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MINERAL INDUSTRIES OF

EUROPE AND CENTRAL EURASIA

U.S.
DEPARTMENT
OF THE
INTERIOR

BUREAU
OF
MINES

1992

UNITED STATES DEPARTMENT OF THE INTERIOR • Bruce Babbitt, Secretary

BUREAU OF MINES

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Preface

This edition of the Minerals Yearbook discusses the performance of the worldwide minerals and materials industry during 1992 and provides background information to assist in interpreting that performance. Content of the individual Yearbook volumes follows:

Volume I, Metals and Minerals, contains chapters on virtually all metallic and industrial mineral commodities important to the U.S. economy. Chapters on advanced materials, nonrenewable organic materials, and nonferrous metals recycling also were added to the Minerals Yearbook series beginning with the 1989, 1990, and 1991 volumes, respectively. A new chapter on materials recycling has been initiated in this 1992 volume. In addition, a chapter on survey methods used in data collection with a statistical summary of nonfuel minerals and a chapter on trends in mining and quarrying in the metals and industrial mineral industries are included.

Volume II, Area Reports: Domestic, contains chapters on the minerals industry of each of the 50 States, Puerto Rico, Northern Marianas, Island Possessions, and Trust Territory. This volume also has a chapter on survey methods used in data collection, including a statistical summary of domestic nonfuel minerals.

Volume III, Minerals Yearbook—International Review contains the latest available mineral data on more than 175 foreign countries and discusses the importance of minerals to the economies of these nations. Since the 1989 International Review, this volume has been presented as six reports: Mineral Industries of the Middle East, Mineral Industries of Africa, Mineral Industries of Asia and the Pacific, Mineral Industries of Latin America and Canada, Mineral Industries of Europe and Central Eurasia, and Minerals in the World Economy. The reports incorporate location maps, industry structure tables, and an outlook section previously incorporated in our Mineral Perspectives Series quinquennial regional books, which are being discontinued.

The U.S. Bureau of Mines continually strives to improve the value of its publications to users. Therefore, constructive comments and suggestions by readers of the Yearbook will be welcomed.

Acknowledgments

The U.S. Bureau of Mines, in preparing these Volume III Minerals Yearbook Reports—International Review, extensively utilized statistics and data on mineral production, consumption, and trade provided by various foreign government minerals and statistical agencies through various official publications. The cooperation and assistance of these organizations is gratefully acknowledged. Statistical and informational material was also obtained from reports of the U.S. Department of State, from United Nations publications, and from the domestic and foreign technical and trade press. Of particular assistance were the routine and special reports submitted by the 10 Regional Resource Officers assigned to minerals and petroleum reporting and by economic and commercial officers and other officials of the Department of State located in U.S. Embassies worldwide. Their contributions are sincerely appreciated.

The text and production, structure of the mineral industry, and reserve tables of this volume were prepared by the respective country authors on the staff of the Division of International Minerals, Information and Analysis Directorate. The mineral export and import trade tables were prepared by the International Data Section of the Division of Statistics and Information Services, Information and Analysis Directorate.

The regimes of some countries reviewed in this volume may not be recognized by the U.S. Government. The information contained herein is technical and statistical in nature and is not to be construed as conflicting with or being contradictory of U.S. foreign policy.

George J. Coakley
Chief, Division of International Minerals

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Mr. Charles L. Kimbell was the U.S. Bureau of Mines Senior Foreign Mineral Specialist. He was on the staff of the Chief of the Division of International Minerals and had more than 34 years of experience in international minerals studies at the U.S. Bureau of Mines. He had been involved with the preparation of the international volume of the Minerals Yearbook since the inception of the volume in 1963. Mr. Kimbell held a B.S. degree in Geology from American University. Mr. Kimbell was one of the most respected international minerals statisticians in the world. He died on September 14, 1993.

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THE MINERAL INDUSTRIES OF

EUROPE AND CENTRAL EURASIA

By Michel C. Frippel and Staff, Branch of Europe and Central Eurasia

INTRODUCTION[1]

This section of the Minerals Yearbook reviews the minerals industries of 45 countries: the 12 nations of the European Community (EC) (Belgium, Denmark/Greenland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom); 6 of the 7 nations of the European Free Trade Association (EFTA) (Austria, Finland, Iceland, Norway, Switzerland, and Sweden); Malta; the 11 Eastern European economies in transition (Albania, Bosnia and Hercegovina, Bulgaria, Croatia, Czechoslovakia, Hungary, Macedonia, Poland, Romania, Serbia and Montenegro, and Slovenia); and the countries of Central Eurasia (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgystan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan).

Western Europe

Western Europe, as defined here, includes the 12 nations of the EC and the 7 nations of EFTA. It is the single largest trading area and consumer of raw materials in the world. Western Europe's mining sector is no longer as important to the area's economy as it once was and increasingly relies on North and South America, Africa, and Australia to supply raw materials for its significant minerals processing industry. In this respect, as the major consumer of raw materials, Western Europe is the single most important determinant of global raw materials production. Western Europe has significant reserves of industrial minerals but has limited availability of metalliferous raw materials. It, therefore, imports significant quantities of the latter and ranks along with the United States and Russia in the production of refined metals. Nineteen-ninety-two was the year of the European Community—"EC 92." This was based on the fact that on December 31, 1992, free movement of goods and services between the 12 EC nations came into effect. As a result, European companies sought, through increased efficiency, mergers, and acquisitions, to increase their competitiveness within the community. Furthermore, U.S. and Japanese firms sought to establish or strengthen their position in the EC to be prepared for the new rules that would be brought on at the end of the year. Overall, the most observable undertakings in the years preceding, and continuing into 1992, were the merging of long-established companies that had been competitors for many years. During the past decade Usinor-Sacilor, France's state-owned steel company, formed through the nationalization and merging of France's numerous steel producers, became the largest European steel company, second only to Nippon Steel, in the world. In Germany, in 1992, two of the country's largest steel and engineering firms, Hoesch AG and Friedrich Krupp AG, were seeking to effect some type of merger. Britain's RTZ, which, over the last decade had become the world's largest minerals/mining company, continued its international expansion and growth. In the years prior to 1992, Italy's Ilva S.p.A., through restructuring, became Italy's fourth largest manufacturing company and Europe's third largest steel producer. In 1992, Ilva, which is wholly Government owned, was encouraging other international steel producers to invest in the company.

