THE ASSOCIATION FOR THE STUDY OF PEAK OIL

"ASPO"

NEWSLETTER No 24 – DECEMBER 2002

ASPO is a network of scientists, affiliated with European institutions and universities, having an interest in determining the date and impact of the peak and decline of the world's production of oil and gas, due to resource constraints.

It presently has members in: Austria, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Sweden and the United Kingdom

Mission:

1. ***To evaluate the world's endowment of oil and gas;***
2. ***To model depletion, taking due account of economics, technology and politics;***
3. ***To raise awareness of the serious consequences for Mankind.***

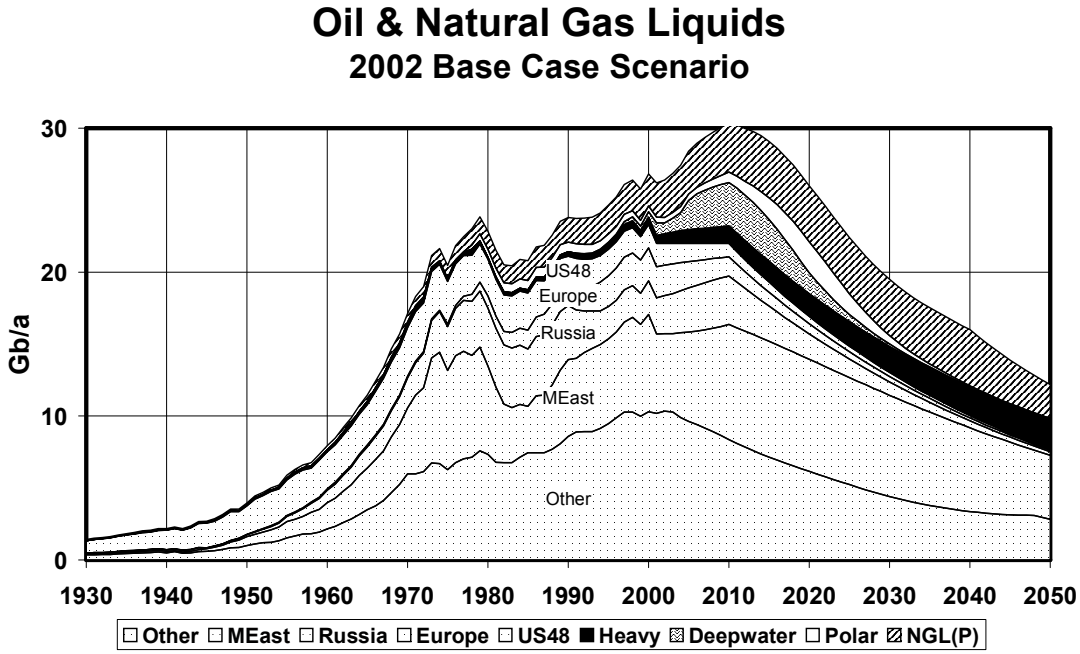
Newsletters on Websites

This newsletter and past issues can be seen on the LBSystemstechnik website http://www.energiekrise.de (Press the ASPONews icon at the top of the page) and the ASPO website www.isv.uu.se/iwood2002

CONTENTS

The new address is aspoone@eircom.net

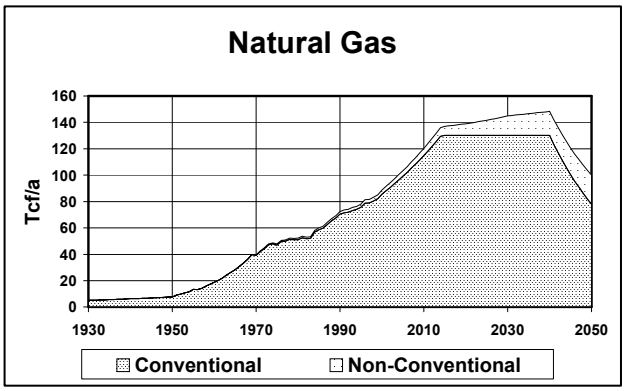
Frontispiece – the general depletion picture

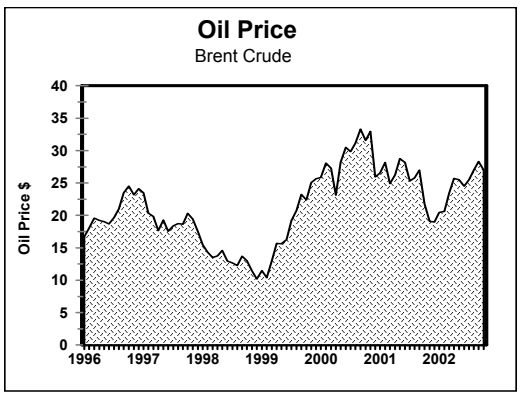


ESTIMATED *CONVENTIONAL OIL* PRODUCED TO 2075			
Past	**Future**		**Total**
Known Fields		New Fields	
873	**884**	**143**	**1900**
ALL LIQUIDS			
958	1742		2700
In billion barrels (Gb) ***Status end 2001***			

