THE ASSOCIATION
FOR THE STUDY OF PEAK OIL AND GAS
"ASPO"

NEWSLETTER No. 80 – AUGUST 2007

ASPO started as a network of scientists and others, 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. Now, independent national associates are in existence or formation in Australia, Austria, Belgium, Canada, China, Denmark, Egypt, Finland, France, Germany, Ireland, Isle of Man, Israel, Italy, Luxembourg, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Portugal, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom and the United States.

Missions:

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

Foreign language editions are available as follows:
Spanish: www.crisisenergetica.org
French: www.oleocene.org (press "Newsletter")

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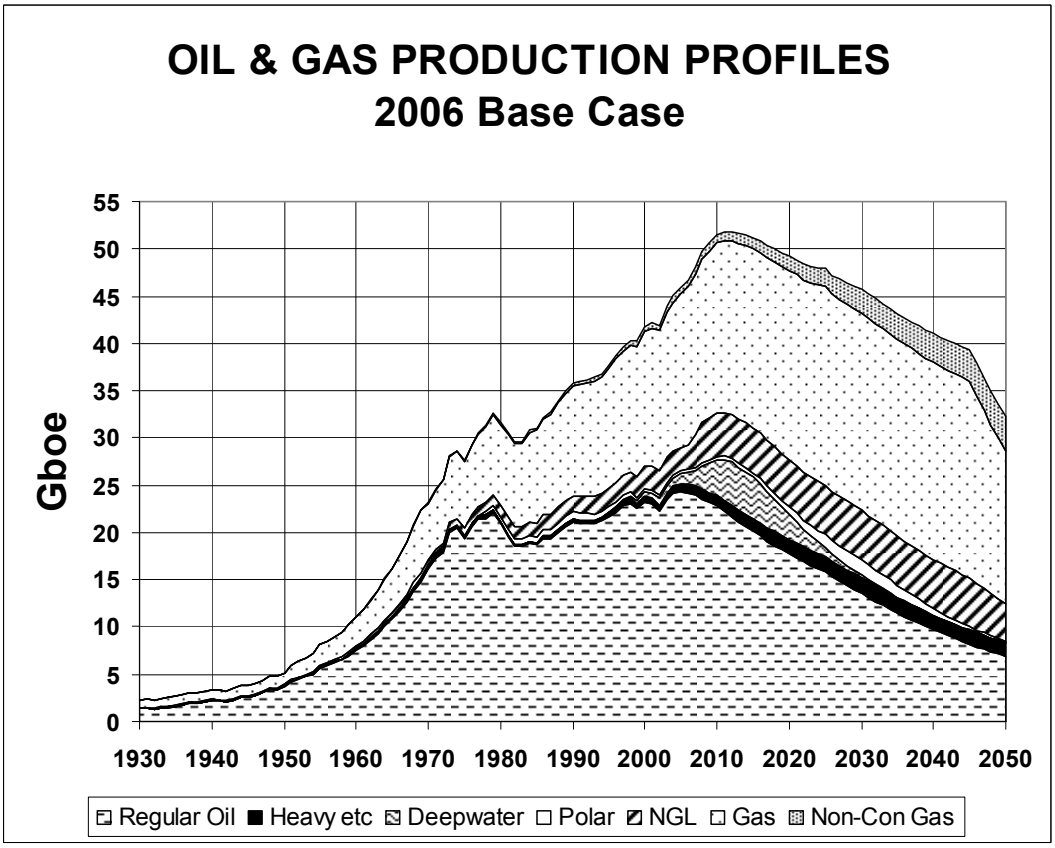
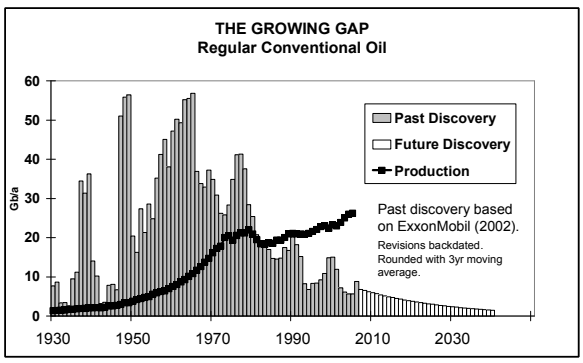
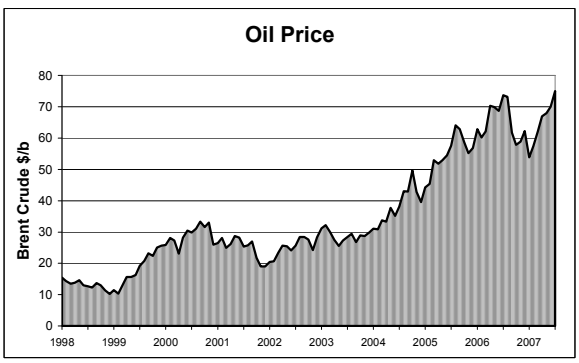
Index of Country & Regional Assessments with Newsletter Reference (*revised)