Thus, Western European mining, minerals, and metallurgical companies were seeking to increase their competitiveness through growth and increased efficiency. Some Governments, such as that of the United Kingdom, sought to improve efficiency through privatization of industries that had previously been nationalized. The British Steel Corp., for example, was privatized in the early 1980's and, on October 13, 1992, the Government proposed closing 31 of the United Kingdom's 51 Government-subsidized coal mines in preparation for denationalization of the British coal industry. Although this announcement was met with strong opposition by the National Union of Mine Workers and the Labour party and was eventually modified, the direction being taken by the current Government was clear.

While in the past decade Britain's Conservative Government had been privatizing its minerals/metals sector, the French Socialist Government took the opposite approach. It sought to improve the competitiveness and efficiency of its minerals/metals sector through nationalization. In the late 1970's and early 1980's, the French Government nationalized and "rationalized" the French steel sector. The trend in France now seems to be toward privatization, and it now appears that the two-step pattern of rationalization through nationalization and, subsequently, privatization, will be followed in France as it has in the United Kingdom.

The merging of European companies is a normal consequence of the closer politico-economic ties between European nations that have been established since 1945. Whereas there is logic in the historical development that the larger

European nations each have several large steel mills, this logic diminishes with the elimination of trade barriers. Without the rationalization of the Western European steel industry that has occurred in the past 20 years, an area one-half the size of the United States would now be home to more than 50 major steel producers. As a result, the EC is taking action to reduce the amount of steel produced within the Community through the imposition of limits on government subsidies to this industry and through production controls.

Eastern Europe

The dissolution of the Council for Mutual Economic Assistance (CMEA) in June 1991 was, in itself, a far more important occurrence than the much heralded EC 92. After all, the road to EC 92 was being built before the Roman Empire and will continue to be built long after 1992. On the other hand, the rather sudden breakup of the CMEA had immediate and drastic consequences throughout all of Europe. Whereas the nations of the Organization for Economic Cooperation and Development (OECD) have systematically been working together to reduce tariffs and encourage trade in such a way that their economies gradually adapted to the developing international economic environment, the industries of the CMEA nations were obliged to develop within a constraining economic ideology. As a result, once the noneconomic restrictive parameters and controls that bound these nations economically and politically were removed, which was done suddenly, there was nothing but history to explain the incongruities and distortions of the industries in these nations. The very existence of the Eastern European mineral industries was based, in large part, on three parameters: The quest for self-sufficiency within the CMEA; the large CMEA demand for strategic metals for military hardware; and the availability of low-priced energy from the U.S.S.R. With the breakup of the CMEA, low priced Soviet energy was no longer readily available to former member countries and the demand for strategic metals for use in military hardware also dropped drastically. Poland, which had produced 16 to 17 million tons of crude steel per year in the 1980's, produced less than 10 million tons in 1992, and Czechoslovakia, which had consistently produced about 15 million tons of crude steel per year in the 1980's, produced slightly more than 11 million tons in 1992. While some mineral producers in Eastern Europe may only need to restructure in order to become viable economic entities, most will have to be phased out in the next decade, if not before. Little can be said, for example, to justify some Eastern European nations, which no longer have access to low-priced energy, producing as energy intensive a metal as aluminum.

The absorption of the German Democratic Republic (GDR) into the Federal Republic of Germany (FRG) on October 3, 1990, brought to light the inefficiencies of the Eastern European minerals/metals sector. The GDR steel industry, which had produced in excess of 8 million tons of crude steel in 1988 and was considered one of the most efficient steel producers in the Eastern bloc, was judged to be generally uneconomic and environmentally unacceptable by West German specialists and consequently, in 1992, this part of the German steel industry produced less than 3 million tons of steel. In fact, the monetary crisis that disrupted the European Monetary System toward the latter half of 1992 was, to a large extent, provoked by the German effort to economically integrate Eastern Germany and, in so doing, imposing relatively high interest rates on the Deutsche Mark (DM) in order to finance the more than DM100 billion per year restructuring program in eastern Germany.

Yugoslavia, which had historically been an important mineral producer, has been torn apart by secession of four of its provinces. Bosnia-Hercegovina, Croatia, Macedonia, and Slovenia declared their independence from the state of Yugoslavia on different dates in 1991 and 1992 and three of the republics were formally recognized as independent, internationally sovereign nations by the U.S. Government on April 7, 1992. Macedonia, due to Greek Government pressure that the country adopt a different name, has not yet been officially recognized by the U.S. Government. The civil wars in the former Yugoslavia, which have caused the deaths of tens of thousands of people and the relocation of millions of others, have obviously severely affected the minerals/metals sector. Even Slovenia, which has suffered little physical disruption in acquiring its independence from the former Yugoslavia, is encountering economic problems in developing new markets for its products as well as in obtaining necessary raw materials and finished goods.

Central Eurasia

With the exception of the three Baltic states (Estonia, Latvia, and Lithuania), which were never formally recognized by the U.S. government as being a part of the former U.S.S.R., the United States officially recognized the 12 remaining former constituent republics of the U.S.S.R. as independent, internationally sovereign nations on December 25, 1991.

Whereas the U.S.S.R. separated surprisingly easily along national lines, the economic ties between the various republics are still holding owing to economic dependencies between the various states. Although bloody civil wars are presently underway in Georgia, Azerbaijan, Armenia, and, to a certain extent, Moldova, Russia has sought to maintain economic unity between the former Soviet republics and successfully formed the Commonwealth of Independent States (CIS). Within this union, Russia is, by far, the most important minerals producer, as it is throughout the world. However, Kazakhstan and Ukraine are important minerals producers and they, as well as some of the smaller nations within the CIS, are aggressively seeking to internationalize their minerals sectors. At present, minerals traders are the most active westerners in this part of the world, and there have been a significant number of successful contractual

agreements involving toll refining of a variety of ores in Kazakhstan, Russia, and Uzbekistan. Seeking hard currency, the Russian Federal Government and local Governments within the Russian Federation have sold large quantities of minerals from their stockpiles. In addition, reduced internal consumption has encouraged exports of current production. These added exports have helped depress the international prices of several commodities, including aluminum, magnesium, nickel and titanium.