PRODUCTION RATE FORECAST Mb/d					*Status: end 2001*
	2005	**2010**	**2020**	**2050**	**Total to 2075**
Conventional Oil	**60**	**60**	**46**	**21**	**1900**
US-48	3.5	2.6	1.4	0.2	195
Europe	4.9	3.6	1.9	0.3	75
Russia	8.4	9.2	4.8	0.7	200
M.East Gulf	17	22	21	12	750
Other	26	23	17	8	680
Heavy, bitumen etc	2.8	4	5	6	300
Deepwater (>500m)	5.6	8	4	0	65
Polar	1.2	2	6	0	30
Natural Gas Liquids	8.2	9	11	6	400
Total	**78**	**83**	**72**	**33**	**2700**

Base Case Scenario: flat demand for conventional oil due to recession; M.East swing role ending in 2010
Conventional Oil includes *Condensate*





115. Anniversary and Future.

This is the 24th issue of the Newsletter, which means that ASPO has been going for two years. Much has happened during this time to impress us of the transcendental importance of our subject as nations begin to vie for with each other for control of critical oil supplies. Although the Newsletter has erred at times in matters of fact, interpretation, judgement and emphasis, it seems to have been broadly successful in raising awareness. The number of ruffled feathers has been quite small, considering that the ice under the commentary is often thin. New applications to join the distribution list, which now numbers about 150, continue to come in. It is understood that overall readership may exceed about a thousand because of wide onward copying. Even the benighted official institutions begin to shift their ground in our direction. It is noteworthy, for example, that BP has adopted our depletion model, as reproduced at the front of the Newsletter, when contributing to an official Norwegian publication, to demonstrate its serious commitment to solar energy. This indeed is progress.

The membership of ASPO itself has expanded over the two years to become a really representative serious European network. The Uppsala workshop of May 2002 was a watershed that put the organisation on the map. Generous sponsorship gives us hope for a more substantive physical presence. But as we grow, we change. Probably it would be an idea to try to establish not so much a network of key scientists as a confederation of small national committees, each having its own identity within its own environment and resources, but working together in a co-operative manner to further the common objectives.

The "National Committee of France" moves forward with the organisation of the next workshop in Paris for May 2003, which will give an opportunity to plan our future better.

116. Re-visiting a proposed Depletion Protocol

At a Conference in Copenhagen on October 30th, Hermann Scheer, a member of the German Parliament, made the good point that a move towards renewable energies was not so much a desirable option as a necessity, given that the essential feature of *fossil* fuels is their depletion. The pace of transition is really the only point for debate. (See also his excellent book: *The Solar Economy – Renewable Energy for a Sustainable Global Future* [ISBN 1 85383 835 7], which discusses in depth the deeper political, philosophical and economic factors).

So far at ASPO we have concentrated our efforts to determine what the endowment of oil and gas in Nature is in order to model appropriate depletion profiles. We worry if we have got our numbers right, but does it really matter that much? It is surely *"better to be vaguely right, than precisely wrong"*. The impact of any errors in the model is probably small in relation to its overall long-term validity.

There is logic to an earlier suggestion for an international Depletion Protocol whereby countries would agree neither to produce in excess of their current Depletion Rate nor import infringements, but to hope for positive international agreement of any sort is probably unrealistic, given the low and often selfish calibre of government. Even so, great advantages could still accrue to any enlightened country that did unilaterally adopt the principles of such a Protocol. The natural decline of ageing giant fields means that few producers can exceed their Depletion Rate in any event so to adopt the Protocol would simply recognise reality.

For the sake of argument, let us consider the impact on, say, Ireland and Britain, in respectively adopting or rejecting the Protocol. Ireland, having no oil of its own and less military power to secure it elsewhere, could unilaterally accept the conditions of the Protocol, given that it could overcome any impeding EU Directives. In doing so, it would set itself the

task of progressively replacing imports by indigenous renewable energies and curbing demand, adapting its economy and life style accordingly. Initially, it might suffer as a consequence, but as tidal rotors around its coasts began to deliver sustainable energy, it would find itself with a progressive competitive advantage in the evolving world situation, as is imposed by Nature. By the end of the Century, Irishmen would be, so to speak, bathing in the sun as they look to the future with confidence, having assured themselves of their own critical supply.

Britain, by contrast, might take an entirely different approach, preferring to burn up the resources as fast as possible under normal economic principles, securing supplies from elsewhere either on the open market or at the gun point of its own or allied forces. Initially, it might be a more successful policy, allowing more popular vehicles to barrel down the highways and more goods to flow from the consumer outlets, to the delight of the voters. But before long, when the country finds that neither the market nor the gun can deliver due to the constraints of Nature, it would discover itself at a disadvantage, being less prepared than the Irishman. Indeed, if advances in technology should now accelerate the rate of oil and gas extraction, as suggested by the IEA, Britain would find itself with very little time to adjust when the need arose, especially as its own production, which has given it a certain false sense of security, is already in steep irrevocable decline.

