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The Future Of Iraq Project



Oil and Energy

Working Group

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Oil and Energy Working Group

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(*) Reflects consensus of the participants in the working group. Other papers reflect the views of their authors.

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Future of Iraq Project

Oil and Energy Working Group

Subcommittee on Oil Policy

SUMMARY PAPER

April 20, 2003

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The following summary paper reflects the final consensus view of the Oil and Energy Working Group on oil policy. Following the summary, also in tab 1, are two papers which represent earlier drafts of the summary paper and to which the latter refer.

In tab 2, the same summary paper on oil policy which represents the consensus of the group is translated into Arabic.

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This paper provides a summary of the discussions of the Subcommittee on Oil Policy of the Future of Iraq Project by reference in particular to two papers: 'Considerations Relevant to an Oil Policy For A Liberated Iraq' dated January 27, 2003 ('Considerations...') and 'Working Draft for Consultation' dated February 25, 2003 ('Consultation...').

IN SUMMARY, THERE IS BROAD AGREEMENT THAT THE FOCUS OF IRAQ'S OIL POLICY NEEDS TO BE DECENTRALISATION OF THE INDUSTRY IF IT IS TO RESOLVE THE ECONOMIC IMPOVERISHMENT OF THE COUNTRY. THREE MODELS FOR DECENTRALISATION HAVE BEEN DISCUSSED.

The paper Consultation... presented two of these models. The paper suggested that the key operating companies of INOC should initially be maintained and strengthened. After a short period the alternative suggested reforms are (a) regroup, part-privatise and retain control and (b) regroup, partner and retain control. The third alternative (c), which draws on the paper Consideration... suggests that decentralisation is an immediate priority.

a) Regroup, part-privatise and retain control

- This model envisages the reorganisation of the current INOC operating companies into three or four entities (e.g. South Oil Company, North Oil Company and Pipeline Company) with assets and licences or production agreements for acreage entirely under their control.
- Equity in these companies would be offered to private investors enabling the state to raise capital. Noted additional advantages of private capital participation into these state oil companies are (1) the anticipated challenge to and reduction of costs and (2) external technology and expertise.
- Maximum initial equity offered would be around 30% implying continued state control of the companies. It is suggested that the equity may be offered as a trade deal (private placement) with a view to a later stock exchange listing.

- The companies would act as independent commercial entities and would be subject to taxation.

b) Regroup, partner and retain control.

- As in the previous model, this model envisages the reorganisation of the current INOC operating companies into three or four entities which although wholly state-owned operate along commercial lines with independent budgeting and only strategy oversight from the Oil Ministry.
- These state-owned oil operating companies, operate the reservoirs within existing fields and operate the associated infrastructure (i.e. the existing oil industry that is the subject of the crash programme).
- Contracts for exploitation of the discovered but undeveloped fields and for exploration will be entered into between the oil ministry and newly formed consortia.
- These consortia could consist of new private Iraqi oil companies and international oil companies. The report suggests that the IOCs would be the majority shareholders in the joint ventures and would be the operators.
- The report suggests that if no private sector Iraqi companies emerge, the state-owned oil operating companies would get some participation in these consortia.
- The control that the state needs to have in this model comes from regulation and from the terms of the contractual arrangements between the oil ministry and the companies.
- Under this model it is suggested that privatisation of INOC and its operating companies can be addressed much later when the competencies and balance sheets of the companies have been established.

Regulation:

- Whatever structure is decided upon for the oil industry, the report Consultation... notes that the roles of the State, Ministry, Regulator and Oil Companies need to be clearly defined.
- Separation of the budgetary process from the Oil Ministry is recommended.
- It is suggested that a new role of Regulator could be introduced after for example 5-7 years.
- The role of the Regulator would be to translate the policies set by the Oil Ministry into regulations governing the NOCs and IOCs and monitor and enforce the compliance of both.
- The examples of Norway and Algeria are cited.

c) De-monopolisation,

- This model envisages that INOC is de-monopolised, i.e. participation in the upstream sector of the oil industry is no longer restricted to INOC but is opened to private companies.
- The model envisages the immediate establishment of an interim administration. The administration's tasks include:
 - i. Supervision of INOC to resume oil operations and marketing.
 - ii. Definition and preliminary evaluation of actions necessary to restore production capacity within eighteen months to 3.5 million bpd.
 - iii. Preparation, preferably with World Bank/IFC involvement, of a data room containing all relevant geological and commercial information (from the Oil Ministry and INOC).
 - iv. Establishment of data room rules in accordance with best industry practice and the provisions of the new Petroleum Law.
 - v. Definition, preliminary evaluation and prioritisation of upstream participation opportunities necessary to (a) achieve the restoration of production capacity to 3.5 million bpd, (b) induce the investment necessary to develop production from the presently discovered but undeveloped fields and (c) induce investment necessary for exploration with the associated range of annual production targets/projections.
 - vi. Preparation of a legal opinion on the status and enforceability of all material claims relating to Iraq's upstream oil industry.
 - vii. Preparation of a revised Petroleum Law for consideration by the Oil Ministry.
 - viii. Preparation, for consideration by the Oil Ministry, of draft terms and conditions of the production sharing agreement (PSA) structured to facilitate participation in Iraq's upstream oil industry of the best

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international oil and gas companies in a manner that provides the most benefit obtainable to Iraq (in every respect but with particular reference to Iraq's economic benefit, the application of best industry practice in the development of Iraq's oilfields, with due regard to Iraq's gas reserves, direct oilfield inward investment, associated inward investment, technology, skill and experience sharing) consistent with current international terms.

- ix. Preparation, for consideration by the Oil Ministry, of a draft regulatory framework to be enacted in conjunction with the Petroleum Law.
 - x. Preparation of briefings, seminars, etc., to facilitate an improved domestic and international understanding of the oil industry, the options available for its development and their consequences for the economy of Iraq and the life of its citizens.
 - xi. Recommendations drawing upon international experience, from the oil industry or other sectors, that might calm fears of those opposing demonopolisation of INOC coupled with the participation of IOCs (IOC participation through widely-held private sector Iraqi oil companies, possibly in conjunction with a voucher system might be relevant*).
 - xii. Actions required to implement the new Petroleum Law (if it is accepted) including, with World Bank/IFC, investment bank and international law firm participation, supervision of the data room, the negotiations and tender process.
- Companies pre-qualified for participation in Iraq's upstream oil industry are permitted access to the data room in accordance with data room rules at the earliest opportunity in order to evaluate the opportunities for participation, enter negotiations with the administration and ultimately the Oil Ministry, tender for participation on PSA or service contract basis in the participation opportunities for capacity restoration, development and/or exploration.
 - *As a point of clarification, IOC participation through PSAs entered into directly with the Oil Ministry, rather than in conjunction with INOC, may, (regardless of the pressing imperative to induce FDI on the terms that best, rapidly and significantly increase production and hence government revenue) engender opposition from those who see this as selling out to foreign oil companies. Rather than compromise the essential reform of demonopolisation, IOC participation might be induced through their participation in private Iraqi oil companies that are themselves widely-held by the Iraqi public, through the issuance of vouchers to all Iraqi citizens. The citizens are then free to keep their vouchers (shares in the new private sector Iraqi oil companies) or to sell them at whatever value the market establishes.

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Future of Iraq Project

Oil and Energy Working Group

Subcommittee on Oil Policy

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25th Feb 2003

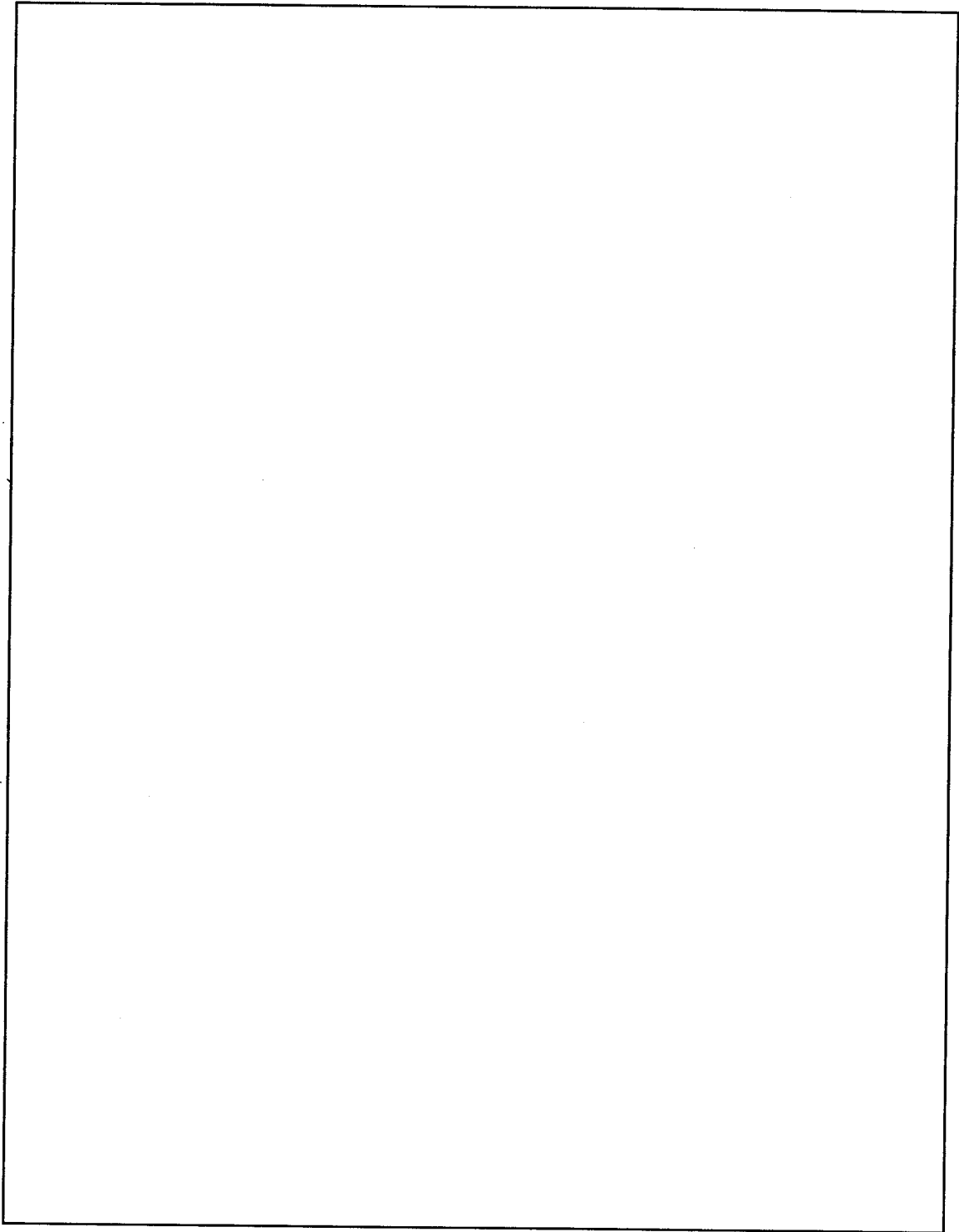
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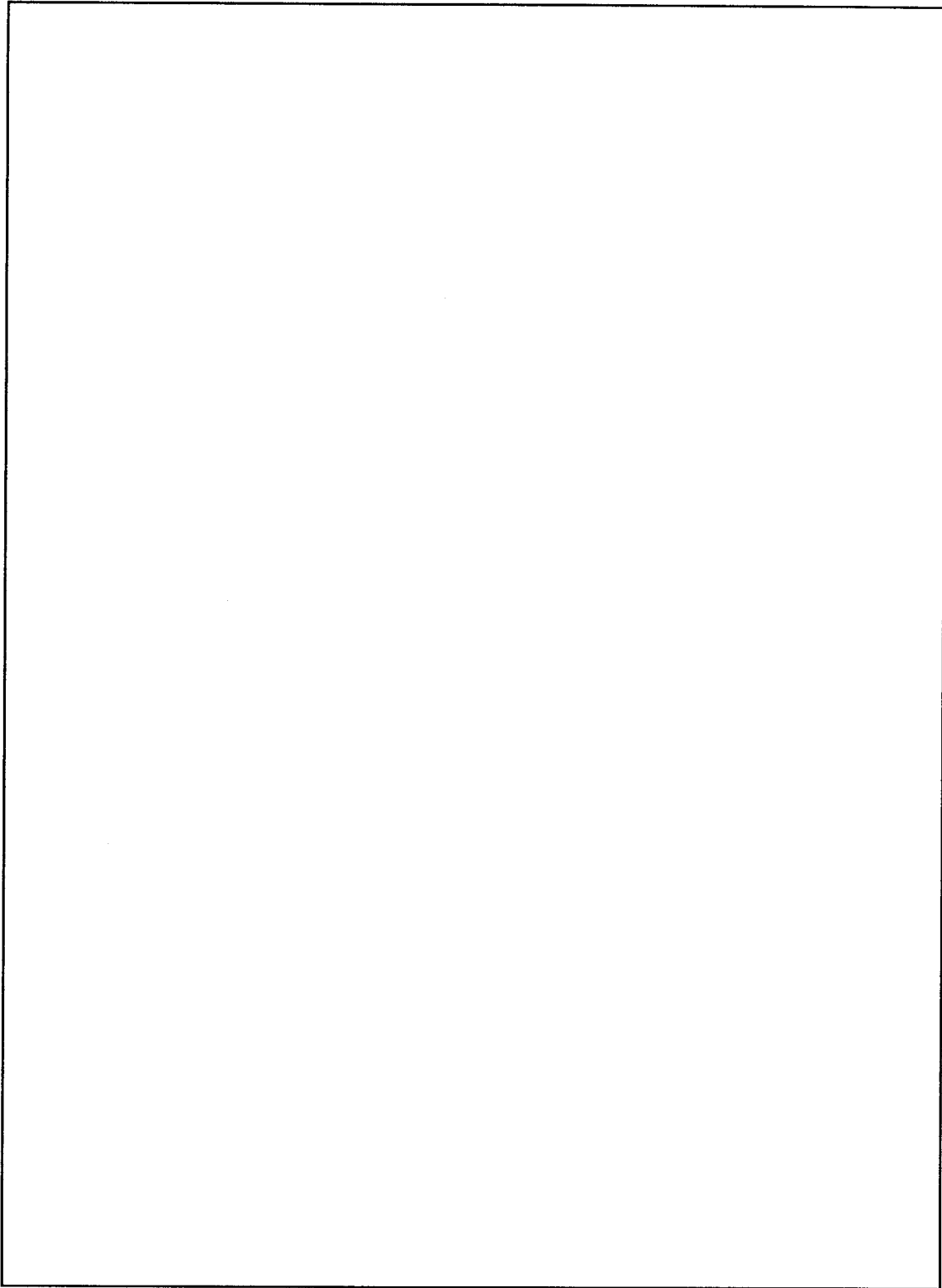


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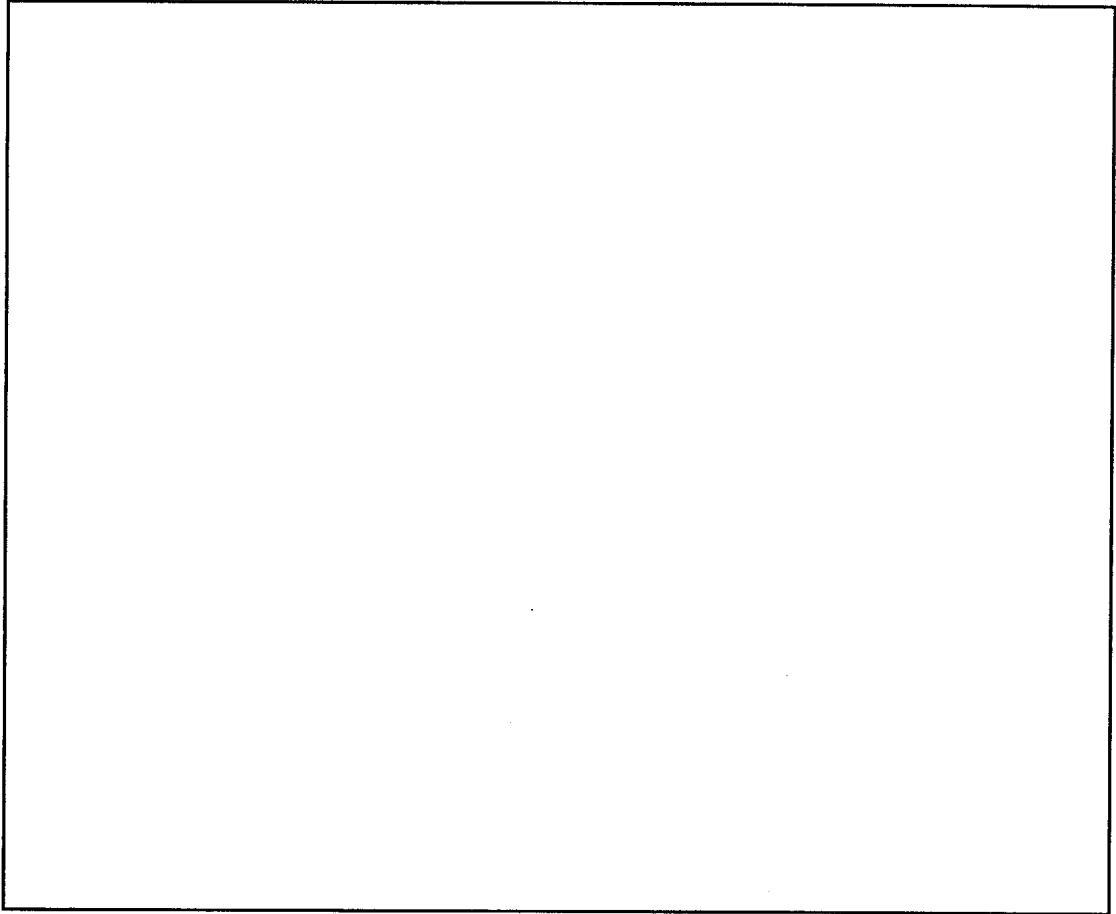
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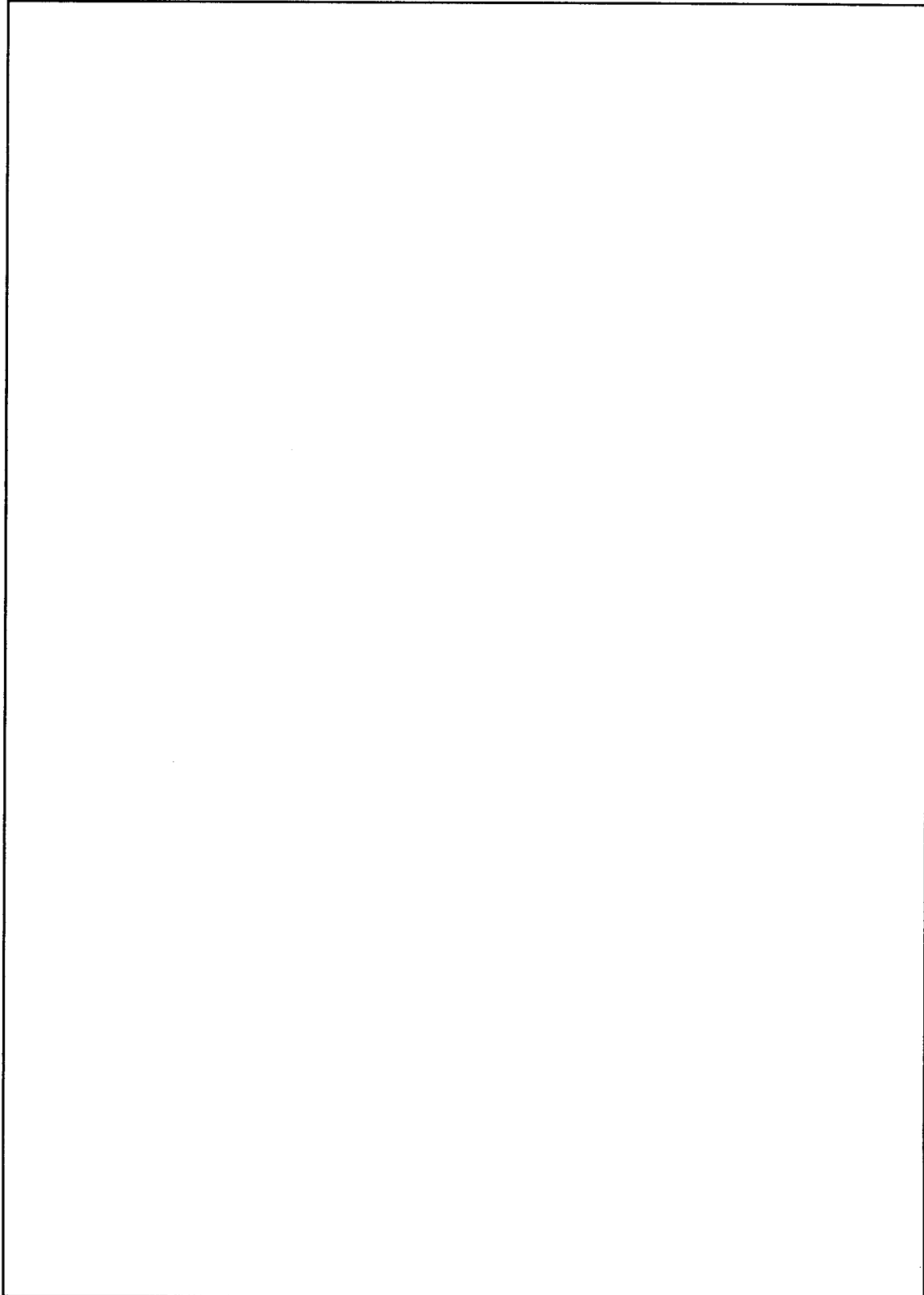


