with 0.6 mm b/d capacity, 100% financed by Iraq

Source: Excerpts from a paper by Issam Chalabi, Former Iraqi Oil Minister, November 2009
Export Opportunities and Difficulties

- Iraq-Turkey export facilities
  - Current capacity 1.4 mm b/d – but to fully utilize Iraq would need to pump Basra oil from the south through the south-north strategic pipeline, which is under capacity and must be fully rehabilitated

- Iraq-Syria pipeline system
  - Technically, any attempt to export oil via this route will require a completely new pipeline system all the way from Basra

- Political Issues – Hemmed in by its neighbors
  - Saudi Arabia, Kuwait, and Syria not excited about plans to increase production to 6-8-10 mm b/d
  - Doubtful that current ruling parties support new project via Turkey and Jordan
  - Leaving Iran, which will undoubtedly be opposed by many Iraqis and Americans

Source: Excerpts from a paper by Issam Chalabi, Former Iraqi Oil Minister, November 2009
Oil Ministry - Issues

- Lack of control over accounts and receipts
- At end of 2008, only 1/3 of planned meters had been installed on its oil industry
- North Oil Co. burned 1.4 million bbls of condensates it could not sell
- State companies reinjected 605,000 bbls of oil, damaged reservoirs
- Millions of bbls of oil unaccounted for
- Placed $3 billion in revenues in an Iraqi bank instead of Iraq’s oil account with the NY Federal Reserve Bank

Source: International Crisis Group
Company Financing?

• According to model contracts, the provision of export facilities is outside the scope of the work of the oil companies.

• If required, it will be an additional obligation and cost.
Now Iran

We are currently involved in negotiations with Iraqi officials in regard to beginning oil drilling operation in Iraq and we are trying to set up an office in Iraq," IRNA quoted Heidar Bahmani, an official of the state-owned National Iranian Drilling Company (NIOC), as saying in a report late yesterday.

"We are awaiting the Iraqi government's positive response," he added.

News Wires, 26 April 2010
Shahristani
Shahristani – Release from Solitary Confinement at Abu Ghraib
Protecting Iraqi Wealth From Unclean Hands

2006: New Government, Shahristani’s Appointment

Hundreds of ministry employees murdered or kidnapped

Top technocrats left Iraq

Shahristani fired 250 security staff – militia members

Evidence of illegal activities turned over to inspector general

Fired or transferred others

Shahristani: “I’m not a political animal, and I don’t enjoy politics. The only reason I’ve accepted and continue with my responsibility to protect Iraqi wealth from unclean hands.”
Legal Basis of Auction

• Ministry relying on a Saddam era law from 1987
  • Provides the Oil Ministry with the authority to sign contracts

• 2005 Constitution does not require parliamentary vote
Auction
## First Round Bids

<table>
<thead>
<tr>
<th>Field</th>
<th>Consortium % Share</th>
<th>Oil Ministry Maximum RF</th>
<th>RF Bid Profit/bbl</th>
<th>Plateau Production Bid mm b/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rumaila</td>
<td>BP 51 CNPC 49</td>
<td>$2.00</td>
<td>$4.00</td>
<td>2.825</td>
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<td></td>
<td>XOM 80.1, Petronas 19.1</td>
<td></td>
<td>$4.80</td>
<td>3.100</td>
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<tr>
<td>Additional</td>
<td>BP 51 CNPC 49</td>
<td>$2.00</td>
<td></td>
<td></td>
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<tr>
<td>bids</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>W Qurna 1</td>
<td>XOM 80 Shell 20</td>
<td>$1.90</td>
<td>$4.00</td>
<td>2.325</td>
</tr>
<tr>
<td></td>
<td>CNPC 46.7 Petronas 33.3 Japex 20</td>
<td></td>
<td>$2.60</td>
<td>1.900</td>
</tr>
<tr>
<td></td>
<td>LUK 67 COP 33</td>
<td></td>
<td>$6.49</td>
<td>1.500</td>
</tr>
<tr>
<td>Negotiated</td>
<td>XOM 80 Shell 20+C39</td>
<td>$1.90</td>
<td></td>
<td>2.325</td>
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<tr>
<td></td>
<td>LUK 67 COP 33</td>
<td></td>
<td>$1.90</td>
<td>1.500</td>
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<td>Zubair</td>
<td>ENI 35 SNP 20 OXY 25 KOGAS 20</td>
<td>$2.00</td>
<td>$4.80</td>
<td>1.125</td>
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<td></td>
<td>CNPC 67 BP 33</td>
<td></td>
<td>$4.09</td>
<td>1.075</td>
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<td>XOM 65.1 Shell 19.9 Petronas 15</td>
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<td>$4.80</td>
<td>0.850</td>
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<td>Negotiated</td>
<td>ENI 53 Oxy 23.3 Kogas 23.3</td>
<td>$2.00</td>
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<td>0.930</td>
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</table>
## Second Round Bids

