Discussions on a paper delivered by J-F Giannesini on Panorama 2003 organized by IFP on February 6, 2003 in Paris with as other speakers Alain Perrodon, Matthew Simmons and Peter Davies:
http://www.ifp.fr/IFP/fr/IFP00EVE.nsf/VFODocumentCON/B50F3129BAC0EE5380256CCC00647A88?OpenDocument
http://www.ifp.fr/IFP/fr/evenement/panorama/PanoramaParis_AlainPerrodon.pdf
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to J-F Giannesini
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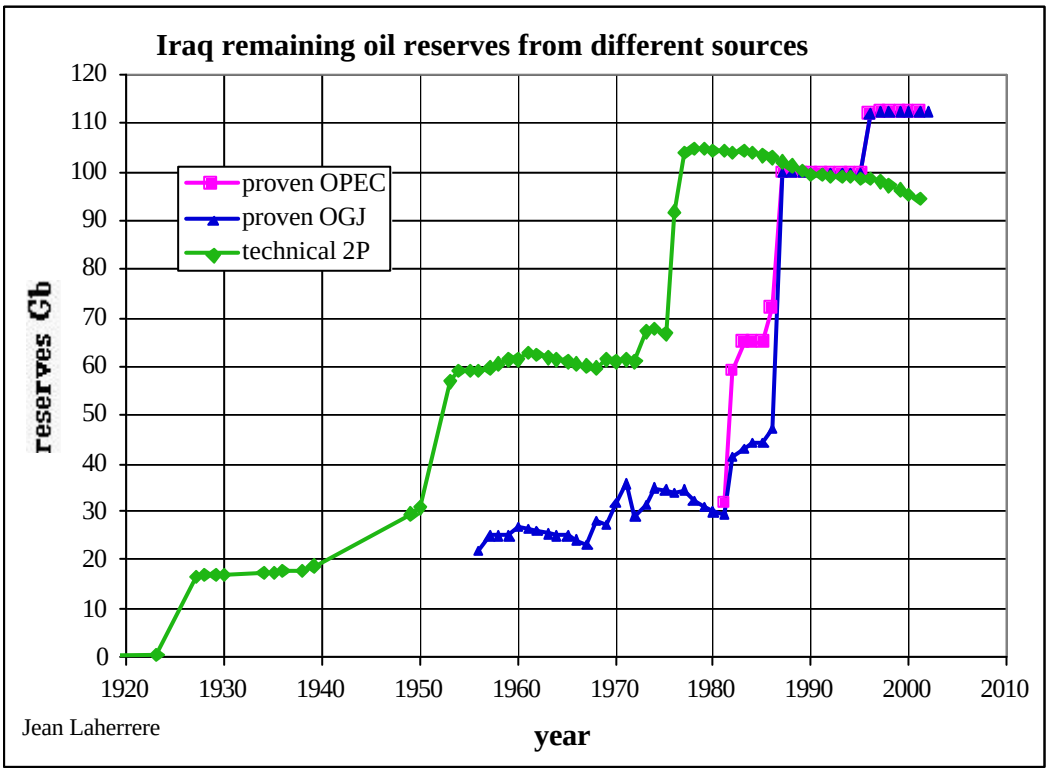
Dear Jean-Francois
As I told you at the end of Panorama 2003, I have appreciated your presentation and in particular your statement on the good result of the OPEC oil price mechanism on the world long-term economy, bringing more stability. As you said, what is needed is an ONGEC, to bring more long term stability on natural gas price. Current price follows too much the short-term situation, when expensive projects need long-term views.
During your speech I did not have time to note all your figures on Iraq, but I found now on the web your paper (as those from Perrodon, Simmons and Davies) and I want to comment on Iraq as poor data are the cause of misunderstanding, bringing the maximum of data that I could gather. I believe that I have more data than IFP on the subject.