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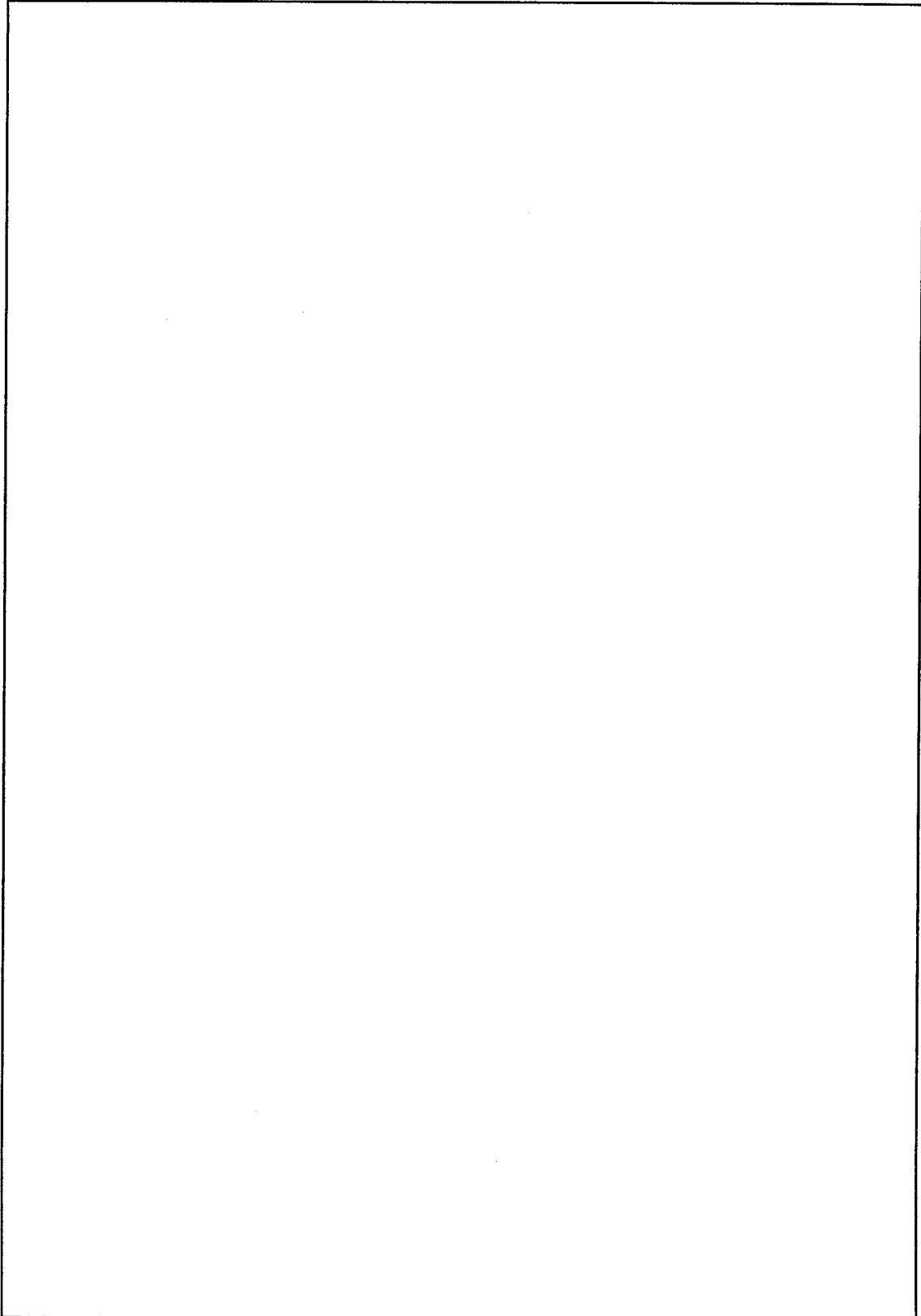
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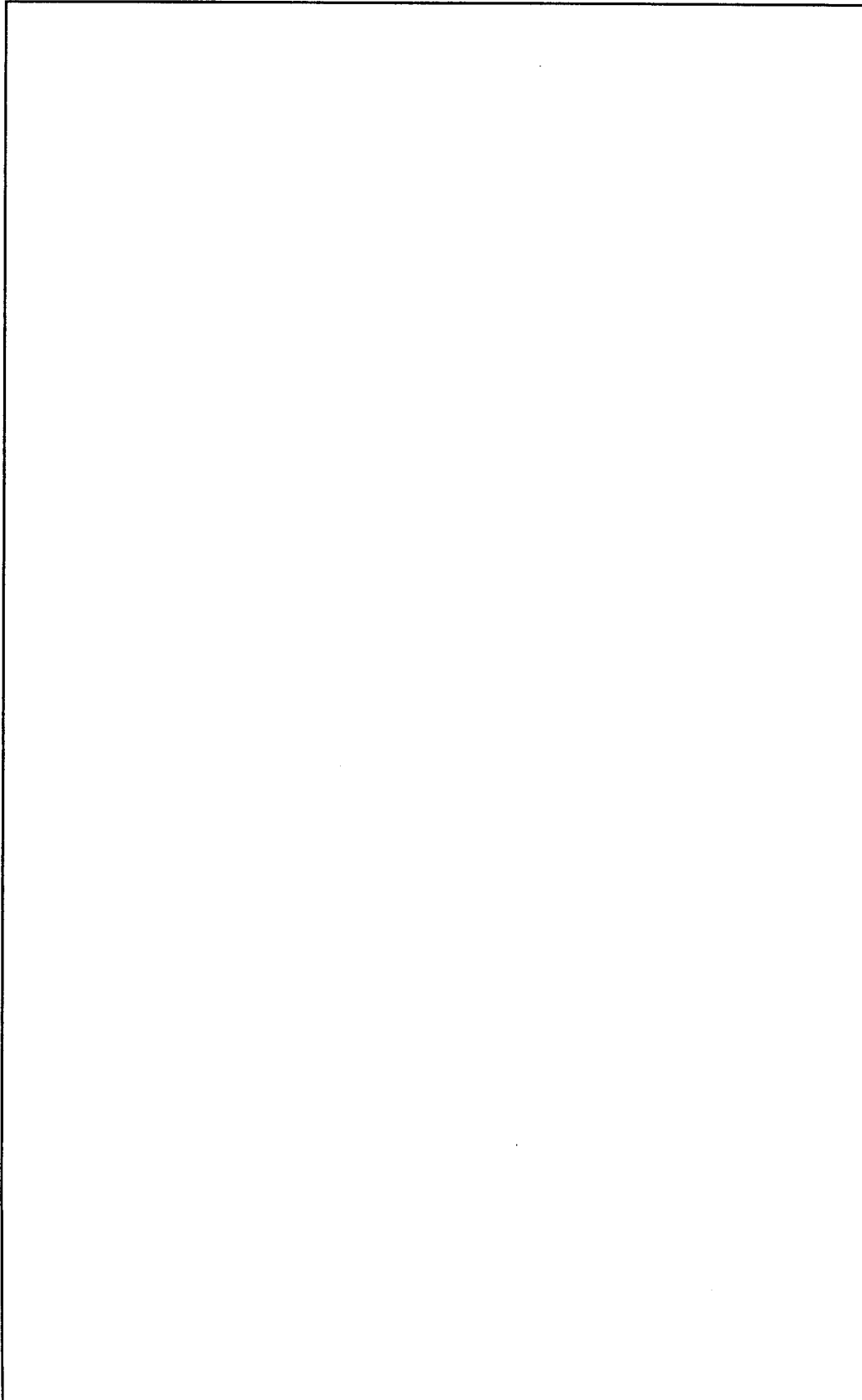


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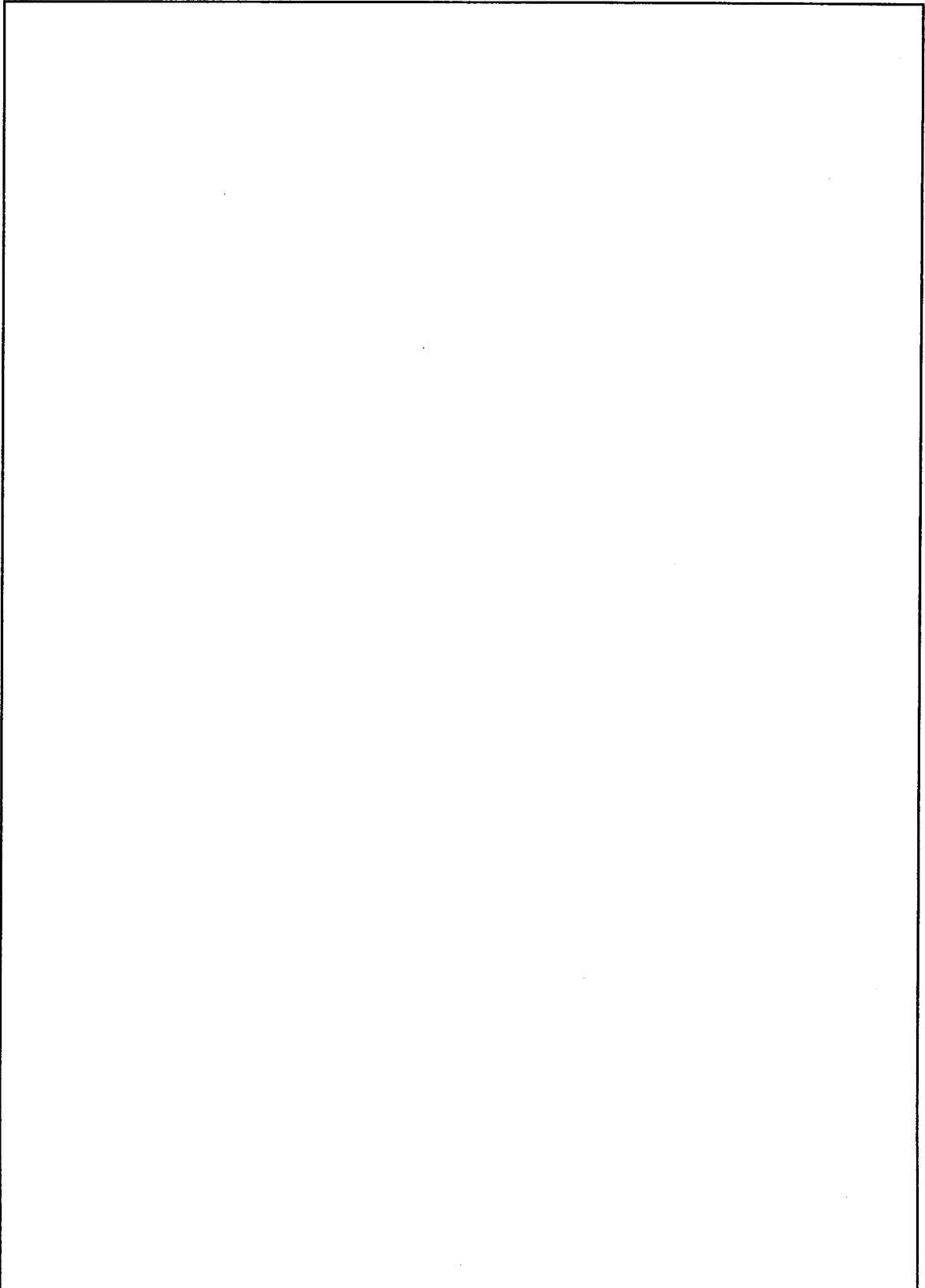
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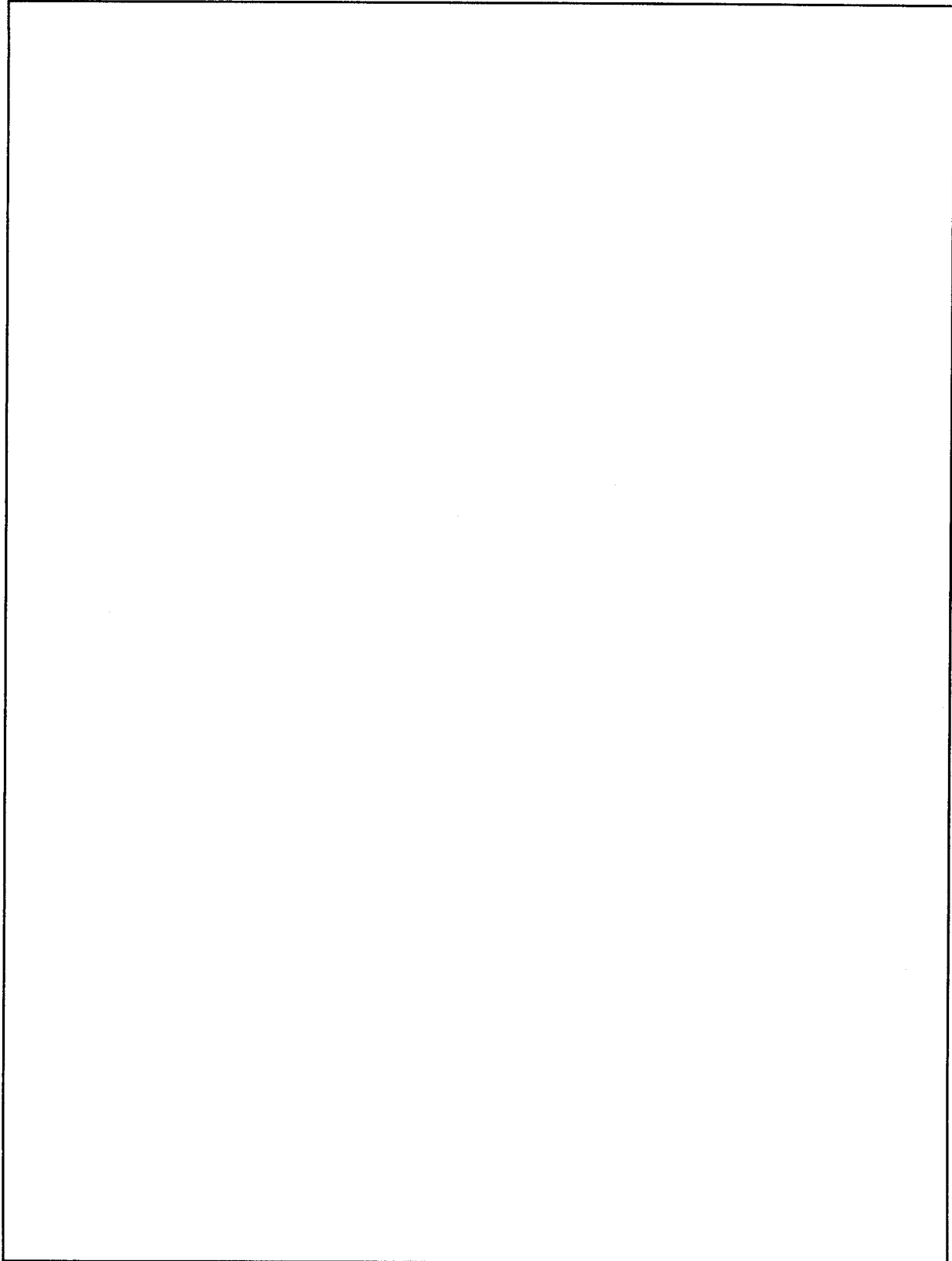
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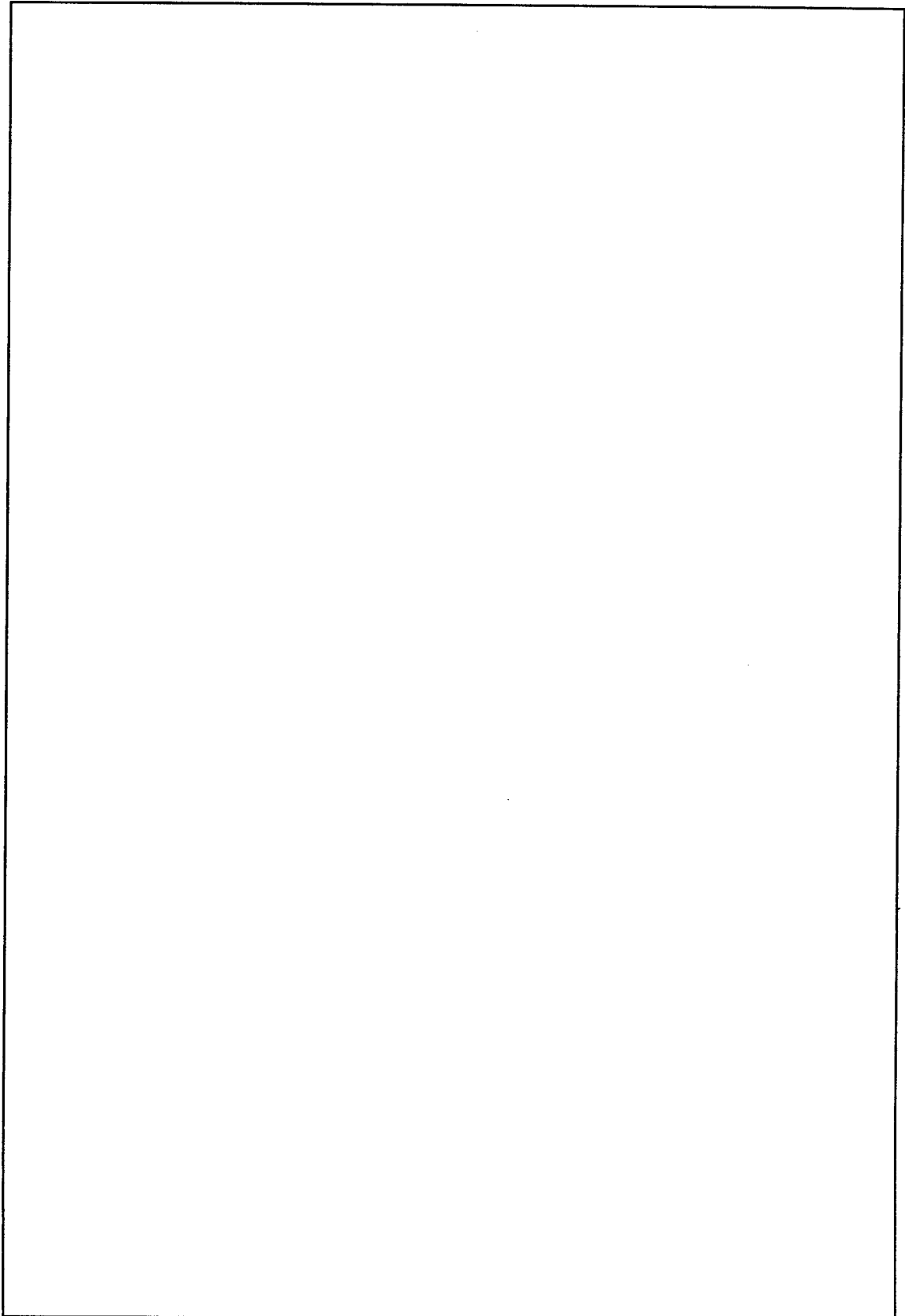
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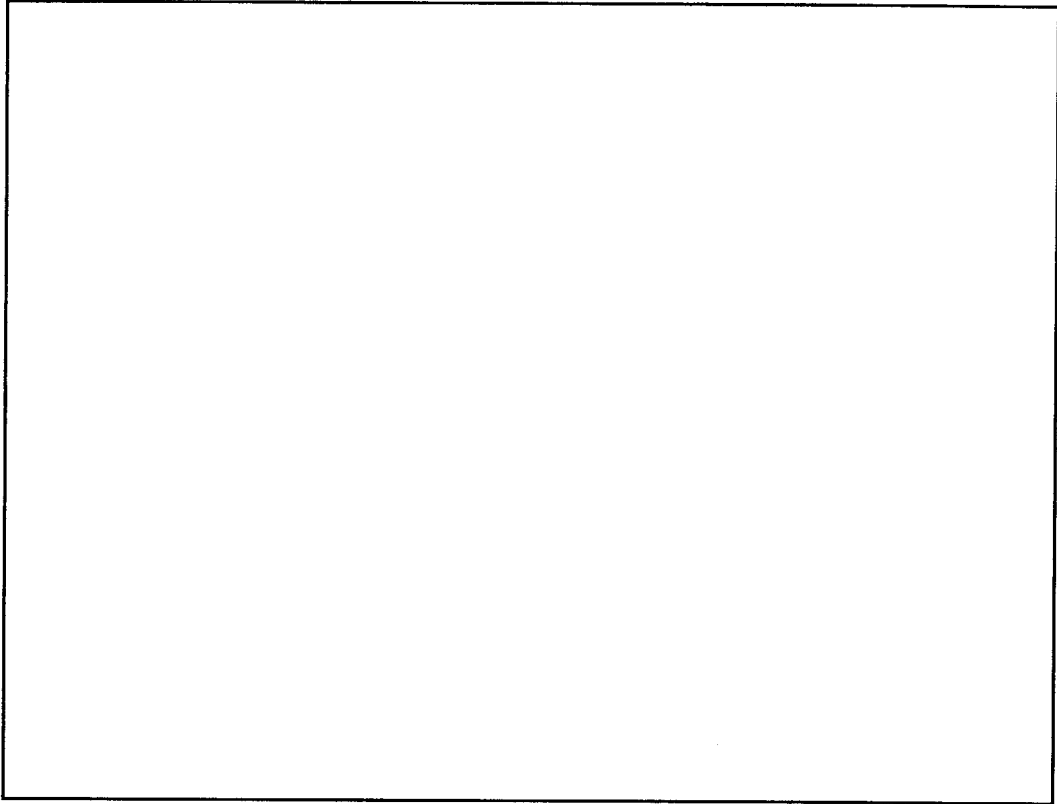
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CONSIDERATIONS RELEVANT TO AN OIL POLICY FOR A LIBERATED IRAQ

THE FUTURE OF IRAQ PROJECT: OIL AND ENERGY WORKING GROUP. OIL POLICY SUBGROUP.