The argument suggests that it might indeed be an admirable idea for the EU to promote, or at least debate, the proposed Protocol. It would face cries of outrage from the flat earth community and the kleptocrats, but by merely floating the idea, and explaining the rationale, it might encourage some of its more enlightened member-countries to adopt policies that would give them a brighter future.

117. Bush strengthens his grip

Bush and his backers strengthened their grip on the long-suffering American nation in the critical mid-term electoral process, despite the bumper stickers proclaiming "Regime Change Starts at Home"; massive anti-war demonstrations, and an outpouring of Internet and other articles, revealing the backgrounds and interests of the administration (collectively having personal investments of as much as $150 M in oil companies). References include: www.rense.com/general31/thr.htm ; *Stupid White Men* by M.Moore ISBN 0-06039245-2, and the works of Thom Hartmann. A leading article in the London Times of 22 Nov. reviewed *Bush at War* by W.Woodward portraying a puzzled, all-powerful President trying to steer between vicious warring cabinet factions, representing lobbies, including the pro-war Israeli lobby.

Blair continues to receive a poor reception across the British press, being compared in the Guardian on November 6th with the symbiotic egret that pecks food from the teeth of a crocodile's jaw. His unquestioning support for Bush is described as "slow political suicide". (see www.monbiot.com). Even the staid Daily Telegraph, with its somewhat imperial tradition, is less than enthusiastic in an article, coinciding with the traditional Remembrance Day ceremonies in London to pay respect to the fallen in two world wars and other conflicts. They took place against a leaden sky and the grim face of Her Majesty the Queen.

118 Country Assessment – Iraq

Last month, we took a look at the United States, so it is perhaps appropriate now to turn to its new enemy.

Iraq

The country covers an area of some 435 000 km2, supporting a population of 20 million. Mountains in the east and north rise to over 3000 m, flanking the fertile valley of the Euphrates and Tigris Rivers, which flow into the Persian Gulf near Kuwait. To the west, lie extensive plains bordering Syria.

Some of the world's greatest ancient civilisations developed in this area. Indeed, the Garden of Eden, where Adam and Eve disported themselves, is supposed to have been located here. Cyrus the Great of Persia conquered the place in 539 BC, before it fell to Alexander the Great in 331 BC. Greek and later renewed Persian dominion followed until it was overrun by Muslim Arabs in the 7th Century. It was later subject to Mongol invasions, and the attentions of Persian and Turkish rulers, before the Ottomans established firm dominion in the 17th Century, operating eventually through three local administrations (vilayets) having a fair degree of delegated authority. Various nomadic Arab tribes were never fully integrated, and the Kurds in the north, being descendants of the ancient Medes, have long sought their independence.

The area began to attract the conflicting commercial and political attentions of Britain and Germany during the latter part of the 19th Century. Britain, as a trading sea-power, was interested in the coastal areas, including what is now Kuwait; also establishing a shipping company on the Tigris to serve the interior. Germany, being a land-power, proposed building a railway from Berlin to Baghdad, recognising its importance in a military context. The Middle East itself seems to have been of limited interest to Britain, but had strategic importance as a bastion against Russian expansion threatening communications with India, the jewel in its imperial crown.

Oil had been known in the area since antiquity, being used as a form of mortar in the construction of Babylon. New interest developed in the early years of the 20th Century, when engineers came across oil seepages in the course of surveying the concession granted by the Ottoman Sultan for the proposed German railway. The Sultan called in a young Armenian oilman, by the name of Calouste Gulbenkian, to investigate, launching him on what became his life's work to develop Iraq's oil. To this end, he established the Turkish Petroleum Company in 1912. It was owned by the Deutsche Bank (25%), which controlled the previous railway concession that conveyed the mineral rights, Shell (25%) and the Turkish National Bank (50%). The latter had been set up by British financial interests, with Gulbenkian holding 30%. The British government then intervened to secure a holding for what is now BP, reducing Gulbenkian's share to 5%.

The rights to the concession were confirmed on June 28th 1914, a few days before the outbreak of the First World War, in which Turkey sided with Germany, with whom it already had close links. The importance of oil became evident during the war, and France and Britain, followed by the United States, began to discuss the eventual carve up of the Middle East while hostilities were still in progress. It was already perceived to hold much of the world's endowment.

Negotiations began in earnest in the peace treaties that followed the war, eventually giving Britain mandated administrative control of the territory. It was declared a Kingdom, with the crown being placed on the head of Prince Feisal, the son of the Grand Sharif of Mecca, Britain's premier ally in the war, who had been promised an Arab Kingdom in return for his contribution. In fact, Feisal had first been put on the throne of Syria, but was recycled when that country came into the more republican French sphere of interest. It was agreed that Iraq's oil, which had become a central issue, would be produced by what became the Iraq Petroleum Company (IPC) with the following shareholding:

Shell (Anglo-Dutch)	23.75%
BP (British)	23.75% (previously Anglo-Persian & Anglo-Iranian)
CFP (French)	23.75% (now TotalFinaElf)
Exxon (US)	11.875%(now Exxon-Mobil)
Mobil (US)	11.875%(now Exxon-Mobil)
Gulbenkian (Independent)	5%

The companies also agreed not to compete with each other throughout most of the previous Turkish Empire, including Saudi Arabia: Exxon and Mobil reneging on the agreement when they joined Aramco in Saudi Arabia in the 1930s.