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[1]Michel C. Frippel, Chief, Branch of Europe and Central Eurasia, Division of International Minerals.

SELECTED GENERAL SOURCES OF REGIONAL INFORMATION

Barclays Bank International, London, England:
ABECOR Group Country Reports.
British Broadcasting Corp., Reading, England:
Summary of World Broadcasts (SWB).
British Geological Survey, Keyworth, England:
World Minerals Statistics, various issues.
British Sulphur Corp. Ltd., London, England:
Nitrogen, bimonthly.
Phosphorus and Potassium, bimonthly.
Sulphur, bimonthly.
Eurostat, Brussels, Belgium:
Energy and Industry Monthly.
Fairchild Publications, New York, NY
American Metals Market, daily.
Financial Times, London, England.
Interfax - America, Inc., Denver, CO:
Interfax Business Report, daily.
Interfax Financial Report, weekly.
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Interfax Petroleum Report, weekly.
Interfax Statistical Report, weekly.
International Lead and Zinc Study Group, London, England.
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Institution of Mining and Metallurgy, London, England:
Transactions, monthly.
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International Trade Administration:
Foreign Economic Trends and Their Implications for the U.S.; International Marketing Information Series.
U.S. Department of Energy.
U.S. Department of the Interior, Bureau of Mines:
Mineral Commodity Summaries.
Minerals Yearbook, V. 1, Metals and Minerals.
U.S. Joint Publications Research Service, Arlington, VA:
Foreign Broadcast Information Service Regional Publications, weekly.
World Bank, Washington, DC: Bank news releases.
World Bureau of Metal Statistics, London, England:
World Metal Statistics, monthly.

TABLE 1

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS FOR 1992[1]

(Thousand metric tons unless otherwise specified)

	Iron and steel			Ferroalloying materials			Aluminum		Copper (metal content)		Lead (metal content)	
	Iron ore (metal content)	Pig iron	Crude steel (gross weight)	Chromite (gross weight)	Manganese ore (gross weight)	Nickel, plant production	Bauxite (gross weight)	Primary metal	Mine	Refined	Mine	Refined
Western Europe:												
European Community (EC):												
Belgium	—	8,533	10,276	—	—	—	—	—	—	295	—	116
Denmark/Greenland	—	—	591	—	—	—	—	—	—	—	—	—
France	1,700	13,051	17,961	—	—	8	—	417	—	59	—	284
Germany	14	28,538	39,768	—	—	—	—	600	—	582	2	345
Greece	610	—	923	—	—	15	2,100	153	—	—	27	—
Ireland	—	—	257	—	—	—	—	—	—	—	42	12
Italy	—	10,461	24,904	—	—	—	2	180	—	76	12	195
Luxembourg	—	2,256	3,068	—	—	—	—	—	—	—	—	—
Netherlands	—	4,852	5,438	—	—	—	—	235	—	—	—	30
Portugal	4	402	749	—	—	—	—	—	151	—	—	6
Spain	1,290	5,076	12,295	—	—	—	1	350	10	179	50	110
United Kingdom	5	11,351	16,050	—	—	28	—	240	—	42	1	347
Total EC	3,623	84,520	132,280	—	—	51	2,103	2,175	161	1,233	134	1,445
European Free Trade Association (EFTA):												
Austria	370	3,067	3,946	—	—	3	—	34	—	55	1	24
Finland	—	2,452	3,077	480	—	18	—	—	10	71	—	—
Iceland	—	—	—	—	—	—	—	89	—	—	—	—
Norway	1,403	80	446	—	—	56	—	813	13	39	4	—
Sweden	12,600	2,735	4,356	—	—	—	—	74	86	101	106	91
Switzerland	—	70	1,050	—	—	—	—	55	—	—	—	6
Total EFTA	14,373	8,404	12,875	480	—	77	—	1,065	109	266	111	121
Total Western Europe	17,996	92,924	145,155	480	—	128	2,103	3,240	270	1,499	245	1,566
Eastern Europe:												
Albania	88	10	5	150	—	—	4	—	4	—	—	—
Bosnia and Herzegovina	200	60	250	—	15	—	900	40	—	—	4	—
Bulgaria	300	1,050	1,500	—	35	—	—	—	45	13	35	55
Croatia	—	150	100	—	—	—	200	50	—	—	—	—
Czechoslovakia	450	8,039	11,140	—	—	2	—	68	3	24	3	17
Hungary	—	1,176	1,559	—	18	—	1,721	26	—	15	—	—
Macedonia	24	100	150	9	—	—	—	—	70	—	25	15
Poland	—	6,348	9,800	—	—	—	—	45	387	387	55	55
Romania	130	3,125	5,372	—	45	—	150	110	20	13	7	23
Serbia and Montenegro	—	600	700	—	—	2	850	60	5	130	50	25
Slovenia	—	—	400	—	—	—	—	65	—	—	3	5
Total Eastern Europe	1,192	20,658	30,976	159	113	4	3,825	464	534	582	182	195
Central Eurasia:												
Armenia	—	—	—	—	—	—	—	—	1	—	—	—
Azerbaijan	—	—	300	—	—	—	—	25	—	—	—	—
Belarus	—	—	700	—	—	—	—	—	—	—	—	—
Estonia	—	—	—	—	—	—	—	—	—	—	—	—
Georgia	—	500	700	—	1,200	—	—	—	6	—	1	—
Kazakhstan	11,000	4,000	5,000	3,600	9	—	500	—	350	365	240	430
Kyrgyzstan	—	—	—	—	—	—	—	—	—	—	—	—

See footnotes at end of table.