You stated that in Iraq, 84 oilfields +5 gasfields = 89 fields were discovered with 113 Gb remaining reserves (but only 35 Gb are developed) and 2916 Gm3 ( I remind you that Gm3 is the symbol for a cubic gigameter, representing about a million the earth volume, a billion cubic meter is a km3, you seem to have forgotten the IFP "Guide des unites" written by my sister in 1980 and published by Technip, this guide was written at my request when I was chairing the French Exploration Commission of the Comite des techniciens of the Union Francaise des Industries Petrolieres).
The technical data give a different result: 123 Gb were discovered (27 Gb already produced) in 96 fields, leaving 96 Gb remaining with 78 Gb developed (23 fields of which 3 are shut-in) and 13 Gb developing (27 fields), with only 4 Gb (but 46 fields) still on appraisal or discovery status.

As for a potential of 60-200 Gb, the Western Desert claimed as having a great potential is outside the main kitchen of the Arabo-Iranian mega-petroleum system as defined in the Petroconsultants report: Laherrère J.H., A.Perrodon, G.Demaison 1994 “Undiscovered Petroleum Potential” 383p .
On the new blocks open on the Western Desert, only a small field was discovered in 1976 on the southern part (Abu Khaimah) on block 8 after three dry holes and one oilwell were drilled: in 1960 on blocks 1 and 2 . On the northern part in Jordan, nothing important was found except the gasfield of Risha.. It is an poorly explored area outside the known potential basins, but the known geochemical data should give a better view if available. All the geological data gathered before the nationalization of IPC in 1972 is well known to the oil companies, in 1972 two thirds of the present discoveries were found and most of the geochemical data were gathered to appraise the potential of the petroleum systems. What is missing is the production data since 1972 and most of the files on field production are incomplete.

The paper by Valerie Marcel with the Royal Institute of International Affairs in London (http://www.riia.org) "The future of oil in Iraq: scenarios and implications" December 2002 the block 3 was negotiated with Pertamina with an undiscovered estimate of 2 Gb and 1.2 Tcf. If the 9 blocks are of the same potential it is difficult to assess the potential at 60 to 200 Gb as you stated. I guess that you use the statement of the Deputy oil minister Taha Moussa (quoted in the article in the Guardian) giving an ultimate for Iraq of 300 Gb but it is mainly political statement.

The last CGES (in London) report gives the following on Iraq: *current proven oil reserves at 112,5 Gb, contained in 73 oilfields of which 9 are giants and 22 are large fields. Thus far, only 15 oilfields have been developed and produced oil. The CGES believes that Iraq's proven oil reserves at present are a fraction of the country's probable reserves, which may exceed 300 Gb. A good indication of this potential is that the Iraqi National oil company's short spell of exploration activity during 1971-1980, which added 45 Gb. In a study prepared by the CGES and Petrolog Consultants, based on a field-by-field appraisal, Iraq's current and probable reserves are estimated at 300 Gb, a number that places Iraq on a par with Saudi Arabia*"
I did not find any reference on the web on Petrolog Consultants. The estimate of 112.5 Gb is the official value provided by INOC to O&GJ (as found in the OPEC site giving the OPEC members reserves from 1981 to 2001). The fact that this value was unchanged at 100 Gb from 1987 to 1995 and at 112,5 Gb from 1996 to 2002 shows without any doubt that it is a political estimate, as it is very unlikely that the discovery (with very little exploration activity) or the improvement on recovery of past discoveries could have replaced exactly the production.
The reported proven reserves (remaining at year end) by OPEC and O&GJ are shown on the following graph together with the technical data (from proven+probable backdated field values)




CGES gives the detail of discoveries in number and values for three periods:

