

THE MINERAL INDUSTRY OF

IRAQ

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Minerals continued to dominate Iraq's economy in 1994 as it had for decades, with petroleum the cornerstone. Prior to Iraq's invasion of Kuwait in August 1990 which caused the United Nations (UN) to impose economic sanctions, Iraq was one of the world's top 10 oil producers and top 12 sulfur producers. It was also an important regional producer of cement, as well as phosphate and urea (nitrogen) for fertilizers. Its crude oil reserves of more than 100 billion barrels (bbl) were the world's next largest after those of Saudi Arabia, according to tabulations in the *Oil & Gas Journal* of December 26, 1994.

Before 1990, minerals—in essence, crude oil—had typically provided more than 95% of foreign earnings estimated at more than \$12 billion for 1989 and more than 70% of a gross domestic product estimated at more than \$35 billion for 1989.²

War damage from the Gulf War and the earlier 1980-88 war with Iran appeared to be substantially repaired by yearend 1993, based on various reports. In addition, some new installations and expansions of existing facilities continued to be announced. Nevertheless, pending Iraq's full compliance with the several UN resolutions that ended the Gulf War hostilities in 1991, the trade embargo on everything except humanitarian needs remained a severe restriction on the country's mineral production, as well as the entire economy. Industrial production during 1994 was thus mostly limited to satisfying domestic consumption. However, UN exceptions apparently allowed exporting a relatively small quantity of oil and sulfur to Jordan. A smaller amount of crude oil and diesel oil also was presumably permitted to go to Turkey from a UN-protected, essentially autonomous, Kurdish zone in the country's north. Additionally, the press reported some covert exporting, at least to Iran, as well as stockpiling.

The Government controlled all industrial production and foreign trade for many years, although some private ownership was permitted in smaller secondary industries, services, and most of the agricultural sector. Through 1994, as in the past, the economy remained significantly oriented toward supporting large military and internal security forces, and the Government continued its long-standing policy of restricting release of statistical and even general information on industrial activity.

Several years prior to the Gulf War, some steps began to be taken toward liberalizing the economy. A new law was adopted in 1988 permitting private and foreign investment

but limiting participation to Arab capital. However, shortly thereafter, reports indicated that other investors would be considered on a case-by-case basis. In September 1993, a decree issued by the ruling Revolutionary Command Council authorized partial privatization of the "thousands" of state-owned enterprises under control of the Ministry of Industry and Minerals. It was to be accomplished by the formation of stock companies and public sale on the Baghdad stock exchange of up to 75% ownership, with a minimum of 25% being retained by the Government. Oil and defense companies were not under that Ministry's control, so presumably they were not affected.

However, the oil sector was affected by earlier events. In 1992, the Government began discussions with foreign companies aimed at production-sharing agreements for direct participation in the planned expansion of the oil sector. Through 1994, these companies were from France, Russia, Italy, Spain, and possibly other countries. Such discussions were said to be limited to preliminary agreements that could be implemented when UN cease-fire sanctions were removed. Previously, foreign firms could only provide contract services.

Environmental matters did not appear to be of much concern to the Government as evidenced during war-end vandalism to Kuwaiti oil installations and post-war irrigation and drainage projects.

Mineral production information was not available from official and reliable sources. However, various observer's statements in the press generally indicated that outputs had returned to about pre-Gulf War domestic demands with some additional minor stockpiling. Capacities of most prewar facilities were essentially restored by yearend 1993, according to Government announcements. (*See table 1*).

Trade under UN sanctions was limited to humanitarian needs, except for some special cases, but some covert trade was periodically reported in the press. Iraq stepped up its campaign to have the UN embargo removed and received some support, particularly from France and Russia, but the United States and the United Kingdom maintained opposition.

Jordan was permitted by the UN to receive 50,000 bbl per day (bbl/d) of crude oil for processing in their Zarqa refinery plus 25,000 bbl/d of refinery products; but for 1993 at least, Jordanian statistics indicated that actual imports were only 41,000 bbl/d of crude and 13,500 bbl/d of products. Jordan also was reported to have received about 50,000 metric tons

of Iraqi sulfur for phosphate fertilizer production during 1993, and in 1994 industry observers estimated about 200,000 metric tons per year (mt/a) was being sent. Both oil and sulfur were transported by truck. Additionally, the Kurdish zone in northern Iraq reportedly began shipping about 30,000 bbl/d of crude oil by truck to Turkey in early 1992, which presumably continued through 1994.

The Turkish Government continued to negotiate draining the 1,000-kilometer (km) pipeline running from Kirkuk, Iraq, to the port at Yumurtalik, Turkey. The line, closed in August 1990, apparently contained up to 36 million bbl (Mbbbl) of crude oil that could cause corrosion. However, Iraq continued to object to UN restrictions on distribution of the proceeds, and an agreement was still pending early in 1995.