TABLE 1—Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS FOR 1992[1]

(Thousand metric tons unless otherwise specified)

	Iron and steel			Ferroalloying materials			Aluminum		Copper (metal content)		Lead (metal content)	
	Iron ore (metal content)	Pig iron	Crude steel (gross weight)	Chromite (gross weight)	Manganese ore (gross weight)	Nickel, plant production	Bauxite (gross weight)	Primary metal	Mine	Refined	Mine	Refined
Central Eurasia—Continued:												
Latvia	—	—	246	—	—	—	—	—	—	—	—	—
Lithuania	—	—	—	—	—	—	—	—	—	—	—	—
Moldova	—	—	619	—	—	—	—	—	—	—	—	—
Russia	45,000	44,000	67,000	121	—	215	4,000	2,700	375	475	75	110
Tajikistan	—	—	—	—	—	—	—	300	—	—	2	—
Turkmenistan	—	—	—	—	—	—	—	—	—	—	—	—
Ukraine	40,000	35,300	42,000	—	5,800	5	—	90	—	—	—	—
Uzbekistan	—	—	800	—	—	—	—	—	80	85	22	—
Total Central Eurasia	96,000	83,800	117,365	3,721	7,009	220	4,500	3,115	812	925	340	540
Total Europe and Central Eurasia	115,188	197,382	293,496	4,360	7,122	352	10,428	6,819	1,616	3,006	767	2,301
Total United States	35,251	47,377	84,322	—	—	9	W	4,042	1,761	2,154	408	1,221
Total world	516,006	497,620	721,315	10,896	19,929	853	103,625	19,219	9,290	10,917	3,242	5,542
Western Europe as a percent of world total	3.5%	18.7%	20.1%	4.4%	0.0%	15.0%	2.0%	16.9%	2.9%	13.7%	7.6%	28.3%
Eastern Europe as a percent of world total	0.2%	4.2%	4.3%	1.5%	0.6%	0.5%	3.7%	2.4%	5.7%	5.3%	5.6%	3.5%
Central Eurasia as a percent of world total	18.6%	16.8%	16.3%	34.2%	35.2%	25.8%	4.3%	16.2%	8.7%	8.5%	10.5%	9.7%
Europe and Central Eurasia as a percent of world total	22.3%	39.7%	40.7%	40.0%	35.7%	41.3%	10.1%	35.5%	17.4%	27.5%	23.7%	41.5%

	Zinc (metal content)		Industrial minerals					
	Mine	Smelter production	Hydraulic cement	Nitrogen (N content of ammonia)	Phosphate rock, (gross weight)	Potash (K_2O equivalent)	Salt	Sulfur (all forms)
Western Europe:								
European Community (EC):								
Belgium	—	215	7,500	300	—	—	—	300
Denmark/Greenland	—	—	2,300	—	—	—	520	12
France	17	305	21,600	1,407	—	1,130	6,600	1,155
Germany	14	383	37,500	2,160	—	3,470	13,125	1,415
Greece	27	—	13,100	200	—	—	125	210
Ireland	194	—	1,600	400	—	—	—	—
Italy	30	253	41,347	1,098	—	100	4,100	480
Luxembourg	—	—	600	—	—	—	—	—
Netherlands	—	205	3,400	2,667	—	—	3,500	290
Portugal	—	3	7,500	100	—	—	650	99
Spain	202	356	26,000	479	—	600	3,400	910
United Kingdom	—	97	10,720	869	—	450	6,600	165
Total EC	484	1,817	173,167	9,680	(2)	5,750	38,620	5,036
European Free Trade Association (EFTA):								
Austria	16	1	5,100	400	—	—	661	42
Finland	31	171	1,300	10	450	—	—	635
Iceland	—	—	95	9	—	—	4	—
Norway	21	128	1,266	343	—	—	—	215
Sweden	170	—	2,500	—	—	—	—	210

See footnotes at end of table.

Table 1-Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS FOR 1992[1]

(Thousand metric tons unless otherwise specified)

	Zinc (metal content)		Industrial minerals					
	Mine	Smelter production	Hydraulic cement	Nitrogen (N content of ammonia)	Phosphate rock, (gross weight)	Potash (K_2O equivalent)	Salt	Sulfur (all forms)
European Free Trade Association (EFTA)—Continued:								
Switzerland	—	—	4,620	31	—	—	250	4
Total EFTA	238	300	14,881	793	450	—	915	1,106
Total Western Europe	722	2,117	188,048	10,473	450	5,750	39,535	6,142
Eastern Europe:								
Albania	—	—	400	50	—	—	50	—
Bosnia and Herzegovina	8	—	400	15	—	—	150	5
Bulgaria	29	46	4,560	1,300	—	—	150	110
Croatia	—	—	1,770	350	—	—	20	6
Czechoslovakia	7	1	8,000	385	—	—	200	96
Hungary	—	1	2,236	185	—	—	—	9
Macedonia	20	32	500	—	—	—	—	10
Poland	151	135	12,000	1,500	—	—	3,900	3,060
Romania	29	10	9,000	1,100	—	—	6,000	450
Serbia and Montenegro	35	14	3,000	250	—	—	30	130
Slovenia	5	—	820	—	—	—	—	1
Total Eastern Europe	284	239	42,686	5,135	—	—	10,500	3,877
Central Eurasia:								
Armenia	—	—	499	—	—	—	(3)	—
Azerbaijan	—	—	599	—	—	—	(3)	(4)
Belarus	—	—	1,633	916	—	3,600	—	(4)
Estonia	—	—	600	117	—	—	—	(4)
Georgia	5	—	1,000	96	—	—	—	—
Kazakhstan	200	190	6,000	220	7,000	—	—	(4)
Kyrgyzstan	—	—	1,000	—	—	—	—	—
Latvia	—	—	400	—	—	—	—	—
Lithuania	—	—	2,000	275	—	—	—	—
Moldova	—	—	1,700	—	—	—	—	—
Russia	150	200	68,000	8,786	14,000	3,500	3,600	(4)
Tajikistan	—	—	300	—	—	—	—	(4)
Turkmenistan	—	—	700	25	—	—	(3)	(4)
Ukraine	—	20	20,000	3,882	—	200	4,400	—
Uzbekistan	70	65	6,000	1,309	—	—	—	(4)
Total Central Eurasia	425	475	110,431	15,626	21,000	[3]7,300	[4]11,000	7,250
Total Europe and Central Eurasia	1,431	2,831	341,165	31,234	21,450	13,050	61,035	17,269
Total United States	552	400	71,426	13,404	46,965	1,705	34,784	10,663
Total world	7,137	6,875	1,252,501	92,532	143,753	24,327	184,854	52,409
Western Europe as a percent of world total	10.1%	30.8%	15.0%	11.3%	0.3%	23.6%	21.4%	11.7%
Eastern Europe as a percent of world total	4.0%	3.5%	3.4%	5.5%	0.0%	0.0%	5.7%	7.4%
Central Eurasia as a percent of world total	6.0%	6.9%	8.8%	16.9%	14.6%	30.0%	6.0%	13.8%
Europe and Central Eurasia as a percent of world total	20.1%	41.2%	27.2%	33.8%	14.9%	53.6%	33.0%	33.0%

W Withheld to avoid disclosing company proprietary data; value included in "Total world."