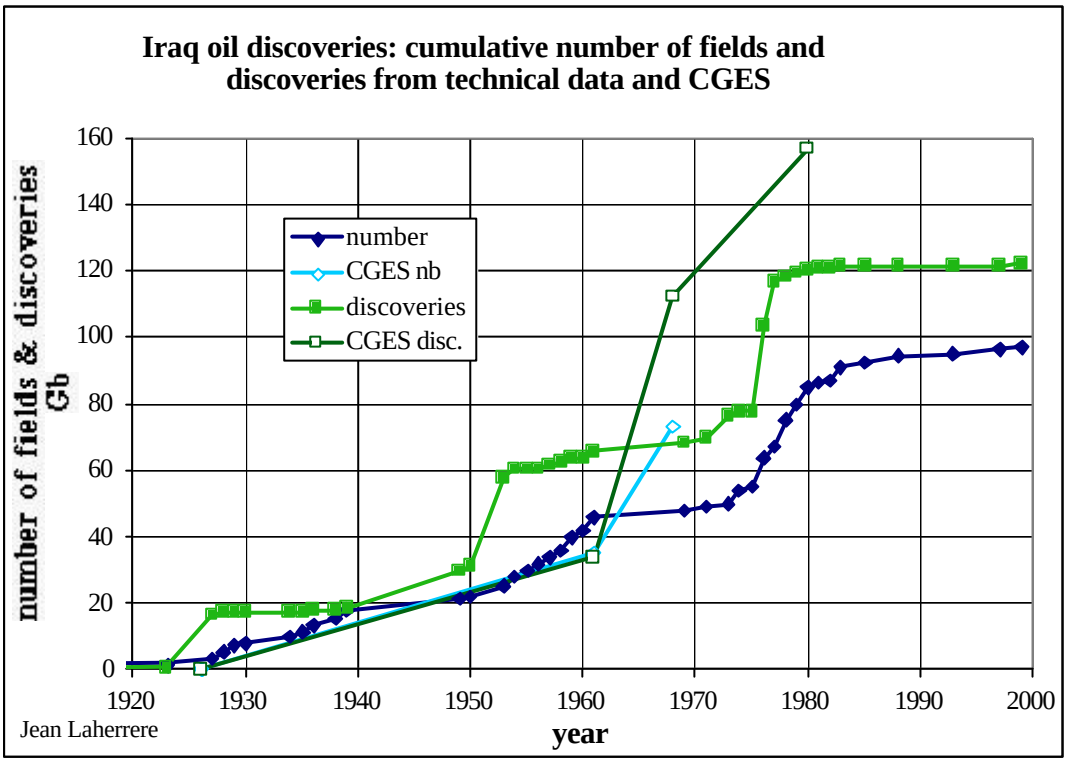
| | nb disc | Gb |
|---|---|---|
| 1927-1961 | 35 | 34 |

| | | |
|---|---|---|
| 1961-1968 | 38 | 78 |
| 1971-1980 | ? | 45 |

| | cum nb | cum Gb |
|---|---|---|
| 1961 | 35 | 34 |
| 1968 | 73 | 112 |
| 1980 | ? | 157 |

The detail is contradictory with the summary which gives 73 fields when it is assumed to be the cumulative number already in 1968, and 157 Gb compared to 112 + 27 already produced = 139 Gb discovered

The comparison with the technical data shows a large difference. In 1969 the cumulative number of discoveries was 48 and not 73 and 68 Gb and not 112 Gb. In 1980 the cumulative number was 85 and 120 Gb and not 157 Gb.




It is obvious that CGES deals mainly with political reserves data and not technical field data.

In your paper you mention that the IEA is giving a different value at 78 Gb coming from the USGS against the 113 Gb given both by O&GJ and BP. You add that this value of 113 Gb is reliable as coming from BP (a reference) and O&GJ being also another reference.

