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Iraq Oil: Reserves, Production, and Potential Revenues

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Summary

Iraq's potential oil wealth remains largely unrealized. Substantial proven reserves exist, and there are likely more resources awaiting discovery. But oil production has been slow to fully recover from the recent war, and many obstacles stand in the way of achieving a stable export flow. And refineries are in need of rehabilitation, necessitating imports of gasoline and cooking fuel within Iraq.

Despite these difficulties, the existence of vast resources suggests easy exploitation and lucrative export earnings that could help fund Iraq's redevelopment. But the sheer resource size masks the difficulty, described in this paper, of generating export revenues that could fund reconstruction and development and offset appropriations approved by Congress in late 2003. This report will be updated as events warrant.

Iraq Oil Reserves and Production. With 112 billion barrels of proven crude oil reserves, Iraq has the world's second-largest endowment of oil, amounting to 11% of the global total. Only 17 of 80 oil fields have been developed; the most significant are Kirkuk in the north and Rumaila in the south. There has been virtually no exploration for many years, suggesting that Iraq may have much more oil than currently estimated. Iraq also has significant proven natural gas reserves; virtually all are undeveloped. As a point of reference, Saudi Arabia, at 260 billion barrels of proven oil reserves, has the largest reserve base and can produce as much as 10.5 million barrels per day (mbd).

Iraq's most recent peak production was realized just before its invasion of Kuwait. In July 1990, output reached 3.5 mbd, before exports were halted by an international boycott. Before the latest war, Iraq's production averaged 2.5 mbd. During 2004, output has varied between 1.9 and 2.4 mbd; exports have been as high as 1.6 mbd but average considerably less as security issues periodically disrupt the flow of crude to export terminals in Turkey and the Persian Gulf.

Iraqi reserves, were they more intensively developed, could easily support much greater production. Amounts three times greater than Iraq's highest output — rivaling Saudi Arabia's production — could potentially be achieved with the application of up-to-

date geological technology and substantial investment in field development and infrastructure. The Department of Energy (DOE) estimates that the cost of bringing oil production on line in Iraq is among the world's lowest, about \$3-\$5 billion per mbd of output.¹ Such potential productivity suggests that Iraq offers one of the world's best long-term petroleum prospects, with substantial output from relatively few wells, which currently suffer from deferred maintenance.

In contrast to a mature oil-producing province such as the United States, where 521,000 wells produce about 5.8 mbd,² Iraqi output comes from only 1,600 wells capable of producing almost 3 mbd. The comparison (U.S. wells average about 10 barrels per day, while Iraqi wells can average several thousand) points up the prolific nature of Iraq's hydrocarbon-bearing geology, and points toward easily realized production increases with the application of current geologic technology and the drilling of additional wells.

The slow recovery of Iraqi oil output after the invasion of Kuwait suggests that realizing Iraq's ultimate potential will require much work in the oilfields and significant new infrastructure. After the first Gulf Crisis, oil production fell to about 500,000 barrels per day, an amount sufficient for domestic consumption. With the start of the U.N. Oil-for-Food program under Resolution 986 — first implemented in December 1996 — oil exports increased, although oil flowed on a stop-start basis as a result of various disagreements between Iraq and its customers and/or the United Nations. During 1999-2001, production averaged 2.5 mbd.³

After the regime change, production — which virtually halted during the fighting — began to increase. Deferred maintenance and damage to wells, gathering facilities, refineries, and mainline transport facilities slowed the effort to restart production. Security issues and difficulties with electric power supply have proven to be hindrances. Some oil — about 200,000 to 300,000 barrels per day — is being reinjected into wells because of local refining and transport constraints in the northern fields around Kirkuk. In some instances refineries were stripping gasoline and propane fractions from crude and re-injecting the leftover petroleum. Among other considerations, this unusual measure poses a difficulty in determining how much net production is taking place.

Current Exports and Near-Term Potential. Domestic consumption in Iraq averaged about 500,000 barrels per day (b/d) before the recent conflict, but current internal demand may be at least 100,000 b/d less. The domestic consumption picture is clouded by refineries' inability to produce needed fuels, leading the Coalition Provisional Authority (CPA) to sponsor imports of gasoline and propane from other countries. The supplemental funding for Iraqi operations includes \$700 million for fuel imports, and this is likely to continue after the June 30, 2004, governmental transition.

