

THE MINERAL INDUSTRY OF

MAURITANIA

By Bernadette Michalski

Iron ore mining and beneficiation was the dominant mineral industry in Mauritania and has accounted for more than 11% of the gross national product and about 40% of export revenues. Cement, gypsum, plaster, and salt also were produced. The nation's sole petroleum refinery, operating on imported crude oil, supplied most of the country's petroleum product requirements. In mid-1997, the Société Guelb Moghrein d'Akjoujt was approved to redevelop the Akjoujt copper deposit 260 kilometers (km) north of Nouakchott. Gold recovery from the retreatment of the old Akjoujt copper mine tailings ended in early 1996 because of stockpile depletion. Between 1992 and 1996, approximately 5,000 kilograms (kg) of gold was recovered from nearly 2 million metric tons (Mt) of tailings by using a combined ammonia-cyanide leach. Several exploration programs were underway during 1997. Principal activities were focused on diamond exploration in the north; gold exploration in the Tassast, Tijirit and Inchiri regions, as well as along the Mali border in the south; and offshore oil exploration.

The Direction des Mines et de la Géologie implements Government policies for developing the mining sector, as well as supervises the semipublic mining companies. Government equity participation in these companies ranges from 40% to 77%.

Mining interests are protected under the Investments Code (1989), the Mining Code of 1977 updated in 1988, and the petroleum code (1988).

Production of the nation's foremost mineral commodity, iron ore, was, for the most part, derived from the M'Haoudat Mine, which provided direct shipping ores averaging 65% iron content. (*See tale 1.*) Salt is recovered from coastal areas near Nouakchott. Production, however, does not meet the heavy requirements of the fish-processing industry.

Mauritania's iron ore shipments exceeded 11 Mt in 1997. Most exports were delivered to the steel mills of the European Union with Italy and France as the leading importers.

In 1997 the African Export Import Bank opened a renewable \$10 million credit line for the purchase of oil from Algeria. Other mineral industry imports included about 125,000 metric tons per year (t/yr) of aluminum and copper semimanufactures, 3,000 t/yr of sulfuric acid, 2,000 t/yr of phosphate fertilizer, and about 12,000 t/yr of salt.

General Gold Resources N.L. of Australia, in partnership with Société Arab des Mines de l'Inchiri, engaged Kvaerner ASA of Norway to oversee the \$181 million development program for the Guelb Moghrein copper mine. The 30-month development period includes test work at the mine site to improve cobalt, copper, and gold recovery. A feasibility study by Kilborn SNC-Lavalin of Canada reports a minable reserve of 21.7 Mt averaging 1.81% copper, 1.44 grams per ton (g/t) of gold, and 0.016% cobalt at a copper equivalent cut-off grade of 1.16%. Reserves

should support a 14-year mine life at a planned processing rate of 1.5 million metric ton per year (Mt/yr) of sulfide ore and 242,000 t/yr of oxide ore. Exploitation is planned by conventional open pit methods to a depth of 186 meters (m) below surface. Total output from the mine is expected to be 325,000 t of copper, 26,000 kg of gold in the form of doré bars for subsequent refining, and 2,600 t of cobalt in hydroxide powder form for further treatment to recover cobalt metal. Solomon Resources, Ltd., of Canada, has made a bid to buy General Gold Resources; Mauritanian properties in 1997. Under the terms of the transaction, General Gold Resources would acquire about 50% interest in Solomon Resources Ltd. in exchange for transferring its Mauritanian properties to Solomon Resources, Ltd. General Gold Resources is to continue to provide all management (General Gold Resources N.L., 1997).

Iron ore mining operations were conducted by Société Nationale Industrielle et Minière (SNIM) in the Tiris province in northern Mauritania. More than one-half of the more than 11 Mt/yr production is derived from the M'Haoudat deposit, 60 km northeast of Zouirat. As the nation's major mining company, SNIM employs approximately 4,500 workers. In 1997, SNIM entered into agreement with the European Union to finance three projects valued at US\$16.4 million. The projects are expected to improve the volume and quality of iron ore exports.

The Alexandria National Iron & Steel Co. and the Holding Co. for Metallurgical Industries, both of Egypt, along with Enterprise Nationale de Siderurgie and Ferphos, both of Algeria, have joined SNIM in signing a protocol agreement on the construction of an iron ore pelletizing plant to satisfy demands of direct-reduction plants in the region. The plant's capacity was planned at 5 Mt/yr of iron ore pellets upgraded to a 68% iron content from an average of 36% iron content. The project involves mining and beneficiation at Ayouj, 30 km north of F'Derik and 650 km from the Port of Nouadhibou.

The Rex Diamond Mining Corp. of Canada has obtained two exploration permits, Akchar and El Hammami, covering 46,700 square kilometers (km²) in northern Mauritania. Within this area, the Taoudeni Basin rim was identified as a high-priority area for diamond exploration. An airborne magnetic survey conducted during July through August covered one-half of the basin rim zone, or 100,000 line kilometers. Initial interpretation of the data resulted in the selection of 103 magnetic anomalies, of which 53 have been modeled as pipeline bodies that could be related to diatremes with diameters ranging from 222 to 970 m. Heavy mineral sampling began in October. Mineralogical results showed high kimberlitic pyrope counts on 23% of the heavy mineral samples. Rex Diamond Mining Corporation has applied for a third exploration permit—Tenoumer—covering 25,000 km². All three exploration permits cover the core of the Archaean

Reguibat craton (Rex Diamond Mining Corporation, press release accessed January 16, 1998, at URL http://bix.yahoo.com/prnews/980116/rex_diamon_1.html).