It seems that you have not read carefully the BP Statistical Review as it is noted for reserves "*Source of data - With the exception of Azerbaijan and Kazakhstan, the estimates contained in this table are those published by the Oil and Gas Journal, plus an estimate of natural gas liquids for USA and Canada. Reserves of shale oil and oil sands are not included.*"

So BP values are mainly O&GJ values. But O&GJ values are the answer from an enquiry done in the fall to governmental agencies. There are political answers giving the reserves at year end before the year end. It is obvious that the technical studies were not available as they are obtained from engineers only few months after year end, as you well know. Most of countries do not answer and their reserves are kept constant, as for France in 1999. For the last survey published Dec. 23, 2002, the majority of countries did not change oil values (67 out of 105 countries). It is not serious to take these poor data as reference (and our proposal

with Simmons and CSIS to obtain better data means that you do not consider O1GJ and BP data as reliable). BP in the 80s (at the time where the data were printed), tried to adjust the Abu Dhabi reserves (as BP was partner in every producing field and had all the technical data). The day following the release of the BP Review Sheik Zayed called BP Chairman and instructed him to destroy all the printed papers and to replace BP estimates by the official data as given to O&GJ. BP did learn the lesson and now they publish only O&GJ data as they do not want to upset OPEC members. I have already told Peter that BP should put more warnings (they are different from the technical data used to decide development) on oil & gas reserves in their good Statistical Review that I use very often for the data outside oil and gas, hoping that they are better.

But I am surprised to see the IFP relying more on political data than on technical data as provided by the USGS which used, in their 2000 study for their estimates of the discovered, the data from Petroconsultants (unfortunately 1996 data which were incomplete). If I disagree with USGS on their undiscovered (based only on simple number of fields to be discovered (low, medium and high) as the size of the fields (low, medium and high) without any calibration to the past) and reserve growth (confusing the US bad practice of proved reserves (to comply with the SEC rules) and the proven+probable practice of the Petroconsultants data), I find their study reliable for the definition of the Petroleum System (done in collaboration with the oil industry (but the collaboration stopped before the estimates of undiscovered, involving confidential data) with the value of the discovery.

USGS 2000 value for Iraq as of end 1995 is 22 Gb produced, 100 Gb discovered and 45 Gb undiscovered, giving an ultimate of 145 Gb, very far from your estimate being 200-340 Gb.