The Organization of Petroleum Exporting Countries (OPEC) reported Iraqi production of 1.90 mbd in February 2004,⁴ reflecting a steady climb from 680,000 b/d in July 2003. Exports continued to expand through April, reaching 2.38 mbd, but fell to 1.90

¹ *Iraq Country Analysis Brief*, Aug. 2003, p. 3.

² *International Petroleum Encyclopedia* — 2003, p. 219.

³ *Iraq Country Analysis Brief*, Aug. 2003, p. 4.

⁴ *Platts Oilgram Price Report*, June 11, 2004, "OPEC Output Jumps 670,000 b/d in May," p. 3.

mbd in May. As much as 300,000 b/d of that production may have been reinjected,⁵ because there is no reliable export route from northern fields, and refineries in that region cannot operate at anywhere near full capacity. OPEC reports gross production, and not exports. Exports are in effect calculated by subtracting consumption from production. In the case of Iraq, this calculation must be further adjusted to reflect the unusual practice of reinjecting oil back into producing fields. Assuming that reinjection and refining each account for 200,000 b/d, and that production is 1.90 mbd, exports could easily run 1.50 mbd based on output levels prior to a mid-June episode of pipeline sabotage impacting Persian Gulf exports.

Looking past current oil field difficulties, Iraqi Oil Minister Ibrahim Bahr al-Ulum — speaking in Vienna after the September 24, 2003, OPEC meeting — outlined the profile of Iraqi production volumes for the next few years. As quoted in *Platts*,⁶ al-Ulum indicated production would rise to 2.0 mbd by the end of 2003, and to 2.8 mbd by the end of March 2004. Further ahead, Iraq plans on reaching 3.5 to 4.0 mbd by the end of 2005, and 6.0 mbd by the end of the decade. His estimated end-of-2003 production target came close to actuality. And it may well be that the targets he outlined are supported by fundamental resources, but persistent security issues have been a setback.

Were security to be improved as the provisional Iraqi government becomes established, the production ramp-up might continue as predicted. For example, if the pipeline to Turkey were to become fully operational and northern oil fields to come online, the al-Ulum target might be met. But the processing facilities, pipelines, terminals, and other handling facilities required to move a large volume of additional crude oil call for improved security and considerable investment and construction, which may or may not be ultimately achievable in the time frame the minister described.

Crude Oil Export Pricing. Current oil exports from Basra are priced to sell in end-markets at figures that will allow purchasers to recoup transport costs. In October 2003, the State Oil Marketing Organization (SOMO) set prices for U.S.-bound crude equal to NYMEX prices for West Texas Intermediate (WTI), minus \$5.20 per barrel.⁷ For Europe-bound crude, the price is Brent crude minus \$2.70 per barrel. This works out to a recent export (fob) price in the \$32 to \$33 per barrel area, although it is important to reiterate that Iraqi export prices are designed to fluctuate with volatile spot markets in New York and London.

Iraq is a founding member of OPEC but has not participated in its deliberations since the Kuwait invasion. When OPEC met in September 2003, with Iraq in attendance but not “participating,” it voted to cut the production quota for the 10 Cartel members with quotas by 900,000 barrels per day. This was seen as an initial step in accommodating the return of Iraqi crude to international commerce, as well as possibly paving the way for Iraq’s full participation in OPEC. While OPEC policy remains market-oriented, it has reserved a place for Iraq to return to active participation in the cartel’s world oil market activities. This may have been in the process of happening before Iraq’s output and exports fell as a result of increasing acts of sabotage starting in April 2004.

⁵ *Wall Street Journal*, Nov. 6, 2003, “Iraq’s Oil Industry Is Slowly Rebounding,” p. B2.

⁶ *Platts Oilgram Price Report*, Sept. 25, 2003, “Iraq to Double Oil Production to 3.5-4 mil b/d by End of 2005,” p. 1.

⁷ *Platts Oilgram Price Report*, Sept. 10, 2003, “Iraq Set to Release Oct. Oil Prices,” p. 1.

