

PORTUGAL

By Harold Newman¹

Portugal, on the Iberian peninsula, is one of the most mineralized areas of Western Europe. The area is geologically very complex, which increases its mineral resource potential. The Iberian peninsula has a diverse mining history that goes back to Phoenician times, and its abundant mineral resources were one of the considerations that precipitated the Roman conquest and development of the region.

The mineral resource industry of Portugal is modest by world standards; however, growth rates during the past few years have made it a dynamic industrial sector in the country. The industry has undergone important changes with the discovery and development of the rich copper and tin deposit at Neves-Corvo. When the mine reached full production in 1991, there was a major increase in European copper and tin production. The country was also a significant tungsten producer.

Environmental Issues

The Government was putting more emphasis on stringent environmental regulations and environmental monitoring as economic growth was intensifying pressures on the environment. Major polluting industries were cement, cork, paper, tanning, and the ceramic industries in the Sines, Lisbon, Porto, and the Barreiro-Seixal areas.

The implementation of the Framework Law on the Environment, which focused on improving water quality, was almost complete. Apart from tighter regulations regarding water pollution, new regulations concerning air pollution, environmental impact assessments, waste, and nature conservation have been passed. The impact of the costs of these regulations has not been determined, however, in some areas it was expected to be significant.

Government Policies and Programs

The Government stated it was proceeding with legislation that would privatize many public companies. The privatization program, begun in 1989, continued with a 25% share of Petroleos de Portugal (Petrogal), the state oil company, being offered to the private sector.

The Government expected that privatization would continue. On the block were cement, chemical, steel, and financial firms, as well as a further 26% share of Petrogal.

The privatization issue was part of a broader program to reduce the role of the state and to restructure the Portuguese economy from one that is state-controlled to one that is market-driven.

There was no uniform procedure for privatization. Some companies were sold on the stock market and others were negotiated with prequalified bidders. A major concern of the Government has been to ensure that Portuguese groups were not overwhelmed by foreign investors with substantially more finances. Maximum foreign ownership percentages were normally established on a case-by-case basis. The Government may elect to retain a substantial voice in management of selected firms.

Production

Sociedade Mineira de Neves-Corvo S.A. (Somincor) continued to produce copper and tin at the Neves-Corvo Mine. Pirites Alentejanas S.A. was the largest producer of pyrite; Siderurgia Nacional S.A. (SN) produced iron and steel; Beralt Tin and Wolfram (Portugal) Ltd. continued tungsten production; and Cimentos de Portugal, S.A. was an important producer of cement. The Jalles Mine, in the Tres Minas gold district, was the only mine in Portugal producing gold as a primary product.

With the exception of copper, ferroalloys, dimension stone, tin, and tungsten, which were of international importance, production of other minerals and related materials had only domestic significance. There was potential for increased production of granite, marble, and slate. (*See table 1.*)

Trade

In 1993, the latest year for which complete data were available, Portugal's major markets continued to be France, Germany, and the United Kingdom, while its major suppliers were Germany, Spain, and France, respectively. Portuguese trade with Spain continued to increase because of mutual tariff and nontariff liberalization.

Table 2 shows the impact of selected classes of mineral commodities on Portugal's balance of payments position in relation to the European Union (EU) and the world.

Structure of the Mineral Industry

By world standards, the mineral industry of Portugal has been modest; however, the country was a significant producer of copper and tin from Somincor's Neves-Corvo Mine. The mine is considered to be one of the richest copper deposits in the world and was the largest copper mine in Western Europe.

Most of the large mineral resource companies were owned or controlled by the Government, although there were some privately owned operations. The Government stated that it was engaged in efforts to privatize some state-owned industries, which included mineral resource companies.

Ownership of minerals was vested in the Government by the Constitution. Any person, Portuguese or foreigner, may explore for and, if a mineral deposit were found, apply for a concession. Deposits were divided into two groups: concessionable deposits (minerals) and nonconcessionable deposits (sand, gravel, and clays). Nonconcessionable deposits were considered the property of the land owner, and concessionable deposits belong to the State. The Government collected certain royalties from concessionable deposits.

All requests for exploration permits or concessions must have specific work programs and investment commitments. The General Directorate for Geology and Mines (DGGM) was the central department of the Ministry of Industry and Energy and regulated the mineral industry, collected statistics, and granted exploration licenses and mining concessions. About 32,000 people were employed by the mineral industry, including mining and processing. (*See table 2.*)

Commodity Review

Metals

Copper.—The Neves-Corvo Mine, which started operation in 1989, was continuing production at the end of 1993. Somincor, the operating company, is 51% Government-owned through the Portuguese Mineral Development Agency (EDM). The minority partner was RTZ Corp., a United Kingdom company that owns 49% of the joint venture.