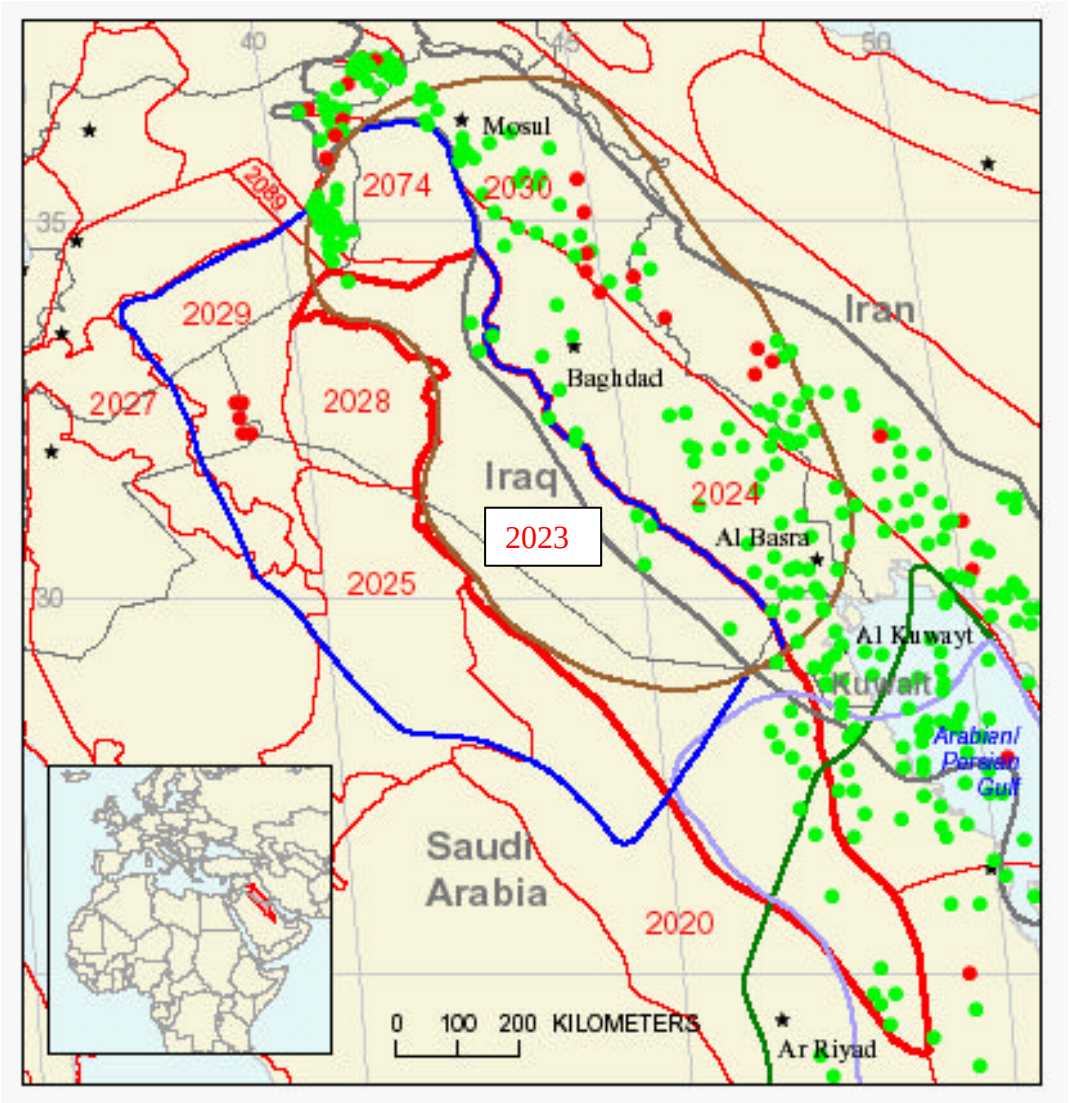
I was surprised to find this low value in 2000, as when visiting in 1998 the USGS in Denver, Tom Ahlbrandt (head of the USGS world study) told me that he was going to visit the following day the CIA to show them a secret map of the seismic structures of the Western Desert, which displays many structures. This secret map is well known by many. Despite this secret map, the USGS in 2000 is fairly conservative compared to the EIA country analysis brief: http://www.eia.doe.gov/emeu/cabs/iraqfull.html which states:

"Deep oil-bearing formations located mainly in the vast Western Desert region, for instance, could yield large additional oil resources (possibly another 100 billion barrels), but have not been explored. Iraq's oil production costs are amongst the lowest in the world, making it a highly attractive oil prospect"

You mention that the western desert covers several sedimentary basins, practically unexplored, and that it should be unlikely not to find a petroleum system. It is vague and means that almost nothing is known.

USGS has studied the boundaries of every petroleum system on the world. USGS 2000 believes that the Western Desert is covered by the following provinces (as shown in the map) with the estimate in undiscovered oil given in Gb for each petroleum system (PS):

| | F95 | mean | F5 |
|---|---|---|---|
| -**Western Desert** | | | |
| -province 2023 Widyan basin-Interior platform | | | |
| with 232301 Paleozoic PS (blue): | 0,4 | 1,6 | 3 |
| with 202302 Jurassic PS (brown) | 1,5 | 4,6 | 8 |
| -province 2028 Rutbal uplift | 0,015 | 0,05 | 0,1 |
| -province 2029 Wadi-Surban basin (only gas) | 0 | 0 | 0 |
| | | | |
| -all **Iraq** | 14 | 45 | 84 Gb |