The Development Fund for Iraq. In March 2003, fighting began in Iraq, and the U.N. adjusted the Oil-for-Food program. On March 28, the U.N. Security Council in Resolution 1472 adjusted and extended the program (until November 21 under Res. 1483) to facilitate the rebuilding of Iraq. A Development Fund for Iraq, held in the Central Bank, was established to be the repository of future oil revenue, and authority for administration of ongoing activities was transferred to the Coalition Provisional Authority. The Oil-for-Food program's phase-down period ended November 23, 2003; during the phase-down, the U.N. transferred \$3 billion to the CPA, which continued to supply humanitarian goods. Subsequent revenues were deposited with the Development Fund.

As the CPA approaches dissolution on June 30, U.N. Resolution 1546, regarding the transition of Iraq to a democratically elected government, notes⁸ that the funds held by the Development Fund shall be disbursed solely at the discretion of the Government of Iraq. The arrangements for depositing oil export revenues into such a fund — as delineated in U.N. Resolution 1483 — shall continue to apply, and the International Advisory and Monitoring Board shall continue its monitoring activities.

Current Export Situation. Terror attacks against oil facilities increased in April 2004 and began to reduce the flow of exports. In mid-June, pipeline bombings in the southern oil fields halted exports through Basrah for nearly two weeks. *Platts* reports that prior to the explosions, exports stood at 1.5 mbd, up from the May monthly average of 1.35 mbd, but down from the 1.8 mbd April average. Since late March, port agents' information suggests loadings have typically averaged around 1.4-1.6 mbd when there have been no weather or sabotage related delays.⁹

Export Revenues — Some Hypothetical Calculations. Many anticipate that Iraq's rebuilding and development will eventually be self-financed with oil revenues. Given large proven reserves, Iraq may ultimately achieve prosperity supported by crude exports. While it is tempting to begin anticipating revenue flows, much needs to be accomplished in terms of security and basic civil engineering projects like electric power and water supply. And oil field and infrastructure rehabilitation is needed before old production levels are fully realized and new production developed. In short, it may be premature to start predicting future oil revenues, even though large proven reserves suggest big revenue flows may be near at hand.

How much might these revenues be? Potentially large, but highly speculative. These estimates are based on assumptions on the amount of production that might actually be attainable, as well as the price that production might sell for. During the past five years, prices — ranging as low as \$10 and as high as \$40 per barrel — have fluctuated as much as Iraqi production. Beyond the normal churning of oil markets, the presence or absence of Iraqi oil is a factor in determining prices. Both prices and amounts exported present moving targets, and add risk to any computation of Iraqi oil revenues.

With this note of caution in mind, some purely hypothetical revenue estimates are shown in **Table 1** below, based on assumed export volumes and prices at current levels and at the upper and lower ends of OPEC's price band, the \$22 to \$28 target price range in which OPEC attempted to keep prices during the past several years.

⁸ U.N. Resolution 1546, June 8, 2004. Article 24.

⁹ *Platts Oilgram News*, June 22, 2004. p.5.

Table 1. Hypothetical Iraq Crude Oil Annual Revenues
(\$ billions)

Exports (mbd)	Revenue @ \$32/barrel	Revenue @ \$28/barrel	Revenue @ \$22/barrel
1	12	10	8
2	23	20	16
3	35	31	24
4	47	41	32

Source: Author's illustrative calculations.

Iraqi Exports. Export infrastructure issues are an important factor bearing on the amount of crude that can be exported. They are discussed extensively in the DOE Country Analysis Brief for Iraq, which is the source of much of the information discussed in this section. Export flow of about 1.6 mbd can be accommodated through the Mina al-Bakr loading facility on the Persian Gulf, although further repairs might be needed to handle more oil. This has been renamed, and is now known as the oil port at Basrah. It was heavily damaged during the first Gulf War but has been brought up to its original capacity of 1.6 mbd.

Another Persian Gulf export facility is located at Khor al-Amaya. This facility was destroyed during the first Gulf War, and is reportedly ready to load 400,000 bd.¹⁰ This would bring Persian Gulf export capability to 2.0 mbd, a figure which could exceed near-term capacity of southern oil fields. How much crude will actually be exported through this terminal could also be limited by shallow water and weather related loading conditions, likely restricting its use to smaller tankers.