This paper puts forward some rather bold conjectures in the hope of constructively challenging the status quo with regard to oil policy. The approach is to focus the spotlight of analysis on some very fundamental oil policy issues that we would suggest need to be critically examined by this Working Group if recommendations for an oil policy relevant to the impoverished state of the Iraqi people is to emerge.

Iraq's oil output is a mere one-third to one-ninth of what it could be if the oil industry was restructured and competitively operated. War and sanctions are not the reason that Iraq's oil industry has chronically failed to achieve its potential output. With political liberation and the associated removal of sanctions but without oil industry restructuring, Iraq's oil output will be constrained to some 3.4 million barrels per day, which is a mere 16% to 42% of its potential. Worse still, the continuing obligation to meet war reparations in accordance with U.N. Security Council resolutions reduces the equivalent economic value to Iraq of this 3.4 million barrels per day oil output to 2.6 million barrels per day, at which level Iraq's oil export revenues will barely exceed those generated under the oil-for-food programme, which in gross terms equate to a mere \$1.02 per day per head of population. Without a radical restructuring of its oil industry, Iraq's oil production potential will remain unrealised. Without a radical restructuring of its oil industry, the massive foreign direct investment that could kick-start both the oil and non-oil sectors of the economy will not materialise. Without a radical restructuring of its oil industry, the Iraqi people will remain condemned to an avoidable and needless continuation of their economic and social exploitation and impoverishment. We conclude with the conjecture that implementation of an oil policy for Iraq that facilitates oil production at or near its potential is imperative not only for economic stimulus but also for political freedom. Failure to formulate and implement a radically different oil policy runs a great risk of setting in motion events and forces that will undermine the political gains achieved through liberation.

IRAQ'S OIL RESERVES, OIL PRODUCTION AND OIL PRODUCTION POTENTIAL.

- Contrary to the common perception associated with the 'lamentable state' of Iraq's oil industry, the volume and value of Iraq's oil production is at or near record levels. For the most recent three years, 1999/2001, Iraq's oil production has averaged 2.54 million barrels per day: a production level only exceeded in five years in the entire history of Iraq's oil industry, 1978/1980 and 1988/1989⁽¹⁾. Revenues from Iraq's petroleum exports during the most recent three years, 1999/2001, at \$42.9 billion⁽²⁾, are at similarly high historic levels.
- Iraq's oil production in 2001, which averaged 2.414 million barrels per day, when expressed as a percentage of Iraq's 112.5 billion barrels proved reserves of oil (a measure we define as oil production yield) is 0.8%⁽³⁾. Iraq's proved reserves of oil and gas are analogous to the birthright, patrimony or inherited wealth of the Iraqi people and annual production is analogous, in physical terms, to the annual yield or return on inherited wealth. Our analysis

demonstrates that Iraq's production yield is abysmal. The Iraqi state's management of the oil industry, by the pursuit of an inappropriate oil policy that has failed to deliver anything near the potential benefits of the oil industry to the Iraqi people, is a prime factor in the impoverishment of the people.

- In 2001 eighteen countries produced in excess of 1 million barrels per day of oil ⁽⁴⁾. Using data on each country's proved reserves of oil and annual oil production, we calculated the year 2001 oil production yield for each country and ranked the countries accordingly. The oil production yields range from a high of 18.7% to a low of 0.8%. Iraq's production yield is the lowest of the eighteen countries.
- To illustrate the magnitude of the losses imposed on Iraq and its people through the chronic inefficiency of its oil industry, as indicated by the absolute and relative paucity of its oil production yield, we calculated what Iraq's volume of oil production would be at various other oil production yields. If Iraq's production yield had matched the 1.35% OPEC average, it would have produced 4.161 million barrels per day of oil, some 72% higher than its actual production in 2001 and 19% higher than its 1979 historical peak production volume ⁽⁵⁾. At the world average production yield of 2.59%, Iraq's production would have been some 8.0 million barrels per day. At the 7% production yield averaged by oil producing countries that are not members of OPEC, Iraq's oil production would amount to some 21.6 million barrels per day.
- Given that the political, social and economic well-being of a liberated Iraq depend on Iraq rapidly and substantially increasing its volume of oil production, it is important to understand the causes of Iraq's abysmally low production yield in order to formulate an appropriate oil policy. Firstly, we can reject any suggestion that Iraq's low level of oil production is due primarily to war and sanctions. Iraq's annual volume of oil production peaked in 1979 at 3.477 million barrels per day: a peak production yield of 1.1% based on its current proved reserves of 112.5 billion barrels. Without war and sanctions, but with a national oil company and as a member of OPEC, it might be reasonable to assume that Iraq's oil production might match that of Iran (this is a very favourable assumption for Iraq: Iraq's production has only exceeded Iran's in seven years, 1951/1956 and 1979, each period relating to the two overthrows of Shah Mohammed Reza Pahlavi, in every other year Iran's production has exceeded Iraq's, usually by a very considerable margin) ⁽⁶⁾. In the period January through September 2002, Iran's oil production, as reported from secondary sources by OPEC ⁽⁷⁾, has averaged 3.395 million barrels per day, which for Iraq would imply a production yield of 1.1%. (Production at Iran's higher 2001 level of 3.688 million barrels per day ⁽⁸⁾, would imply an Iraqi production yield of 1.2%). To the extent that the effects of war and sanctions are reducing Iraq's current volume of oil production from what it would otherwise have been, such reduction is modest, possibly reducing the production yield from 1.1% or 1.2% to 0.8%.
- To lift the Iraqi people out of their present impoverished condition, it is not good enough to focus on the effects of sanctions, which constrain the production yield from 1.1% to 0.8%: from say 3.4 to 2.5 million barrels per day. Rather, Iraq's oil policy must focus on the reasons for the potential oil production yield being say 1.1% rather than say 2.6% or more: 3.4 as opposed to 8.0 or more million barrels per day. The former approach carries with it the uncritical acceptance of a continuation of the present oil policy, which itself, independent of war and sanctions, has failed the Iraqi people. The latter approach, by contrast, requires that oil policy be formulated on a critical assessment of how to structure and manage Iraq's enormous hydrocarbon reserves such that their full potential benefit accrues to their owners, the Iraqi people.
- As noted above, Iraq's oil production in 2001 at 2.4 million barrels per day was not low by its historical standards and yet, in terms of production yield, it is the lowest of the eighteen countries with oil production in excess of one million barrels per day. It may be relevant to

note that, five of the six countries with the highest production yields have highly decentralized oil industries. By contrast, five of the six countries with the lowest production yields have highly centralized oil industries dominated by their politically controlled, monopolized, nationalized oil industries. Formulation of an oil policy that has as its goal the delivery of the full benefits of Iraq's enormous oil reserves to the Iraqi people, must involve a critical analysis of the role, consequences of and alternatives to the monopoly rights of the centralized national oil company (NOC). This, we would suggest, is the most fundamental issue to be addressed.

- If a continuation of the monopoly status of the NOC is to be recommended, then such recommendation must be accompanied by (a) a quantified demonstration that, appearances to the contrary notwithstanding, underproduction is not an inherent consequence of the monopoly status of the NOC, or (b) an explanation of why we recommend such continuation of the monopoly status mindful of the fact that it results in underproduction and hence in the deliberate decision not to deliver the full benefits of Iraq's enormous oil reserves to the Iraqi people – i.e., why we recommend that the people accept a low yield on their patrimony.

THE DEPENDENCE OF IRAQ'S ECONOMY ON ITS OIL SECTOR.

- Iraq's gross domestic product (GDP) reportedly peaked at \$74.9 billion in 1990, collapsed to \$10 billion in 1991 and stood at \$27.8 billion by 2001 ⁽⁹⁾. Over the same period, the combined GDP of the other ten OPEC member states grew by 43 per cent from \$568 billion to \$812 billion. If Iraq's GDP had grown at this same rate over the period 1990/2001, its GDP by 2001 would have been \$107 billion rather than \$27.8 billion. On a per person basis, Iraq's per capita GDP in 2001 was \$1,178 compared with its peak of \$4,145 in 1990. Again had Iraq's GDP grown at the rate of the OPEC-10, by 2001 on a per capita basis it would have been \$4,540, almost four times its actual reported level. Recognising price and exchange rate distortions, The World Fact-book 2002 reports only 31 countries in the world outside Africa with a lower per capita GDP than Iraq on a purchasing power parity basis. The economic impoverishment of Iraq carries in its wake social deprivation, for example, outside Africa, there are only 16 countries listed in The World Fact-book ⁽¹⁰⁾ with a literacy rate lower than Iraq's. This, for the country with near record oil production volumes from the world's second largest proved reserves of oil. Following liberation, the people of Iraq will expect and demand that their elected representatives produce a rapid and immense improvement in the social and economic welfare of the people.
- It is true that oil is the lifeblood of Iraq's economy and that Iraq's oil industry, which has been in a 'lamentable state' these several years past, has, since 1990, been subjected to rigorous sanctions. It would be understandable, but incorrect, to assume, as many otherwise well informed observers do, that the 'lamentable state' of Iraq's oil industry, brought about by war and sanctions, is the sole, or even primary cause of Iraq's economic impoverishment, and to conclude therefore, that Iraq's economic impoverishment can be relatively easily reversed, following the removal of sanctions, by increased oil production brought about by readily forthcoming capital investment in Iraq's oil industry. Petroleum export revenues during the period 1999/2001 amount to more than 50% of Iraq's GDP, compared with 12.8% in 1990 ⁽¹¹⁾. In 1990 the difference between Iraq's GDP and its petroleum export revenues (a proxy for the value of the non-oil sector of its economy) was \$ 65.4 billion, over the last three years by contrast it has averaged \$13.5 billion ⁽¹²⁾. It is the non-oil sectors of Iraq's economy, rather than the oil sector, that have collapsed. It is inconceivable however, that the non-oil sector can generate the growth necessary to alleviate Iraq's poverty within a politically acceptable timeframe. Tens of billions of dollars foreign investment can be induced into Iraq's oil industry over the next decade. No other industry or sector of Iraq's economy can attract anything like

this volume of investment into the country. If this investment is successfully induced into Iraq's oil industry, the non-oil sectors of the economy will simultaneously prosper. But as we have suggested above, failure to rapidly implement major structural change of the oil industry carries with it the risk that Iraq's oil output will remain constrained at no more than some 3.4 million barrels per day. With oil output constrained at that level, foreign investment will be correspondingly constrained, the economy will not prosper, in fact it will remain impoverished as it has been for the last twelve years.

- Under the oil-for-food programme since December 1996, Iraq has exported 3,249 million barrels of oil (just under 1.5 million barrels per day) generating petroleum export revenues of \$59,458 million. On the basis of population data reported by the government of Iraq, the revenues equate to a mere \$1.02 per day per head of population. In the two latest phases (11 and 12) Iraq exported 449.3 million barrels of oil (some 1.25 million barrels per day) generating export revenues of \$9,907 million (averaging \$22.05/Bbl compared with \$18.31/Bbl over the entire 12 phases). On a per person basis the revenues equate to \$1.03 per day compared with \$1.02 per day over the 12 phases ⁽¹³⁾.
- The economic plight of the people is much worse than these figures suggest. Of the \$59,458 million oil export revenue; \$18,579 million is allocated to the Compensation Fund, to the UN and to UNMOVIC. The balance, \$40,879 million, is allocated to Iraq, some \$0.70 per person per day ⁽¹⁴⁾.
- Notwithstanding these "allocations", the reported value of contracts for supplies and equipment actually received in Iraq over the past six years under the oil-for-food programme is a mere \$25.6 billion: 44 cents per head of population per day ⁽¹⁵⁾. That is the cash yield received by the owners of the second largest proved reserves of oil in the world: 44 cents per day.
- If actual oil production volume has exceeded the volume exported under the oil-for-food programme (3,327 million barrels) by 0.5 million barrels per day, total production since December 1996 has been some 4.446 billion barrels or some 1.98 million barrels per day. Representative unit costs within the region associated with best industry practice are some \$1.50/Bbl operating costs and \$1.50 to \$3.00/Bbl capital costs ⁽¹⁶⁾. Assuming combined (operating and capital) costs of \$2.25/Bbl for Iraq means that expenditure related to this level of production would have been some \$10.0 billion rather than the actual \$1.6 billion - a shortfall of \$8.4 billion. Iraq's oil fields and associated infrastructure have been damaged. Reportedly reservoirs have been so badly damaged due to the lack of capital expenditure and poor operating practices that ultimate reserve recovery rates have plummeted to 15 to 20% of oil in place. To sustain production of some 2 million barrels per day may therefore require immediate investment of up to \$8.4 billion. To raise production to the capacity limit suggested above, that applies in the absence of de-monopolisation of the industry, some 3.4 million barrels per day, within say two years, would involve ongoing costs of some \$2.8 billion per year.
- Assuming, for simple illustrative purposes, an oil export price equivalent to that achieved on average over the past six years, \$18.31/Bbl, and production of 3.4 million barrels per day, of which 2.9 million barrels per day is exported. Gross revenues from petroleum exports would amount to \$19.4 billion. Assuming that 27.2%, \$5.3 billion, is payable to the Compensation Fund and the UN, then \$14.1 billion is available to Iraq: \$1.45 per day per head of population. The oil industry itself, as illustrated above, may initially need up to \$11.2 billion of this \$14.1 billion, leaving a mere \$2.9 billion revenues, 30 cents per day per head of population, to meet the massive demands for expenditure on food, medicine, housing, education, agriculture...not to mention servicing foreign debt (\$42.1 billion in 1990 and with, accumulated unpaid interest, estimated at \$62.2 billion or more now) and possibly reimbursing the armies of liberation. Excluding the one-off capital expenditure of up to \$8.4 billion needed to restore the oil

production facilities, the position going forward, net revenues to Iraq would be some \$11.3 billion a year, equivalent to \$1.16 per day per head of population, clearly not the sort of revenue stream with which an adequate social welfare programme can be financed and not the revenue stream (or the FDI) necessary to kick start Iraq's economy.

- In summary, Iraq's economy is massively dependent on its oil industry. With the removal of sanctions, it is the one industry in Iraq that has the possibility of inducing the enormous amount of foreign direct investment that is necessary to alleviate the impoverishment of the Iraqi people. If, without restructuring the oil industry however, output remains constrained at some 3.4 million barrels per day, both the volume of foreign investment necessary to kick-start the economy and the revenue stream necessary to finance an adequate social welfare programme will be denied to Iraq and its people. If, mindful of the potential cost in terms of the continued suffering of the Iraqi people, we do not recommend a very fundamental restructuring of the oil industry to induce substantial flows of foreign direct investment, we have a clear responsibility to explain why.

IRAQ'S OIL INDUSTRY AND GLOBAL TRENDS.

- In the above summary of the oil production yields of the eighteen largest oil producing countries in the world, it was noted that five of the six countries with the highest oil production yields have decentralized oil industries, and that by contrast, five of the six countries with the lowest production yields have highly centralized oil industries dominated by their politically controlled, monopolized, nationalized oil industries. We suggest that this is no coincidence.
- There has been a massive trend to privatisation or at least de-monopolisation of national oil companies throughout the world and we are unaware of a single instance of re-nationalisation or re-monopolisation of a national oil company.
- National oil companies served a purpose in a world in which market imperfections enabled major oil companies to abuse their political, financial and market power. That time has passed. Markets are broader and deeper. Major (competitive, private sector) oil companies have adapted to the realities of the market. National oil companies that are protected by monopoly rights have not. In today's oil markets, monopolized national oil companies are an anachronism. They no longer serve the best interests of their countries. Rather, as illustrated by the analysis of oil production yields, their inherent inefficiencies, born of their protection from competitive forces endowed by their monopoly status, cost the countries in which they survive billions of dollars each year from foregone production.
- National oil companies in many oil-producing countries inherited the responsibility to manage oil industries nationalised foreign oil companies' interests. In some cases, including Iraq, they spectacularly increased proved reserves of oil and historically they increased production. The data irrefutably demonstrate however, that the national oil companies, where they have survived, are now so unsuccessful at increasing oil output that the governments and rulers of oil producing countries are without exception turning to foreign oil companies to implement their oil production expansion programmes⁽¹⁷⁾.
- OPEC production constraints are not the issue here. Quota constrained, declining output notwithstanding, Middle East OPEC members, eyeing projections of significantly increased demand for their oil over the next twenty years (EIA and IEA forecasts for example), are initiating oil development programmes to increase their production capacity. Contrary to the sometimes heard assertion that foreign oil company participation has not spread to the Middle East, the reality is that all Middle East OPEC members have turned to foreign oil companies in their efforts to increase oil production capacity (except Saudi Arabia which

already has 3.45 million barrels per day spare capacity that can be brought on-stream within ninety days. Saudi Arabia has however turned to foreign oil companies to implement its massive gas development project just as it turned to foreign oil companies to establish its petrochemicals industry).

- Foreign oil company participation takes various forms: license and royalty, production sharing agreements (PSA), service agreements (including buy back agreements), joint ventures or other forms of direct equity ownership. It must be emphasised that in all of these cases the state retains ownership of the mineral rights, of the oil in the ground and, one way or another, receives economic rent from the oil companies for their contractual right to exploit those resources, whether the contractual right is granted to a national oil company, or under a PSA, or to a privatised oil company.
- A common form of foreign oil company participation is through PSAs. Under these arrangements, the oil is owned by the state, which brings in an oil company to explore and develop the resource. The oil company operates at its sole risk and expense, and in return, if commercial production ensues within the duration of the agreement, receives a share of production. A 1995 paper by Chakib Khelil ⁽¹⁾ for the World Bank reported more than 300 companies engaged in international exploration in more than 150 countries. Governments offer exploration or development opportunities to private oil companies through formal bidding rounds or on a negotiated case-by-case basis. Under the PSA all oil produced is owned by the state, and the share of production allocated to the oil company can be regarded as compensation for the risk taken and services rendered. The government take, the revenues received by the government under the terms of the fiscal system (which can include royalties, share of profit oil, tax, bonuses, duties, associated gas, and other contractual arrangements) globally averaged some 64%, ranging from a low of 25% (Ireland) to a high of 95% (Yemen) as reported in the Khelil paper. Key attractions of production sharing agreements to private oil companies are that although the reserves are owned by the state, accounting procedures permit the companies to book the reserves in their accounts, but, other things being equal, the most important feature from the perspective of private oil companies is that the government-take is defined in the terms of the production sharing agreements and the oil companies are therefore protected under a PSA from future adverse legislation. Technical considerations, costs, depreciation allowances, government-take and the myriad of other issues can all be agreed to the satisfaction of both the state and the oil companies, but, if the legislative framework within which the PSAs are to operate is deemed by the oil companies to be incomplete, not a dollar will be forthcoming. More precisely, significantly less dollars may be forthcoming, on less attractive terms for the state, from second, third and fourth choice oil companies, and none from the first choice oil companies.
- Iraq's oilfield development programme announced in 1997 under which production sharing contracts, service contracts and joint ventures have been negotiated with French, Russian, Chinese companies, (and reportedly with Italian, Spanish, Indian, Turkish, Vietnamese, Algerian, Indonesian, and other oil companies) provided for the development of 33 fields containing 50 billion barrels of reserves and potential production of 4.65 million barrels per day. Of the 33 fields 25 have been appraised but never developed. The output potential of these 25 fields is 3.75 million barrels per day.
- More important than the specifics of oilfield development plans negotiated during the period of the dictatorship, in the event of a regime change, these are the most coherent development plans available. The new oil minister will be under enormous pressure to initiate programmes to increase production rapidly and massively. By default, the existing plans may be implemented albeit with different foreign oil companies. Accordingly, after its demise, the

dictatorship will continue to exert enormous (albeit posthumous) influence over the oil industry and hence over the economy.