from USGS digital data series DDS-60

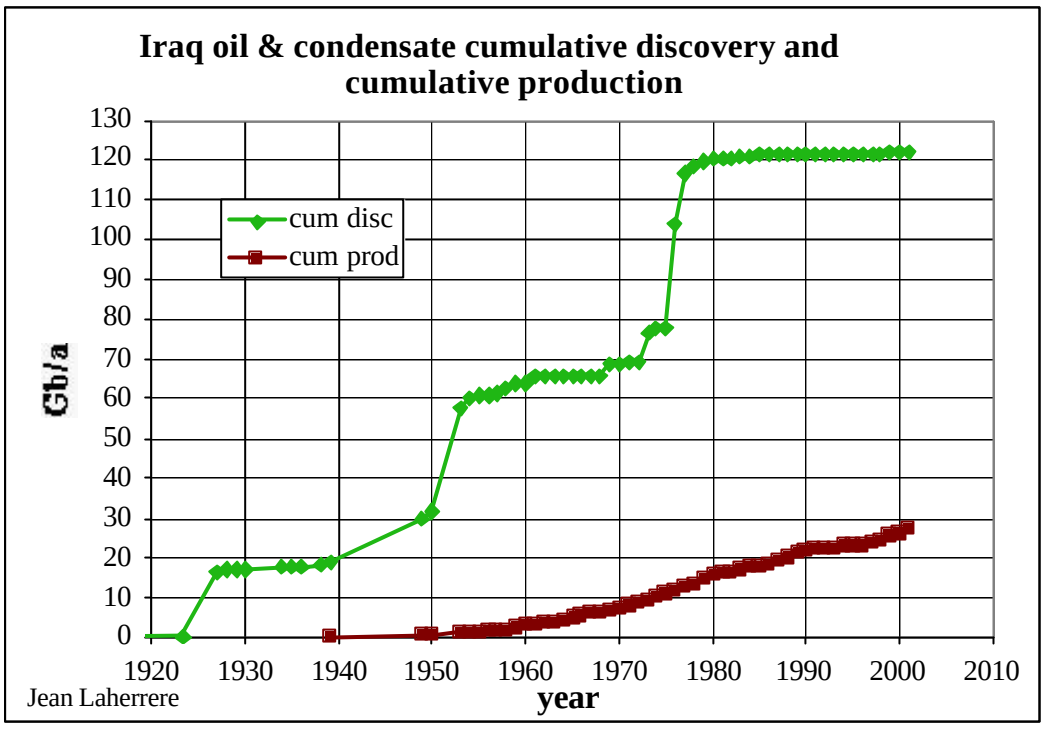
In fact the Western Desert offered blocks exclude the area with fields except for Abu Khaimah on block 8.

The northern part of the Western Desert (blocks 5, 6, 7) seems for the USGS to offer a very small, if any, oil potential, and the southern part a potential of about 5 Gb (mean).