In early 1997, Parliament ratified the 24,645-km² petroleum exploration permit in the Senegal-Mauritania coastal basin provisionally awarded to Hardman Resources NL of Australia in September 1996. The contract allows for 9 years of exploration in 3-year terms and a 25-year exploitation period plus a 10-year extension. The contract initially calls for acquisition of 500 km of seismic survey data and the drilling of at least one well by September 1999. This was the first active hydrocarbon exploration agreement since 1993 and the first under the new petroleum legislation terms which were revised by the World Bank in 1994-95. Mauritania's sole petroleum refinery, Nouadhibou, was owned by the Société Mauritanienne d'Industrie de Raffinage and operated under the technical management of Algeria's Nafta. The 20,000-barrel-per-day-capacity refinery, operating on imported crude oil, supplied most of Mauritania's petroleum product requirements.

Mauritania's proven iron ore reserves are 155 Mt of hematite ore ranging from 60% to 68% iron and 531 Mt of magnetite ore ranging from 36% to 40% iron. In addition to these proven reserves, probable iron ore reserves in the western Guelb amount to 980 Mt of low-grade ores. Reserves at the Guelb Moghrein copper mine from surface to 110 m depth are oxide, 1.7 Mt averaging 1.94% copper, 2.40 g/t of gold, and 0.031% cobalt, and sulfide, 13.7 Mt averaging 1.81% copper, 1.62 g/t of gold, and 0.025% cobalt. Indicated sulfide resources from 110 to 220 m depth at Guelb Moghrein are 10.7 Mt. averaging 1.63% copper, and 0.93 g/t of gold; indicated oxide resources are 0.9 Mt averaging 0.82% copper, 1.54 g/t of gold, and 0.016% cobalt (General Gold Resources N.L., 1997).

The nation's limited infrastructure, which renders all but the largest deposits uneconomic, remained a major barrier. There were four paved roads in Mauritania—from the port of Nouakchott to the copper deposits at Akjoujt in the north, from

Nouakchott to Nema in the east, from Nouakchott to Rosso in the south, and from Boghe to Kaedi on the southern border. The sole railroad in Mauritania was owned and operated by SNIM for the transport of iron ore from the northern mines to the export terminal. The 1.425-m-standard-gauge railroad extends for 704 km from M'Haoudat to the port at Nouadhibo.

In 1997, Mauritania, assisted by the World Bank, was preparing to overhaul its mining sector policies to attract more foreign investment with the objective of diversifying the economic base, increasing employment, and strengthening the technical skills of the labor force. The Ministry of Mines and Industry was revising the mining code and reinforcing and restructuring the state institutions involved in geology and mining. In spite of the nation's heavy external debt burden and significant fiscal balance-of-payments deficits, the existing and planned mining operations suggest an improved outlook for the nation's economy; that is, however, largely dependent on world copper, gold, and iron ore prices.

Reference Cited

General Gold Resources N.L., 1997, Quarterly report for the period ending 31 March 1997: West Perth, Western Australia, General Gold Resources N.L., 20 p.

Major Sources of Information

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TABLE 1
MAURITANIA: PRODUCTION OF MINERAL COMMODITIES 1/

| Commodity 2/ | | 1993 | 1994 | 1995 | 1996 | 1997 e/ |
|---------------------------------|----------------------------|------------|------------|------------|----------|---------|
| Cement e/ | metric tons | 111,000 3/ | 374,000 3/ | 120,000 r/ | 120,000 | 125,000 |
| Gold | kilograms | 1,264 | 1,738 | 1,196 r/ | 189 | -- |
| Gypsum | metric tons | 3,240 | 4,230 | 5,810 r/ | 12,500 | 12,500 |
| Iron and steel: Iron ore: | | | | | | |
| Gross weight | thousand metric tons | 9,362 | 11,400 | 11,610 r/ | 11,360 | 11,700 |
| Iron content e/ | do. | 5,700 | 7,000 | 7,000 | 7,000 | 7,000 |
| Petroleum refinery products: e/ | | | | | | |
| Liquefied petroleum gas | thousand 42-gallon barrels | 418 3/ | 415 | 439 r/ | 440 r/ | 440 |
| Gasoline | do. | 1,938 3/ | 1,925 | 1,962 r/ | 1,925 | 1,925 |
| Kerosene | do. | 471 3/ | 470 | 479 r/ | 470 | 470 |
| Distillate fuel oil | do. | 1,099 3/ | 1,100 | 1,100 | 1,100 | 1,100 |
| Residual fuel oil | do. | 2,357 3/ | 2,355 | 2,458 r/ | 2,450 r/ | 2,450 |
| Other | do. | 635 3/ | 640 | 700 r/ | 700 | 700 |
| Total | do. | 6,918 3/ | 6,905 | 7,138 r/ | 7,085 r/ | 7,085 |
| Salt e/ | metric tons | 5,500 | 5,500 | 5,500 | 5,500 | 5,500 |

e/ Estimated. r/ Revised.

1/ Table includes data available through August 1, 1998.

2/ In addition to the commodities listed, modest quantities of crude construction materials (clays, sand and gravel, and stone) presumably were produced, but output was not reported quantitatively, and available information was inadequate to make reliable estimates of output levels.

3/ Reported figure.