[1]Some of the individual entries in this table may differ from those appearing in individual country production tables elsewhere in this volume owing to the inclusion in this table of data received at a later time.

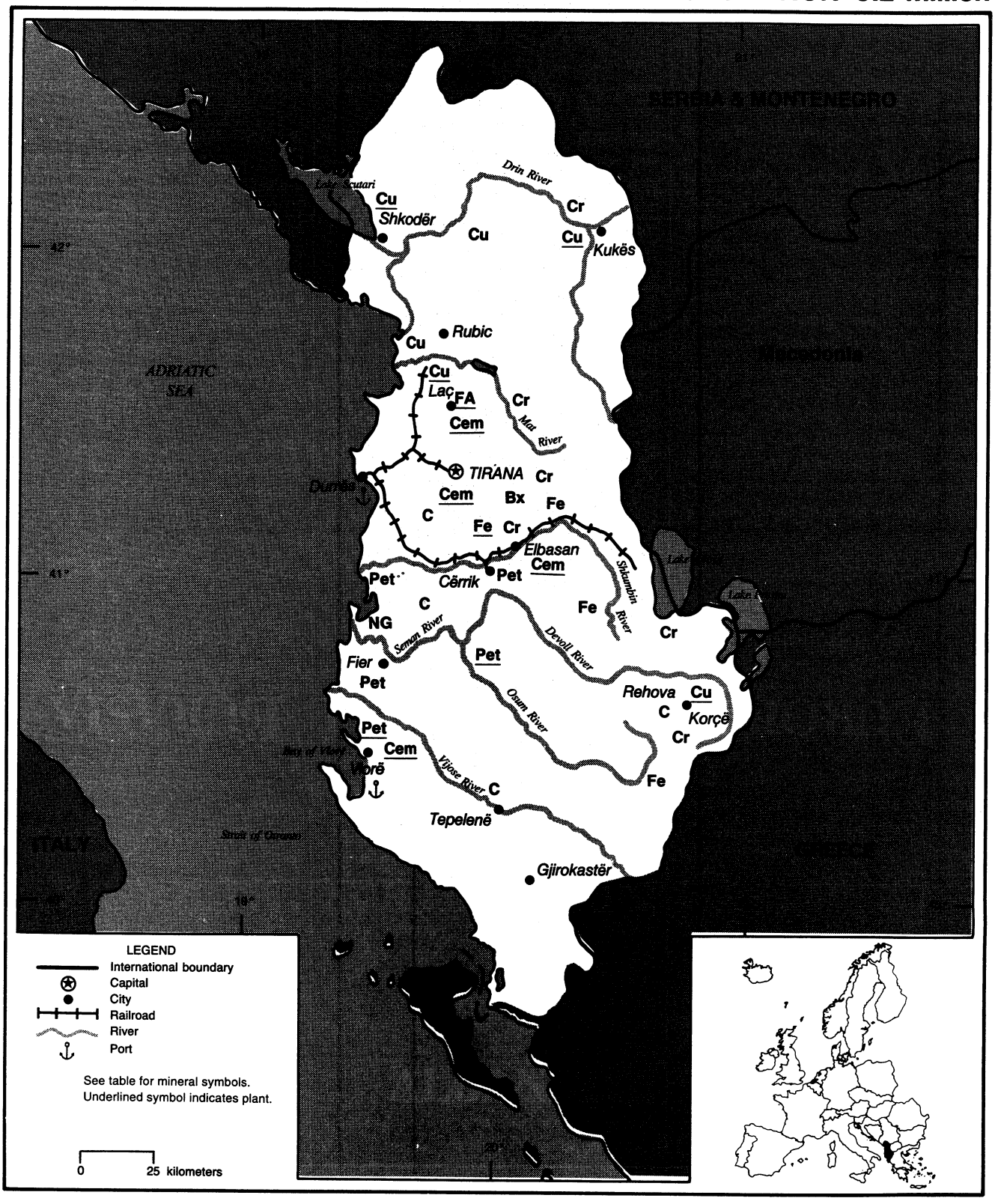
[2]In addition to the production of phosphate rock that is listed in this column, the world phosphate supply was augmented by the production of Thomas slag, a byproduct of pig iron production from phosphate iron ores. Thomas slag production, a modest yet significant component of Europe's phosphate raw material supply, was as follows in 1992, in thousand metric tons: France—500; Germany—125; Luxembourg—550. Thomas slag averages about 16% P_2O_5 content. World phosphate rock production averaged slightly more than 31% P_2O_5.

[3]Approximately 3,000,000 metric tons of salt is produced in Armenia, Azerbaijan, and Turkmenistan, that cannot be allocated to these regions, but are shown in the total for Central Eurasia.

[4]Total Central Eurasia sulfur production cannot be allocated to the various sulfur-producing republics: Azerbaijan, Belarus, Estonia, Kazakhstan, Russia, Tajikistan, Turkmenistan, and Uzbekistan.