The mine was designed to produce 1.3 million metric tons per year (Mmt/a) of raw ore which was expected to yield 500,000 metric tons per year (mt/a) of concentrate averaging 26% copper content. The estimated life of the mine, based on proven reserves, was 20 years. Total investment in the project was estimated to be \$400 million.²

The Neves-Corvo complex consisted of four proven ore bodies: Graca, reported by the company to be averaging 10% copper; Corvo, ranging from 7% to 10% copper; Neves, averaging 1% copper; and Zambujal, a complex sulfide ore of copper, lead, and zinc. Zinc was also associated with the other three deposits, reportedly averaging 10% in the Graca ore body.

A railway track linking the Neves-Corvo Mine with the national railway system was completed. Production was being shipped by rail directly to port loading facilities for export.

Pirites Alentejanas S.A.'s metals concentrate plant at Aljustrel was on-stream and the company stated it had planned to process up to 1.2 Mmt/a of copper, zinc and lead-silver ore from its Moinho ore body. However, the company stated that technical problems affected the plant operation so that the planned levels of production of mineral concentrates recovered from pyrites produced by the mine were not attained. At yearend, the company was continuing with efforts to solve the problems.

Iron and Steel.—The Portuguese iron and steel operation was nationalized in 1975 and continues to function as a public entity incorporated as Siderúrgia Nacional S.A. (SN). The main goal of SN was to ensure its viability beyond the transition period of the single European market, as mentioned in Portugal's Act of Accession to the EU.

The Government changed SN into a public, limited company as a major step toward privatization. Lusosider, a joint-venture company consisting of Usinor Sacilor of France and Cia Espanola de Laminacion of Spain, was the sole bidder to acquire an 80% majority shareholding. The amount of the bid or other details were not available; however, it was believed to include proposals for restructuring SN's operation. The Government rejected the offer and began its own restructuring plan. This plan was thought to include proposals to abandon the integrated steel making activities at SN's main site at Seixal and replace the existing works with an electric furnace operation.

Also, the Government split the original SN into three separate companies covering the mill's activities. SN would function as a holding company responsible for managing the financial affairs of the three subsidiary companies. The three companies were: SN Longos, comprising the bar, rod and long products operation at Maia and Seixal; SN Planos, covering the flat products operations at Seixal; and SN Serviços, comprising auxiliary operations including a powerplant and a oxygen plant. The Government stated that each of the three companies would be privatized in full and potential bidders would be required to make offers for 100% of each of the units in which they are interested. SN Planos was expected to be the first company to be sold.³

Tin.—Somincor's tin concentrator was inaugurated in May 1990. The facility included three stages of crushing, grinding, tabling, flotation, and filtration. The project also included related infrastructure, utilities, a loadout facility, and a 5-kilometer-long tailings pipeline. The plant was considered to be unique in that it was designed to process two types of ore, a shale and a sulfide. The process will produce three grades of tin concentrate ranging from 25% to 55% metal content. Plant capacity was to be 5,000 mt/a of tin in concentrate, which should make Portugal one of the world's major tin producers. Somincor stated it would initially

produce two grades of concentrate: one with a grade of 50% to 55% tin and the other with a lower grade of 30% to 35% tin. Although plant capacity was 5,000 mt/a, recovery levels would fluctuate from year to year because of the complex nature of the ore body.

Tungsten.—Beralt Tin and Wolfram (Portugal) S.A. was the only producer of tungsten in 1994. However, Beralt was maintaining a lower production level because of market conditions for wolframite. This decision, according to the company, was the result of a depressed market and lower prices.

Beralt was proceeding with development work at its Panasqueira Mine at Barroca Grande to improve efficiency and increase the life of the mine. Most of the work was directed toward accessing lower levels where proven reserves were estimated to be sufficient for a 40-year mine life. This would enable the company to increase production in the future if justified by market conditions.

Industrial Minerals

The industrial mineral sector was a modern and efficient producer of a variety of materials, most notably ceramics and dimension stone. The dimension stone industry continued as a very important segment of the mining industry in terms of value and was developing an import/export trade. Marble was the most valuable of the stone products and accounted for about 68% of stone production. The main area for marble mining continued to be the district of Evora.

Demand for cement continued as the building and construction industry maintained its levels of activity. This situation was expected to continue given the substantial volume of work expected in coming years to develop Portugal's infrastructure. The Portuguese Government was continuing to examine measures to privatize the country's cement industry.