LESSONS FROM THE RUSSIAN EXPERIENCE.

- Following the collapse of the Soviet Union, Russia successfully denationalised its oil industry. The process involved the replacement of the nationalised oil company by twelve regional vertically integrated joint stock oil companies. The shares of these companies were initially owned 100% by government agencies. As legislation permitted, the ownership was gradually transferred from the state by various means including the voucher system, direct offerings of shares, state defaults on loans secured by shareholdings in the regional joint stock companies, etc. It was messy. Some say it was state robbery. On some measures the state received a mere 3 cents on the dollar. However, contrary to the naïve predictions of nationalists, it did not result in the sell-out of Russia's oil industry to foreigners. Far from it. Frankly, foreign oil companies at the time were simply not interested in buying into the Russian oil companies in view of what they perceived as a hostile fiscal regime, uncertainties concerning the future legislative reforms, an inadequate legal framework for foreign investment, high political risk and an unwelcoming attitude to foreign ownership.
- Instead, foreign oil companies focussed their attention on PSAs. The low price obtained by the state in the privatisation process in large part therefore reflected the absence of interest from foreign companies coupled with the impoverishment of the domestic capital base and the domestic scarcity of entrepreneurial expertise. The privatisation halted and then reversed the decline in Russian oil production.
- From the several privatised oil companies, two new major oil companies have emerged, Lukoil and Yukos. Lukoil signed contracts with Iraq's government for post-sanctions involvement in Kirkuk and West Qurna. The West Qurna deal provides for \$20 billion investment over 23 years. Lukoil's CEO Alekperov has reportedly ⁽¹⁹⁾ prevailed on President Putin to save this deal, has nurtured a close relationship with the US and is in discussions with Western oil companies to become partners of Lukoil in these contracts in Iraq. Owning 24% of Russia's oil reserves, his twin objectives are, firstly, to ensure that western investment dollars flow into Russia before they are undermined by Iraq, and secondly, through political influence in Russia and the US and by bringing western oil companies into partnership with Lukoil on the \$20 billion investments in Iraq, to secure a major stake in these Iraqi opportunities for Lukoil. (This report was prepared in late-November 2002 summarising part of the research undertaken in the prior two months on Iraq's oil industry. The Iraqi government has subsequently announced the cancellation of the above mentioned contract citing Lukoil's discussions with parties opposed to the government as the reason).
- In Russia today, four production sharing agreements (PSAs) have been signed and the Russian State Duma (parliament) has approved a further twenty-five. Total investment of all 29 PSAs if implemented during the period 2002 to 2010 would amount to \$90 billion. Potential annual production from all 29 PSAs is estimated at 187 million tonnes (some 1.3 billion barrels, or 3.6 million barrels per day) ⁽²⁰⁾. Strikingly, incremental production of 3.6 million barrels per day over the often quoted 3.4 million barrels per day 'restored' level of production capacity over an eight-year period is about the magnitude of increase that is frequently cited as a target for Iraq. The investment required to achieve this increase will be less in Iraq than in Russia, a variety of estimates have been quoted and most fall within the range, \$30 to \$50 billion.

- The 25 PSAs still awaiting final negotiation, signature and implementation, are not only for foreign companies. Over half the projects approved for PSA development are to be developed exclusively by Russian companies, while the others involve foreign oil companies working in partnership with Russian oil companies ⁽²¹⁾.
- In Russia, it has taken 10 years of market reform to reach this stage. As early as 1995, 10 PSAs worth an estimated \$60 billion dollars in new investments had been negotiated with fourteen different companies but none implemented ⁽²²⁾. Despite the desperate plight of its economy, Russia failed to put in place a competitive investment framework with the result that billions of dollars of investment were invested elsewhere while the Russian people suffered unnecessarily and to no avail ⁽²³⁾. Seven years later only four PSAs are signed, while a further twenty-five are stalled by the politicians. For those who advocate a central role for PSAs in the oil policy of liberated Iraq, the Russian experience provides a salutary lesson: PSAs can induce many billions of dollars of foreign direct investment into Iraq, but only with the right terms, conditions, regulatory framework, laws, oil industry structure and perceived attitude to foreign participation. In the absence of these, and many other detailed considerations, the investment that Iraq so desperately needs will be withheld, delayed, or, at best, significantly reduced to reflect higher degrees of perceived risk.
- Details of one of the four signed and implemented PSAs may help illustrate the broader economic benefits that can accrue to the host country (although it should be recognised that this agreement provides among other things for an LNG plant). Due to active support for the PSA by the regional government of Sakhalin Island, the PSA was signed in 1994. The foreign oil company consortium has set up its head office in Sakhalin Island. Total planned investment is \$10 billion. Projected benefits to the Russian government from this one PSA are estimated at \$49 billion in direct revenues to the state, plus over \$20 billion in contracts and the employment of significant manpower during the construction phase – more than 10,000 people upgrading the infrastructure on Sakhalin Island including ports, roads, bridges and airports ⁽²⁴⁾.

CONCLUDING REMARKS.

The starting point of this paper is that Iraq's enormous reserves of oil and gas are the endowment, patrimony, and birthright of the Iraqi people. This endowment is managed for the Iraqi people by the state. In the new, liberated Iraq, the focus of oil policy at its most fundamental, should be to derive the maximum obtainable benefits from Iraq's enormous hydrocarbon reserves and deliver these benefits to their owners, the Iraqi people.

A review of the data from this perspective, leads to the following observations and interpretations:

- Even before war and sanctions the Iraqi state failed to obtain the maximum benefits from the country's massive reserves of oil and gas.
- We delude ourselves if we consider 1979's production volume as the pre-war norm. It was a one-off. Notwithstanding, nor underestimating, the serious present problems of Iraq's oil industry, production in 1999/2001 was close to its historical high.
- An oil policy premised on the assumption that the paramount problems faced by Iraq's oil industry are problems that stem from war and sanctions, and that fails to recognise that there is an inherent, systemic problem that is of course worsened dramatically by war and sanctions, will address and rectify the effects of war and

sanctions but leave the more fundamental, systemic problem unresolved. Such an oil policy will fail to derive and deliver the potential benefits to the people.

- An international comparison of Iraq's rate of oil production, or oil production yield, confirms that Iraq's production is, and historically has been, woefully low.
- Reinterpretation of Iraq's recent historically high petroleum export revenues on a per capita basis, quantifies vividly what we all know: the Iraqi people are impoverished, the priceless oil reserves generate export revenues to Iraq of a mere 70 to 80 cents per person per day. Depending of course on the future price of oil exports, raising production to 3.4 million barrels per day leaves the Iraqi people impoverished.
- Delays or cancellation of the reparation burden and renegotiation of Iraq's foreign debt service liability would improve the plight of the country and of the people. But that is true regardless of oil policy.
- Formulation oil policy recommendations for Iraq can only be enriched by due consideration of recent trends in the international oil industry. In that regard the following observations have particular relevance:
 - i. The least efficient oil industries, in terms of production yield, are those with highly centralised national oil companies with domestic upstream monopoly rights.
 - ii. Denationalisation and de-monopolisation of oil companies is a well-established trend.
 - iii. Throughout OPEC member states and throughout the Middle East, governments are turning to private international oil companies (rather than to their NOCs) to implement their oilfield development programmes.
 - iv. Billions of dollars of international and domestic capital has been withheld from the Russian oil industry as their policy makers stalled in the enactment of enabling legislation.

Iraq's economy upon liberation will be in need of billions of dollars of foreign direct investment. An appropriate oil policy can be the catalyst to induce these much-needed funds. The appalling plight of the people calls for radical and yet considered oil policy initiatives. The regime change provides the opportunity to liberate not only the country but also the economy. If, as appears to be the case, the monopoly status of the NOC constrains the return on the people's wealth by, as monopolies do, constraining output, which in turn limits the urgently needed capital investment, we have an obligation in formulating our policy recommendations to address the future status of such monopoly and to define the terms, conditions and ramifications of alternative industry structures that will urgently induce substantial direct investment into Iraq's oil industry and hence invigorate Iraq's economy and lift the Iraqi people out of a future of impoverishment. To do that, we need the advisory input of several oil companies, of other oil producing countries and of top law firms, investment banks and consultants that have or have had direct and influential involvement in the induction of foreign direct investment into the oil industry.

Updated: January 27, 2003.

NOTES & SOURCES.

- (1) Data on Iraq post-1990, whether oil production or economic indicators, are replete with ambiguities. For data on oil, we rely primarily on data presented in the following two publications, BP Statistical Review of World Energy 2002. (BP SR 02) www.bp.com and OPEC Annual Statistical Bulletin 2001 (OPEC ASB 01) www.opec.org. For post-1996 data we attempt reconciliation with data from the United Nations Office of the Iraq Programme (OIP) www.un.org/Depts/oip. For example, Iraq's historical oil production in Mbpd:

Year	BP SR 02	3 Year Ave.	OPEC ASB 01	3 Year Ave.
1976	2422		2415.4	
1977	2358		2348.2	
1978	2574	2451.3	2562.0	2441.9
1979	3489	2807.0	3476.9	2795.7
1980	2658	2907.0	2646.4	2895.1
1981	907		897.4	
...	
1987	2389		2358.7	
1988	2777		2744.5	
1989	2840	2668.7	2785.8	2629.7
1990	2157	2591.3	2112.6	2547.6
1991	279		282.5	
...	
1998	2162		2181.1	
1999	2581		2719.8	
2000	2624		2810.2	
2001	2414	2539.7	2593.7	2707.9

In the text, for the period 1999/2001 we quote the 3-year average derived from the BP SR 02 data, 2.54 million barrels per day, and note that this has only been exceeded in 5 prior years (BP SR 02 data are from 1965, OPEC ASB 02 data are from 1928), as illustrated in the above table. This 3-year average has been exceeded by only 4 previous 3-year averages. The OPEC ASB 02 derived 3-year average for 1999/2001, at 2,707.9, is some 294 Mbpd higher than the corresponding estimate derived from the BP SR 02 data. On the OPEC data the 1999/2001 average has been exceeded in only 3 prior years and by only 2 prior 3-year averages.

The period 1999/2001 broadly corresponds to the oil-for-food Phases V to X (November 24, 1998 to November, 29 2001). During these six Phases, Iraq's petroleum exports under the programme were 2,062.7 million barrels, some 1,874 Mbpd. OPEC ASB 01, reports Iraq's output of refined products as averaging 489.3 Mbpd in 1999/2001 (taking this as a proxy for crude input to the Iraq's refineries) implies crude oil production, excluding sales outside the UN programme, of some 2,552 Mbpd. Some 12.3 Mbpd less than the BP SR 02 derived estimate and 168.2 Mbpd less than the estimate derived from the OPEC ASB 01 data. With regard to the point being addressed in this report, these differences in the data are not significant: whether the production volume averaged 2.54 or 2.71 million barrels per day, it was, despite sanctions, an output level close to the highest ever achieved by Iraq. Consideration of recent production brings into question, furthermore, the appropriateness of describing 1979's production volume as 'the pre-war production level'.

- (2) OPEC ASB 01. Cross-reference OIP, value of petroleum exports (through the UN programme) for Phases V through X \$40.2 billion leaving \$2.7 billion difference.

- (3) BP SR 02. Note, if OPEC ASB 01 estimate of 2,594 Mbpd is used, the production yield is unchanged at 0.8% (albeit 0.84% rather than 0.78%).
- (4) BP SR 02. (See table of yields below).
- (5) Comparisons quoted in text (72% and 19%) are versus the BP SR 02 estimates of 2,414 and 3,489 Mbpd for 2001 and 1979 respectively. Versus the OPEC ASB 01 estimates of 2,593.7 and 3,476.9 Mbpd the increases are 60% and 20% respectively.
- (6) OPEC ASB 01 (provides estimates of Iraq and Iran's annual production volume back to 1928 and 1913 respectively. BP SR 02 provides annual estimates back to 1965).
- (7) OPEC Monthly Oil Market Report (MOMR). Update, the January 2003 MOMR reports Iran's year 2002 production at 3,417 Mbpd, which, compared with Iraq's proved reserves, is still a yield of 1.1%.
- (8) BP SR 02.
- (9) Nominal GDP data OPEC ASB 01.
- (10) CIA The World Factbook 2002 www.cia.gov.
- (11) OPEC ASB 01.
- (12) OPEC ASB 01.
- (13) OIP mid-November 2002. Update: as at 17 January 2003,

Volume of oil exported under the programme	3,327 million barrels
Petroleum export revenue under the programme	\$61,718 million
Days (December 10, 1996 to January 17, 2003)	2,239 days
Population (government table T-2 to UN)	26.698402 million (June 2002)
Population (CIA The World Factbook 2002)	24.001806 million (July 2002 estimate)
Revenue/person/day (Government population estimate)	\$1.03
Revenue/person/day (CIA population estimate)	\$1.15

- (14) OIP mid-November 2002. Update: Allocation to Iraq as at 17 January 2003, 70 cents per person per day. (On the CIA population estimates the allocated revenue is 78 cents per person per day).
- (15) OIP mid-November 2002. Update: the weekly update issued 21 January 2003 for week ending January 17, asserts that supplies to the value of about \$26 billion, including \$1.6 billion oil spare parts, have been delivered. On the Government population estimate this equates to 43 cents per person per day. On the CIA population estimate it equates to 48 cents per person per day.
- (16) Report of the Group of United Nations Experts Established Pursuant to Paragraph 30 of the Security Council Resolution 1284 (2000) (Expert Report) March 2000, www.un.org.
- (17) An interesting accessible discussion of some of the issues involved is presented in: 'Managing Hydrocarbon Resources in a New Era: The Call from Algeria' by Ali Aissaoui, OIES Monthly Comment July 2000, and 'A Little Bit of Opening Up: The Middle East Invites Bids by Foreign Oil Companies' by Kirsten Bindemann, December 1999. www.oxfordenergy.org.
- (18) Cha kib Khelil (Algeria's present Oil Minister) 'Fiscal Systems for Oil: The Government Take and Competition for Exploration Investment' www.imf.org which draws extensively on data presented in Barrows (1994), 'World Fiscal Systems for Oil'.
- (19) 'Lukoil's \$20 Billion Headache'. Business Week Online. October 14, 2002. www.businessweek.com
- (19) 'Production Sharing Agreements as a means of drawing large-scale investments into the energy, mining and other sectors (an oil and gas industry perspective from Russia)'. Dr Andrew Seck, PSA & JV Manager of Sakhalin Energy Investment Company, to the APEC Investment Symposium held in Vladivostok on 4-7 September 2002. (Seck)
- (20) Seck *ibid*.
- (21) 'Policy Reform in Russia's Oil Sector'. Colin McPherson. IMF. Finance & Development. June 1996. Volume 33. Number 2. www.imf.org.

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(22) 'Restructuring, Consolidation Top Solutions for Russia's Major Oil Companies' Woes' by Mark A Gyetvay. Oil & Gas Journal March 13, 2000. Also on line at www.pwcglobal.com posted May 11, 2000.

(23) Seck ibid.

COUNTRY	Production Mbpd	Production MM Bbl/year	Reserves Billion barrels	YIELD %
IRAQ	2414	881.11	112.5	0.78
KUWAIT	2142	781.83	96.5	0.81
UAE	2422	884.03	97.8	0.90
SAUDI ARABIA	8768	3200.32	261.8	1.22
IRAN	3688	1346.12	89.7	1.50
VENEZUELA	3418	1247.57	77.7	1.61
LIBYA	1425	520.125	29.5	1.76
NIGERIA	2148	784.02	24.0	3.27
MEXICO	3560	1299.4	26.9	4.83
CHINA	3308	1207.42	24.0	5.03
RUSSIA	7056	2575.44	48.6	5.30
BRAZIL	1337	488.01	8.5	5.74
ALGERIA	1563	570.495	9.2	6.20
USA	7717	2816.705	30.4	9.27
INDONESIA	1410	514.65	5.0	10.29
NORWAY	3414	1246.11	9.4	13.26
CANADA	2763	1008.495	6.6	15.28
UK	2503	913.595	4.9	18.64
WORLD	74493	27189.945	1050.0	2.59
OPEC	30181	11016.065	818.8	1.35
NON-OPEC	44312	16173.88	231.2	7.00

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مشروع مستقبل العراق

ورقة تلخص أعمال

مجموعة العمل المختصة بالبتروول والطاقة

اللجنة الفرعية للطاقة

20 أبريل / نيسان 2003

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تقدم هذه الورقة ملخصاً للمناقشات التي دارت في إطار اجتماعات اللجنة الفرعية المختصة بسياسة البترول التابعة لمشروع مستقبل العراق، ويشير الملخص بالتحديد إلى ورقتين، تحمل الأولى عنوان "اعتبارات متصلة بسياسة البترول في العراق بعد تحريره" بتاريخ 27 يناير / كانون ثاني 2003 (ويشار لها فيما بعد باسم "اعتبارات"). وتحمل الورقة الثانية بتاريخ 25 فبراير / شباط 2003 عنوان "مسودة للتشاور" (ويشار لها فيما بعد باسم "التشاور").

بإيجاز، ثمة اتفاق عريض حول ضرورة تغيير الطبيعة المركزية لسياسة البترول في العراق وتحويلها إلى سياسة لامركزية بغية تمكينها من التغلب على حالة الإفكار التي تعرضت لها البلاد، وقد ناقشت اللجنة الفرعية ثلاث نماذج للتحويل إلى اللامركزية.

قدمت ورقة "التشاور" نموذجين من تلك النماذج الثلاث، واقترحت الاحتفاظ بمبدأ بالشركات العاملة الرئيسية التابعة للمؤسسة العراقية الوطنية للبترول (INOC) ودعمها، كما اقترحت إجراء إصلاحات بديلة بعد مرور فترة زمنية قصيرة، تتمثل فيما يلي: (أ) إعادة تشكيل الشركات وتثبيتها للعمل في ظل الأوضاع الجديدة وخصخصة جزء من أصول المؤسسة مع الاحتفاظ بالسيطرة عليها، و (ب) إعادة تشكيل الشركات وتثبيتها للعمل في ظل الأوضاع الجديدة والدخول في علاقة مشاركة مع الاحتفاظ بالسيطرة على المؤسسة. ويقترح البديل الثالث (ج) المستمد من مضمون الورقة "اعتبارات"، إعطاء الأولوية الأولى والمباشرة إلى اللامركزية.

(I) إعادة تشكيل الشركات وتثبيتها للعمل في ظل الأوضاع الجديدة وخصخصة جزء من أصول المؤسسة مع الاحتفاظ بالسيطرة عليها

يتصور هذا النموذج إعادة تنظيم الشركات العاملة حالياً في إطار المؤسسة العراقية الوطنية للبترول بغية تحويلها إلى ثلاث أو أربعة كيانات (شركة البترول الجنوبية وشركة البترول الشمالية وشركة خط أنابيب البترول، على سبيل المثال) تمتلك أصولاً وتراخيص أو اتفاقات لاستخراج وإنتاج البترول من الأراضي الخاضعة تماماً لسيطرتها الكاملة.

تتاح للمستثمرين في القطاع الخاص فرصة شراء أسهم في تلك الشركات بغية تمكين الدولة من الحصول على رأس المال. وتتمثل المزايا الإضافية لمشاركة رأس المال الخاص في شركات البترول الوطنية في (1) اعتبار هذه المشاركة بمثابة التحدي المرتقب [لإعادة التنظيم] الذي يخفف التكاليف [التي تتحملها الدولة]، و (2) تواجدهم التكنولوجية والخبرة الخارجية.

لا تتجاوز قيمة رأس المال الخاص المستثمر في تلك الشركات ما يساوي 30 في المائة من قيمة إجمالي أصولها، مما يعني استمرار سيطرة الدولة عليها، ويقترح أن تتاح لرأس المال الخاص فرصة الاستثمار هذه في البداية من خلال عرض خاص لاستثمار الأموال يرمي في المستقبل إلى طرح أسهم الشركة للتداول العام في سوق الأوراق المالية.

تمارس الشركات نشاطها مثلما تمارسه الشركات التجارية المستقلة وتخضع للضريبة.

(ب) إعادة تشكيل الشركات وتهيتها للعمل في ظل الأوضاع الجديدة والدخول في علاقة مشاركة مع الاحتفاظ بالسيطرة على المؤسسة

يتصور هذا النموذج ما طرحه النموذج السابق من إعادة تنظيم للشركات العاملة حالياً في إطار المؤسسة العراقية الوطنية للبترول بغية تحويلها إلى ثلاث أو أربعة كيانات تمارس عملياتها بأسلوب تجاري رغم امتلاك الدولة وحدها لها، ويكون لها ميزانية مستقلة رغم خضوعها لإشراف استراتيجي فقط من قبل وزارة البترول.

تتولى تلك الشركات العاملة المملوكة للدولة عمليات تشغيل الخزانات الواقعة في حقول البترول القائمة، كما تتولى تشغيل البنى التحتية المرتبطة بها (ونذكر هنا على سبيل المثال صناعة البترول القائمة الخاضعة لهذا البرنامج الرامي لإصلاح الأوضاع على وجه السرعة).