Exploration soon commenced to be richly rewarded with the discovery of the Kirkuk Field in 1927, holding about 16 Gb of oil in a large surface structure, obvious for miles around in the northern, Kurdish, part of the country. Production rose gradually to the Second World War, reaching 100 kb/d by 1947. It was not, accordingly, a particularly important exporter to that point.

The post-war epoch was characterised by growing nationalism throughout the region, being encouraged when the United States opposed an Anglo-French military strike to prevent Egypt sequestering the Suez Canal in 1956. Most of the producing countries nationalised the holdings of the foreign oil companies over the ensuing

years: Iraq doing so in 1972. Exploration continued successfully, testing the prospects already identified by the IPC. As many as fifty oilfields have been found, of which about half are giant fields, together holding some 90 Gb. Of that, about 50 Gb lie in just three fields: Rumaila (1953); Kirkuk (1927); and East Baghdad (1976). Production to-date from all fields amounts to almost 30 Gb, leaving about 60 Gb for the future plus whatever new exploration might turn up. It seems very clear from the size distribution of the fields that the bulk of Iraq's oil has already been found, with many of the smaller discoveries still awaiting development.

Saddam Hussein was born in 1937, making him 65 years of age. He joined the Ba'athist Party in 1957, which was an Arab version of Communist style dictatorship. In the following year, the then King, Feisal II, was beheaded in a coup led by a Colonel Kassim, who was backed by Egypt. He in turn fell in another coup that brought the Ba'athists to power in 1968, appointing Saddam Hussein President in 1979. As described above, the country was a somewhat artificial construction, comprising Kurds, who have long sought independence, in the north; Shi'ites with links to Iran in the south; and Sunni's around Baghdad, the capital. Evidently, it takes a strong leader to hold these disparate groups together as a nation. It previously had a substantial, well-integrated Jewish community, Baghdad having been one of the great centres of Judaic culture in the 5th Century, but it was driven out by popular outrage on the creation of the State of Israel.

In 1974, heavy fighting broke out between government forces and Kurdish separatists, who were being backed by Iran, but the dispute was settled when Iran withdrew its support in return for resolution of a long-standing boundary dispute, related to the key Shatt al-Arab estuary of the Tigris-Euphrates river system, Iraq's main trade route. But tensions with Iran erupted again on the fall of the Shah in 1979 when unrest among the Iranian Kurds spilled over into Iraq. It soon developed into a full-scale war, which dragged on for almost eight long years with colossal loss of life to both sides. Although nominally neutral, the United States backed Iraq during this conflict, still smarting from an incident in which American citizens were taken hostage in Tehran, following the fall of the Shah. During the late 1980s, the United States supplied Iraq with substantial bank credits and technology to rebuild its military strength. The Soviets too developed close ties, furnishing credit and weapons.

Meanwhile, President Reagan and Mrs Thatcher resolved to try to bring down the Soviet regime, ending the policy of co-existence. According to the book, *Victory*, by Peter Schweizer, the first step was to rearm the Afghans to end the Soviet occupation, and undermine its military credibility. This was achieved with the help of King Fahd of Saudi Arabia, who funded the covert purchase of arms in Egypt for shipment to none other than Osama bin-Laden, who was backing the Taliban with CIA support.

The next step was to persuade King Fahd to step up production to undermine the price of oil. The Soviets relied on oil exports for foreign exchange, which they now needed in greater amounts to buy equipment with which counter the new US "star wars" initiative. It was a successful strategy, which contributed to the fall of the Soviets, but was achieved at a cost, as the low price of oil was bankrupting not only King Fahd but the Texan oil constituents of Mr Bush Sr.

While all this was going on, Kuwait arbitrarily increased its reported reserves by 50% in 1985 although nothing particular had changed in its reservoirs. It did so in order to raise its OPEC production quota, which was based on reserves. It also began pumping from the southern end of the Rumaila field that straddles the ill-defined border with Iraq. The latter complained bitterly both about what amounted to the theft of its oil across the border, and the loss of oil revenue, as prices fell consequent upon Kuwait's failure to observe its contractual OPEC agreement.

Now, US strategy moved to strengthen the price of oil, dispatching an emissary, Henry Shuyler, to encourage its ally, Saddam Hussein, to intervene in the councils of OPEC to enforce quota agreements sufficiently to achieve that end. It was recognised that words might not be enough to concentrate the minds of the OPEC ministers. Exactly what was proposed is not known, but it seems clear that a border incident to stop Kuwait producing from the southern end of the shared oilfield was contemplated. This interpretation is confirmed by the words of April Glaspie, the US ambassador to Baghdad, who, on the eve of the invasion of Kuwait, made a statement to the effect that boundary disputes between Arab countries were of no concern to the United States. It was clearly an authorised statement, being released simultaneously in Washington under the signature of James Baker, the Secretary of State.

