THE MINERAL INDUSTRY OF

PORTUGAL

By Harold Newman

Portugal, on the Iberian peninsula, is one of the most mineralized areas of Western Europe and geologically very complex. The mineral industry of Portugal is modest by world standards; however, its growth rate during the past few years has made it one of the country's dynamic industrial sectors.

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.

The Government stated it was proceeding with legislation that would privatize many public companies. 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.

Of interest to the mineral industry is the privatization of the mining conglomerate Empresa de Desenvolvimento Mineiro (EDM) which was scheduled for 1997. EDM is a holding company for state-owned interests in a number of mining concerns, including Sociedade Mineira de Neves-Corvo S.A.R.L. (Somincor). It also has controlling interest in Pirites Alentajanas and Empressa Nacional de Uranio.

Somincor continued to produce copper and tin at the Neves-Corvo Mine. Pirites Alentejanas S.A.R.L. was the largest producer of pyrite; Siderúrgia Nacional S.A.R.L. (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.

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.)*

In 1994, 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.

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.

Most of the large mineral resource companies were owned or controlled by the Government, although there were some privately owned operations. About 32,000 people were employed by the mineral industry, including mining and processing. *(See table 3.)*

Somincor was 51% Government-owned through 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 Mt/yr of raw ore to yield 500,000 t/yr of concentrate averaging 26% copper content. The estimated life of the mine, based on estimated proven reserves, was 20 years.

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.

Recovery of tin-in-concentrate has stabilized at Neves Corvo at around 4,000 to 5,000 t/yr. As Neves Corvo is primarily a copper mining operation, Somincor considers tin more as a byproduct.

Pirites Alentejanas S.A.'s metals concentrate plant at Aljustrel was on-stream in 1995 and the company stated it had planned to process up to 1.2 Mt/yr of copper, zinc, and lead-silver ore from its Moinho orebody. 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.

The Portuguese iron and steel operation was nationalized in 1975 to function as a public entity incorporated as Siderúrgia Nacional Empresa de Productos Planos (SN-Planos). The Government changed SN-Planos into a public, limited company as a major step toward privatization.

A proposal by Lusosider, the joint venture of Hoogovens Group BV of the Netherlands and Sollac, a division of Usinor Sacilor SA, of France, to acquire the state's holdings has been given the go-ahead by the Portuguese government. The stated plan is for Lusosider to develop SN-Planos into a modern, efficient producer of cold-rolled and galvanized sheet and tinplate with a 300,000 t/yr capacity.

Beralt Tin and Wolfram (Portugal) S.A. was the only producer of tungsten in 1995. 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 the final treatment of concentrates. The old plant for final treatment of concentrates was being moved to the main zone of operation at Barroca Grande and modernized to increase capacity and improve efficiency. Beralt also has a small production of byproduct copper and tin concentrates.

The industrial minerals 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 anticipated to be necessary in coming years to develop Portugal's infrastructure.

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 t/yr of anthracite coal. However, the Government was planning to close the mine at yearend 1996 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 sought to diversify its energy sources and increase electrical power capacity to meet consumption growth.

The Administracao do Porto de Sines initiated a program to build a terminal at the Port of Sines principally for steam coal imports by Electricidade de Portugal for electricity generation. The two major cement producers, Cimpor and Secil, also used coal as a major fuel source.

The transportation network included 3,613 kilometer (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.

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.

There were 39 exploration contracts signed with various companies, foreign and Portuguese, of which 22 were for metallic minerals, 13 for non-metallic, 3 for mineral waters and 1 for geothermal resources . However, in the short term, Portugal was expected to be a net importer of its mineral resources requirements.