Opening the pipeline to the Mediterranean is a key near-term export capacity consideration. The 600-mile Kirkuk-Ceyhan pipeline supported much of Iraq's oil-for-food exports. It actually consists of a pair of parallel pipes, although only the 40-inch diameter pipe — having a nominal capacity of 1.1 mbd — was used. The second pipe — with a diameter of 48 inches and a nominal capacity of 500,000 barrels per day — is reportedly inoperable.

There have been several attempts to operate the 40-inch diameter pipeline since the fighting stopped, but repeated sabotage prevents its normal, continuous operation. There is no projected in-service date, and exports from the important northern fields near Kirkuk can take place only sporadically. The pipeline reopened in March 2004, but shipments were sporadic because of security problems. With significant storage at Ceyhan, SOMO has been able to accumulate stored shipments that are auctioned off when sufficient storage levels are reached. Recent sabotage has halted shipments for most of June. Reportedly, shipments of about 200,000 barrels per day began on June 22.¹¹ This is much less than the pipeline's nominal capacity or the 450,000 barrels per day seen earlier this year. But it does offer the possibility that SOMO may hold another auction of Kirkuk crude this summer.

¹⁰ *Platts Oilgram Price Report*, Feb. 24, 2004, "Iraq Loading Terminal Khor al-Amaya Ready to Load Crude," p. 1.

¹¹ *Platts Oilgram Price Report*, "Basra Oil Loadings Below Capacity; Kirkuk Resumes," June 24, 2004, p. 1.

In addition to the pipeline to Turkey, a number of very old, unused pipelines exist. The extent to which they may be operable is not known, but they are currently out of service. Among the routes are a north-to-south pipeline in Iraq, one that crosses Saudi Arabia to the Red Sea, a 50-year old pipe to the Syrian port of Baniyas, and a connector from Mosul to Haifa, Israel.

A new export option for Iraq could be via Kuwaiti oil terminals, Oil Minister al-Ulum told reporters during a visit to Kuwait. Quoted in Platts,¹² he stated: “The future Iraqi policy [will adopt a strategy] to have various export outlets.” Al-Ulum elaborated further that he had discussed this with the Kuwaiti Oil Minister, and further discussion would take place.

Iraqi Oil Industry Organization. Technocrats in the Iraqi National Oil Company and SOMO report to Thamer Gadban, Chief Executive of the Ministry of Oil, and Oil Minister Ibrahim Bahr al-Ulum. The National Oil Company manages production and refining, while SOMO handles export transactions. Monies received from these deals are deposited in the Development Fund for Iraq, described above.

Gadban and al-Ulum were appointed by the Iraqi Governing Council. Philip Carrol, a retired Shell executive, served as the Coalition Provisional Authority’s first senior advisor to the Oil Ministry but stepped down in October 2003. Carrol was originally intended to head a global board of advisors that would ultimately be in charge of the Iraqi oil industry, but it was subsequently decided that Iraqi technocrats could carry on without extensive foreign input.

As Carrol assumed his responsibilities, the *Los Angeles Times* reported:

The decision was prompted in part by the reluctance of foreign oil company experts and prominent Iraqi expatriates to join the board. The expatriates expressed concern they would be perceived by Iraqis as agents of a U.S.-orchestrated takeover of the Iraqi industry. Some oil companies reportedly were reluctant to assign key personnel to the effort, fearing that their participation might sour future business deals in Iraq.¹³

His replacement, Robert McKee, a former ConocoPhillips executive, continued Carrol’s policy of Iraqi management of day-to-day operations. McKee left at the end of March 2004, leaving day-to-day operations in the hands of the Iraqi Oil Ministry staff and Oil Company/SOMO personnel. As of June 22, the CPA had stopped answering questions relating to oil matters, referring all inquiries to the Ministry of Oil in Baghdad. A CPA spokesman said: “We’ve handed over media responses on this to the Ministry ... in preparation for the handover on the 30th.”¹⁴

¹² *Platts Oilgram Price Report*, “Iraq Eyes Exporting Oil via Kuwait,” November 20, 2003, p. 1.

¹³ *Los Angeles Times*, “U.S. to Let Iraq Manage Its Oil,” August 18, 2003, p. 1.

¹⁴ *Platts Oilgram Price Report*, “Basra Oil Loadings Below Capacity; Kirkuk Resumes,” June 24, 2004, p. 11.