عقود لاستغلال حقول البترول التي تم اكتشافها والتي لم يتم تطويرها بصورة كاملة، وعقود لاستكشاف حقول البترول يتم إبرامها بين وزارة البترول والاتحادات الجديدة التي تم تشكيلها لهذا الغرض.

قد تشمل تلك الاتحادات على شركات عراقية خاصة وجديدة للبترول، وعلى شركات دولية للبترول، ويقترح التقرير امتلاك شركات البترول العراقية غالبية الأسهم في المشاريع المشتركة وأن تتولى هي عمليات التشغيل.

ويقترح التقرير إمكانية اشتراك شركات البترول العاملة المملوكة للدولة مع الاتحادات الجديدة المذكورة في حالة عدم بروز شركات عراقية خاصة في الصورة.

ينطوي هذا النموذج على أنظمة تقتضيها سيطرة الدولة على قطاع البترول في البلاد، كما ينطوي على شروط الترتيبات التعاقدية بين وزارة البترول والشركات.

ويقترح في إطار هذا النموذج معالجة موضوع خصخصة المؤسسة العراقية الوطنية للبترول وشركات التشغيل التابعة لها والتعرض له لاحقاً بعد إثبات كفاءة الشركات ووضع ميزاتياتها العمومية على نحو ثابت ومستقر.

السيطرة والتنظيم:

يذكر تقرير "التشاور" ضرورة وجود تحديد واضح لأدوار كل من الدولة والوزارة والهيئة المنظمة وشركات البترول بغض النظر عن ما يتخذ من قرارات بخصوص صناعة البترول في البلاد.

يوصى بفصل وزارة البترول عن عمليات وضع الموازنة المالية.

ويُقترح إمكانية استحداث دور جديد للكيان التنظيمي بعد مرور خمس أو سبع سنوات مثلاً.

يقوم هذا الكيان التنظيمي بدور يتمثل في ترجمة السياسات التي وضعتها وزارة البترول إلى أنظمة تخضع لها شركات البترول الوطنية وشركات البترول العراقية، كما يتولى الكيان التنظيمي متابعة قيام تلك الشركات بتطبيق تلك الأنظمة والامتثال لها. ويستشهد التقرير بما يتم تطبيقه في النرويج وفي جمهورية الجزائر.

(V) فك الاحتكار

يرى هذا النموذج ويتصور فك الاحتكار الذي كانت تتمتع به المؤسسة العراقية الوطنية للبترول، ويعني ذلك عدم احتكارها لنشاط استخراج البترول وفتح هذا المجال للشركات الخاصة. ويتصور هذا النموذج ويرى المبادرة فوراً بإقامة وتأسيس إدارة مؤقتة تشمل مهامها ما يلي:

- 1) الإشراف على المؤسسة العراقية الوطنية للبترول بغية استئناف عمليات تكرير البترول وتسويقه.
- 2) القيام خلال فترة 18 شهر بتحديد الأعمال المطلوب القيام بها من أجل استعادة الطاقة الإنتاجية إلى مستوى 3.5 مليون برميل يومياً والقيام بتقييم مبدئي لها.
- 3) إعداد قاعة للبيانات (data room) (يُفضل أن يتم ذلك بالعمل مع البنك الدولي ومؤسسة التمويل الدولية) تتضمن المعلومات الجيولوجية والتجارية ذات الصلة (من وزارة البترول ومن المؤسسة العراقية الوطنية للبترول).
- 4) وضع قواعد لقاعة البيانات [المذكورة آنفاً] تتماشى مع أفضل الممارسات المتبعة في صناعة البترول ومع لوائح ونصوص قانون البترول الجديد.
- 5) تحديد الفرص المتاحة للمشاركة في عمليات استخراج البترول وتقييمها مبدئياً وتحديد أولوياتها من أجل (أ) استعادة الطاقة الإنتاجية إلى مستوى 3.5 مليون برميل في اليوم، ومن أجل (2) الحصول على الاستثمار المطلوب لتطوير إنتاج البترول من الحقول المعروفة التي تم اكتشافها والتي لم يتم تطويرها بعد على نحو كامل، ومن أجل (3) الحصول على الاستثمار اللازم لاستكشاف البترول وتحقيق ما يرتبط بذلك من أهداف وتوقعات للإنتاج السنوي منه.
- 6) إعداد رد قانوني حول وضع كافة الدعاوى المادية المتصلة بعمليات استخراج البترول في صناعة البترول يتضمن إمكانية تطبيق تلك الدعاوى أو المطالبات.
- 7) إعداد [مسودة] قانون معدل للبترول يُعرض على وزارة البترول لدراسته والنظر فيه.

8) إعداد مسودة الشروط والقواعد الخاصة باتفاق المشاركة في الإنتاج تُعرض على وزارة البترول لدراستها ويُراعى فيها تسهيل مشاركة أفضل شركات البترول والغاز الدولية في عمليات استخراج البترول في العراق على نحو يعود بأفضل مردود وأقصى منفعة للعراق (من كل جانب مع الإشارة بصورة خاصة إلى الفائدة الاقتصادية العائدة للعراق وتطبيق أفضل الممارسات في صناعة البترول من أجل تطوير وتنمية حقول البترول في العراق، مع الأخذ بعين الاعتبار احتياطي العراق من الغاز والاستثمار المباشر في حقول النفط والاستثمار الداخلي المرتبط بذلك والتكنولوجيا والمشاركة في المهارات وفي الخبرة). ويُراعى أن يتم كل ذلك بصورة تتماشى مع الشروط الدولية القائمة.

9) وضع وإعداد مسودة إطار تنظيمي يعرض على وزارة البترول لدراسته، على أن يتم العمل به عندما يصبح قانون البترول ساري المفعول.

10) إعداد عروض إخبارية موجزة وندوات وما إلى ذلك بغية تحقيق إدراك أفضل لوضع صناعة البترول على المستوى المحلي والدولي ومن أجل تسهيل فهم الخيارات المتاحة الرامية لتطوير تلك الصناعة وآثار ذلك على اقتصاد العراق وعلى حياة مواطني العراق.

11) توصيات مستمدة من التجارب الدولية في مجال صناعة البترول أو الصناعات الأخرى من شأنها تهدئة مخاوف من يعارضون فك لاحتكار مؤسسة البترول العراقية الوطنية وإرتباط فك الاحتكار هذا بمشاركة شركات البترول العراقية (تتم هذه المشاركة عن طريق شركات البترول العراقية التابعة للقطاع الخاص وقد تتم هذه المشاركة بواسطة أو من خلال نظام للبطاقات*).

12) تشمل الأعمال المطلوبة لتنفيذ قانون البترول الجديد (في حالة الموافقة عليه) مشاركة البنك الدولي ومؤسسة التمويل الدولية وبنك الاستثمار ومكاتب وشركات المحاماة الدولية، كما تشمل الإشراف على قاعة البيانات [المذكورة آنفاً] وعلى عمليات التفاوض وإرساء العقود على مقدمي العروض.

-- يُسمح للشركات التي تم تأهيلها مسبقاً للاشتراك في نشاط استخراج البترول في العراق بالوصول في أقرب فرصة إلى قاعة البيانات [المذكورة آنفاً] وفقاً لقواعدها من أجل تقييم فرص المشاركة في صناعة البترول ومن ثم التفاوض مع الإدارة ومع وزارة البترول بعد ذلك وتقديم عرض للاشتراك في اتفاق للمشاركة في الإنتاج أو للاشتراك في مثل هذا الاتفاق على أساس عقد لتقديم الخدمات الرامية لاستعادة الطاقة الإنتاجية والتطوير أو لاستكشاف البترول أو أي من ذلك.

-- * نقطة توضيح: قد تؤدي مشاركة شركات البترول العراقية في صناعة البترول عن طريق اتفاقات المشاركة في الإنتاج المعقودة مع وزارة البترول مباشرة بدلاً من المؤسسة العراقية الوطنية للبترول إلى معارضة من يعتبرون مثل هذه المشاركة بمثابة تنازل لشركات البترول الأجنبية (وذلك بغض النظر عن الضرورة الملحة للقاضية بحث الأموال الأجنبية على

الاستثمار المباشر وفقاً لأفضل الشروط المؤدية لزيادة الإنتاج بصورة كبيرة وبسرعة ومن ثم زيادة دخل الدولة). قد تتحقق مشاركة شركات البترول الدولية من خلال شركات البترول العراقية الخاصة التي تملك شريحة عريضة من الجمهور العراقي أسهم فيها نتيجة ما تم توزيعه عليهم من بطاقات أو استمارات، وذلك بدلاً من تحقيقها عن طريق اللجوء لأنصاف الحلول من أجل القيام بالإصلاح الضروري القاضي بفك الاحتكار. ويحتفظ المواطنون بعد ذلك بحريتهم في الاحتفاظ بتلك الأسهم في شركات البترول العراقية التابعة للقطاع الخاص الجديد أو بيعها في سوق الأوراق المالية وفقاً لقيمتها في السوق.

**Brief Comments on: Appendix 1: Iraq Oil Industry Post
Sanctions – Master Plan for the Upstream Oil Operations**

The report does not mention the data used in building the master plan, and what vintage this data is. It is a well-known fact that any plan is as good as the data upon which it is based. Therefore, without a review of the data used and its validity it is impossible to accept an important plan like this on its face value.

2. There are many assumptions made in the report without any attempt to substantiate them, or at the least present some facts and figures to support them, e.g. the current production capacity of the Iraqi fields, the current production decline rate, the status of the wells and the production facilities etc. The validity of the plan relies mainly on these assumptions, and without any facts and figures to support them, the credibility of the plan is in question.
3. The plan seems to ignore the expertise available in Iraq, and seems to put the blame on the Iraqi oil personnel for the low quality of reservoir management, and the general state of affairs in these oilfields. Furthermore, the report seems to ignore the impact of the current policy of maximising production at any cost imposed upon them by Saddam regime.
4. The plan is considered to be very pessimistic regarding the potential improvement in the existing fields' production capacities. Phase II of the plan assumes that some \$9.6 billions will be needed to "develop 5 fields and upgrade production from two main reservoirs in South and North Rumaila plus two other fields. It will need about 180 wells by end of third year." Accordingly, the gain in production is expected to peak during the third year to about 0.8 million b/d. This is thought to be very pessimistic and seems to be based on unacceptably low average well rates, particularly for these southern fields.

It is safe to believe that the Iraqi oil personnel currently working on these producing fields are the people with the best knowledge as to the current status of the wells and facilities, and what is needed to improve the production performances of these fields and remove the bottlenecks. Oilfield development experts from outside Iraq could help the Iraqi personnel to prioritise the required operations and effectively use the resources to be made available to them, to achieve the pre-war production capacities in the most efficient and cost effective manner.

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It is believed that these policies of erratic interruptions and over production have caused severe damage to these reservoirs, which is something the Iraqi oil personnel could not avoid. Detailed studies are needed to determine the extent of the damage, and economic evaluations must be done as soon as possible, to select the optimum redevelopment plan for each of these fields, at least the giant reservoirs.

- 5 The phase III of the plan is considered to be very aggressive and unsafe. This phase aims to increase the total production level to 6.00 MMb/d by the eighth year by developing new field(s) etc. It assumes that production from the new field(s) will commence after only one year after the change in the ruling regime in Iraq. The report states "This is supported by a full conceptual development plan of all the existing fields". It is unsafe and unacceptable to go ahead with the development of new fields based on conceptual plans. It is imperative that the optimum development plan be selected for each of the undeveloped fields. To do this, detailed studies are needed for the alternative development scenarios in each field, and economic evaluation conducted for each alternative. This will need a lot of time and effort, which is not catered for in the master plan.

To develop these important oil fields without proper studies and economic evaluations of the different alternatives is very risky and may cause loss of reserves and severe reservoir damage. The current Iraqi regime has dictated the policy of over production from the existing fields, which we believe has led to irreversible reservoir damage. It is essential that we do not follow this kind of policy in the future, and safeguard the oil reserves of Iraq. It is believed that developing these important fields without proper planning, as per this master plan, would result in similar damage to these reservoirs.

6. In making a master plan of this magnitude which envisages the expenditure of some \$37 billions over a period of eight years, and upon which the success of which the Iraqi economy will depend entirely, needs the help of a group of experts in oil field development. A task force is needed for identifying the problems of the existing fields, and planning their repairs and redevelopment. Another task force is needed for planning the development of the new fields.

These task forces should consist of the available Iraqi experts, and could be augmented by multinational experts. Their expertise should cover drilling, well completion, reservoir engineering, project engineering, economic evaluation, and oil field safety etc. Work of these task forces could start now using the resources currently available to them, and adding to it when the regime changes in Iraq.

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Future of Iraq Project

Oil & Energy Working Group

Subcommittee On Rehabilitation Of Iraqi Oil Fields

ACTION PLAN

What Are the Immediate Needs Of Iraqi Oil Sector?

ADOHC COMMITTEE

There will be an urgent need to form an ADOHC committee in the immediate aftermath of the removal of the Saddam regime with the forgoing objectives (APNM):

- **Overall Assessments:** provide a quick overall assessment of the immediate requirements of the upstream oil sector.
- **Setting of Priorities:** identify and prioritize the oil field's urgent requirements versus oil production.
- **Establishment of Networks:**
 - Establish an efficient network system for the procurement of materials and supplies in a timely manner.
 - Establish an effective distribution network system for delivering these requirements.
- **Monitoring System:** Establish an effective monitoring system for following up the plan.

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COMMITTEE STRUCTURE

The multi-layered structure for this committee is based on the following elements:

- **Key Iraqi oil personnel currently working in the existing producing fields are the people with best knowledge as to the current status of the wells and facilities.**
- **Iraqi oil experts in exile based on their past experience in Iraqi oil industry. These experts could make a valuable contribution to the resolution of the for the current oil production problems.**
- **International oil field development experts having experience in similar fields as and if needed could help the Iraqi oil personnel to priorities the essential operations and effectively use the resources available to them.**

Therefore, the suggested personnel to be nominated for ADHOC committee responsible for the rehabilitation of the Iraqi upstream oil sector are as follows:

- **7-9 High level technical personnel selected carefully from the current operating companies:**
 - **South Oil Company (SOC) and**
 - **North Oil Company (NOC).**
- **3-5 Iraqi oil experts in exile.**
- **5-7 Independent International oil field development experts including Arab oil personnel. These individuals will be selected by the Iraqi experts.**
- **2-3 Representative of the newly Iraqi Government**

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- The core of the committee is the Iraqi technical oil personnel who are currently active in operating the oil fields.
- These people must have good experience and records.
- Three to five people need to be selected from each operating company to assume posts to assume posts to assume posts in different areas:
 - Chief Production Engineer
 - Chief Reservoir Engineer
 - Chief Drilling Engineer
 - Chief Well Completion Engineer
 - Chief Safety Engineer

It is essential that the nomination of the personnel of the other layer to be with different technical background.

COMMITTEE AUTHORITY

- The nomination of the task force will be approved with full mandate for the first six months extendable as and when necessary required to act as soon as possible providing it the required facilities to execute their plan throughout the country.
- The committee will report directly to the office of the Ministerial oil committee. They should hold regular meetings.
- The committee has the authority to choose the appropriate systems for procurement, distribution, signing short term contracts with the service oil companies within a framework.
- The committee has the authority to establish direct contact with field managers and to have access to the fields.

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COMMITTEE ACTIVITIES

- **Initial Assessments & Prioritization :** A fresh evaluation and assessment of the current status of the producing oil fields and finding out the immediate needs:
 - **Two Weeks Field Trips:** Live investigation of the actual status of the oil fields via field trips, particularly the main ones:
 - Identify the current problems and the required including the spare parts.
 - Prioritize the needs versus the oil production and safety.
 - **Listing the most needed parts and actions for the first 60, 120 and 180 days.**
- **Procurement Network System:** Examining the most effective ways of procuring the required parts or getting the required services within a very short time avoiding any probable delays:
 - Regional oil Companies, KOC, ARAMCO, ADNOC, NIOC, etc.
 - Regional dealer such as in UAE.
 - International Oil Companies.
 - Establishing a temporary Sale Office in London /Texas or any other means.
- **Distributing Network System:** Establishing the most efficient mechanism for the immediate delivery of the tools, equipment and parts:
 - Three main distribution centers; North, Central and South.
 - Providing efficient and large storage in these centers.
 - Security of these storage is necessary
 - Setting up the appropriate transportation system.

- **Monitoring System:** Set up an effective monitoring system and follow up procedure to ensure successful plan implementation:
 - **Setting up Field Manger Network (FMN):** All oil field mangers will be maintain direct contact with the committee as follows.
 - **Updated Field Status and report their new needs**
 - **Assuring the part and services deliverability.**
 - **Bimonthly headquarter meetings with the ADHOC committee**
 - **Periodic Field Trips for the ADHOC every two months for updating the plan.**
 - **Continuous revision of the plan in order to make necessary modifications.**

FUNDING ADHOC PLANS

- The currently 15 producing fields contain about 40% of the total proven reserve.
- Kirkuk and Bai Hassan of North provinces and Rumail and Zubair of the South provinces contribute more than 80% of the current oil production.
- Immediate Repair and Redevelopment Plan
 - Surface Facilities Problems
 - Well or Reservoir Problems.

REQUIRES

- Tremendous Efforts
- Technical Assistance
- Funds

THERE IS ALREADY ENOUGH FUNDING IN THE UNALLOCATED UN OIL FOR FOOD PROGRAMME TO PAY FOR THIS PHASE OF DEVELOPMENT. APPROVAL OF UN OR OTHER APPROPRIATE AUTHORITY IS URGENTLY REQUIRED.

DOWNSTREAM OIL OPERATIONS

PART I: REFINING

1- BACKGROUND

Iraq has three refining centers Dora in Baghdad, Basra in the south and Baiji (S W Kirkuk) in the North of the country. Other small refineries making use of skid mounted units of 10000 b/d, Iraq bought prior to the war with Iran. A fourth refinery was planned in the Central part of Iraq (near Baghdad), but activities were halted down due to the Gulf War. The Salahideen complex near Baiji has two modern refineries that were completed during the early 80's. The Dora refinery was upgraded and expanded to about 100000 b/d as well.

The refining centers were bombed during the Gulf War, but some 70% of the capacity was restored within two years. The refineries continued to operate with insufficient maintenance and spare parts during the last 12 years. The status of the sector during the second quarter of year 2000 may be summed up as follows:

Shortage of back up to the operating units, spare parts and equipment are serious limitations to the refining industry:

- Lack of functioning instruments and control equipment
- Poor quality of refined products and waste water effluent
- General lack of safety, fire fighting and environmental control equipment

The following are common to all Downstream Operators (Refining, Gas processing and Product Distribution). Requirements for upgrading products quality and operational standards, de-bottle necking in refining capacity, and improve safety & reduce pollution are:

- 1.1- Supply of spare parts, equipment, materials, chemicals, replacement units, workshop facilities
- 1.2- Repair and overhaul service contracts.
- 1.3- Revamping and rehabilitation of existing plants to improve efficiency and product quality
- 1.4- Improvement of storage flexibility, power generation, gas treatment and control facilities.
- 1.5- Completion of facilities/ provisions of safety of personnel and environmental protection
- 1.6- Improvement of testing and engineering inspection services
- 1.7- Improvement of the metering standards
- 1.8- Expanding and modernising the training facilities with introduction of an incentives system
- 1.9- Preparation of manual on contracts and contracting with local and foreign consultants and companies.
- 1.10- Involvement of foreign investment in the form of financing and joint ventures

In particular, the refining industry requires supply/ commissioning of:

- 1.11- Improvement of storage flexibility, power generation, gas treatment and control facilities.
- 1.12- Completion of facilities/ provisions of safety of personnel and environmental protection
- 1.13- Automatic Lube oil blending facilities

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- 1.14- Whole Naphtha transformation facilities & Nitrogen plants
1.15- Manufacturing facilities for plastic drums and bottles for lubricants

Furthermore, it is required to commence of studies, and design of an Isomerization unit (FCC), a reformer, and a light gas oil high- density de-sulphurisation units in the refineries. Some preparatory work is needed as well.

2- REFINING CAPACITY

The refining capacity prior to the war with Iran was about 700 thousands b/d but it was reduced to few thousands b/d in the aftermath of the Gulf War. The capacity was gradually restored until it reached over 600 MBD in the first quarter of 1994. The following are the capacities of the refineries that are expected to prevail after necessary maintenance is undertaken:

	MBD	Designed MBD	Remarks
Dora Refinery	100	100	increased from 92 MBD early 1994
Salahideen complex	290	300	
Basra	126	165	
Kirkuk	27	30	
Nasriya	27	30	
Haditha	14	20	
Baiji	20	20	
Samawa	25	30	
Muftiya	4.5	4.5!	
Qayara	4.5	4.5!	
Subtotal	638	704	
Central Refinery	-	140	Planned to start activities prior to the Gulf War. The refinery was to be fed from East Baghdad field (up to 80 MBD) and backup from Basra crude. Some site preparation, conceptual and basic design was made just before the start of the Gulf War.
4 New skid mounted refineries		<u>80</u>	
Grand total		924	

3-REFINED PRODUCTS

According to OPEC data, the products in 1000 BD that were refined during the years 1997 -2000 were estimated as:

	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>
Gasoline (88 & 92)		69.4	71.6	69.1	75.8				
Kerosene (+ jet fuel)	32.9	34.8	32.8	36.5					
Distillate	137.8	141.5	136.4	151.9					
Residuals	138.7	143.2	138.2	158.8					
Others	66.6	68.7	66.3	78.9					
Total	445.5	459.1	442.8	493.2	531.9				
Refining capacity	603.0	603.0	603.0	603.0					

Losses are within 5% in the conventional refineries and about 10 in the skid mounted units comprising the packages of Kirkuk, Nasiriya, Haditha, Baiji and Samawa. The average refinery yield is about 20% Gasoline, 17% Kerosene, Gas oil 12% and 45% Residuals.