Prior to 1990, the United States was a major trading partner in both exports (principally oil) and imports (mostly manufactures and food). Fertilizers, sulfur, and cement were principal exports to regional destinations. In 1994, press reports indicated Jordan and Turkey were Iraq's major trading partners, both overtly and covertly, and Iran was an important partner in covert trade.

The structure of the mineral industry was not fully defined in available sources, but all mineral commodity production facilities were apparently owned by the Government, except for some small local construction material operations. Some attempts at privatization were reported in 1993, when the Government offered a limited number of shares in a cement plant at Samawah and a brick plant in Diwaniyah, but the offerings were appreciably undersubscribed. Production-sharing agreements with foreign companies were reportedly being negotiated for expansion plans in the oil sector. Participation by such companies was previously limited to service contracts.

The structure of the petroleum sector was unclear because of overlapping responsibilities of the various organizations that were involved, as periodically reported in the press. The Ministry of Petroleum and the Iraq National Oil Co. were obviously major organizations, but their relationship was not clear with each other or with entities that had regional or functional names. Two of these apparently were responsible for at least exploration, development, and production functions in the northern and southern regions. Other entities appeared to be responsible, possibly industry-wide, for separate functions of oil refining, gas processing, distribution, and marketing, as well as other more specific activities, such as oil drilling and equipment manufacturing. The Arab Oil & Gas Directory for 1994 lists 20 major oilfields, 10 refineries, and 2 major gas processing plants. For the most part, operations were in the vicinity of Basrah in the southeast and Kirkuk in the north. Some operations in the north were under independent control of the Kurds.

Other sectors of the mineral industry were apparently under the jurisdiction of the Ministry of Industry and Minerals. Separate organizations or enterprises were established for mining and/or processing of various specific mineral commodities.

Iron and steel facilities were at Khor al Zubair, southwest

of Basrah in southern Iraq. Two natural gas-based direct-reduced iron units using the HYL process of Hylsa S.A. de C.V. in Mexico were listed with design output capacities of 543 thousand metric tons per year (kmt/a) and 950 kmt/a of sponge iron, normally having a content of 90% to 92% iron. Steel facilities were described as including four 70-ton electric arc furnaces.

A uranium mine was reported northeast of Mosul, but no other details were available. Uranium also was recovered from phosphate rock during processing at a fertilizer complex in the west at Al Qaim, but no quantitative data were available.

Cement plants reported in operation totaled either 14 or 15, of which 8 had a kiln capacity of about 2 million mt/a (Mmt/a) or more. Each installation presumably had a limestone quarry associated with it. Most of the plants were spaced at intervals along the Euphrates River from Basrah to the Syrian border. Several plants were in the north near Mosul and Kirkuk.

Ammonia plants were at five locations: three near Basrah in the south, one at Baiji in the middle north on the Tigris River, and one at Al Qaim in the west on the Euphrates River. The nitrogen-content capacities were 110 kmt/a for one unit near Basrah, 370 kmt/a at Al Qaim, and 270 kmt/a at the others.

Phosphate rock was produced from the Akashat open pit mine in the west and, after some beneficiation, was shipped by rail about 140 km northeast to a fertilizer complex at Al Qaim and the other fertilizer plants at Baiji and near Basrah.

Salt was produced, apparently by solar evaporation, from seawater at the north end of the Gulf and from salt lakes in the middle south.

Sulfur was produced from underground deposits at Mishraq, on the west bank of the Tigris River about 50 km south of Mosul in the north. Extraction was through drillholes by the Frasch process of melting with hot water. Additional byproduct sulfur came from processing oil and gas at several locations.

In iron and steel, during 1994 the direct-reduced iron facilities at Khor al Zubair apparently were not operating due to unrepaired war damage, inability to import iron ore, or both. The steel facilities were apparently operating, presumably using scrap.

For cement, little information was available in 1994 regarding progress on repairing war damage that occurred at several installations. Earlier, several plants were reported to have cannibalized one processing line to repair another. In 1993, Kurdish authorities requested UN permission to import repair parts for one cannibalized line of two 3.2-Mmt/a finished-cement lines at the Taslujah plant in their territory, but the outcome was not subsequently reported in available sources.

In phosphate rock, a large new deposit was found in the western desert, according to a Government announcement, but no other details were given. Prior to the announcement, the last new deposit announced in available sources was in 1987 when the Al Murbat deposit near Akashat was

described as containing 2 billion mt of 22% phosphorous pentoxide (P₂O₅) in one layer and 500 Mmt of 27% P₂O₅ in another layer.

Sulfur production was improved late in 1993 when a submerged combustion distillation unit was reported to have gone on-stream at the Mishraq Mine. It was aimed at reducing carbon content to 1%. The design was supplied by Freeport Sulphur Co. of the United States prior to the Gulf War. The unit was said to be a key part of the plan to increase Frasch sulfur production capacity to 2 Mmt/a that was announced in 1992.