The General Depletion Picture



ESTIMATED PRODUCTION TO 2100										End 2006
Amount			Gb	Annual Rate - Regular Oil						Gb	Peak
Regular Oil				Mb/d	2006	2010	2015	2020	2030	Total	Date
Past	Future		Total	US-48	3.6	3.0	2.3	1.8	1.1	200	1970
Known Fields		New		Europe	4.5	3.6	2.5	1.7	0.8	76	2000
1001	773	126	1900	Russia	9.5	9.5	7.6	6.1	3.9	230	1987
	899			ME Gulf	20	20	20	20	18	693	2015
All Liquids				Other	29	27	22	19	13	701	2004
1102	1498		2600	**World**	**67**	**63**	**55**	**48**	**37**	**1900**	2005
2005 Base Scenario				**Annual Rate - Other**							
M.East producing at capacity				Heavy etc.	2.8	4	5	5	6	207	2030
(anomalous reporting corrected)				Deepwater	2.7	10	12	7	1	69	2012
Regular Oil excludes Heavy Oils				Polar	0.9	1	1	2	4	52	2030
(inc. tarsands, oilshales); Polar &				Gas Liquid	6.9	12	13	14	14	355	2035
Deepwater Oil; & gasplant NGL				*Rounding*			-1	-2	2	18	
Revised 14/07/2007				**ALL**	**80**	**90**	**85**	**75**	**65**	**2600**	2011





844. Crude Impact

An excellent explanation of the impact of Peak Oil is given in a nine-part series on www.YouTube.com (search *Crude Impact – Peak Oil Documentary*). It emphasises in particular the role of the United States during both the First and Second Half of the Age of Oil. During the First Half, it led in the expansion of just about everything, but it remains to be seen how it will fare in the Second, when the world faces the corresponding contraction, as the prime energy supplies decline from natural depletion, and the climate changes. The hope is that, if the people are informed by presentations such as this, they will succeed in recovering their democratic right to influence their governments in the right direction.

845. From Peak Oil to Dark Age

BusinessWeek, no less, carried an article in its issue of 25th June with the above title. It draws attention to the issue of Peak Oil in clear terms, rightly casting doubt on the validity of the reserves reported by Middle East countries and pointing out that *regardless of the implications for climate change, peak oil represents a mortal threat to the US economy*. The inhabitants of Baghdad could be forgiven for thinking that a Dark Age has already begun, and many Africans, facing starvation, disease and tribal warfare, while their oil resources are exported, may share the same view. *(Reference furnished by Walter Youngquist)*

846. The Post-Petroleum Cookbook

Amazon has kindly drawn attention to a book entitled *The Post-Petroleum Survival Guide and Cookbook: Recipes for Changing Times* by Albert Bates, providing a reader review, reproduced below. It won't be that bad if we can look forward to eating well after Peak.

> The Post-Petroleum Survival Guide and cookbook by Albert Bates is an intriguing and well constructed look at what every citizen in the oil addicted world should know and begin to move toward if any kind of survival is possible when oil is no longer readily available. Bates begins by giving convincing evidence that the availability of plenty of oil and gas is not in the world's future. But the book is not a dooms day end of the world account. After explaining the supply/demand situation for the world relying mainly on oil and gas as the key source of energy, he then goes on to spend most of the book detailing ways in which the average consumer can begin to do things in a daily way that will make everyone less dependent on petroleum as the main energy source. The book details everything from creating one's own energy supplies to food preparation and storage to the way to save in transportation. The margins of each page of the book contains menus of dishes that help to form a more energy efficient approach to cooking. The book is well written with good explanations of approaches the author feels are key to beginning the change to living in a world without abundant petroleum supplies

847. Forecasting Future Production

Item 828 in Newsletter No.79, covering an assessment of the Western Desert of Iraq, has prompted the following communication from Bruce Robinson of ASPO Australia, who comments that this is an interesting and authoritative critique of IHS claims, using much more conservative estimates from USGS as a counterbalance