4-CONSUMPTION

The consumption requirements were estimated by OPEC:

	1000 BD									
	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	
Gasoline (88 & 92)	122.2	126.5	122.5	134.3	141.8					
Kerosene (+ jet fuel)	66.1	68.0	65.7	71.9	76.3					
Distillate	183.9	185.1	178.3	194.3	206.0					
Residuals	123.2	128.3	124.1	135.7	143.4					
Others	109.0	112.7	109.1	119.5	126.6					
Total	601.4	620.7	599.6	655.3	694.0		(800.0)		(900.0)	

The reported consumption seems to be more than production for all products except for the Residuals that are mostly fuel oil. The reported surplus of fuel oil is:

	1000 BD				
	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>
Surplus Residual	15.5	14.9	14.1	22.5	27.8

Surplus fuel oil is normally exported to Turkey and the Gulf Area and it is very difficult to find out how much is that. The consumption figures look higher than the actual demand. On the other hand some 30000-50000 b/d were being injected in Kirkuk field during years of sanctions after 1995. While other consumption figures may be on the high side during the sanctions era, they do represent reasonable guidelines for a forecast. They nearly correspond to the domestic needs in normal conditions, no sanctions.

The consumption trend indicates that the refining capacity should increase to about 800 MBD in year 2003 and 900 MBD in year 2005. The implication of that is the immediate need for retaining the old total capacity of the refineries plus going ahead with the central refinery. The estimated growth in the consumption may be less than what both the Northern Governorates and the rest of Iraq needs. The change of the mode of life in North of Iraq requires more consumption than what was assumed before.

It will be necessary to install at least 4 skid-mounted units of 20 MBD each, in Sulaimaniya, Arbil, Mosul and Dhuk. Hopefully the total refining capacity in the country will be around 925 MBD by 2004. The expected surplus of fuel oil in the coming few years, assuming no sanctions, is around (250-300)000 BD. The first four projects in section 5 below are expected to resolve the problem of the fuel oil, by converting it to white products.

The technoeconomic feasibility study of the export refinery, previously planned to be in Basra, may be upgraded to decide whether to go ahead with the project or not.

LPG has not been included in this presentation as it is part of the Gas Utilization Plan. Long term planning has show surplus in LPG for the production scenarios of 4.5 and 6.0 MMBD.

5-UPGRADING AND EXPANSION

Plans drawn out before the last Gulf war included upgrading and expansion. The products specs were slightly below international standards, especially gasoline. Some upgrading took place after installation of hydro-desulphurisation, naphtha reforming and hydrocracking units. Plans to phase out lead from gasoline by installation of isomerization units were mostly postponed. During the two years following cessation of the Gulf war activities, all refineries were restored to most of the pre-war capacity, with additional conversion units installed in some of them. Progress was also made in the construction of the Central Refinery. Dora refinery (Baghdad) restored both its capacity and efficiency of operations including production and specs. A mixture of Basra crude and East Baghdad crude will feed the Central Refinery. The yield will include white products, asphalt and lube oil.

The plan of the Ministry of Oil after lifting sanctions comprises completion of the reconstruction of the damaged facilities, improvement of products specification and meeting rise in local demand for middle distillates and gasoline.

This requires the following projects/ tasks:

A- Upgrading

<u>Project</u>	<u>Aim</u>	<u>Timing, yrs</u>	<u>Est. Cost, \$mn</u>
a- Isomerization	Specifications	2-3	100
Hydrodesulphurisation	Environment		
b- Upgrading Baiji refineries	Efficiency, Specs &	5	600
FCC unit of 75000 BOPD	Reduction of fuel oil		
c- Upgrading Basra Refinery	Reduction of fuel oil	10	650
Hydro cracking unit	Increase middle distillates		
d- Completion of Central Refinery, 140000 BOPD	Local demand & feedstock	5	1000
e- Construction of Subsidiary			
Plants: Wax, 20000 T/Y		5	50
Used Lube oil, 10000 T/Y		5	30
High viscosity Lube 150000 T/Y		10	120
f- Four skid mounted refineries (U\$1.2 million/1000B)		2	100
plus contingency			
Subtotal			2650

B- Rehabilitation and reconstruction

<u>Project</u>	<u>Aim</u>	<u>Timing, yrs</u>	<u>Est Cost, \$mn</u>
a- Baiji 2nd Lube plant	Maintain design capacity	2-3	70
b- Baiji process units	Increase production of gas oil	2-3	20

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c- Baiji waste water Treatment plant	Environmental protection	2-3	30
d- Water treatment	To improve utilities	3	
Baiji, six 100 cum units	Improve utilities		10
Basra RO units, water Purification scheme			50
Three 100 ton boilers			30
e- Safety, fire fighting and environmental control equipment			10
Subtotal			220
Grand total			2870

PART II: STORAGE AND DISTRIBUTION SECTOR

1- BACKGROUND

Surface facilities for storage and transportation of crude oil are completely segregated from those of products. The responsibilities and operation are as follows:

Crude oil: Northern Oil Company and Southern Oil Company.

Products storage within refinery fence: Relevant refinery

Products storage and distribution depots: Oil Products & Gas Distribution Establishment.

Products pipelines: State Establishment of Pipelines.

By 1990, Iraq had over 6000 km of domestic pipelines, 40% of which were allocated for transportation of 880000 BOPD white products. 200 km carries black products to power stations at a rate of 45000 BOPD. The system comprised 11 pumping stations, 17 reception terminals and 33 storage depots with total capacity of 1.7 million cu.m.

Products are transported via two routes. There are the 8" LPG line Baiji- Baghdad and the 2X8" product lines Baghdad- Zubair (Basra) that are capable of batch pumping of three products. **This line was a paramount storage line for gasoline during the Gulf War.**

The gas network included branch off to power stations like Mussayab (South of Baghdad) that is receiving 240 Million cu. ft/day, and Khor AlZubair south west of Basra. Many power stations are fed with fuel oil.

During the period 1985-1987 a 250000 cu. m storage scheme in underground salt caverns, was completed in the vicinity of Kirkuk field. The scheme consisted of five caverns for storing Propane, Butane and LPG. They were connected to the North Gas project (some 15 km away from Kirkuk) where liquids are stripped off the natural gas of the Northern fields.

2- DOMESTIC & EXPORT MARKETS

The storage and transportation systems are very limited now. The local market suffers from very noticeable constraints in winter, which is expected to worsen if we take the

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needs of the Northern Governorates into consideration. With increase of the oil production to 4.5 then 6.0 million b/d more LPG is going to be available. The southern production can be exported via the present LPG terminal while production in the North can be routed to Mousul then possibly to Turkey. An underground storage in the underground thick salts of Tel Hajar may prove to be necessary. The thickness and quality of the salt was investigated in the late 70's-early 80' in at least two wells. A project, which needs to be re-investigated, is the export of LPG to Turkey. A preliminary study is already available with the Ministry of Oil.

There is a need to expand utilization and export of LPG. The immediate storage and transport requirements are:

- Maintenance of the four brine reservoirs and the restoration of the original capacity of Kirkuk Underground Storage Project
- Detailed study with conceptual design of a new 1 million cu m plus project of salt caverns in Tel Hajar near Mousul
- Detailed study with basic design for an LPG line from the North Gas Project near Kirkuk to Mousul then Tel Hajar.
- Rehabilitation of the LPG export terminal in Khor AlZubair (South West of Basra).

3- PROJECTS

The following projects are required:

i- Rehabilitation and Reconstruction

<u>Project</u>	<u>Aim</u>	<u>Years</u>	<u>Cost, \$ mn</u>
1- Refinery storage tanks 47 Tanks of total capacity of 700000 cum	Increase storage	2-3	50
2- Replacement of 20 damaged Products depot tanks, total capacity of 250000 cum.		2-3	20
3- Rehabilitation of Kirkuk LPG underground project		0.5	1.0
4- Rehabilitation of Khor Alzubair LPG export terminal		1	2.0
Sub- total			73.0

ii- Development

<u>Project</u>	<u>Aim</u>	<u>Years</u>	<u>Cost, \$mn</u>
1- Product transportation system 360 km, 8" - 10" pipeline 500 km, 12- 14" pipeline 3 pumping stations, 6000- 8000 cum/d	Flexibility	2-3 5-10 2-3	55 75 20
2- Product storage tanks		3-5	10
Sub- total			160

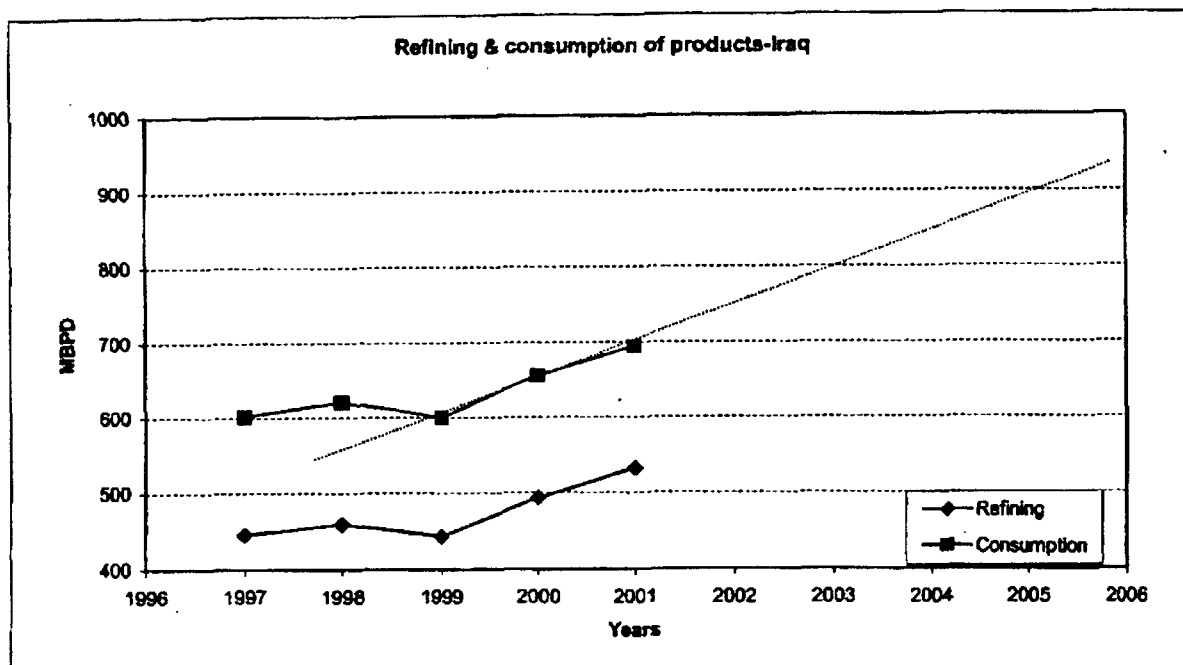
iii- Studies- LPG

LPG line Baiji-Mousul-Tel Hajar- Turkey	0.5	0.25
LPG underground storage in Tel Hajar	0.5	0.25

Grand total **233.50**

4- CONCLUSIONS

Maintenance, upgrading including partial replacement, and expansion is required in the Downstream sector. The expansion must take care of the needs of the Northern Governorates. The estimated cost of the proposed program is 2870 million dollars for the refining activities and 233.5 million dollars for storage and distribution. At least 2.5 billion dollars will be spent in the first 3 years.



Sub-committee on Downstream Oil Sector
January 03

PART I : REFINING

1-BACKGROUND

Overview of Refineries in Iraq.

Production limitations:

- 1 Shortage of equipment & spare parts.
- 2 Poor quality of products & waste water effluents.
- 3 Lack of safety and environmental control.

Common requirements to all downstream operations:

- 1 To upgrade product quality.
- 2 De-bottlenecking operating capacities.
- 3 To improve safety & reduce pollution.

2-REFINERY CAPACITY

- 1 Existing capacity vs. design.
- 2 Capacity expansion by year 2005.

(3 &4)- REFINED PRODUCTS VS. CONSUMPTION

- 1 Surplus of residuals.
- 2 Shortage of other products.

IMPLICATIONS

- 1 Boost production to design capacity in the short term.
- 2 To go ahead for the Central Refinery, meanwhile to install 4 Skid-mounted Refineries.
- 3 Basra Export Refinery feasibility to be revised and to finalize a decision.
- 4 Surplus LPG problem ,if oil production to reach 4.5 then 6.0 mmbd.

5-UPGRADING AND EXPANSION

Upgrading

Objectives:

- 1 Improve specifications of products and environmental standards.
- 2 Optimize product yield to satisfy increasing local demand.
- 3 Project completion in 2-5 years, at estimated total cost 2650 \$ mm.

Rehabilitation and ^{Reconstruction} constraints

Objectives:

- 1 To restore design capacities.
- 2 Maximize gas oil production.
- 3 Improve product , safety, control equipment and increase utilities production.

PART II: STORAGE AND DISTRIBUTION

1- BACKGROUND

Overview of Existing System.

2-DOMESTIC & EXPORT MARKET

Constraints in local markets expected to worsen in the future (excess LPG in the north) when crude is boosted to 4.5 mbpd up.

IMMEDIATE REQUIREMENTS ARE:

- 1 Maintenance of four brine reservoirs and the restoration of Kirkuk Underground Storage Project.
- 2 Detailed study with conceptual design of new 1 million cu m plus project of salt caverns in Tel Hajar.
- 3 Detailed study with basic design for an LPG line from the North Gas Project of Mousel then to Tel Hajar.
- 4 Rehabilitation of the export Terminal in Khor Al Zubair.

3-PROJECTS

Rehabilitation, Reconstruction, and LPG Studies.

Total Estimated Cost 233.5 \$ n mn. Of which 148.5 \$ mn is needed in 3 years.

CONCLUSIONS

Downstream Sector Needs:

- Maintenance, Upgrading , and Expansion.

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- Refining projects est. cost 2870.0 million dollars.
- Storage and Distribution est. cost 233.5 million dollars ..
- At Least 2.5 billion dollars will be spent in the first 3 years.

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Future of Iraq Project

Oil and Energy Working Group

Subgroup 3

Iraqi Natural Gas Policy

Gas reserves:

Iraq's proven natural gas reserves reached 3.11 trillion cubic meters (TCM) or 109.8 trillion cubic feet (TCF) in 1.1.2003. With such reserves, Iraq ranks fifth among the Arabian Gulf countries and tenth among the world's gas-rich countries. The Iraqi Oil Ministry expects proven reserves to reach 4.5-5.0 TCM (159-177 TCF) as a result of exploratory activities after the sanctions are lifted. Around 71 % Iraq's gas is associated with oil, 14% is free and 15% is cap (dome) gas.

Associated gas comes mainly from the Kerkuk, Bai Hassan, Ain Zaleh and Butmah oilfields in the north and from the North Rumailah, South Rumaila and Zubair oilfields in the south. Around 55% of Iraq's associated gas is contained in the existing developed producing oilfields, while around 45% is contained in the undeveloped oilfields. Around 83% of the associated gas reserves are contained in the southern fields, while the remainder (17%) is contained in the northern and central fields. This unbalanced distribution of associated gas reserves is due to the unbalanced distribution of oil reserves, as 75% of the oil reserves are in the south. Besides, The gas-oil-ratio (GOR) in the southern fields is about double that of the northern fields.

All cap gas (except for one) is found in the north and central oilfields, and around 94% of cap gas reserves is contained in five fields: Jambur, Saddam, Bai Hassan, Khabbaz and Kerkuk, while there is a small gas cap in the Majnoon field in the south, being the only oilfield southern Iraq, so far, having a gas cap.

Non-associated gas comes from the Al-Anfal field (near Kerkuk), which was started up in mid-1990. This is the only developed gas field out of six fields containing non-associated gas discovered in Iraq so far. The other five fields, all in northeastern Iraq, are Chemchemal, Jaria Pika, Khashm al-Ahmar, Mansuriyah, and Tel Ghazal.

Associated gas in Iraq is characterized by high heavier liquid components (C3+1) compared with cap gas. Also, Associated gas produced from the southern oilfields is sweet, containing only traces of hydrogen sulphide compared with associated gas from the northern oilfields, which sour and contains around 7% of hydrogen sulphide.

Gas production:

Iraqi gas production started in 1927 in association with oil production. This production increased in the 1970s and reached a peak of 14.4 billion cubic meters (BCM) in 1979, the same year when oil production peaked. With the Iran-Iraq war, gas production declined severely during the first half of the 1980s and recovered during the second half as oil production recovered. Iraqi gas production reached another peak of 11.8 BCM in 1989 before collapsing in the aftermath of the Gulf War and economic sanctions.

Around 70% of associated gas production comes from the southern oil fields. The remainder of gas production comes from the north. The large share of the south in gas production is due to its large share in oil production and also due to the larger GOR of the southern oil fields, as mentioned above. Production of cap gas takes place to support associated gas production. This has been especially so during the 1990s when oil production dwindled. Cap gas from the Jambur field in the north constituted 15-25% of total production during the 1990s.

Domestic gas consumption:

Iraqi natural gas consumption increased gradually and reached a peak of around 6.5 BCM in 1989 before declining drastically in the aftermath of Kuwait's invasion. The main reasons for this decline are the devastation of Iraq's economy, the destruction of a good portion of its gas-consuming industry, and the ongoing economic embargo.

During the decade of the 1970s, over 85% of the produced gas was flared. The portion of flared gas, however, declined considerably with the commissioning of Iraq's gas gathering and processing systems. On the other hand, the volumes of marketed gas, which include gas consumed domestically and gas exported, took an upward trend to the 1989 peak, that is if we ignore the Iran-Iraq war years. Marketed production collapsed in 1991 and started recovering very slowly thereafter. Two wars and an ongoing embargo have prevented Iraq from any sensible indigenous utilization of its abundant natural gas resources.

There is one final comment about the data taken from OPEC's annual Statistical Bulletin. It shows comparatively low levels of gas production after 1997. This cannot be true since, for example, Iraqi oil production in 1999 was similar to that of 1989 and if we assume a similar GOR, then the volumes of gas produced in those two years should have been almost similar. The low levels of gas production after 1997 may be due to misreporting of flared gas volumes.

Natural gas is consumed in Iraq by four main sectors, other than minimal exports to Kuwait, which were stopped after the invasion. The four sectors are: electric power generation, raw material input for industry, industrial fuel and oil industry. The percentage shares of these sectors are shown for 1990 and 1999 in the table below.

	1990	1999
Power generation	27.3	35.2
Raw material input	19.5	25.8
Industrial fuel	12.5	2.2
Oil industry	35.8	36.8
Rexport	4.9	0.0

Source: Oil & Arabic Cooperation (Arabic)

Consumption of liquefied petroleum gas (LPG):

LPG consumption increased slowly with the start of LPG's bottled distribution until it reached 2,500 tones/year in 1970. The apparent limited consumption is mainly due to supply and distribution limitations. When LPG supply improved as a result the completion of the Kerkuk gas treatment facilities, LPG consumption increased rapidly, at an average annual rate of around 32% during the 1970s and around 12% during the 1980s. LPG consumption exceeded 1.6 million tones in 1999. Domestic consumption of LPG is expected to decelerate as markets mature, but demand for it will continue at a healthy growth rate as long as corresponding supplies are secured.

Gas treatment facilities:

Iraq has two gas gathering and treatment systems, which are called the Northern Gas Project and the Southern Gas Project. The Northern Gas Project, commissioned in 1983, was designed to process in the Kerkuk area 7.3 BCM/yr of sour gas to produce 4 BCM/yr of sweet dry gas and around 1.5 million tons/yr of LPG and natural gasoline. The Southern Gas project, completed in 1985 but mothballed till February 1990, was designed to gather up to 20 BCM/yr from the Zubair and Rumaila fields, and process around one BCM/yr in the Basra plant and 6 BCM/yr in the Zubair plant producing up to 5.5 millions tons of LPG and natural gasoline each year.

Future prospects and recommendations:**Option I:**

Domestic demand for natural gas grew at an average rate of around 11% per annum over the period 1970-89 (we ignored the 1990s decade because of the abnormal conditions).

After removal of the economic sanctions, high rate of growth of around 7%-10% in the demand for natural gas is expected to take place. Such growth rate may continue for a decade before declining gradually to around 4%-5% per annum. Power generation, utilizing combined cycle gas turbines (CCGT) and the petrochemical industry will be the main consumers of natural gas.

Domestic consumption of natural gas has to be encouraged for two reasons: one reason is that natural gas is a clean fuel, environmentally friendly and cheaper and more efficient to utilize in power generation using CCGT. The other reason is that Iraq contains very huge oil reserves and it is paramount that it becomes a very important oil supplier. It is far more profitable for Iraq to export high-rent oil than low-rent gas.