However, Saddam Hussein, possibly misunderstanding a wink and nod, did not stop with a border incident, mounting a successful full-scale invasion of Kuwait on August 2nd 1990. April Glaspie, on being woken by journalists with the news, reportedly responded "*Oh My God, they have n't taken the whole place, have they?*", which hints of collusion or at least fore-knowledge.

US policy now changed to condemn its former ally. A series of UN resolutions called for Iraq to withdraw from Kuwait by January 15th 1991, leading to a US aerial bombardment, when it failed to comply. Ground forces, led

by General Schwarzkopf, crossed the frontier, killing tens of thousands of Iraqis and destroying most of its military capability, before being ordered to halt at the gates of Baghdad when a cease-fire was agreed. The dissident Shi'ites in the south and the Kurds in the north saw this as their moment to rise, but were successfully suppressed by remnant government forces. Hundreds of thousands of Kurdish refugees fled into neighbouring Turkey and Iran, where they were not exactly welcome.

The United Nations then imposed a trade embargo on Iraq, making it effectively swing oil producer of last recourse, which provided a useful mechanism for stabilising the world price of oil at no cost to anyone but Iraq. In common with many countries, Iraq had made certain progress in developing modern nuclear, chemical and biological weapons, but by 1998, UN inspectors had reported that virtually all such facilities had been destroyed. The embargo remained, however, although it was partly relaxed for "humanitarian" reasons when the price of oil rose to uncomfortable levels. Several European, Russian, Chinese and other companies have signed agreements to develop oilfields as soon as the embargo is lifted, committing over $1.7 trillion to do so. US officials have stated that such agreements would be nullified by the overthrow of the present government, paving the way for the entry of the major US companies. Whether Blair's support for Bush would be rewarded with a stake for BP remains to be seen.

The United States is now moving against Iraq on the grounds that it might be re-developing its weapons such that they could pose a threat to unspecified targets in the future. Little concrete evidence has yet been furnished, but the United States claims to be entitled to move on the so-called precautionary principle in its new generalised "war on terror". There has been no love lost between Saddam Hussein and Osama bin-Laden, who is said to have been behind acts of terror, so evidently a different strain of terror is attributed to Iraq.

Future Scenarios

The United Nations has now passed a Resolution calling for the re-entry of the famous inspectors, to which Iraq has agreed. At the time of writing (Nov 20, 2002), it appears that some of the tension has gone out of the situation following the US elections when President Bush and his backers succeeded in strengthening their grip on the country, partly on the strength of a certain war fever.

Scenario of Peace

As it is impossible to begin to forecast the actual turn of events, we will have to be content with a fanciful fairy tale scenario. Let's imagine that a certain Baron Werner von Wittel, a historian from Munich University, was working on archives in the Istanbul Museum, and when clearing away the ancient parchments at the end of the day, his eye was caught by a document that had slipped from the pile. Closer inspection showed it to be a hitherto unknown contract between Abdul Hamid, the last of the Ottoman Sultans, and Calouste Gulbenkian, his heirs and assigns, dated 1897. It conveyed irrevocable rights in perpetuity to the oil lands of the Vilayet of Mosul and surrounding territories, being countersigned by three descendants of the Prophet; the Ambassadors of France, Great Britain and the United States; and the Chief Rabbi of Jerusalem. It carried a special proviso establishing legal protection against regime change, such being guaranteed by the co-signatory governments.

The Baron, realising its possible current significance, passed a surreptitious copy to his Ambassador. A search of the international phone directory located a Mr Gulbenkian in Lisbon who was invited to present himself. Some frantic diplomatic activity ensued.

Next day, the sunburnt shrewd face of the Armenian appeared at the Embassy gates. After some pleasantries confirming that he was indeed the great grandson of the signatory to the contract, he asked to make some international phone calls. The first was placed to the Oval Office where he quickly struck a deal for Texan oil interests to have exclusive rights to Iraqi oil, with an overriding royalty to the President=s favourite charity. The next was to Saddam Hussein in Baghdad, who readily accepted a proposed 20% royalty to the Iraqi State and an override to his family charity, not wishing to be up-staged by the US leader.

The UN inspectors rushed in to find that the suspect biological laboratory had been developing a flu vaccine, and that the suspect radio-active materials had been purchased for an ageing Russian nuclear electricity generator in Basra. Within a few weeks, Kofi Annan was able to sign a clean bill of health.

The Gulbenkian Oil Company was incorporated in Bermuda with obscure nominee shareholders; and Western contractors were brought in to undertake the rehabilitation of the industry. The new management decided to establish three divisions : the Foothills; Central; and Western Divisions. Bankers arrived, offering unsecured bonds to finance the operation. The financial press was enthusiastic for what was identified as one of the most straightforward and fair oil deals struck in recent years. It was free of the hidden subsidies taken as operating cost against taxable income; the politicians had been paid off reasonably; and the national interests of Iraq and the United States protected. The latter was particularly pleased to be able to draw on Iraqi supplies at cost plus

25%. The slim figure of the Armenian was seen being carried shoulder high through Wall Street from one champagne lunch to another.