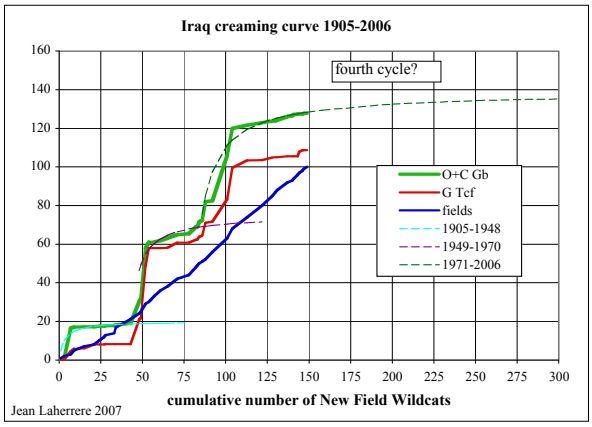
> *"Perhaps the most important conclusion to be drawn from these profoundly contradictory studies is the need for a higher level of discipline and objectivity in the process of estimating global oil reserves and resources. After all, the difference between the two studies in this one region represents nearly 100 billion bbl of oil resources. This in turn is the equivalent of 10% of the entire world's reported proven oil reserves. While arriving at identical conclusions from such studies for one geological region is not realistic, discrepancies in technical estimates that differ by two orders of magnitude must surely indicate a major flaw in the resource estimation process."*

Jean Laherrère of ASPO-FRANCE has also written a report summarised below

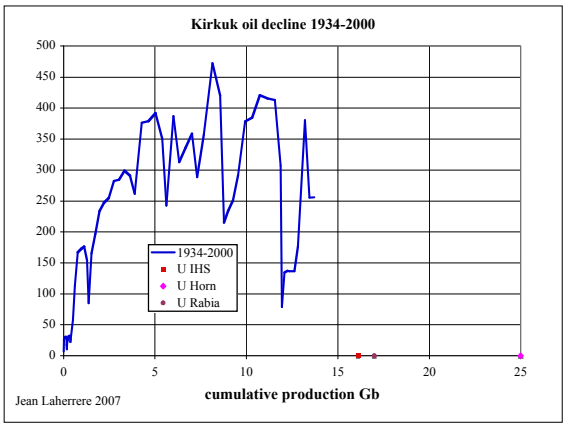
Comments on fuzzy Iraqi oil reserves by Jean Laherrère July 2007

An article in *World Oil* of July 2007, entitled *Iraqi oil reserves show great potential* by Dr H.Rabia demonstrates much confusion on data and definition.

It includes two tables : the first gives the official reported reserves of 115 Gb (billion barrels) as of 2003, and the second lists the size of individuals fields totalling a rounded 110 Gb of oil equivalent, mainly compiled

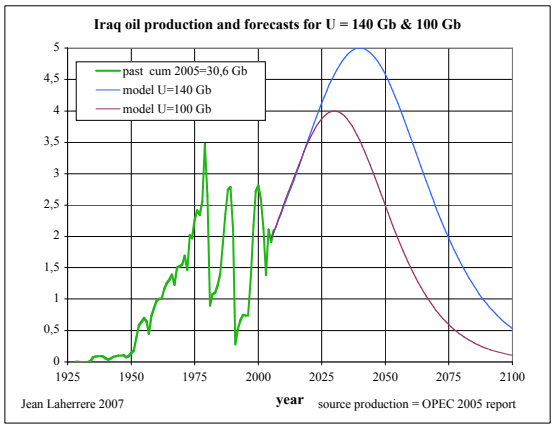


from AAPG papers. The estimates range widely : Gong (2003) reports 28 giant fields with a total of 80 Gb of oil and 21 Tcf of gas (85 Gb of oil equivalent); Horn (2005) reports 30 giant fields with a total of 130 Gb of oil and 93 Tcf of gas (146 Gboe); Rabia reports 38 giant fields with a total of 101 Gb of oil and 51 Tcf of gas (110 Gboe). The latest industry information for 2007 indicates that 146 exploration boreholes have found 100 fields containing 128 Gb of oil and condensate, and 109 Tcf of gas (146 Gboe).



Plotting cumulative discovery against cumulative exploration drilling (the so-called *creaming curve*) offers a good method for determining ultimate recovery (see Figure). Several cycles can be identified : the first cycle, dominated by the Kirkuk Field, lasted from 1905 to 1949; the second, dominated by the Rumaila Field, lasted from 1949 to 1974; and the third, dominated by the East Baghdad and Majnoon fields, lasted from 1975 to 2006. The number of fields discovered gives a straight trend. Extrapolating these trends suggests that the ultimate recovery of Iraq will amount to about 140 Gb assuming that there is no fourth cycle and that the input data on field sizes are correct. In fact, there are considerable doubts about the data, especially in relation to past production, which was affected by wars and other disturbances, as is well illustrated by the production record of the Kirkuk Field (see figure) which shows no clear trend. Reported cumulative production through 2000 amounted 13.7 Gb, with the estimates of ultimate recovery ranging from 16 to 25 Gb.

In 2000, the USGS estimated that Iraq, as of 1995, had produced 22 Gb out of a total discovery of 100 Gb. It anticipated future discovery at 45 Gb, giving an ultimate recovery of 145 Gb, close to that indicated by the above *Creaming Curve*. Of the 45 Gb yet-to-find only 6.2 Gb was attributed to the Western Desert.