<table>
<thead>
<tr>
<th>Field</th>
<th>Consortium % Share</th>
<th>Oil Ministry Maximum RF</th>
<th>RF Bid Profit/bbl</th>
<th>Plateau Production Bid mm b/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Majnoon</td>
<td>Shell 60  Petronas 40</td>
<td>$1.39</td>
<td>1.800</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>57 CNPC 43</td>
<td>$1.75</td>
<td>1.405</td>
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<tr>
<td>W Qurna II</td>
<td>LUKoil 85 Statoil 15</td>
<td>$1.15</td>
<td>1.800</td>
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<tr>
<td>Petronas 60</td>
<td>$1.25</td>
<td>1.200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pertamina 20</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td></td>
<td>$1.72</td>
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<td>Missan</td>
<td>CNOOC 80 Sinochem 20</td>
<td>$2.30</td>
<td>0.450</td>
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<tr>
<td>Negotiated</td>
<td>CNOOC 80 Sinochem 20</td>
<td>$2.30</td>
<td>????</td>
<td></td>
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</tbody>
</table>
Auctioned Production at Peak by Field and Cumulative

- Cumulative Auctioned Production (Red Line - Right Axis)
- Auctioned Production by Field (Blue Bars - Left Axis)
Contracts
• Technical Service Contract – For Producing Fields
  • I: Rehabilitation Phase – 3 Years
    Rehabilitation
    Stop suboptimal operations
    Arresting Production Decline
    Achieving Sustainable production 10% above initial rate (as soon as possible)
    and Appraisal (for both producing and non-producing reservoirs)

• By the time the rehabilitation phase ends, output is expected to be up by at least 30% as they embark on an enhanced redevelopment plan.
Timeline of a Development and Service Contract

- Effective Date
  - Jan 2010*

- Preliminary Dev Plan
  - Jun 2010

- Final Dev Plan
  - Jan 2013

- Target Plateau
  - Jun 2013

- Minimum Work Program
  - Jan 2017
Zubair Service Contract Flow - ENI

**INCREMENTAL PRODUCTION (I.P.)**

- Remuneration Fee (R.F.) * I.P.
- Petroleum Costs (P.C.)

**Service Fee Due (P.C.+R.F.)**

**Service Fee Cap (S.F.C.)** (1)

**Service Fee + Suppl. Fee** (2)

minus

- Capital Cost + Opex + Suppl. costs
- CIT (35% on R.F.)

**CONTRACTOR NET CASH FLOW**

**Plateau Production Target**

- Service Fee payment starts once production reaches 215

**Baseline Production**

Source: Wood Mackenzie

The contract term is twenty years with an optional five-year extension

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(1) Extent of a maximum of 50% of the I.P. revenues

(2) Max 10% of Baseline Production revenues
History
ME Crude Production - % Change Across Historical Periods
Post UN Sanctions - 1995

• Iraq’s longer term objective of reaching crude oil output of capacity of 6 mm b/d includes an interim goal of 5 mm b/d by 2000.

• Iraq has signaled it intention to allow foreign companies to operate in its oil sector...[and] a re-introduction of production sharing and greater involvement in exploration and production...

• Given this development, crude oil production capacity of 6 mm b/d seems reasonable

Source: IEA, OECD
An alternative is for the national oil company to enter into a contractual regime with international oil companies to expedite the process of rehabilitation and future production capacity expansion, instead of paying out cash payments to service companies.

Such arrangements would provide the state-of-the-art technology, training and investment capital.

Such arrangements could take the form of buy-back service or production-sharing contracts

Tariq Shafiq, writing in 2003
Iraq’s Production has Remained Stagnant

- Production capacity is still below what was prevailing prior to the US invasion in 2003.
- Since the beginning of 2004, production has remained around 2 million b/d.
- The increase during the past two years has been due to opening infrastructure in the North (no new production capacity).
- At the same time there have been significant declines in the large Southern fields.
Implications
What Will Iraq’s Production Surge Do to the World?

• OPEC Collision
• Oil Prices
• Alternative Fuels
• Peak Oil Perceptions
Global Oil Production Implications
Iraq’s Potential Impact on “Peak Oil”

I have been associated with the view that oil production would not go too much higher. You can see articulation of this point of view, for example, at old Oil Drum pieces like Why Peak Oil is Probably About Now, and Hubbert Theory says Peak is Probably Slow Squeeze.

It seems to me that the possibility that Iraq may actually succeed in doing this should be taken seriously. If it did succeed, that would act to delay the final plateau of oil production by a decade (ballpark)

Stuart Standiford, former staff member, The Oil Drum (a “Peak Oil” journal)