TABLE 1
PORTUGAL: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1991	1992	1993	1994	1995 e/
METALS						
Arsenic, white e/		200	150	150	125	125
Beryl concentrate, gross weight e/		4	4	4	5	5
Copper:						
Concentrate:						
Gross weight		656,549	609,242	615,189	534,516	536,724
Cu content		157,572	152,311	153,797	133,629	134,181
Metal: e/						
Smelter, secondary		2,000	1,000	1,000	--	--
Refined, primary		300	--	--	--	--
Gold, mine output, Au content e/	kilograms	160	89	-- r/	--	--
Iron and steel:						
Iron ore and concentrate:						
Gross weight, manganiferous		16,067	14,500	16,200	14,330	16,000
Fe content, manganiferous		5,949	5,365	6,114	5,417	5,500
Metal:						
Pig iron	thousand tons	251	402	398	415	400
Crude steel	do.	573	769	775	749	800
Lead, refined, secondary e/		5,000	7,400	8,300	8,000	8,000
Manganese, Mn content of iron ore e/		1,200	500	500	500	500
Silver, mine output, Ag content	kilograms	43,820	39,454	36,000	31,800	32,000
Tin:						
Mine output, Sn content		8,333	6,560	5,334	4,332	8,467
Metal, primary and secondary e/		1,000	1,000	1,000	1,000	1,000
Titanium, concentrates: e/						
Gross weight		40	30	20	20	--
Content of TiO_2		9	10	5	5	--
Tungsten, mine output, W content e/		971	1,126	768	60	1,511
Uranium concentrate, U content e/		32	29	33	28	22
Zinc, smelter, primary e/		2,100	2,200	2,600	3,000	3,000
INDUSTRIAL MINERALS						
Barite e/		1,000	378	350	50	100
Cement, hydraulic	thousand tons	7,473	7,638	7,600	7,500	7,500
Clays:						
Kaolin 2/		149,788	125,000	100,000	181,933	200,000
Refractory e/		301,160	300,000	300,000	431,967	300,000
Diatomite e/		2,410	1,850	1,860	2,150	2,000
Feldspar		93,000	99,645	90,547	92,440	74,000
Gypsum and anhydrite e/		359,355	416,824	458,112	450,000	450,000
Lime, hydrated and quicklime e/		200,000	200,000	200,000	200,000	200,000
Lithium minerals, lepidolite		12,433	15,904	13,289	11,352	12,000
Nitrogen, N content of ammonia e/		198,000	100,000	91,000	100,000	100,000
Pyrite and pyrrhotite (including cuprous), gross weight		12,433	14,000	14,000	14,000	12,000
Salt: e/						
Rock		525,000	592,485	524,540	519,432	544,647
Marine		125,000	125,000	125,000	125,000	125,000
Total		650,000	717,485	649,540	644,432	669,647
Sand e/		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
Sulfate		50,000	50,000	50,000	50,000	50,000
Stone: e/						
Basalt	thousand tons	194	100	100	530	100
Calcareous:	do.					
Dolomite	do.	178	150	150	471	150
Limestone, marl, calcite	do.	21,309	20,000	15,000	33,134	15,000
Marble	do.	947	900	939	935	800
Diorite	do.	593	1,000	1,000	1,029	1,000
Gabbro	do.	3,753	2,500	1,000	132	100
Granite	thousand tons	12,681 r/	12,000	8,500	17,360	10,000
Graywacke	do.	18	20	20	138	20
Ophite	do.	74 r/	50	50	110	50
Quartz	do.	7	8	9	14	12
Quartzite	do.	600	500	500	526	500

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity		1991	1992	1993	1994	1995 e/
INDUSTRIAL MINERALS--Continued						
Stone e/--Continued:						
Schist	do.	101 r/	100	100	273	100
Slate	do.	24 r/	50	61	40	30
Syenite	do.	33 r/	30	30	58	25
Sulfur: e/						
Content of pyrites		5,670 r/	5,000 r/	5,000	5,000	5,000
Byproduct, all sources		4,000	4,000	4,000	4,000	4,000
Total		9,670	9,000	9,000	9,000	9,000
Talc		10,794 r/	9,166	9,054	8,367	8,400
MINERAL FUELS AND RELATED MATERIALS						
Coal, anthracite e/	thousand tons	202	221	216	148	140
Coke, metallurgical e/	do.	160	150	150	150	150
Gas, manufactured e/	million cubic meters	136	130	125	125	125
Petroleum refinery products: e/						
Liquefied petroleum gas	thousand 42-gallon barrels	4,500	4,600	4,500	4,600	4,600
Gasoline	do.	10,000	12,000	14,000	15,000	15,000
Jet fuel	do.	5,000	5,200	5,000	5,000	5,000
Kerosene	do.	225	230	225	225	225
Distillate fuel oil	do.	22,000	21,000	20,000	20,000	20,000
Residual fuel oil	do.	21,000	20,000	20,000	20,000	20,000
All other products	do.	9,000	8,600	8,800	9,000	9,000
Refinery fuel and losses	do.	3,800	3,400	3,500	3,500	3,500
Total	do.	75,525	75,030	76,025	77,325	77,325

e/ Estimated. r/ Revised.
1/ Table includes data available through Mar. 1996.
2/ Includes washed and unwashed kaolin.

TABLE 2
PORTUGAL: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of facilities	Annual capacity
Cement		Cimentos de Portugal S.A. (Cimpor) (Government,100%)	10 plants, various locations	6,000
Coal		Empressa Carbonifera de Duro S.A.R.L. (ECD) (Government, 100%)	Germunde Mine at Castello de Pavia	250
Copper		Sociedade Minera de Neves-Corvo S.A. (Somincor) (Government, 51%; RTZ Corp., 49%)	Neves-Corvo Mine near Castro Verde	500
Diatomite		Sociedade Anglo-Portugesa de Diatomite Lda.	Mines at Obidos and Rolica	5
Feldspar		A.J. da Fonseca Lda.	Seixigal Quarry, Chaves	10
Ferroalloys		Electrometalurgia S.A.R.L. (Eurominas)	Plant at Setubal	100
Petroleum, refined	barrels per day	Petroleos de Portugal (Petrogal) (Government 100%)	Refineries at Lisbon, Porto, and Sines	300,000
Pyrite		Pirites Alentejanas S.A.R.L. (Eurominas)	Plant at Setubal	100
Steel, crude		Siderugia Nacional S.A.R.L. (SN) (Government 100%)	Ironworks and steelworks at Seixal and Maia	1,000
Tin		Sociedade Mineira de Neves-Corvo S.A. (Somincor) (Government 51%, RTZ Corp. , 49%)	Neves-Corvo Mine near Castro Verde	5
Tungsten		Beralt Tin and Wolfram (Portugal) Ltd. (Minorco S.A., 91%; Government 9%)	Mine and plant at Panasqueira	1,600
Uranium	tons	Empressa Nacional de Uranio (ENU)	Mines and plant at Guargia	170
Zinc, refined		Quimigel E.P. (Government 100%)	Electrolytic plant at Barreiro	11