In 2007, the consultancy IHS issued a report claiming that as much as 100 Gb would be found, but this was roundly rebutted by Sadad and Moujahed al-Husseini (formerly of Saudi Aramco). While there are a large number of potential traps, indicated by seismic surveys, it is mainly a Palaeozoic petroleum system, very different from the prolific trends responsible for the major finds to the east.

An Ultimate Recovery of 140 Gb could deliver a theoretical peak of 5 Mb/d around 2040, given that operations were stepped up to the maximum level possible, which is hardly likely, given the political situation. A lower Ultimate Recovery of 100 Gb would deliver a corresponding of 4 Mb/d around 2030.

It follows that claims of as much as 6 Mb/d, as reported in the media, are extremely implausible. Certainly, Rabia's paper does not stand up to detailed analysis, quoting estimates to unrealistic accuracy and demonstrating much confusion between oil and gas, initial and remaining reserves and exploration potential, which cannot be enumerated here for reasons of space.

In conclusion, it may be said that estimating the size of an oilfield early in its life poses no great technical challenge although naturally subject to a range of uncertainly. Furthermore, the trend of past discovery, which was always aimed at the biggest and best prospects, delivers a sound basis for extrapolating future discovery. The problems lie in the reporting, which in the case of Iraq has been particularly unreliable. Evidently, the political situation in Iraq is heavily influenced by its oil potential: it is important therefore that governments avoid basing policies on unrealistic expectations.

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848. Production Forecasting Methodology

Given the wide range of public pronouncements on Peak Oil, it may be useful to summarise the ten steps taken in the analysis that stands behind the assessment used in this newsletter, which itself is being compiled into *An Atlas of Oil and Gas Depletion* for eventual publication. Much constructive debate could surround each step for each country, but bland assertions of the world situation defy analysis and barely warrant serious consideration.

The **First Step**, of course, is to decide the purpose of the exercise : namely to make an ***objective*** study based on the physical discovery and production of a finite resource formed in the geological past, free of political camouflage.

The **Second Step** is to define what to measure : here *Regular Conventional Oil* is distinguished from oils heavier than 17.5°API (including bitumen, oil shale etc), deepwater oil (>500m) , Polar oil, and liquids from gas plants, which are covered separately.

The **Third Step** is to input ***Past Production*** by country as so defined. This is not easily achieved as the various public databases (such as the Oil & Gas Journal, World Oil, BP Statistical Review and various national and industry sources) report different numbers and sometimes even revise earlier reports. It takes some judgment after reviewing all these sources to input what seems a reasonable working hypothesis.

The **Fourth Step** is to input past discovery by country and year, backdating any field reserve revisions. More judgment is required as the database is even less sure.

The **Fifth Step** is to plot the discovery trend and the size distribution of fields, as well as other statistical techniques including the Derivative Logistic which plots annual/cumulative production against cumulative production, and sometimes delivers a clear trend. It is then necessary to take a deep breath and estimate the ***Total*** likely to be produced to a certain date (say 2050). With that information, it is possible to subtract ***Past Production*** to deliver ***Future Production***.

The **Sixth Step** is to input exploration drilling by year: a decline in activity gives a hint of the maturity of the area and the dwindling scope for new discovery.

The **Seventh Step** is to take a second deep breath and assess what percentage of ***Future Production*** comes from ***Known Fields*** ("Reserves"), using again the wide range of published and other data to try to reach a reasonable estimate. The balance represents what is ***Yet-to-Find*** from new discovery.

The **Eighth Step** is to calculate ***Depletion Rate*** (annual production as a percent of ***Future Production***) by year, which is a useful check against the estimated ***Total***. For example, a Depletion Rate above 10% would suggest that the ***Total*** had been under-estimated.

The **Ninth Step** is to forecast future production by country, distinguishing three groups of country:

a) **Post-Midpoint countries**, which have produced more than half of their estimated ***Total***, such that future production is expected to decline at the current Depletion Rate.

b**) Pre-Midpoint countries**, where production may continue to rise on the past trend, or as otherwise suggested by local circumstances, including pipeline capacity. Since most such countries are within a few years of Midpoint, the assumptions are not too critical to the overall assessment ;

c) **The Middle East Gulf countries**, where production may rise or fall on political criteria. A reasonable base-case assumption is that production will be about flat until Depletion Rate rises above 3% marking the onset of terminal decline.