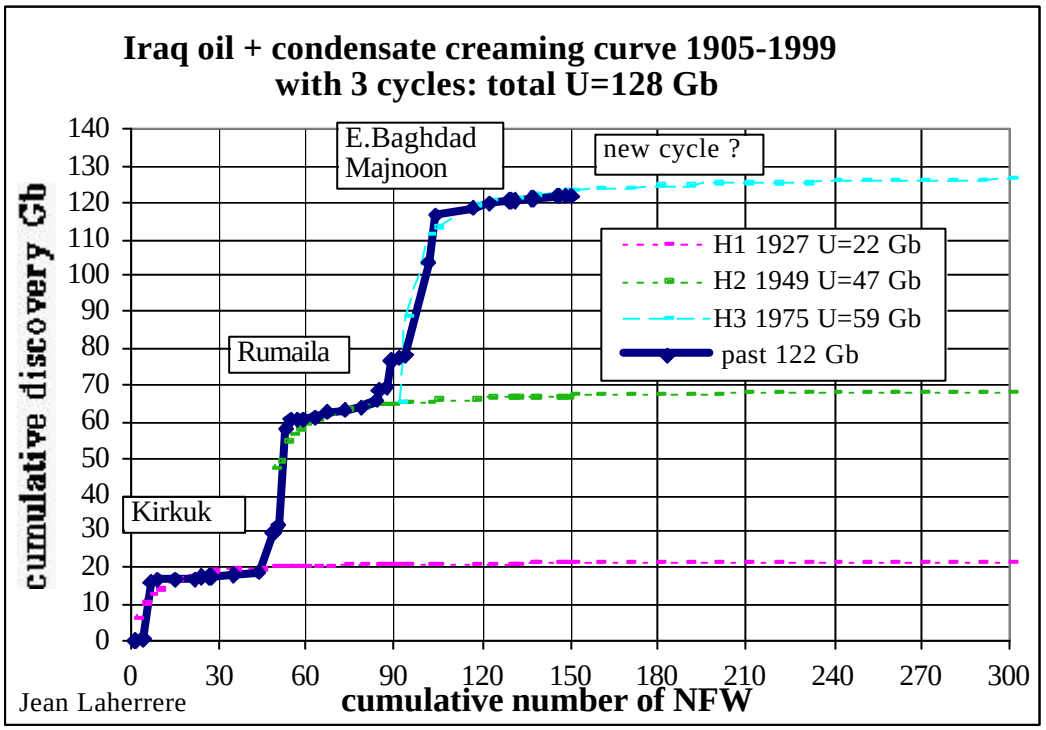
So your potential of 60-200 Gb looks very optimistic. I could accept the high value with a low probability of 5 % or less, but I find difficult to accept the low value of 60 Gb which is supposed to represent a probability of 95 % to exist. A value of 10 Gb (14 Gb for USGS) should be more reasonable.

Without any knowledge of the undrilled prospects, the modeling of the past data can provide an estimate of the ultimate, using creaming curve.

The plot of the past discovery and production is as follows:




The creaming curve (cumulative discovery versus cumulative number of New Field Wildcat) can be modeled with three hyperbolic curves corresponding to the discovery of supergiants as Kirkuk for the first, Rumaila for the second and East Baghdad for the third.




These three cycles can be modeled fairly well giving an ultimate of 128 Gb. The probability of a significant fourth cycle is small as the unexplored Western desert has a small potential. So our ultimate is about 130 Gb, compared with 145 Gb for the USGS and 135 Gb for ASPO (Newsletter 26 http://www.asponews.org). These values are similar and in the order of less than half your estimate.

I has seen you several times in the media this week with the article in the Point magazine of February 21 with your picture, in the two hours TV show on France 2 "Complement d'enquete" on oil of February 24. I admire your guess for oil price to get down to 21 $/b fairly quickly in case of Iraq short war or not. I refuse to forecast any oil price as it deals with irrational behavior. But you can be right, price can go down, not because there is plenty of supply to fill the official forecast of economic growth of 3%/a for the next 30 years, but because the demand will stay low or even decline as the present recession can turn into depression. The question is not to get a quick victory, as it was in Afghanistan, but to keep the country in peace. The example of Somali where Americans were welcomed first as saviors seems to be forgotten. I am afraid that the winner will be Ben Laden and the terrorism. After a quick (or long) war, the Middle East will stay a barrel of powder, as does Afghanistan. Saddam Hussein is just a pretext, the goal is to be around to prevent an explosion of the Saudi Arabia at the soon coming death of King Fahd. Another reason is the OPEC possibility to replace in oil price the dollar by the euro.

If you are right with a steady 21 $/b for a long time, it means the end of the Athabasca tarsands (as the shortage of gas in North America increasing independently of the Middle East will make it uneconomical and they plan to build a nuclear plant to get hot steam), the end of hope for energy savings.