ALBANIA

AREA 29,000 km² **POPULATION 3.2 million**



THE MINERAL INDUSTRY OF

ALBANIA

By Walter G. Steblez

In 1992, Albania's economy came to a virtual halt. The collapse of the Communist-led Government in midyear removed the coercive underpinnings from the country's rigid, centrally planned economy that resulted in the abandonment of many state-owned enterprises by workers as well as strikes at a number of mines and plants. This process, to a large extent, was accelerated by the breakdown of Eastern Europe's barter-based trading system on which Albania heavily depended. In September, it was reported that industrial production during the period from January to August declined by about 85% compared with the same period in 1991. Reportedly, the rate of unemployment approached 70% during this period. It also became apparent that rumors that appeared in print in the past concerning the use of slave and convict labor in the country's mines (mainly copper) were true. The chief activities in the country's mineral industry, apart from closures at several mining and processing facilities, involved discussions between Albanian authorities and foreign mining and petroleum-producing interests on future foreign participation in the development and operation of these sectors.

GOVERNMENT POLICIES AND PROGRAMS

A new Government was democratically elected in March 1992 following a gradual 2-year diminution of authority of the Communist-led Government. The new Government, immediately challenged with rapidly disintegrating social and economic structures, focused its efforts at both restoring governmental authority in Albania and replacing former authoritarian state structures with democratic political and economic institutions. To promote the development of a market economy, Albania's parliament adopted a law in August that would permit foreign investment in the country. Based on reciprocity and essentially restricting Government interference, the new legislation, reportedly, would ensure full freedom to the investor to transfer capital abroad. Reportedly, the Government encouraged foreign commercial ventures in chromite and copper mining, ferrochromium production, offshore petroleum exploration, and petroleum recovery enhancement at the country's onshore installations.

The Government reportedly planned to initiate a large-scale building effort in 1993 for infrastructure such as airports, highways, roads, and telecommunications facilities. Most of the financial aid for these projects would be provided by the International Bank for Reconstruction and Development and the European Bank for Reconstruction and Development. The country's construction materials and industrial minerals industries would be the primary minerals industry beneficiaries. In June, the longstanding dispute between Albania and the United Kingdom concerning the return of gold bullion worth $18 million to Albania was settled. The gold was removed from Albania's state treasury by the Germans during World War II and subsequently held in London.

After the war, a dispute between Albania and the United Kingdom arose concerning compensation for Albania's alleged sinking of a British warship near its coast. The new agreement between Albania and the United Kingdom, reportedly, called for the return of the gold to Albania in return for Albania's compensation of the United Kingdom amounting to $2 million.

PRODUCTION

With the virtual collapse of the country's economy in 1992, mineral industry output in all sectors and stages of operation fell substantially. Workers at mines and plants were no longer forced to remain at their jobs, and entire operations were idled for much of the year. Industries that depended on byproducts of mineral processing or crude material such as fertilizer plants and glass factories also idled as did the downstream commercial activity. *(See table 1.)*

TRADE

Mineral export was the most significant element in Albania's foreign commerce. With a poor manufacturing base, Albania's sole means of acquiring imported machinery and equipment was mostly through exports of chromite, ferrochromium, copper, and nickeliferous iron ore. Consequently, Albania's economy had been substantially dependent on world commodity price fluctuations. The country's highest value added exports consisted largely of ferrochromium and copper wire and cable.

In prior years, downturns in Albania's mining output and/or electric power generation, usually resulting from drought, had, due to the lack of hard-currency generation, direct negative impact on imports, including those needed by the mineral sector for modernization. Albania's imports of equipment and machinery includes spare parts needed for their operation.

In recent years, about 45% of Albania's trade turnover had been with

centrally planned economy countries, and approximately 25% has been with members of the European Community (EC). Although trade data for 1992 were largely unavailable, the country's foreign commercial activity presumably declined in concert with Albania's deteriorating economic situation. *(See table 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

Albania's mineral industry continued to be the largest sector of the country's overall industrial structure. In 1992, Albania's mineral industry remained entirely state-owned and operated. Table 2 lists the administrative bodies as well as subordinate units of production of the main branches of the country's mineral industry as they were in 1991. The economic viability of many of these facilities is doubtful, and the final organizational structure of the industry must still be determined. *(See table 4.)*

COMMODITY REVIEW

Metals

Metal ores have been Albania's chief source of mineral wealth. Apart from the commodities reviewed in this report, Albania, reportedly, possesses numerous known but undeveloped alluvial deposits of heavy sands, containing zirconium, rare earths, as well as rutile and ilmenite.

Bauxite.—Albania's bauxite deposits are mainly in the central part of the country, just east of Tirana, as well as in the Northern Alpine region near the Yugoslav border. Bauxite reserves were estimated at about 12 Mmt. The largest deposit at Daijti contains approximately 8 to 9 Mmt of reserves with an average grade of 39% to 40% Al_2O_3, 13% SiO_2, 6% S, 4% to 5% CaO, and 18.3% Fe_2O_3. Only 50,000 to 60,000 mt/a of bauxite, reportedly, has been mined near Prrenjas, in the Librazhd district. Because of a lack of domestic alumina refining and aluminum smelting capacity, this limited quantity of domestically mined bauxite has been entirely designated for export.

Chromite.—Albania's chromite mining operations were the most important component of its mineral industry. From the late 1970's through the 1980's, Albania has been a leading world producer and exporter of chromite, usually ranked second in terms of export and third in terms of production. Exports of chromite and ferrochromium have been vital earners of foreign exchange.

Although some chromite deposits and outcroppings can be found throughout Albania, the country's principal commercial chromite deposits are in the north-central and northern parts of the country in ultrabasic massifs in the Midrita area. The mainly podiform ore was mined at seven mining districts, of which Bulquize and Batra, about 30 km northeast of Tirana, represented about two-thirds of Albania's total production capacity. Albanian ore graded from 18% to 43% Cr_2O_3. Lumpy ores grading 39% to 42% Cr_2O_3 and concentrates grading from 50% to 53% Cr_2O_3 have been designated for export. Albania's largest and richest chromite mine at Bulquize annually produced between 450,000 and 500,000 tons of ore. About one-half of the ore was suitable for direct shipment; the balance was divided equally for beneficiation and for shipment as feedstock for the Burrel ferrochromium plant. Chromite extraction had become more difficult because of the declining availability of ore suitable for open pit mining, the increasingly complex geological environment at underground mining operations, especially at the Bulquize Mine, and the need for modern machinery and equipment. In midyear, 4,000 mine workers reportedly went on strike for 2 weeks for better wages and working conditions. In October, chromite mine workers reportedly again went on strike, which lasted until mid-December, for the same reason.