The country forecasts are then summed into Regional and World Totals

The **Tenth Step** is an ongoing process to check and recheck, and revise as new information and insight come in, recognising that **ALL NUMBERS ARE WRONG – THE QUESTION IS : BY HOW MUCH ?**

849. Government Responses

The Swedish Government probably leads with its declared policy of weaning itself of oil dependency by 2020. The Hong Kong Government is also considering a first class report which explains the issue and implications (see Chen, Footman & Tancock of Bauhinia). Having described *Peak Oil* in accurate and lucid terms, it proposes seven steps: 1) Establish Responsibility; 2) Identify the risks; 3) Develop contingency plans; 4) Devise mitigating strategies; 5) Communicate with stakeholders; 6) Raise community awareness; and 7) Communicate with cross-boundary authorities. The latter is particularly relevant as there are indications that the Chinese Government is facing up to Peak Oil.

The National Petroleum Council in Washington has also issued a lengthy report explaining the matter with only moderate camouflage. The draft report included an illustration showing that production from

existing reserves is at peak before declining steeply and that the contribution from *unconventional* sources falls far short of offsetting the decline, but it evidently failed to reach the final report.

At the same time, the report seeks to cushion reality. It adds production from what are termed *known reserves* without explaining what they are. It speaks of a total oil endowment at 13-15 trillion barrels (compared with only 2.5 trillion in thee USGS *high probability* case for) and has new discovery far in excess of the past trend. But it qualifies unrealistic expectations by stating that only a fraction is producible.

The report states that US energy self-sufficiency is incompatible with its broader foreign policy objectives, which demand access to foreign oil, and it significantly refers to the strategic, and implied military, significance of the Suez Canal, Bosporus and the Straits of Hormuz and Malacca. At the same time, it calls for radical cuts in demand and improvements in efficiency.

It is quite straight on the Post-Peak world, saying that *many of the expected changes could heighten risks to US energy security in a world where US influence is likely to decline as economic power shifts to other nations.* This almost hints at a pending US recession, inflation and devaluation of the dollar, which would be a natural response to the decline in the critical supply of cheap energy, on which its economy was built.

Overall, camouflage apart, it is remarkably forthright, considering the sensitive nature of the subject and the political constraints.

Generals don't just charge headlong into battle – and this is a form of battle - but use tactics with feints and subtle manoeuvres. The issue is of such magnitude that it cannot be addressed head on: the NPC and other similar new positions, such for example as that adopted by the International Energy Agency, are simply steps in the strategy of the campaign needed to face the Second Half of the Age of Oil.

We do not face the abrupt end of oil, but merely the onset of a gentle decline in the rate of extraction, giving some room for manoeuvre. That said, the change from the growth to decline of this critical energy supply on which the modern world depends is a discontinuity of historic proportions, especially in financial terms. The growing awareness of the reality imposed by Nature is giving rise to a certain resentment, as people begin to ask why they have not been properly informed. Attention focuses in particular in the behaviour of the International Energy Agency whose primary responsibility has been to study energy issues and advise the OECD Governments accordingly. It is known that the agency was fully briefed in the peak oil issue some ten years ago, being supplied with valid data, and that there were elements within the organisation who studied it properly seeking to reveal the truth. This is clear from its 1998 World Energy Outlook, in which a shortfall in 2010 is covered by camouflage in the form of *Unidentified Unconventional,* which miraculously rises from zero to 19 Mb/d ten years later without further explanation or description. The coded message was later suppressed with the mysterious *Unidentified* supply being arbitrarily attributed to Non-OPEC in subsequent editions.

The new *volte face* therefore speaks less of publicising the results of some new evaluation, but rather of a decision to come clean with what has long been known. This in turn poses important questions about the nature and function of the organisation and the identity of those who eventually control it.

It has been expedient for Governments to hide behind the silken curtains of the IEA to spare themselves from having to face difficult decisions and adopt new policies. But there comes a time when the political advantages of deception expire as voters increasingly demand straight answers. Mr Chamberlain, the former British Prime Minister, famously proclaimed *Peace in our time* on the eve of the Second World War, but was duly replaced by Mr Churchill offering nothing but *blood, sweat and tears*.

850. More Information on Kuwait

The size of Kuwait's reserves was discussed in Item 832 in Newsletter 79 prompting what can be described as a *normally reliable source* in the Middle East to pass on new information, reporting that the real reserves of Kuwait are 24 Gb *Proved* ; 51 Gb *Proved & Probable* ; and 101.5 Gb *Proved, Probable & Possible.* The best estimate of what is realistically producible is normally equated with *Proved & Probable*, namely 51 Gb. It is odd to find *Possible* quoted to such a high and exact number for a small very thoroughly explored area. Furthermore is the question of whether the numbers refer to *Regular Conventional Oil* or whether they include gas quoted in terms of *Oil Equivalent*. The database behind this newsletter assumes that Kuwait started reporting *Original* not *Remaining Reserves* when it made the overnight increase from 64 to 90 Gb in 1985. (22 Gb had been produced to that date, which with the then reserves of 64 Gb gave a total of 86 Gb that may have been rounded up to 90 Gb, based on assumed higher recovery). It also assumes that 2Gb remain to be found and produced from new fields. It is not quite sure therefore if these new numbers refer to *Original* or *Remaining Reserves* which leads to two alternative interpretations as shown in the table.