Now began the serious work of developing Iraq=s remaining oil in a highly technical manner, free of political or speculative pressures. The following ten-year work programme was drawn up for the monumental task in hand, recognising that it was costly and slow onshore work in tough terrain.

1. Exploration.

Establishment of a staff of 30 geologists and support

$ Regional compilation of existing reports, data, samples
$ Photogeological evaluation
$ Geochemical laboratory
$ Field work to identify and map source rocks using modern methods
$ Seismic surveys : five crews to provide modern coverage
$ 30 Geophysicists with computing support to interpret the data

The objective was to develop a steady stream of prospects to be tested by five exploration rigs, which were to be kept in continuous operation.

2. Reservoir Engineering

Establishment of a staff of 30 reservoir engineers to evaluate past well data on producing fields, optimise reservoir performance, introduce pressure maintenance and waterflood programmes as appropriate. It was found that several reservoirs had suffered serious damage from over-production in recent years.

3. Operations

$ Operate ten workover rigs, repairing and reconfiguring existing wells;
$ Operate ten rigs dedicated to infill drilling and new field development

4. Support Services and Construction

$ Warehousing, purchasing, housing, personnel
$ Road construction to remote locations
$ Helicopter and air services
$ Transport and maintenance
$ Pipeline construction: maintenance and repair
$ Loading terminals: repair, expansion and operation

The scale of the work soon became evident. A remarkable feature was the good co-operation from the Iraqi workforce, including professionals with invaluable local knowledge. Although the true production potential was not determinable for several years, a valid preliminary assessment gradually did emerge as follows:

1. Foothills Division

It transpired that the geology of the Zagros Foothills had already been well determined by the old Iraq Petroleum Company. All the major structures of interest had been identified; and most had been tested. What remained to do was to evaluate deeper plays in the frontal thrust-belt, in part relying on secondary source and reservoir objectives in complex structural conditions. It called for intensive geophysical work.

2. Central Division

This was the prime area of interest, but its geology was complicated by the superimposition of two structural frameworks: the original sedimentary basin, running northward from the Gulf, having been cut but late-stage northeasterly transverse movements that broke it up into alternating structural highs and lows. The lows were found to be generally gas-prone or non-prospective, although having some scope for secondary source and reservoir potential. All the larger prospects on the highs had been identified long ago; and most had been tested.

3. Western Division

This area is characterised by very low structural relief offering subtle, but possibly large, stratigraphic traps. A deeper gas-prone play, relying on Silurian sources charging patchy, poor-quality Permian reservoirs, is also in range in this area. While generally poorly prospective, it might nevertheless turn up a few positive surprises.

In Summary

There can be little doubt that Iraq has the potential to produce much more oil. Exactly how much will be known only after a comprehensive evaluation and new information. However, it would be reasonable to assume on to-day=s evidence that about a total of 125 Gb will have been discovered by 2010, with about another 10 Gb to come in after that. Some 30 Gb have been produced to-date. Production stands at about 2 Mb/d, the amount being uncertain because of smuggled exports through Turkey, Syria, Jordan and Iran, which appear unseen in the statistics of those countries. It turns out that there is very little instantly available spare capacity. Under optimal, unconstrained operating conditions, it would be reasonable to expect production to rise to about 3 Mb/d by 2010, reaching a peak of 4.5 Mb/d around 2020. By then, it might be able to supply about one-quarter of US needs, assuming its consumption did not rise greatly in the future, under very advantageous terms, far below the then current world prices.

The scenario assumes general political stability, with any moves to Kurdish separatism being brutally suppressed by Turkey, Iraq and Iran, now with a UN mandate and US help. Such repression would be nothing new having been practised by both the current government and Britain during the 1920s, when it had found it necessary to call in the Royal Air Force strafe Kurdish positions in its effort to maintain order and underpin the IPC concession.

A Scenario of War

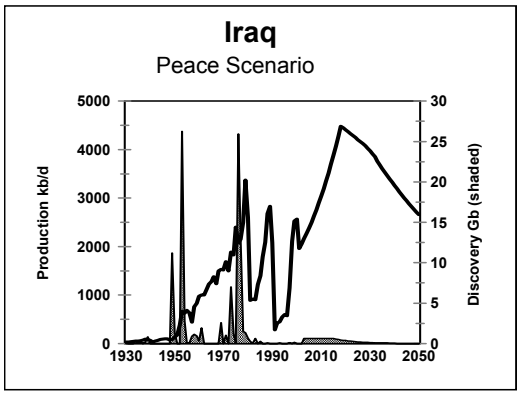
If, on the other hand, the country is subject to military attack, it would be hard pressed to maintain even present production in the face of death, devastation and prolonged conflict, with the oil installations being subject to continuing relatively easy acts of sabotage. The silver lining would be that there would be more left for the survivors of the apocalypse. It is too awful a scenario to contemplate in detail.