Despite the decline in chromite output in 1992, reportedly, companies such as Samancor and CMI of South Africa, Ilva Techint of Italy, Mitsubishi of Japan, and others sent technical delegations during the year to make preliminary assessments of Albania's chromite deposits and mined for possible future investment.

Copper.—During the 1980's, Albania's output of copper ore had been about 1 Mmt/a, grading 1.5% to 4% copper. All copper ore was mined underground. With the exception of the Rehove Mine and beneficiation plant in southeastern Albania, copper was mined, processed, smelted, and refined largely in the northern part of the country. The largest copper mining and beneficiation complex at Fushe Arrez had produced more than 320,000 mt/a of ore. After beneficiation, copper concentrates were smelted at the Rubic and Gjegjan (Kukes) and Lac pyrometallurgical primary smelters. Refineries and rolling mills at Rubic and Lac have produced copper wire, a large part of which was exported. Because Albania had few private telephones, only a limited amount of copper was consumed by the country's telecommunications industry.

In April, many of the country's copper mines reported operating at only 30% of capacity following the abolition of forced labor at these facilities. But in October, at some of the copper mining and processing enterprises, production reportedly began to approach normal levels.

Iron and Steel.—Albania's reserves of nickeliferrous iron ore were estimated at about 300 Mmt. Yearly output has ranged from 1 to 1.2 Mmt of ore, of which about one-half is consumed at the Elbasan iron and steel works to produce pig iron, a small amount of steel, and salts of nickel and cobalt. The balance of the iron ore was exported, largely to Bulgaria and Czechoslovakia. Over several decades, Czechoslovakia has been the largest consumer of Albanian nickeliferrous iron ore with annual imports ranging from 200,000 to 350,000 mt/a of ore. Czechoslovakia processed Albanian ore at its Sered refinery, where nickel and cobalt are extracted.

Deposits of commercial-grade ore were in ultrabasic massifs, near

Pogradec, in east-central Albania. The principal mines were at Prrenjas, Guri i Kuq, and Bitinska. The largest mining operation at Prrenjas in recent years produced about 600,000 mt/a of ore. The majority of Albanian ores are lateritic, grading 35% to 45% Fe, 1.4% Ni, and 0.05% cobalt. The Bitinska deposit was believed to contain considerable resources of lateritic ore as well as silicate ores, but only the lateritic material has been mined.

In 1992, the output of iron and steel at the Elbasan steelworks continued to decline sharply from the already low output levels of 1991, reportedly because of outdated and worn plant and equipment and the lack of available funds needed to import coking coal for the Elbasan steelworks. There were little data available on the future prospects at this operation.

Nickel and Cobalt.—During the 1980's, the trade returns of market economy countries showed occasional shipments of small lots of nickel matte, speiss, and nickeliferous residues. Also, recent nonstatistical sources have been reporting the construction of a nickel and cobalt plant at Elbasan, in progress from about 1985 to the present time. The completion of the plant had been postponed over a number of years because of technical difficulties. However, it seems fairly clear that some component of the Elbasan iron and steelworks, or of the new nickel and cobalt plant, has produced a commercially marketable grade of nickel carbonate for a number of years from lateritic nickeliferrous iron ores. This product has been exported to countries where it is used in much the same way as nickel oxide sinter—as a direct additive product in steelmaking. The same facility presumably produced cobalt salts, which were also destined for the export market.

Industrial Minerals

Albania's industrial mineral industry remained in early stages of development. In recent years, Albanian officials indicated that future investment would be aimed at developing facilities to exploit the country's asbestos, fluorite, kaolin, magnesite, phosphate, and quartz deposits. In view of efforts in 1992 to initiate work on modernizing the country's infrastructure, these developments appear to be probable. Albania also produced sufficient amounts of sand, gravel, and dressed stone to meet domestic needs.

Albania's phosphate rock, reportedly, was mined in the southern part of the country, near Gjirokaster. The ore, with an average grade of 6% to 7% P_2O_5, was processed mainly at the Lac fertilizer plant together with phosphate rock imported from North Africa. A small amount of domestically produced phosphate was ground locally for fertilizer. In addition to basic fertilizers, the Lac fertilizer plant had been producing superphosphate with 15% to 20% P_2O_5, concentrated nitric acid, and simple phosphate made into granular form.

In 1992, this plant, reportedly, ceased to operate because the nearby copper mines ceased to supply ore from which needed sulfuric acid was obtained during copper processing at the Lac plant.

Mineral Fuels

Albania produced lignite, hydroelectric power, natural gas, and petroleum, which, in past years, in view of low domestic fuel consumption, allowed the country to be a net exporter of energy. In recent years, owing to reduced hydroelectric power output resulting from several years of drought, a general downturn in petroleum production, and increasing indigenous energy requirements, Albania's energy status became tenuous.

Coal.—Albania's exploitable coal resources reportedly amounted to 158 Mmt of low-calorie lignite. Lignite has been mined from thin seams with reportedly outdated methods and a low level of mechanization. The entire output was consumed domestically, mainly at thermal electric power stations. In 1992, as in other branches of the mineral industry, coal miners at the Valias and other mining enterprises went on strike during the year for better working conditions and higher wages.

Petroleum, Crude.—Apart from strikes, which, as in other cases described earlier, occurred also in the natural gas and petroleum sector during the year, offshore petroleum exploration was the most significant event in this sector. In 1992, the Agip Corp. of Italy; Occidental Petroleum Corp. and Chevron Corp. of the United States; Deminex-OMV, a Austrian-German company; and the Hamilton Oil Corp. of the United States conducted offshore prospecting in cooperation with the Albanian Government. At yearend, research was reportedly completed in Chevron's No. 4 block, as well as seismic studies at Deminex-OMV blocks. Subsequent work was to begin in offshore blocks granted to Agip, Hamilton, and Occidental Petroleum corporations.