The Depletion Rates give certain hints. A Depletion Rate of 4.2%, in the case that *Original Reserves* are reported, sounds quite reasonable for a mature country like Kuwait, compared for example with 6.5% in the United Kingdom or 4.5% in the US-48. The country would in this case be 64% depleted, which also does not sound unreasonable given that most of its oil lies in the Burgan complex of fields found in 1938. In the case that *Remaining Reserves* are reported, production could be held at present levels of 2.2 Mb/d to 2030 by which time the Depletion Rate would have risen to 2.5%, which is still comparatively low, or alternatively production could rise to an earlier peak followed by a steeper decline. On the other hand, if *Original Reserves* are being reported, a 4.2% decline would reduce production to 785 kb/d by 2030.

Kuwait Reported Reserves			
If Remaining	**Gb**	***If Original***	**Gb**
2006 Production	0.8	2006 Production	0.8
Past Production	34	Past Production	34
Future Production	53	Future Production	19
From Known Fields	51	From Known Fields	17
From New Fields	2	From New Fields	2
Total	87	Total	53
Depletion Rate	1.5%	Depletion Rate	4.2%

It will be remembered too that at least 2 Gb of oil went up in smoke in the Gulf War, which clearly reduced reserves by like amount although not counted as production. Prior to the invasion, Kuwait was taking Iraqi oil from shared fields, straddling the border, which indeed was one of the factors behind the invasion, suggesting that it was experiencing some limits to its own capacity. The jury is out on the issue, but the balance of evidence begins to points at the lower numbers.

851. ASPO-6 Final Agenda Announced

The final agenda for ASPO6 has been announced. Two cabinet members of the newly elected Irish Government will be participating in the final panel discussion. It promises to be a fantastic event.

REGISTER NOW! [www.aspo-ireland.org]

Day 1		**Day 2**	
Dr. James R Schlesinger		**Lord Ron Oxburgh**	
Supply Side		**Risk Management**	
Jeremy Gilbert Ex BP	**James Buckee** Talisman Energy Inc	**Jeremy Leggett** SolarCentury	**Matt Dempsey** IFJ
Mike Rodgers PFC Energy	**Gareth Roberts** Denbury Resources	**Alfredo Curbelo** GEPROP Cuba	**Mary Graham** Practical Small Projects
Ray Leonard Kuwait Energy Co.	**Chris Skrebowski** Petroleum Review	**Michael Dittmar** ETH, CERN	**Gerard O'Neill** Amárach
PR Bauquis IPF	**Eddie Walshe** Poten Partners	**Nate Hagens** Gund Institute	**Philip Walton** *BENE*
Demand Side		**Policy & Environment**	
George Lee RTE	**Jim Barry** NTR Plc	**Eddie Hobbs**	**Micheál Martin** TD Minister
Herman Franssen International Energy Associates	**Richard Douthwaite** Feasta	**Debbie Cook** Huntington Beach Local Government	**Michael Meacher** Labour MP
Prof. Pang China Petroleum Uni.	**Dr. David Fleming** The Lean Economy	**Rob Hopkins** Totnes Town	**Eamon Ryan** TD Minister
Jeff Rubin CIBC World Markets	**Carlos Rossi** AVHI, Venezuela	**Eddie O'Connor** Airtricity	**Edward Schreyer** The Rt. Hon.

The Post-Conference event, termed *Apres-Pic*, in Killarney has also received much interest. It will give participants a chance to see something of the scenic beauties of the west of Ireland as well as to meet and converse in a relaxed and convivial lake-side atmosphere. Golf, fishing and other tourist attractions are available, but places are limited. Contact the hotel direct for reservations (www. info@lakehotel.com)

852. Reserve to Production Ratio and Challenges

The two most commonly used weapons of those wishing to conceal the reality of Peak Oil are references to *Reserve to Production Ratio* and *Challenges*. Quoting Annual Production as a function of Reserves is a perfectly reasonable measurement. For example, the 2006 BP Statistical Review states, however incorrectly, that annual production in 2006 was 81.663 Mb (or 29.8 Gb) and that Proved Reserves stand at 1208 Gb. The

calculation is simple: 1208/29.8=41. This is widely misrepresented to mean that Reserves support Current Production for 41 years, which is absolutely not the case because all fields are subject to gradual declines. Obviously, *Rate* is not the same as *Amount.*

Another more subtle weapon is the use of the word *Challenge* carrying the implication that it can be met by dedication, investment and courage. Thus the growing gap between falling oil supply and growing demand is often depicted as a matter of *challenge* to somehow take steps to produce more, when the real challenge is to get used to using less because there is less left to produce.