Natural gas supply in Iraq will meet expected demand, as oil production takes an upward trend. In order to provide the gas supply, however, upgrading and expansion of the gas treatment facilities and transportation lines have to be made.

As for the possibility of exports, Iraq exported associated gas to Kuwait for a brief period (1986-90) through an 170km, 40-inch, 400 MMCF/day (4.1 BCM/year) pipeline linking the southern field, Rumaila, to a pumping station in northern Kuwait. Supplies were, of course, halted after the invasion. On a larger export scale, Iraq signed in 1997 a protocol with Turkey to export 10 BCM/year of natural gas over a 20-year period. On the Iraqi side, a short, 44-inch pipeline extension is proposed to be built from the north-east region to the Turkish border while, on the Turkish side, a pipeline is proposed to be built to link up with the pipeline bringing gas from the Russian Federation.

Export of natural gas is not recommended for the same reasons mentioned above to encourage domestic utilization. Furthermore, Iraq's natural gas reserves are comparatively small. It is certainly feasible for neighboring Iran, and definitely Qatar, to export natural gas, since they rank second and third in the world in natural gas reserves. This is not the case with Iraq. The free gas, which was proposed to be exported to Turkey from the northern area, should the northern area itself. Additionally, it should be used as a make up source in times of oil production decline and also to meet peak demand. Turkey, after all, is currently replete with natural gas, and it is already connected via pipelines with Russia and Iran and will, in the near future, be connected with the Caspian gas supplies.

As for Kuwait, although it has already been agreed between Qatar and Kuwait that Kuwait be supplied with Qatari via an undersea pipeline, it is more feasible for Kuwait to get its gas from Iraq for several reasons, including Iraq's proximity to Kuwait, the presence of a gas line already connecting the two countries and abundance of natural gas in the south.

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It is recommended, in case of the availability of surplus gas in Iraq, that such gas is directed to storage and/or re-injected to maintain oil reservoir pressures.

Option II:

Quote

"Iraq contains 110 trillion cubic feet (Tcf) of proven natural gas reserves, along with roughly 150 Tcf in probable reserves. About 70% of Iraq's natural gas reserves are associated (i.e., natural gas produced in conjunction with oil), with the rest made up of non-associated gas (20%) and dome gas (10%). Until 1990, all of Iraq's natural gas production was from associated fields. In 2000, Iraq produced 111 billion cubic feet (Bcf) of natural gas, down drastically from peak output levels of 700 Bcf in 1979. Within two years after the lifting of U.N. sanctions, Iraq hopes to produce 550 Bcf., and within a decade, Iraq aims to be producing about 4.2 Tcf of natural gas annually. Since most of Iraq's natural gas is associated with oil, progress on increasing the country's oil output will directly affect the gas sector as well. Natural gas is both produced with oil and also used for reinjection for enhanced oil recovery efforts. Generally, Iraq's policy is to award gas and oil concessions to companies from countries supporting the easing or lifting of U.N. sanctions (i.e., France, China, Russia). Russian companies reportedly are hoping to develop a number of natural gas production and processing facilities in Iraq, including a group of fields in the Misan region of southern Iraq.

Main sources of associated natural gas are the Kerkuk, Ain Zalah, Butma, and Bai Hassan oil fields in northern Iraq, as well as the North and South Rumaila and Zubair fields in the south. The Southern Area Gas Project was completed in 1985, but was not brought online until February 1990. It has nine gathering stations and a larger processing capacity of 1.5 billion cubic feet per day. Natural gas gathered from the North and South Rumaila and Zubair fields is carried via pipeline to a 575-Mmcf/d natural gas liquids (NGL) fractionation plant in Zubair and a 100-Mmcf/d processing plant in Basra. At Khor al-Zubair, a 17.5-million-cubic-foot LPG storage tank farm and loading terminals were added to the southern gas system in 1990.

Iraq's only non-associated natural gas production is from the al-Anfal field (200 Mmcf/d of output) in northern Iraq. Al-Anfal production is piped to the Jambur gas processing station near the Kerkuk field, which is 20 miles away. Al-Anfal's gas resources are estimated at 4.5 Tcf, of which 1.8 Tcf is proven. In December 2001, Russia's Gazprom reportedly was negotiating possible development of al-Anfal. In November 2001, a large non-associated natural gas field reportedly was discovered in the Akas region of western Iraq, near the border with Syria, and containing an estimated 2.1 Tcf of natural gas reserves. It is not clear whether or not the field is associated or non-associated.

In August 2001, Iraqi oil minister Rashid announced that Iraq had reached an agreement with Turkey to build a \$2.5 billion gas pipeline to Turkey, and possibly on to Europe. Iraq aims to increase its natural gas exports to Europe, and Turkey could be a key transit center. Iraq also would like to export natural gas to Syria, Lebanon, and Jordan."

Unquote

The Country Analysis Brief of EIA, as quoted above, signifies the scope of Iraq's Natural Gas (NG) sector. Iraq has one of the most important reserves in the world.

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Given world trends of the NG sector and new technologies, this resource can be converted to real wealth for the Country and its financial needs.

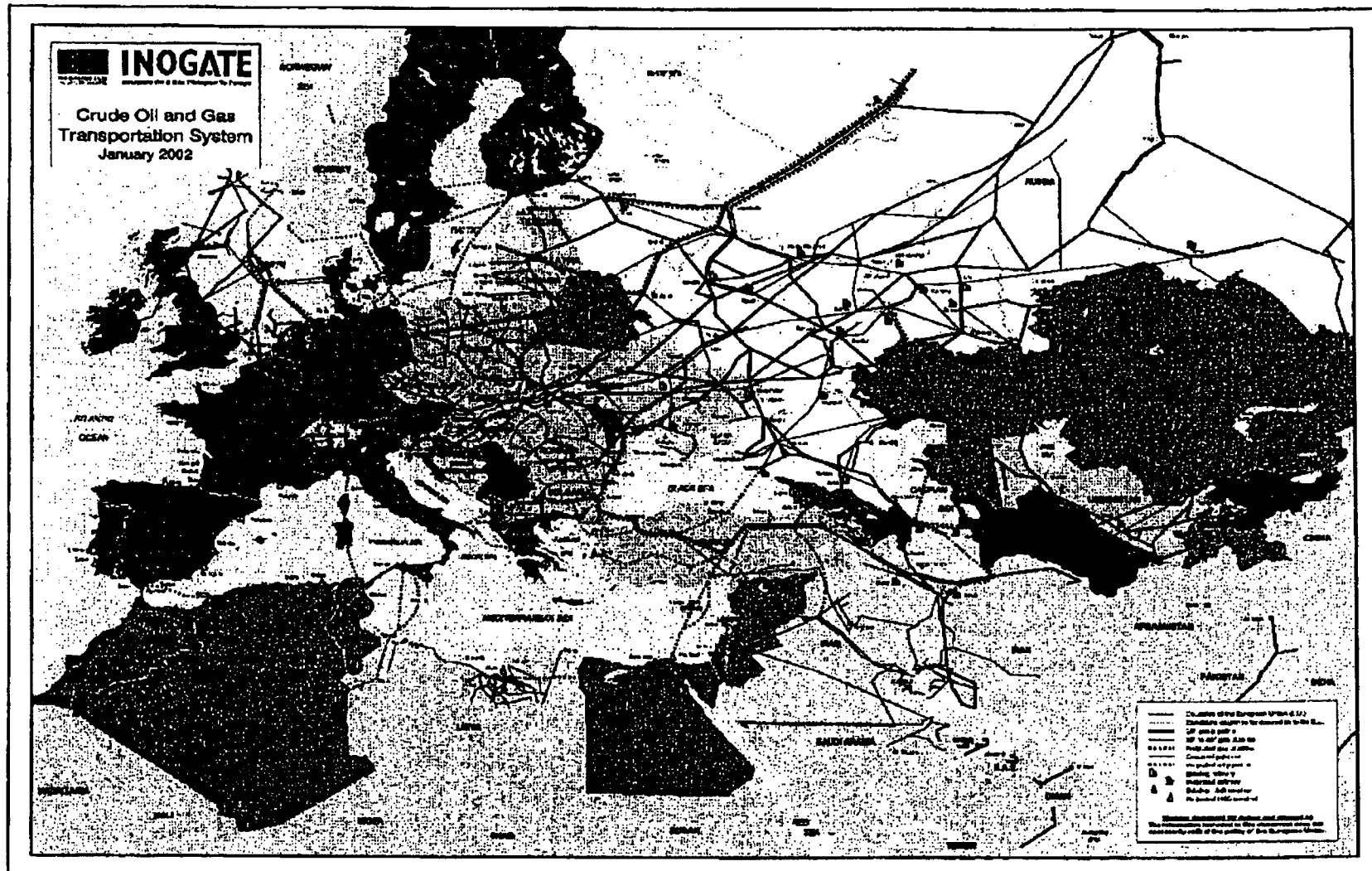
NG sector should be considered as a priority, perhaps along with the Oil sector rehabilitation and development process, during and after the period of rebuilding Iraqi infrastructure. The reasons are:

- **Geographic location of Iraq, as an alternative to Russian reserves and a "southern route" for exports to the consumption areas in Europe with Turkish consumption along the way; As it can be seen very clearly from the attached map of "INOGATE" Iraq is one of the main alternatives of NG supply to Europe and the infrastructure for transportation are almost complete. This will give the advantage of exporting without the need for huge investments budget for pipelines. (Attachment I)**
- **Relative and incremental costs of production as more than 70% of Iraqi NG reserves are "associated gas" with crude oil production, thus reducing capital allocations for exploration and production;**
- **Estimated decline in (real terms) price of crude oil as Iraqi production and supply is to increase will be partially balanced by export sales of NG; The price comparison table taken from "bp statistical review of the world" is self explanatory. (Attachment II)**
- **As OPEC protocols do not cover exports of NG, Iraq will be free to export gas at competitive prices to level the effect of long-term displacement of crude oil consumption that will, in turn, apply pressure on Iraqi market share for crude oil (always assuming that Iraq will remain in OPEC);**
- **NG is an environmentally friendly fossil fuel that will match forecasted limitations in emissions.**
- **Electricity production using NG-fired turbines are rapidly replacing coal and fuel oil facilities. New developments and technologies in this sector are the most realistic methods of electric power production and potentially for district heating (specially in the Northern parts of Iraq).**

As a result, taking into consideration the general acceptance of Privatization and Integration to the World economy as bases for all economical aspects, NG Sector in our country can be one of the main driving tools for economy and must be paid the most attention.

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Gas: Prices	LNG	Natural gas	Natural gas	Natural gas	Natural gas	Crude Oil
US dollars per million Btu	Japan	European	UK	USA	Canada	OECD
	CIF	Union CIF	(Heren NBP Index)†	Henry Hub†	(Alberta) ‡	Countries CIF
1984		3.26		-		5.00
1985	5.23	3.83	-	-	-	4.75
1986	4.10	3.66		-		2.57
1987	3.35	2.59	-	-	-	3.09
1988	3.04	2.36				2.56
1989	3.28	2.09	-	1.70	-	3.01
1990	3.64	2.82		1.64	1.05	3.82
1991	3.99	3.18	-	1.49	0.89	3.33
1992	3.62	2.76		1.77	0.98	3.19
1993	3.52	2.53	-	2.12	1.69	2.82
1994	3.18	2.24		1.92	1.45	2.70
1995	3.46	2.37	-	1.69	0.89	2.96
1996	3.66	2.43	1.85	2.78	1.12	3.54
1997	3.91	2.65	2.03	2.53	1.36	3.29
1998	3.05	2.26	1.92	2.08	1.42	2.10
1999	3.14	1.8	1.64	2.27	2.00	2.98
2000	4.72	3.25	2.68	4.23	3.75	4.83
2001	4.64	4.19	3.22	4.07	3.61	4.06

Source: BP Energy

Source: Natural Gas Week

Note: CIF = cost in London (average prices)

†Source: Natural Gas Week.

Note: All prices are in US dollars (average prices).

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IRAQ: ECONOMIC DEVELOPMENT, THE OIL SECTOR, AND MEMBERSHIP OF THE WTO*

-Iraq's development and the development of its oil sector are interwoven and should be viewed in a wide perspective. The Iraqi economy will, for a foreseeable future, depend on oil revenues to finance its investments and butteries its operations. In the longer term, Iraq's stability and prosperity will depend on how successful it is in establishing a sustainable base in agriculture, industry and services, and on how efficient it has been in utilizing its natural resources.

-War reparations, accumulated debts, building the damaged infrastructure and meeting the basic needs of a population deprived for more than a decade, would undoubtedly weigh heavily in the economic policy decisions. But considerations for the development and stability of the economy, for meeting the need of the growing population, and its aspiration for a sustainable higher standard of living call also for concentrating on the fundamentals of growth and development.

-A lost decade of sanction, and three decades of one party rule, militarism, wars, and perpetuate internal and external conflicts, coupled with an erroneous development strategy anchored on the omnipotence public sector, have resulted in an economy totally inadequate. An economy which has failed both to meet the needs and aspirations of its population, and be integrated in the world economy.

-The country may on the surface look strongly linked to the world economy. It exports most of its crude oil and imports most of its foodstuffs, raw materials, and capital goods. But its productive domestic sectors (goods and service producing sectors) make very little if any contribution to this trade. The inadequacy of Iraq's economy was well illustrated during the sanction. After four decades of investments in agriculture, manufacturing, and services, the greater part of the country's need for goods and services were met from foreign supplies through the Oil for Food Programme.

-The inadequacy and inefficiency that characterized Iraq's economy and its performance extended also to the performance of its oil sector and utilization of its other natural resources. For example, in the period 1999-2001 and "contrary to the common perception...the volume and value of Iraq's oil...was at or close to the record level, averaging 2.5 mbpd". This production level, it is reported, was only exceeded in five years in the entire history of Iraq's oil production. Yet this level when expressed as a percentage of Iraq's 112,5 billion barrels proven reserve, results in a production yield amounting to 0.8%, which is the lowest compared to the production yield in any other oil producing country in the world. (See paper entitled "Consideration Relevant to an Oil Policy for a Liberated Iraq", The Future of Iraq Project: Oil and Energy Working Group. Oil Policy Subgroup. Pages 1-3, and Notes and Sources, London, March 2003).

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-This unsatisfactory economic performance is man made. It is the result of dictatorship, dogma, centralization, inaptitude, and easy excess to funds. But it can, as experiences elsewhere have shown, be redressed through democracy, transparency, decentralization, ownership, and efficient management of the economy.

-However, adequate economic systems can only be attained by applying world-tested standards and rules, and efficient management requires adherence to tested economic methods.

-The need to establish adequate and efficient economic systems has persuaded the great majority of nations in the world first to create the economic environment that induces efficient performance of business in the private and the public sectors. Securing such an environment has also proved to be essential for achieving sustainable development.

-The experiences of 170 countries in the world, including all of Iraq's neighbors and trade partners (except Syria) (Saudi Arabia is in the process of accession) show that the way to create the right economic environment is by seeking and becoming a member of the World Trade Organization (WTO). Membership of the WTO usually takes a long time (5 to 7 years). Applying for accession helps therefore to put the economy on the right course to set up the prerequisites for creating the right economic environment. These prerequisites, it is to be noted, constitute the fundamentals of modern economic system. They are also the necessary conditions for integrating in the world economy.

-Membership of WTO has a number of other important advantages.

- a. It will guaranty access to the markets of all WTO members. Unless a member, Iraq's exports will not enjoy fair and non-discriminatory treatment in these countries. Membership helps to secure Most Favored Nation treatment and avoid arbitrary tariff and non-tariff measures against Iraq's export.
- b. It will remove unjustified export restrictions on Iraqi imports. Iraq relies heavily on imports of raw materials, equipment and machinery together with a wide range of services, all of which could be subject to arbitrary restrictions to non-WTO members.
- c. By predicating availability in the country of a business environment conducive to competition WTO membership will facilitate efficient operation of economic apparatus. It calls for national legislation to establish transparency, accountability, and elimination of monopolistic practices.
- d. It will send a signal to international investors that the Iraqi economy provides the necessary guarantees for investment, protects intellectual property rights, and promotes transfer of technology and modern business and production practices. It will therefore promote development of local technical capabilities.

-It is therefore important that as soon as normality is restored to the country, serious steps are taken to apply for accession to WTO and make Iraq part of the multilateral trading system. This is necessary to establish more stable trade relations and defend Iraq's trade interest. The country at the moment is denied the means for resolving its trade disputes with its trade partners. It has no forum that can be described as neutral and independent to resolve its trade disputes. Bilateral arrangements meanwhile are an anachronism fraught with problems.

-Membership of the WTO therefore should be an essential part of Iraq's development strategy. So long as Iraq remains outside the WTO system its competitors among the WTO members will have advantage, and Iraq will be denied the opportunity to gain experience in trading under WTO rules. In addition, the Iraqi government will have no say in shaping future WTO rules to safeguard its interest even in issues relating to oil.

-Moreover, the requirements imposed on new comers are becoming increasingly stiffer. For example, member countries are becoming increasingly determined to secure deeper and broader access to the market of new members. It is therefore highly recommended that Iraq apply for accession to WTO as soon as possible to play its expected role in shaping trade rules.

-The timing of the accession to WTO would be opportune for another reason. It will coincide with the building of the economy of the free, federal, and democratic Iraq. The old institutions, laws, legislation, and rules that governed Iraqi economy for half a century will have to be discarded and replaced by new institutions, legislation, and rules. The latter will have to be based on the best international practices. This is necessary to reduce bureaucracy, create cost-efficient business environment, and induce investment.

-Implementing major policy, legal, institutional reforms are part and parcel of the accession for WTO. It is therefore in the best interest of the country that the reforms that need to be introduced soon are in the direction of the best practices that are also in conformity with the WTO Agreements. The WTO rules, it has been proved, provide sound discipline for decision making, introduce the rule of law, reduce corruption, limit discretionary authority, ensure accountability and promotes transparency. It is also important to underline that WTO rules allow countries to retain their rights to safeguard local producers from unfair trade, and programme the scaling down of protection and subsidies.

-Regarding the oil sector, as we know OPEC is established to coordinate and unify the oil policies of its members. It recommends measures to protect the individual and collective interests of its members. It works to stabilize oil prices in the international market against price fluctuations to ensure stable revenues for the members, and maintains stable supply of oil for the consumers, with a fair income for investors in the oil industry.

-Contrary to the generally held view, oil and gas are very much part of the GATT and WTO Agreements. If they have not, until recently, been brought up to the WTO negotiation, it is

because there has been a "Gentlemen Agreement" between some powerful interest groups in the WTO, who believe that oil, as a natural resource with a limited supply, should not be subjected to the same competitive market mechanism as other goods. Soon however several aspects of trade in oil are likely to be the subject of WTO negotiation.

-Membership of the WTO it should be stressed does not permit selectivity. In other words WTO Agreements are binding in their interity. In addition, not being a member in the WTO is not a guarantee to protect against what may be considered as "unfavorable" implications. More than 90 per cent of the international trade is conducted under the Agreements.

-There is therefore a consensus among the oil producers that it is advantageous to seek the WTO membership. Memberships, it is argued, strengthens the negotiation position of the oil producers and enable them to form a strong block within the WTO to counterbalance the consumer countries. Thus, Iraq's membership in the WTO will allow her to pursue its own interest inside OPEC and WTO, and strengthen OPEC member's position inside the WTO.

The following are some of the key reform measures that may have to be introduced to bring Iraq's foreign trade regime into full conformity with the WTO to allow accession.

1. Enact a law on internal trade in goods to comply with GATT 1994 and the Agreement on Imported Licensing.
2. Eliminate all measures that are inconsistent with Article I of GATT 1994.
3. Repeal legislation that require import and export licensing that are in violation of compliance with GATT 1994.
4. Repeal all legislation requiring import and export prohibition.
5. Amend the law on customs or enact a new one.
6. Adopt implementing regulations on customs valuation.
7. Adopt implementing regulations on broader enforcement of intellectual property rights.
8. Assess all trade-related fees and amend relevant legislation to reflect the approximate cost of services.
9. Enact law on anti-dumping measures and adopt implementing regulations.
10. Enact law on countervailing measures and adopt implementing regulations.
11. Enact law on safeguard measures and adopt implementing regulations.
12. Reduce subsidies that may not in line with the country's commitment.
13. Amend standards legislation.
14. Amend legislation on sanitary measures.
15. Amend legislation on phytosanitary measures.
16. Amend legislation on veterinary measures.
17. Review all technical regulations and eliminate any that are unjustified.
18. Review all sanitary, phytosanitary and veterinary measures and eliminate any that are unjustifiable.
19. Trade in intellectual property rights.
20. Amend the law on copyrights.
21. Amend the law on patents.