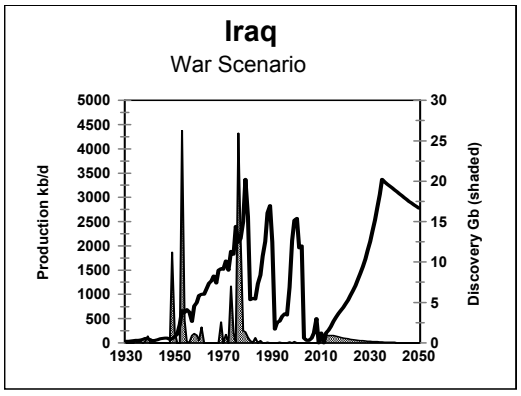
Summary

It is difficult to present the standard data table that normally accompanies these evaluations because the available information is so unreliable, but the following is based on the current model, for what it is worth, approximating with the *Peace Scenario*. Two plots give the production profiles under the two alternative scenarios, but are no more than illustrative. The country has no known *Non-Conventional* potential but probably plenty of gas for the future.

(It is worth mentioning in passing that the USGS, which may be misleading the US government, proposes much higher Mean estimates, having come upon an outdated consultant's map of Iraq that has been floating around the industry for many years. It shows notional prospect leads, several of which were subsequently tested, and deserves no particular credence.)

Iraq – Conventional		
Rates Mb/d		
Consumption	2001	0.4
Production	2001	2.0
	Forecast 2010	3.0
	Forecast 2020	4.5
Discovery 5-year average (Gb)		0.06
Amounts Gb		
Past Production		27
Reported *Proved Reserves*		113
Estimated Future Production to 2075		
From Known Fields		95
From New Fields		13
Future Total		108
Past and Future Production		135
Current Depletion Rate		0.7%
Depletion Midpoint Date		2021
Peak Discovery Date		1948
Peak Production Date		2013





119. BBC Open University Video

The BBC has produced an admirable video for the Open University on energy, and fossil fuel depletion, featuring C.J.Campbell and the former Chairman of Shell, who surprisingly did not seriously disagree with the premise of oil decline in the not too distant future. It was produced by Anne-Marie Gallon and carries a reference FOUT657R T206/VC1B1-01. (BBC, Perry Building, Walton Hall, Milton Keynes, Bucks, MK7 6BH, England). ASPO members could well find it useful for teaching or illustrative purposes.

120. New book on depletion and sustainable energy

A new book by members of ASPO has been published in Germany as follows:
Title: Ölwechsel!
Subtitle: Das Ende des Erdölzeitalters und die Weichenstellung für die Zukunft
Authors: Colin J. Campbell, Frauke Liesenborghs, Jörg Schindler, Werner Zittel

Editor: Global Challenges Network (www.gcn.org)
Publisher: Deutscher Taschenbuch Verlag (dtv) Series: dtv-premium, No. 24321 ISBN 3-423-24321-4

121. Words of Wisdom

Attention is drawn to the works of John Attarian, an economist from Michigan, who explains with great lucidity the devastating consequences of outdated flat-earth economic principles, seeing the depletion of oil as one of the mechanisms that will impose change to a more sustainable life-style. Some of his work can be found on www.thesocialcontract.com

122. The USGS seeks to perpetuate its mistake

We can readily forgive the USGS for its flawed new study of the potential for oil discovery, which counters its own excellent work over the past thirty years. It is indeed a difficult subject calling for judgement and experience. It is less easy to forgive them for trying to perpetuate their mistake, which is doing great damage by misleading foreign governments and international agencies.

A REPLY BY C.J.CAMPBELL

to

"GLOBAL PETROLEUM RESERVES – A VIEW TO THE FUTURE"
by Thomas S. Ahlbrandt and J.McCabe,,United States Geological Survey
Published in Geotimes, November 2002

Ahlbrandt and McCabe have written an elegant article choosing their words with extreme care to present what seems to be an authoritative account of the world's oil and gas situation, based on a study made by the United States Geological Survey in 2000. But a closer look shows it to be a thoroughly flawed study that has done incalculable damage by misleading international agencies and governments.

The study was in fact a marked departure from earlier sound evaluations made by the USGS over a thirty years period under its previous project director, the late C.H.Masters. He showed that he understood the situation well, using great skill to deliver the message, albeit at times between the lines, as he recognised its sensitive nature.

Neither of the authors claim practical oil experience. That is betrayed by their mindset, which is more appropriate to the mining geologist for whom resource concentration is as important as occurrence. They say they speak to a Mr Green of Exxon, but we do not know what he tells them or with what motive: another spokesman in the same company reportedly made the succinct comment: *"you get what you pay for, and that came free"*.

It is an old trick for the politician to answer a question that is not asked. No one need be seriously concerned about when the last drop of oil will be produced. What matters – and matters greatly – is the date when the growth of past production gives way to decline from resource constraints. This is the transcendental issue, given the world's dependence on abundant oil-based energy, furnishing 40% of all traded energy and 90% of transport fuel, essential to trade. The USA itself experienced the discontinuity in 1971, and the same pattern of growth to decline has been repeated from one country to another around the world. A recent example is the United Kingdom, with production peaking in 1999, twenty-seven years after peak discovery. Production inevitably has to mirror earlier discovery after a time lag. The world peak of discovery was in 1964, so it should surprise no one that a corresponding peak in production is now imminent. It is so self-evident, even if our eyes are too blinkered to see it.