853. Revision of Production Forecast

The database and depletion model are subject to continual revision and refinement as new information comes in and as errors are spotted and corrected. The current revision is reproduced overleaf. The numbers are quoted as computed, and obviously deserve to be generously rounded. They nevertheless are thought to give a reasonable approximation of what can be expected. It should be noted that so-called *Demand* is computed on the basis of a notional 1.5% annual increase, but in reality it will likely fall in the face of soaring price and economic recession.

Calendar - Forthcoming Conferences and Meetings

ASPO members and associates [shown in parenthesis] will be addressing the subject of Peak Oil at the following conferences and meetings. Information for inclusion in future newsletters is welcomed.

2007	
Sept. 5	Simmons & Co Offshore Europe Conference, **Gleneagles**, Scotland [Aleklett, Campbell, Simmons]
Sept. 11-12	Geological Society bi-Centennial Conference, **London** [Campbell]
Sept. 17-18	ASPO-6 International Conference, **Cork,** Ireland
Oct. 17-20	ASPO-USA Conference, **Houston**, Texas (See Item 823 June Newsletter)
Nov. 8-9	ASPO-SOUTH AFRICA, **Johannesburg**, South Africa [Ratcliffe]
Nov. 15-16	OECD International Transport Forum, **Paris**, [Aleklett, Bentley]
Dec. 4-5	VorArlberg Sustainability Conference, **Bregenz**, Austria [Campbell]
2008	
	ASPO-7 International Conference, Norway

NOTE

Compiled by C.J.Campbell, Staball Hill, Ballydehob, Co. Cork, Ireland.

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RESOURCE BASED PRODUCTION FORECAST — 2006

Regular Conventional Oil by Country

Sorted by production in 2010

Mb/d	2000	2005	2010	2020	2030
Russia	6.45	9.41	9.48	6.11	3.94
Saudi Arabia	8.00	9.06	8.99	8.99	7.76
Iran	3.68	3.89	3.86	3.86	3.39
China	3.24	3.63	3.11	2.03	1.33
USA	4.21	3.51	2.97	1.78	1.06
Mexico	3.46	3.76	2.59	1.23	0.58
Abu Dhabi	1.90	2.30	2.44	2.44	2.07
Kuwait	1.77	2.13	2.19	2.19	1.93
Nigeria	2.03	2.48	2.14	1.59	1.18
Libya	1.41	1.64	2.07	1.57	1.19
Kazakhstan	0.75	1.30	2.05	2.05	1.75
Iraq	2.57	1.81	1.89	2.41	2.41
Norway	3.21	2.93	1.83	0.87	0.41
Venezuela	2.34	1.66	1.45	1.29	1.02
UK	2.71	1.68	1.26	0.58	0.27
Algeria	0.81	1.35	1.17	0.83	0.59
Azerbaijan	0.28	0.44	0.93	0.93	0.65
Canada	1.08	1.15	0.91	0.41	0.18
Indonesia	1.27	0.95	0.78	0.56	0.41
Qatar	0.69	0.80	0.70	0.46	0.30
Oman	0.93	0.76	0.63	0.43	0.29
Malaysia	0.69	0.77	0.61	0.38	0.24
India	0.65	0.66	0.58	0.38	0.25
Egypt	0.81	0.70	0.54	0.31	0.18
Argentina	0.75	0.65	0.51	0.29	0.17
N.Zone	0.63	0.58	0.50	0.34	0.23
Angola	0.74	0.59	0.46	0.28	0.17
Colombia	0.69	0.53	0.44	0.27	0.17
Ecuador	0.42	0.53	0.41	0.24	0.15
Australia	0.72	0.47	0.40	0.29	0.21
Vietnam	0.30	0.34	0.36	0.25	0.15
Syria	0.52	0.46	0.33	0.18	0.10
Brasil	0.50	0.54	0.32	0.16	0.08
Yemen	0.35	0.41	0.30	0.14	0.06
Sudan	0.21	0.33	0.30	0.22	0.12
Denmark	0.36	0.38	0.25	0.12	0.06
Thailand	0.11	0.19	0.22	0.10	0.05
Dubai	0.28	0.30	0.21	0.10	0.04
Chad	0.00	0.18	0.19	0.14	0.08
Gabon	0.33	0.23	0.19	0.11	0.07
Brunei	0.18	0.19	0.16	0.09	0.05
Congo	0.27	0.21	0.16	0.09	0.05
Turkmenistan	0.15	0.19	0.15	0.11	0.09
Uzbekistan	0.15	0.11	0.12	0.10	0.07
Trinidad	0.13	0.15	0.12	0.08	0.05
Peru	0.10	0.11	0.10	0.08	0.06
Romania	0.12	0.10	0.10	0.08	0.07
Italy	0.09	0.12	0.09	0.06	0.04
Ukraine	0.07	0.09	0.09	0.07	0.06
Cameroon	0.10	0.08	0.07	0.04	0.02
Tunisia	0.08	0.07	0.06	0.04	0.03
Germany	0.06	0.07	0.06	0.03	0.02
Pakistan	0.04	0.06	0.05	0.02	0.01
Papua	0.07	0.05	0.05	0.03	0.02
Bolivia	0.03	0.04	0.05	0.05	0.03
Sharjah	0.05	0.05	0.04	0.03	0.02
Netherlands	0.05	0.05	0.04	0.03	0.02
Turkey	0.06	0.04	0.03	0.02	0.01
Bahrain	0.03	0.03	0.03	0.02	0.01
France	0.03	0.02	0.02	0.01	0.01
Croatia	0.02	0.02	0.02	0.01	0.01
Hungary	0.03	0.02	0.02	0.01	0.01
Austria	0.02	0.02	0.01	0.01	0.01
Albania	0.01	0.01	0.01	0.01	0.01
Chile	0.01	0.00	0.00	0.00	0.00