Natural gas produced in Iraq was mostly associated gas, and according to the Government, satisfying the domestic demand for gas required producing oil that exceeded the domestic demand for oil, with the surplus oil being reinjected.

In petroleum, two French companies appeared to have reached an agreement with the Iraq Government to directly participate in developing large new oilfields in the south after UN sanctions are removed: Elf Aquitaine at Majnoon and Total at Nahr Umr. Additionally, Italy's Agip SpA, Russia's Lukoil, and Spain's Repsol S.A. were pursuing discussions to develop other large fields in the south. Iraq announced that such foreign investment was aimed at helping achieve a crude oil production capacity goal of 6 Mbbbl/d by the end of the century.

Oil exploration was reported underway since 1992 in the western part of the country, aimed at testing seismic indicators. Production from the first new field since before the Gulf War, reportedly began in March 1994 at 30,000 bbl/d crude and 1.25 million cubic meters per day (Mm³/d) gas from the Khabbaz field, about 30 km west of Kirkuk in the north. The field was discovered in 1976, and development that started in 1987 was interrupted by the War.

Refining capacity was projected to increase by 290,000 bbl/d when a refinery at Babylon, about 125 km south of Baghdad, eventually comes on-stream. Of several new refineries planned prior to the Gulf War, it was announced in 1992 as the only project that was proceeding. The first phase was scheduled to be completed in 1993, but information on actual status of the project was not available. According to Government statements, there was more than sufficient capacity to meet domestic needs without the new refinery.

Pipelines for transporting refinery products and crude for short distances were reportedly completed at several locations, including those needed for offshore ship-loading terminals in the Persian Gulf.

Reserves announce by the Government as of January 1, 1994 included crude oil reserves of 112 billion bbl and gas reserves estimated at 3.1 trillion m³. Government announcements on reserves of other minerals were not clear or consistent.

Infrastructure facilities appeared to be reasonably adequate for more populated areas, although electric power shortages continued to be reported during 1994.

The outlook is for increased mineral production once the Government conforms to UN cease-fire resolutions and sanctions are removed.

¹Text prepared Mar. 1995.

²Estimates from The World Factbook 1991. U.S. Central Intelligence Agency, 1991, pp.148-149.

Major Publication

Arab Oil & Gas Directory 1994, Arab Petroleum Research Center, Paris, France, 1994, 616 pp.

TABLE 1
IRAQ: PRODUCTION OF MINERAL COMMODITIES e/ 1/

(Thousand metric tons unless otherwise specified)

Commodity 2/	1990	1991	1992	1993	1994
METALS					
Iron and steel:					
Pig iron (direct-reduced sponge)	170	--	--	--	--
Steel, crude	150	20	100	300	300
INDUSTRIAL MINERALS					
Cement, hydraulic	10,000	5,000	10,000	12,000	12,000
Nitrogen: N content of ammonia	240	40	200	500	500
Phosphate rock:					
Beneficiated 3/	900	400	600	800	1,000
Phosphorus pentoxide content	270	120	180	240	300
Salt	250	120	250	300	300
Sulfur, elemental:					
Native, Frasch	800	250	500	600 r/	600
Byproduct 4/	380	50	100	200	200
Total	1,180	300	600	800 r/	800
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:					
Gross million cubic meters	9,100	1,900 r/	2,400 r/	5,000	5,000
Dry do.	4,200	1,100 r/	1,400 r/	3,000	3,000
Natural gas plant liquids thousand 42-gallon barrels	11,000	3,000 r/	6,000 r/	10,000	10,000
Petroleum:					
Crude (including lease condensate) do.	745,000	111,000 r/	164,000 r/	187,000	225,000
Refinery products do.	164,000	100,000 r/	120,000 r/	150,000	175,000

e/ Estimated. r/ Revised.

1/ Includes data available through Mar. 1, 1995. Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; data may not add to totals shown because of independent rounding.

2/ In addition to commodities listed, the following also were produced but information is inadequate to reliably estimate output: gypsum for cement (about 0.038 ton per ton of finished cement), plaster, mortar and other products; limestone for cement (about 1.3 tons per ton of finished cement), lime, and construction stone; clay and/or shale for cement (about 0.4 ton per ton of finished cement); other construction minerals (e.g., clays for brick and tile, sand and gravel, stone); uranium and fluorine compounds from phosphate rock processing; industrial sand for foundry use and glass manufacture; and clays for ceramics and refractories.

3/ Estimated to contain 30% phosphorous pentoxide. Last report on crude rock production was for 1988: 3.5 Mmt, estimated to contain 22% phosphorous pentoxide.

4/ Presumably from petroleum and natural gas processing.