The authors present the comforting notion of a resource pyramid, implying that the World can seamlessly move to more difficult and expensive sources of oil and gas when the need arises. This is the case in eastern Venezuela and western Canada where huge deposits of degraded oil flank the basins, but they are exceptional. There is a polarity about oil that they fail to grasp: it is either present in profitable abundance or not there at all, due ultimately to the fact that it is a liquid concentrated by Nature in a few places having the right geology. They speak of "crustal abundance" when a glance at the oil map shows clusters of oilfields separated wide barren tracts.

They give emphasis to "reserve growth" as a new element, although recognised and dismissed by their predecessor, yet fail to point out that the text of the study itself expresses grave reservations. "Growth" is in fact more an artefact of reporting practices than a technological or economic dynamic. In short, reserves described as *Proved* for financial purposes refer to what has been confirmed so far by drilling, saying little about the full size of the field concerned. Clearly, it was absurd to apply, as the study did, the experience of the old onshore fields

of the USA, with their special commercial, legal and reporting environment, to the offshore or international spheres, where very different conditions obtain.

The authors speak of their impressive probabilistic methods, which in the study allowed them to quote estimates to three decimal places. In, for example, the famous case of little known NE Greenland, the study states with a straight face that there is a 95% subjective probability of more than zero, namely at least one barrel, and a 5% probability of more than 111.815 Gb (billion barrels). A *Mean* value of 47.148 Gb is then computed from this range, being incorporated in the global assessment. Can we really give much credence to the suggestion that this remote place, which has so far failed to attract the interest of the industry, holds almost as much, or indeed more, than the North Sea, the largest new province to be found since the Second World War? Could this be pseudo-science at its best?

Turning to the actual estimates, the authors state that the sum of past production, reserves, reserve growth and undiscovered comes to about three trillion barrels, but then claim that the peak of production will not arise before the mid-Century. Experience shows that the onset of decline comes at, or before, the midpoint of depletion, due largely to the immutable physics of the reservoir that impose a gradual decline on production towards exhaustion. Depletion Midpoint on their estimates will come when 1500 Gb have been produced, which will be around 2020 at present production rates, or sooner if demand should rise. A mid-Century peak implies a precipitate fall thereafter, which is implausible. But this line of reasoning does not paint the full picture, because it fails to distinguish the different categories of oil. There is, clearly, a huge difference between a Middle East free flowing well and digging up a tar-sand in Canada with a shovel. As the authors themselves state, there will be an increasing reliance on heavy oils, low on their resource pyramid, which are slow to produce and will not contribute significantly until after global peak for obvious reasons. The USGS study did not forecast production itself, but simply indicated the amounts to be found over the 30-year study period ending in 2025. But the internal evidence, flawed as it is, indicates a peak long before the mid-Century. If that were not enough, we can now compare the actual results with forecast over the first six yours of the study period. The indicated average annual discovery is 24 Gb, whereas the actual has been less than half that amount. This is doubly damning because it would be normal to expect the larger fields to be found first as the past record amply confirms.

What the USGS failed to do was to extrapolate past discovery trends in the world's mature basins, containing most of its oil and gas, having properly backdated reserve revisions to the discovery of the respective fields. It is axiomatic that a field is found by the first successful borehole drilled into it, even if its size is not exactly known at the outset. Had the USGS done that, it would have had the benefit of the considerable experience of the oil industry working in the real world, which is likely to give a better view of the future than abstract geological assessment couched in subjective probability ranking.

The authors accuse those, who draw attention to the manifest failure of the study, of having hidden agendas, introducing the colourful but unhelpful designations of Cornucopian and Malthusian, when all we seek is a realistic assessment of this critical issue.

The article reviews two specific areas: the Caspian and Iraq. Is it a coincidence that the United States earlier this year attacked Afghanistan, which borders the Caspian, and now turns its guns on Iraq?

We can forgive its authors for having got it wrong as it is a difficult subject, calling for long years of experience, as marshalled by their predecessor, but to perpetuate the error with persuasive language and specious argument verges on the culpable.

123. Petroleum and People

A paper by C.J.Campbell under the above title appears in *Population and Environment* v.24/2 (Nov 2002), reviewing the impact of oil depletion on society in general.

124. Dire UK Gas situation

Papers from the UK gas industry reveal that gas production peaked in 2000, declining at 2% while demand increases in like amount, such that the UK will be importing 50% of its needs in ten years. The position for poor Ireland, which relies on UK gas, will be even worse. Little thought seems to have been given to exactly where the imports will come from, with misplaced reliance on the famous flat earth "Open Market" to deliver.

The Newsletter very much welcomes contributions from ASPO members and other readers, who may wish to draw attention to items of interest or the progress of their own research.

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