Regular Conventional Oil by Region

Mb/d	2000	2005	2010	2020	2030
ME GULF	18.54	19.77	19.86	20.23	17.80
EURASIA	11.27	15.32	16.07	11.54	7.99
N.AMERICA	5.29	4.67	3.72	2.11	1.21
L.AMERICA	8.43	7.97	5.99	3.69	2.31
AFRICA	6.77	7.87	7.33	5.22	3.67
EUROPE	6.53	5.26	3.56	1.71	0.83
ASIA-PACIFIC	4.02	3.67	3.19	2.11	1.38
M-EAST MINOR	2.91	2.85	2.28	1.37	0.85
Minor	0.47	0.61	0.53	0.38	0.28
Unforeseen	0.00	0.00	0.02	0.11	0.66
Non MEast	46	48	43	28	19
MEGulf Share	29%	30%	32%	42%	45%
WORLD	**63**	**67**	**62**	**48**	**39**

Excl. bitumen, heavy, deepwater, polar, NGL

Other Liquid Petroleum

Oil					Mb/d
Heavy Oils (#1)	**2.2**	**2.8**	**4.2**	**5.5**	**6.2**
Canada	1.0	1.2	1.6	2.5	2.5
Venezuela I	0.2	0.6	0.9	1.1	1.5
Venezuela II	0.5	0.4	0.4	0.3	0.3
Other	0.5	0.5	1.3	1.6	1.9
Deepwater (#2)	**1.6**	**3.6**	**11.8**	**6.4**	**0.6**
G. Mexico	0.6	1.0	2.4	1.7	0.3
Brasil	0.8	1.6	4.4	1.4	0.1
Angola	0.0	0.6	2.7	1.2	0.0
Nigeria	0.0	0.0	1.5	1.2	0.0
Other	0.2	0.4	0.8	0.8	0.2
Polar	**1.0**	**0.9**	**0.9**	**2.1**	**4.4**
Alaska	1.0	0.8	0.6	0.4	0.3
Other	0.0	0.1	0.3	1.7	4.1
Other (#3)	0.0	0.1	0.3	0.5	1.0
Subtotal	**5**	**7**	**17**	**15**	**12**
Gas & Gas Liquids	(Gas at 6cf=1boe)				
Gas	39	44	50	55	57
Non-con gas	1	2	2	4	7
Subtotal	**40**	**46**	**52**	**59**	**64**
Gas Liquids					
NGL (#4)	**6**	**7**	**12**	**14**	**14**
All Categories					
Gas	**40**	**46**	**52**	**59**	**64**
Liquids	**74**	**81**	**91**	**76**	**66**
Processing Gain	1.5	1.6	1.8	1.5	1.3
Total	**116**	**129**	**145**	**137**	**131**
Balance	*Notional Demand +1.5%yr*				
Liquids Mb/d					
Supply	76	82	93	78	67
Demand	75	82	87	108	117
Balance	0	0	6	-30	-50

NOTES *Regular Oil* includes condensate

(#1) Bitumen, Extra-Heavy Oil, Heavy Oil (<17.5 API)

(#2) Oil in water depth of more than 500m

(#3) Oil from oil-shales, coal

(#4) Liquids from Natural Gas plants

ME-Gulf = A.Dhabi, Iran, Iraq, Kuwait, NZ, S.Arabia

Eurasia = FSU, E.Europe & China

N.America = USA & Canada

Venezuela I = ordinary heavy

Venezuela II = 4 Extra-Heavy oil projects

Production Forecast assumes decline as follows:

1. Post-midpoint countries : at current Dep.Rate
2. Pre-midpoint countries : at midpoint date & rate
3. M.East Gulf : when Dep. Rate exceeds 3%

Depletion Rate = annual production as % of remaining.

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