22. Amend the law on Trademarks.
23. Enact law on industrial designs.
24. Enact law on variety protection.
25. Enact law on commercial secrets.
26. Enact law on integrated circuit.
27. Enact law on commercial secrets.
28. Enact law on unfair competition.
29. Establish enforcement infrastructure for all the above mentioned laws.
30. Trade in services.
 - a. Amend law on Foreign Investment.
 - b. Enact a law on competition policy.
 - c. Enact a law regulating natural monopolies.
 - d. Ensure gradual compliance with the Most Favored Nation principle.
 - e. Review all regulations governing services and revise to conform to GATS conditional obligations.
31. Institutional requirements: attend to all the institutional requirements involved to operationalize the above-mentioned commitments.
32. Institutional requirement:
 - a. Judicial, arbitral or administrative tribunals to review and correct administrative action relating to customs matters.
 - b. *Central government standardization body.*
 - c. Investigating authority and administrative tribunals to review administrative actions.

OIL COORDINATION GROUP

Proposal to the 4th meeting of the OEWG

This proposal is a replacement to the ADHOC committee that was suggested in the 3rd meeting of the OEWG. It centers on preparing a data bank for major requirements of the Crash Program to resume production operations.

This proposed Coordination Group will be very useful in case a partial resumption of oil operations is needed before the war is completely over. Such a need is forecasted to support the Oil for Food Program.

The scope of activities of the Group may be expanded to include:

- 1- preparations for local training and recruitments of needed international experts to assist Iraqis to run the upstream and downstream operations.
- 2- Revision of the work of the OEWG based on the new changes to the status of the oil industry and requirements.

The work requires allocations of few experts and a budget. We strongly recommend an immediate start.

The transitional stage of the oil industry during the Crash Program will be heavily in need of materials, spare parts, equipment, service contracts and co-ordination with the Iraqi Oil Operators IOO (companies). Direct intervention with the activities whether in the form supervision or follow up will create bitterness and condemnation from the IOO's.

ORIGINAL PROPOSAL ADHOC COMMITTEE

DISADVANTAGES:

- 1- Scope of activities restricted to upstream sector
- 2- It looks like a think tank with authorities of upper management that undermines the capabilities and sole role of the IOO's
- 3- Scope of involvement too big to be handled:

*Assessment of the immediate requirements, a prime role of the IOO's already dictated by status of the industry & best known by IOO's.

ADVANTAGES

Provides satisfaction to the Iraqi experts in exile in return for a service to their country.

NEW PROPOSAL COORDINATION GROUP

ADVANTAGES:

- 1- Provides support and not supervision
- 2- Cut short the time and effort for procurement, studies and other services
- 3- May shorten the time for maintenance and other services and hence resumption of oil production to the required level
- 4- Helps foreign suppliers and others to provide help as needed, and in coordination with the Iraqi Operators.
- 5- Gives satisfaction to the Iraqi experts and specialists in exile, that they are contributing to their country and not specifically looking for a job

The present events in Iraq indicates that there will be quite a time before oil production can be resumed. War damages so far do not seem to be much! (28th Mar 03). The days to come will show if extra damage will be inflicted in the surface installations, both upstream and downstream. Some more oil wells may be damaged. Following the the end of the waror after establishing the necessary stability in the areas related to oil production including pipelines, export terminals and offices;removal of mines and war debris will be necessary. This is to be followed by site clearance and repair works. Material, spareparts and equipment will be needed. A data bank containing the related information (RI) will be very usefu:l

Known suppliers, contractors, consultants and service companies

Addresses

Lists of items with range of price and deliverability

Shipping costs

The following scope of work is suggested:

- 1- Advertise an 'appeal' to all suppliers who might have supplied Iraq with key materials, equipment and services to both the upstream and downstream sectors (Key Items, KI).
- 2- Prepare a list of KI (can be arranged without much difficulties) .
- 3- Build a data bank of the KI and related informations RI

This will require naming the group, setting up a budget, and providing office facilities and necessary accommodation. Group members must be experienced and familiar with the usual requirements of both the downstream and or the upstream oil sectors.

It is preferable that selected members are those who actually worked in Iraq.

THE GROUP

We need at least 3-5 specialities in the the following activities:

Oil Production, storage and pumping

Refining and gas handling

Pipelines

At least one experienced secretary will be needed to help in making the contacts, arrange the input and prepare the data bank. Good computer skill is needed

THE BUDGET

The group should aim at two months period to gather the information and build up the data bank.

	US\$
Three experts (US\$X a dayh)	180X
Secretary (US\$Y a day)	60Y
Accmmmodation & meals (US\$Z/day/ person) for 3 persons	180Z
Total

FEED BACK

Continuous feed back of the changing status of the oil industry during the current warmust be ensured.

EMERGENCY PLAN FOR OIL PRODUCTS

It looks that the war is going to be long which most probably will endanger the safety of the downstream operations. This plan concerns the availability of LPG, gasoline, diesel oil and kerosene for the domestic need.

The source for LPG is the production of associated gas that may not be possible in times of crisis. It is very likely that damage to the refineries will take place, affecting the availability of refined products. In all cases more products are needed for the people of the North.

Two 20000 b/d skid mounted refineries with material for two tank farms are needed. One refinery is required to handle Kirkuk type crude while the second is to take Basra Medium. A third one may be needed, to handle Buzergan type crude for Maisan province.

The present LPG port facilities in Khor AlZubair must be inspected together with the related storage and pumping facilities of the South Gas Project. Preparation of running the related facilities to reverse-pump imported LPG from the terminal must be made. We propose setting up of a study group for this plan, immediately.

History of Oil Exploration in Iraq

UNCLASSIFIED

UNCLASSIFIED

- Iraq has attracted many groups and geologists since the beginning of the century ; starting in the Kifri area in 1905 and 1910 due to the presence of bituminous deposits , and hence the known "Kifri Coal" . Few other Asphalt and oil seepages are known to cover the Mesopotamia.
- In 1918 the Anglo- Persian Oil Company reported on the geological aspects in the above area.
- In march 1925 , and prior to the confirmation of the Turkish Petroleum Company's Concession , the geological aspect were examined in 1919-1920 and 1922.

The agreement was signed in 1925 , and T.P.C. Concession covered all regions from Baghdad to Mosul. Intensive geological reconnaissance was carried out from late 1925 to 1929, mapping of the major structures was carried out at high speed , and a tentative order of structural testing and relative evaluation of structural prospects was arrived at.

The first exploratory well, drilled on the Pulkhana structure, was commenced in 1927

The progress of the exploratory Drilling

<u>Well</u>	<u>Commenced</u>	<u>Abandoned</u>
Pulkhana -1	5/4/1927	23/11/1927
Pulkhana-2	27/4/1927	13/12/1927
Khashim Al Ahmer-1	2/5/1927	2/10/1928
Injana-1	14/6/1927	24/5/1929
Jambur-1	15/9/1927	5/5/1929
Pulkhana-3	27/7/1928	27/10/1929
Injana-2	21/11/1928	22/4/1929
Injana-3	10/6/1929	2/2/1930
Injana-4	13/7/1929	12/2/1930
Pulkhana-4	22/8/1929	5/2/1930

UNCLASSIFIED

The above wells were abandoned for
mechanical reasons arising from strong water
or gas shows

UNCLASSIFIED

- Exploration drilling was discontinued during April 1930, following the decision to develop the Kirkuk field, where oil was struck in October 1927. The well was drilled in 1925 near the gas seepages of the famous "Eternal Fires".

- Geological work was carried out up to the outbreak of war.
- By 1932, 26 wells were completed in the Baba Dome of the Kirkuk structure, and the 12-inch pipelines to the Haifa and Tripoli terminals had been commenced.
- The Turkish Petroleum Company had changed its name to the Iraq Petroleum Company, a consortium made up of a number of international companies (BP, Shell, CFP (TOTAL), Esso (Exxon), Mobil, and Partex (Gulbenkian Interests).

- Another consortium of companies- British oilfield development company (BOD) - with large German interests-obtained a concession west of the Tigris river and discovered heavy sulphurous oil in several structures in the Mosul region in the late 1930's (Qayarah, Najmah, Qasab, etc.), these were never developed and the concession was taken over by an associated company of I.P.C., Mosul Petroleum Company (M.P.C) which subsequently discovered better oil at Ain Zalah.
- In March 1931, the original concession terms were modified.
- Exploitation and exploratory extension drilling of the Kirkuk field has continued up to the present, with one break during the war period between April 1940 and September 1943.

- The construction of the two new 16-inch pipelines from Kirkuk to Tripoli and Haifa was started during late 1946.
- The Tripoli line was completed and put into operation,
- But the outbreak of the Palestine war prevented the laying of the southern line west of the Jordan river, and this line has never been used.
- Construction of a 30-inch line to the Syrian port of Banias, on the eastern Mediterranean coast, was completed in April 1952. This line runs parallel to the northern limb of the previous pipeline system as far as Homs, there it diverges to Banias.

- Few more exploration wells were drilled in the region. Jambur-2 encountered oil in commercial quantities in 1953.
- As far as geophysical exploration is concerned, apart from a single brief seismic survey season during 1929, when certain southern structures (in Kirkuk) were investigated ion attempts to determine the subsurface crest line and elevation on the Tertiary reservoir rock, there was no such investigation in I.P.C. area prior to 1947.
- After 1939- 45 war, exploration in Iraq stepped up, when another associated company of I.P.C., Basrah Petroleum Company (B.P.C) , obtained a concession over a southern part of Iraq. The Nahr Umr and Zubair accumulation were found by seismic in the Basrah area in 1948/49, and Rumaila discovery in 1953

- In 1947, a seismic reflection survey was made, covering the syncline between the Bai Hassan and the southern flanks of the Kirkuk structure. More survey covered the Bai Hassan structure.
- Reconnaissance survey by gravimeter and magnetometer was commenced in the area between the Diyala and Tigris river in may 1952.
- Other areas, in Kirkuk, was covered by these method of geophysical exploration.
- In 1955, the Pulkhana was surveyed by geophysical exploration, then Injana, and Gilabat.
- Throughout the years 1925-1961 extensive field geology surveying was carried out, supporting the exploration activities.

- Post war oil discoveries were made at Butmah by M.P.C., at Jambur and Bai Hassan by I.P.C. , and at Zubair and Rumaila by B.P.C. , all of which fields were on production when Iraq government.....

- Revoked the exploration rights of the I.P.C. and associated companies in 1961, leaving them only the currently producing fields; any discoveries not actually on production at that time were taken over.
- Finally, the I.P.C. producing fields were also nationalized, in 1972, and 1973, as part of the settlement between I.P.C. and Associated Companies and Iraqi government, the M.P.C. oilfields were handed over to the government- owned Iraqi company for oil operation (I.C.O.O.) which has also taken over the running of the Kirkuk, Bai Hassan , and Jambur fields in the original I.P.C. concession.

- Then, in late 1973, the Iraqi government nationalized the interest of certain groups- Exxon, Mobil, Shell, and Partex-in B.P.C., leaving only CFP and BP as their foreign partners.
- The shares of these were taken over in 1975 following negotiations.
- In 1967, the Iraq National Oil Company (I.N.O.C), which was formed in 1964, had taken over exploration right over the rest of Iraq outside the producing fields, although the running of.....
- Naft Khanah (originally operated by A.I.O.C, later BP) which straddles the Iranian border as the Nafti-I shahr field had been handed over some previously, and I.N.O.C. also operated the
- Qayarah heavy-oil accumulation in the Mosul region, discovered by B.O.D., to provide Asphalt for Iraq.

- Subsequently, I.N.O.C. also took over all production operations in the country.
- Late 1960s , I.N.O.C. entered a service contract agreement with the French ELF-ERAP concern, as a result of which first Siba (SE of Basrah) was discovered, then , three oil discoveries were subsequently made at Jabal Fauqi , Abu Ghurab, and Buzurgan in the former B.P.C. exploration area.
- Other service contract agreements were made with the Indian Oil Natural Gas commission (O.N.G.C.) and Braspetro, the latter making a major discovery at Majnoon in south eastern Iraq close to Iran border.

- Two of the ELF fields briefly went on production in 1976, but because of a dispute with Iraq, ELF transferred all operations to I.N.O.C. in 1977.
- That year the ONGC relinquished its contract area (Abu Khaimah etc) and Braspetro did the same in 1979.
- Two new pipeline systems were constructed to facilitate the evacuation of the increased oil output - the so-called "strategic pipeline" linking Kirkuk - Haditha - Fao; and.....
- A 40 - inch line which connects Kirkuk area oil fields with Turkish Mediterranean port of Dortyol

- Later, post Gulf war, few agreements were signed with the French (TOTAL) to develop Majnoon and Russian Lukoil to develop West Qurna.
- Lukoil deal was cancelled and other agreements were signed with three different Russian companies. However, these were only on paper! And part of a political game between Saddam's regime and Russia.
- Few other agreements were signed namely with the Chinese to work on Ahdab structure, Shell and ENI Companies to work in the southern oil fields. Negotiations were held with the Malaysian and Korean governments. All these were pending due to sanctions.

**SHORT TERM OF REHABILITATION
OILWELL AND PIPELINE FIRES**

12.03.2003

1.OILWELL FIRES:

Oil wells in Iraq are verywell protected by present Iraqi regeme now for the reason of protecting the oilwells from anti Iraqi regeme of Kurks living independently from Iraqi regeme. But what we should worry about is the unavoidable desasters to the oil wells, christmas trees after Saddam leaving the power. It is verywell known that these well head christmas trees are in cellars and some are covered by concrete slabs but some others are not. Any dïstructive attack will blow out some part or the whole of the well head christmas tree and may or maynot cause a fire, in case of breack out without fire the safety precautions should be taken to protect the christmas tree then starting the workover must be done as without delay, that is by careful study of the outcoming of the desaster and it's situation on site, which is actually one of the extreemly dangerous and critical industrial desaster ever because of any small mistake takes place causes dangers to the lives of the workers and the installation also the loss of money and time, this critical situation needs special skilled and experienced men to reach the the aim of repair by finding the exact defectd of the wellhead for trying to stop the blow of gas and oil with the possible modern technology. This may take days of remedy depending on the technology followed therein. This is done by removing the upper part of the affected tool like the casing flanges whatever the size it may be, by an endeavour of reching the affected of rupture place then replacing convinient new casing flange by following extreme standard safety measures, using the safe tools and equipment in the dense gaz and open crude oil atmosphere and pressure. Although these matters are one of the most difficult situations to be faced in oil business, but we could come over it many times safely and conviniently to bring the wells into production during my experience of life working as a toolpusher and firemarshal for 38 years in the oil fields of Kirkuk, Bay hasan, Jambur, Injana, Ain zala and Rumaila high pressure wild cat fields .

Considering all the safety precaution are implemented and the area surrounding declared as battey limit of No Fire and No Smoking area then the first thing to be done is to divert the oil blow out flow to a safe place, by excavating a large ditch in a safe distance to contain the flowing oil including to order large numbers of oil tankers to convey the extracted oil which should be sent to nearest oil storage or refinery, the dich must be in a distance not less than 100 meters away from the well head then flowing the oil via a trench deeper than the cellar base of the wellhead to facilitate the oil flow by gravity leading to the excavated large ditch. No smoking area

should be defined by safety signals, All the equipment used and engines including the surrounding must be explosion proof and the heavy equipment exhausts must be protected by spark arrestors and silencers, all the tools must be spark proof. The working crew must wear self contained breathing apparatus or air line masks but never an oxygen mask. The work starts with reaching the christmas tree in the direction of the wind flow. In the case of difficulty of capping the flow then is wise to dismantle and remove the upper part of the affected christmas tree, then replacing a convenient blow out preventer like cameron or schaffer blow out preventer with accessories then kill the well by mud and start the work over.

For the second part of the mishap is that the well head catches fires, which will happen in most of the instances, because of the explosion and friction of the construction of the Christmas tree or an oil well rig etc. The unconventional fire fighting methods is to blow out the wellhead by explosives as it was used in old times, because of the disaster caused to the wellhead without accurate measure of the exact place of the wellhead defect. The safest method to be followed to extinguish the fire first by covering the wellhead by wet or dry earth by means of heavy earth moving appliances which must reach the area in the first place, then the area must be cooled down by means of water spray but it is advisable to leave it to be cooled by the ambient atmospheric temperature, it is possible if the time permits you may flood the area with high viscous and velocity mud or dry powder jets but the most economic way is to extinguish the fire with high velocity of sand or dust collected from surrounding area, or if available by using jet compressors of large amount of sand blasting including the smothering the area by high pressure of water sprays down wind. The safest and more practicable method is that an earth moving appliances like a bull dozer, shovel or excavator or back hoe which ever is available must reach the area. With the fire, Safety and ambulance appliances. Then the surrounding mud, soil, earth or sand must be compiled over the wellhead, while other excavators prepare a large ditch then the process of removing oil and repairing should be followed as above. Using foam is waste of money and fire prevention, because of high dense of the flame and extremely high heat the foam will dry up and wasted in the open area of the fire of the wellhead, the surrounding area of the fires must be extinguished by covering earth as it all these to be done within very limit time to save time and money for repair and maintenance of the well head restoring the wellhead.

2. OIL PIPELINE REPAIR.

You cannot see not even one horsehead on any oilwells neither in Kirkuk or any Iraqi oilwells. The oil flows from the wells by its pressure or by means of water injection to the oil reservoir. These oils of Kirkuk fields are

gathered in the process plant through the degassing stations and pumped to K1 tank farm to be pumped to the pipelines. The pipelines extended from K1 tank farm through the following pipelines to the mediterranean and persian gulf:-

KIRKUK FIELDS PIPELINES

1. 42" Pipeline to Ceyhan terminal in Turkey conveying 35mta. Of oil
2. 47" Pipeline to Ceyhan terminal in Turkey conveying 35mta. Of oil
3. 42" Pipeline to Basrah terminal conveying 35mta. Of oil
4. 32" Pipeline to Banias "Syria"
5. 32" Pipeline to Tripoli "Syria"
6. 12" Pipeline to Hayfa "Israel" abandoned
7. Pipeline to Daura refinery in Baghdad

BASRAH AND RUMAILA FIELDS PIPELINES

All are collected in Basrah and qurna tank farms then used to be pumped to Kor Al Amara offshore or Mina Al Bakr or Abadan for exportation.

After the production from the Christmas tree via tubing or annulus of the well, the second important matter is the explosion of the different sizes of the pipelines, which may or may not catch fires. In the first case the oil draining from the rupture pipeline should be trenched to a safe area to a pond excavated and transportation of drained oil to be transferred to road tankers to be taken to the nearest oil terminals all in safe and explosion proof methods....etc. then the ruptured piece of the pipeline and the case to be carefully studied to repair, maintain or by pass the pipeline by stoppling methods or else, this should be studied and decided on site for draining the pipeline and starting the repair. All safety precautions must be implemented as to use explosion proof tools, engines, excavators, vehicles, electric pumps and non sparking tool, etc., for the personal protection self contained gas masks or air line masks to used. The repair should be carried out on an reasonable empty pipeline, but the no welding what so ever should be carried out on empty pipeline unless there is a flow of oil or gas through the pipeline then the welding and hot work on the pipeline must be implemented, the affected part should be cut by cold cutter method the cut piece should be removed by not to cause any metal to metal friction that causes any sparks all the area must be safely protected including all the engines and generators or compressors to be on safe distances and explosion proof equipment must be used in all the operation time, while the oil transfer is over, then both ends of the cut pipe should be isolated, and taped with balloons and the area isolated and entirely gas freed then the suitable piece of the pipe to be replaced, both ends either to be clamped tightly with some about 90 bolts, a flow of oil must be started before any

welding starting then the claps should be welded. all these should be carried out at the same temperature of the day considering the expansion and contraction of the pipeline which may lead to leave a gap in the welding place or dislocations may happen every precaution should be taken while measuring the correct pipe to be replaced. This is the fastest operation of oil pipeline repair. In case of a fire, the fire fighting starts from the rupture place using land excavators, bulldozers etc. to cover the rupture place and stop the flow of oil the cover the area with earth extinguishing as much fire of the area that may extend to 4 or 5 km sq. of area with leaving no fire or spark source of fire, to leave the pipe for cooling instantly until the pipe temperature drops down to workable media, by this time a trench must be prepared opposite the oil drainage area, after the cooling of the area and surroundings are safe but still utmost care had be taken for no smoking area of 100 meters diameter of area, then the drainage of oil must be started from the rupture area to a reasonable ditch excavated for the purpose of the collection of the drained oil, the oil should be drained and transported to a nearby terminal by road tankers, until the oil drainage stops, then the pipe repair starts for commissioning the pipeline for transportation of oil as fast as possible.

EQUIPMENT NEEDED TO STAND BY FOR EMERGENCY

1. Fully equipped of Largest sizes and capacity of firefighting appliances
2. Fully equipped ambulance and resuscitation appliance.
3. Heavy and light earth moving equipment.
4. Fully equipped workshop.
5. Fully equipped communications appliance.
6. Large water road tankers.
7. Large empty oil tankers.
8. Water pumps and relay water lines of large dia.
9. Very well equipped ware house on trolley.
10. Dewelling caravans and or tents for the personnel.
11. Mobile restaurant with no alchohol.
12. Mechanical, Electrical, communications etc., men.
13. Compressors, welding and repair machines etc.



**IRAQ PETROLEUM CO. Ltd.
BOTAŞ IRAQI-TURKISH PIPELINE AND
CEYHAN OIL TERMINAL**

B6