Mineral Fuels

Coal accounted for about 4% of total energy consumption. Most coal was imported although there are some domestic reserves. Empresa Carbonifera de Douro S.A., a state-owned company, operated the Germunde Mine at Castelo de Paiva. The mine produced 200,000 mt/a of anthracite coal. However, the Government was planning to close the mine at yearend 1994 or early 1995 because of high production costs and difficult mining conditions. Coal demand was growing because the electricity sector was switching from oil. There were no natural gas reserves and no nuclear powerplants in Portugal. Hydropower accounted for about 45% of electricity generation. The Government was seeking to diversify its energy sources and increase electrical power capacity to meet consumption growth.

The Administracao do Porto de Sines (APS) initiated a program to build a terminal at the Port of Sines principally for steam coal imports by Electricidade de Portugal (EDP)

for the electricity sector. The two major cement producers, Cimpor and Secil, also used coal as a major fuel source.

Infrastructure

The transportation network included 3,613 kilometers (km) of railroad, most of which was operated by the state-owned Portuguese Railroad Co. (CPR). Most of the trackage was single-track, 1.665-meter (m) gauge, of which about 15% is electrified. CPR was planning to match the European gauge width, 1.433 m, on a number of key routes throughout the country. It was expected this would be done by adding a track to the existing lines.

The Government was planning to invest about \$22.4 billion in infrastructure improvements during the next few years. The main thrust would be the modernization of the country's ports. Major seaports were Lisbon, Porto, and Sines. These ports were considered very important in a country where the main movement of goods was by sea. Other areas to be improved included the highways and bridges of the national motorway network. Portugal had about 74,000 km of usable highways, of which 84% was paved.

Outlook

The present structure of the mineral industry could change in the near future because of significant mining exploration in progress by several foreign companies. Copper, gold, kaolin, lead, lithium, pyrites, and tin were some of the minerals targeted for exploration.

The Iberian Pyrite Belt, which extends from the southwest coast of Portugal near Setubal to the Guadalquivir River near Seville, Spain, was a prime area for this exploration activity. However, in the short term, Portugal was expected to be a net importer of mineral resources.

¹Text prepared Apr. 1995.

²Where necessary, values have been converted from Portuguese escudos (Esc) to U.S. dollars at the rate of Esc160=US\$1.00, the average exchange rate for 1994.

³Metal Bulletin, Sept. 2, 1993, p. 21

Major Sources of Information

Ministry of Industry and Energy

Rua da Horta Seca, 15
1200 Lisbon, Portugal

General Directorate of Geology and Mines

Rua Antonio Enes, 7
1000 Lisbon, Portugal

Geological Survey of Portugal

Rua Academia das Ciencias, 19 - 2
1200 Lisbon, Portugal

Major Publications

Ministry of Industry and Energy, Lisbon:
Bulletin of Industrial Statistics, monthly.
Bulletin of Statistics, monthly.

General Directorate of Geology and Mines, Lisbon:
Bulletin of Mines, quarterly.
Bulletin of the Geologic Survey of Portugal, quarterly.