You mention the cheap cost of oil in the Middle East but the projects of new developments by foreign oil companies that I can read in the media for Kuwait and Iran mention cost of about 10 000 $/b/d, as expensive as the deepwater. I refuse to speak on cost by b/d, as they are meaningless, as they are supposed to deal with unspecified items for the full life (can be over 50 years) of the fields with unknown rules of amortization, discounting. Only development cost on known projects (involving contractors) on a short period (less than 2 years)with a maximum known capacity is reliable. It will make the solution of future oil depletion in 2020 more severe. The only solution for the energy future of our grandchildren is to move quickly to high energy price, in order to get energy savings, progresses in renewable, and changes in behavior. American way of life is based on cheap energy, how are they going to change to a new order of high energy price?

The proposed study (at a cost of half a million dollar for 20 clients) on the productive capacity of Middle East oil fields by the combined team from IFP, Simmons co and CSIS seems a good project, except that the main problem is to get reliable and complete data. Having played with production data for more than 10 years to estimate the capacity I know that it is very difficult to get them, in particular in the Middle East because the problem of cheating on quotas and production. The only way will be to involve every government and the whole OPEC., as the rules have to be changed as the quotas are based on reserves. If one OPEC member refuses to join, the others will be reluctant to tell the truth if one will not. I am curious to know how you plan to get reliable data. Furthermore, wars and quotas have disturbed the production pattern to get a good trend.

As you are going to retire soon, I hope that you will keep involved as a free person in forecasting future oil production and that you will join our ASPO association, as Bauquis did. I wish you an happy retirement, but I hope to get some answers before you leave and to have more discussions on the subject.

Amicalement
Jean Laherrere

**Answer:**
Fri, 28 Feb 2003 De: GIANNESINI Jean-Francois <J-Francois.GIANNESINI@ifp.fr> à: '"jean laherrere"' <jean.laherrere@wanadoo.fr>,

Dear Jean,
Thank you for your detailed message and all the good graphs.
Concerning Iraq, there is not an IFP figure for the reserves, a figure with our stamp on. If we perform the proposed study with CSIS and Matt there will probably be one! My purpose in Panorama was to show the relative order of magnitude for the geopolitical aspect of the question. Therefore what is important at this stage is the relative place of Iraq (is it second to Saudi Arabia or not). However the figures I used ( 112,5 ) comes from our data bases field by field for the 89 fields. As you did I draw the creaming curve and the parabolic curve (which is not as clear as for Africa or the US, as it is observed in MO due to an oversized king effect). These two curves are not contradictory with the OGJ/BP/CGES figure which I know have the same roots. In 1980 I was in charge of a reservoir study of one of the Iraq's giant oilfield. I spent about half a year with a team of engineers and geologists to perform oil in place calculation and to model developement. It is always a very good experience to work back with the basic data set, logs cores and so forth. The figures we got at that time were higher than the ones we have in our data base. For the potential of Iraq the range I gave 60-200 is not for the sole Western Desert as you wrote. I was probably not clear enough. This range is for new discoveries in the Zagros Belt, + recovery improvement in the discovered fields (and I think this can be rather big according to my experience), + news discoveries in the Western Desert. For the new discoveries in the Zagros Belt the creaming curve could be well completed with at least a new cycle (even if the last one is the largest one), because exploration in this area stopped at the end of the third cycle i.e. 1981 and nothing has been done since that date (other priorites in Iraq). When I went to Bagdad in 81 and to Kirkuk I saw there several maps with undrilled structures, some of them being rather large. I also saw a structure map of the Western desert which looked promising mainly in the southern part, if I remember well. At that time exploration was a bit outside of my cup of tea! The recent discoveries of giant fields in Iran and Kuwaït are advocating in favor of a new cycle. I agree with you that predicting the price of the oil is a frustating and probably pointless exercise. You probably noticed that whenever I give predictions on this subject it is within the framework of a scenario. Because the source of uncertainties is not in predicting the relationship between effects and causes but in predicting causes. Inside a scenario all the causes are known because it is the hypothesis you work with. In such a case the relationship between causes and effects is purely mechanistic, which does not mean that you cannot make a mistake! Thank you again for you comments. With my best regards Jean-Francois Giannesini