TABLE 1
PORTUGAL: PRODUCTION OF MINERAL COMMODITIES 1/2/

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/	Annual capacity e/ Jan. 1, 1995)
METALS						
Arsenic, white e/	200	200	150	150	125	200
Beryl concentrate, gross weight e/	4	4	4	4	5	10
Copper:						
Concentrate:						
Gross weight	661,594	656,549	609,242	615,189	534,516	1,300,000
Cu content	163,000	165,000	152,311	153,797	133,629	500,000
Metal: e/						
Smelter:						
Primary	--	--	--	--	--	--
Secondary	2,000	2,000	1,000	1,000	1,200	2,000
Total	2,000	2,000	1,000	1,000	1,200	2,000
Refined, primary	1,000	300	--	--	--	--
Gold: Mine output, Au content e/ kilograms	350	160	89 r/	-- r/	--	350
Iron and steel:						
Iron ore and concentrate:						
Gross weight: Manganiferous	14,080 r/	16,067 r/	14,500 r/	16,200 r/	16,500	10,000
Fe content: Manganiferous	5,210 r/	5,949 r/	5,365 r/	5,994	6,100	--
Metal:						
Pig iron thousand tons	339	251	402	398 r/	415	500
Ferroalloys: Ferromanganese e/	12,500	--	--	--	--	10,000
Crude steel thousand tons	744	541	749	750	720	1,000
Lead: Refined, secondary e/	6,000	5,000	7,400 r/	8,300 r/	8,000	5,000
Manganese: Mn content of iron ore e/	1,200	1,200	500	500	500	1,000
Silver, mine output, Ag content kilograms	42,200	42,600	38,200	35,000	32,000	40,000
Tin:						
Mine output, Sn content	4,779	8,333	6,560 r/	10,117 r/	7,637	15,000
Metal, primary and secondary e/	1,400	1,000	1,000	100	1,000	1,500
Titanium, concentrates: e/						
Gross weight	45	40	30	20 r/	20	50
Content of TiO ₂	43 r/	9 r/	10 r/	5 r/	5	25
Tungsten, mine output, W content e/	2,343	971 r/	1,870	1,280	100	1,500
Uranium concentrate: U content e/	76 r/	32 r/	29 r/	33 r/	30	150
Zinc: Smelter, primary e/	5,500	2,100	2,200 r/	2,600 r/	3,000	5,000
INDUSTRIAL MINERALS						
Barite e/	1,480 r/	1,400 r/	378	350	300	1,500
Cement, hydraulic thousand tons	7,280	7,470	7,640	7,600	7,500	9,000
Clays:						
Kaolin 3/	108,392 r/	149,788 r/	125,000 r/	100,000 r/	100,000	75,000
Refractory e/	327,088 r/	301,160 r/	300,000	300,000	300,000	500,000
Diatomite e/	2,270	2,410	1,850	1,860	2,150	3,000
Feldspar	77,329 r/	93,000 r/	99,645 r/	90,547 r/	90,000	100,000
Gypsum and anhydrite e/	309,260	359,355	416,824	458,112	450,000	500,000
Lime, hydrated and quicklime e/	200,000	200,000	200,000	200,000	200,000	200,000
Lithium minerals: Lepidolite	18,970	12,433	15,904	13,289	14,000	20,000
Nitrogen: N content of ammonia e/	198,000	198,000	100,000	91,000	100,000	200,000
Pyrite and pyrrhotite (including cuprous), gross weight	98,290	12,433	14,000	14,000	14,000	150,000
Salt: e/						
Rock	523,000	525,000	592,000 r/	588,000 r/	580,000	600,000
Marine	125,000	125,000	125,000	125,000	125,000	150,000
Total	648,000	650,000	717,000	713,000	705,000	750,000
Sand e/	5,000	5,000	5,000	5,000	5,000	5,000
Sodium compounds, n.e.s.: e/						
Soda ash	150,000	150,000	150,000	150,000	150,000	175,000
Sulfate	50,000	50,000	50,000	50,000	50,000	50,000
Stone: e/						
Basalt thousand tons	171 r/	194 r/	100	100	100	200
Calcareous: do.						
Dolomite do.	123 r/	178 r/	150 r/	150	150	250
Limestone, marl, calcite do.	21,426 r/	21,309 r/	20,000	15,000	15,000	25,000
Marble do.	885 r/	947 r/	900	939	800	1,000
Stone e/ do.						
Diorite do.	834 r/	593 r/	1,000	1,000	1,000	1,500
Gabbro do.	2,097 r/	3,753 r/	2,500	2,500	2,500	3,000
Granite do.	11,561 r/	12,681 r/	12,000	8,500	10,000	12,000
Graywacke do.	20	18	20	20	20	25
Ophite do.	216 r/	74 r/	50	50	50	50

See footnotes at end of table

TABLE 1-Continued
 PORTUGAL: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/	Annual capacity e/ (Jan. 1, 1995)
Stone-Continued:						
Quartz thousand tons	6	7	8	10	10	10
Quartzite do.	575	600	500	500	500	600
Schist do.	116 r/	101 r/	100	100	100	100
Slate do.	23 r/	24 r/	50	61	30	40
Syenite do.	29 r/	33 r/	30	30	25	25
Sulfur: e/						
Content of pyrites	44,800 r/	5,670 r/	5,000 r/	5,000	5,000	100,000
Byproduct, all sources	3,000	4,000	4,000	4,000	4,000	5,000
Total	47,800	76,000	9,000	9,000	8,000	76,000
Talc	11,535 r/	10,794 r/	9,166	9,054	9,000	10,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, anthracite e/ thousand tons	216	202	221	216	148	250
Coke, metallurgical e/ do.	160	160	150	150	150	150
Gas, manufactured e/ million cubic meters	136	136	130	125	125	150
Petroleum refinery products: e/						
Liquefied petroleum gas thousand 42-gallon barrels	4,630	4,500	4,600	4,500	4,600	5,000
Gasoline do.	14,600	10,000	12,000	14,000	15,000	15,000
Jet fuel do.	5,160	5,000	5,200	5,000	5,000	6,000
Kerosene do.	230	225	230	225	225	250
Distillate fuel oil do.	21,400	22,000	21,000	20,000	20,000	25,000
Residual fuel oil do.	22,800	21,000	20,000	20,000	20,000	25,000
All other products do.	8,800	9,000	8,600	8,800	9,000	10,000
Refinery fuel and losses do.	3,600	3,800	3,400	3,500	3,500	4,000
Total do.	81,300	75,500	75,000	76,000	77,600	90,300

e/ Estimated. r/ Revised.

1/ Table includes data available through Jan. 1995.

2/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

3/ Includes washed and unwashed kaolin.