Reserves

In accordance with the "Stalinist" model of centrally planned industrial development, since the early 1950's, Albania has pursued the policy of attaining self-sufficiency at all costs. In Albania, as in other centrally planned economy countries, rigid Government directives to discover exploitable resources have often led to overevaluations of collected field data. The system used to measure reserves in Albania, as in other centrally planned economy countries, was based on two cross-imposed classification schemes, one relating to the exploitability of the material in question, and the other relating to the reliability of the information on the quantity of material in place. The first system was used to determine whether or not the deposit was suitable for exploitation, given current technological capability and industrial need. The second classification related to the reliability of data gathered on the quantity of the mineral in situ. The second classification designated deposits

into reserve categories A, B, and C_1, where sufficient geological data have been obtained relative to the size of the deposit and its mineral grade. Reserve category A referred to deposits that were known in detail. The ore body boundaries were outlined by trenching, exploratory boreholes, or exploratory workings; the depositional environment, the proportion of different commercial grades of ore, and the hydrogeologic conditions of exploitation had been ascertained. The quality and technological properties of the ore had been determined in detail, assuring the reliability of projected beneficiation and production processes. Category B differed from A mainly in that fewer details were available concerning the distribution of ore grades within the deposit. Category C_1 referred to reserves in place estimated by a sparse grid of exploratory boreholes or workings. These reserves could adjoin the boundaries of categories A and B; they can also be reserves of very difficult deposits where the distribution of mineral values could not be ascertained even by a dense exploratory grid. The types, industrial grades, and quality of ore, as well as the necessary beneficiation technology, were tentatively established by means of laboratory analysis, and/or by analogy with similar known deposits. The general conditions of exploitation and the hydrogeological environment of the deposit were known tentatively as well. Taking this into account, Albania's mineral resources in categories $A+B+C_1$ are given in table 3. *(See table 5.)*

INFRASTRUCTURE

Albania's inland system of ways and communications consists of about 17,300 km of highways, railroads, and waterways. The railroad system consists of 509 km of 1.435-m standard-guage track and 34 km of narrow-guage single track. The road system consists of 6,700 km of highways and main roads and 10,000 km of forest and rurals roads. About 60% of all domestic cargo is transported by truck, 35% by rail, and 2% by coastal shipping along the Adriatic Sea and sections of Lake Scutari, Lake Ohrid, and Lake Prespa. Nickeliferous iron ore mining areas at Prrenjas and Guri i Kuq are linked by rail to processing centers at Elbasan. The copper mining district at Shkoder is also rail-linked to the copper smelter and refinery at Lac. Albania has a 1,630,000-kW generating capacity, mostly from hydroelectric sources. The country's petroleum and natural gas sector has about 145 km of crude oil pipeline, 55 km of refinery products pipeline, and 64 km of pipeline for natural gas. Seaports are at Durres, Sarande, and Vlore, but most bulk mineral cargoes are handled at Durres.

OUTLOOK

Albania's mineral industry is labor-intensive and in need of large infusions of capital. The country was conspicuously behind other former Eastern European centrally planned countries in terms of both political and economic reforms.

Albania's capital stock reportedly was antiquated with a technological level dated to the extent that several outside technical observers felt that modernizing many of the country's mineral industries, given the country's low ore grades, would not appreciably benefit the country's economy. At issue was a debate concerning whether or not to reindustrialize or capitalize in favor of a strong tourist economy. Apparently, the future of the country's mineral industry in the context of market economics may be in taking a greenfields approach to the country's mineral deposits.

OTHER SOURCES OF INFORMATION

Agency

Ministria Industrise dhe Minerave (Ministry of Industry and Mining)
Tirana, Albania

Publications

Albania Today (in English), Tirana, monthly.
35 Vjet Shqiperi Socialiste (35 Years of Socialist Albania), Tirana; a 5-year statistical report.

TABLE 1

ALBANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Bauxite[e]		25,000	25,000	26,000	20,000	4,000
Chromium:						
Chromite, gross weight	thousand tons	1,109	e900	910	e500	150
Marketable ore	do.	346	294	295	e150	35
Concentrate	do.	160	173	157	e75	15
Ferrochromium	do.	39	39	24	e35	15
Cobalt:[e]						
Mine output, Co content[3]		600	600	600	600	20
Plant production, Co content[4]		10	10	20	15	3
Copper:						
Ore:						
Gross weight	thousand tons	1,187	1,136	931	e500	90
Concentrate		55,000	62,000	e49,000	e25,000	4,000
Cu content[e]		13,300	14,000	11,500	6,100	900
Metal, primary:						
Smelter		14,772	15,312	r1,600	r4,800	200
Refined		14,097	14,512	r e10,900	r e4,400	90
Iron and steel:						
Iron ore, nickeliferous:						
Gross weight	thousand tons	1,067	1,179	930	r e750	200
Fe content[e]	do.	470	520	410	350	88
Metal:						
Pig iron		172,000	179,000	96,000	e50,000	10,000
Crude steel[e]		110,000	112,000	65,000	35,000	5,000
Rolled steel		96,000	92,500	e60,000	e30,000	1,000
Nickel:[e]						
Mine output, Ni content		10,100	11,200	8,800	7,500	150
Plant production, Ni content		4,500	5,400	5,500	5,000	100
Metal, Ni cathode		300	1,800	2,500	2,200	50
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	746	754	e750	r e600	200
Clay, kaolin[e]		9,000	9,000	5,000	2,000	500
Dolomite[e]		350,000	400,000	r397,000	e350,000	50,000
Fertilizer, manufactured:						
Phosphatic		165,000	165,000	e100,000	e75,000	10,000
Urea		77,000	92,000	e50,000	e25,000	4,000
Nitrogen: N content of ammonia[e]		100,000	110,000	100,000	80,000	15,000
Olivinite		e50,000	52,000	56,000	e45,000	300
Phosphate rock (12% to 15% P_2O_5)[e]		25,000	25,000	10,000	9,000	1,500
Pyrite, unroasted[e]		r51,000	r48,800	r48,000	r23,000	7,000
Salt[e]		70,000	80,000	r85,000	55,000	5,000
Sodium compounds n.e.s.: Soda ash, calcined		22,000	27,000	e27,000	r e16,000	150
Sulfuric acid		81,000	82,000	e70,000	e50,000	1,000
MINERAL FUELS AND RELATED MATERIALS						
Asphalt and bitumen, natural[e 6]	thousand tons	900	900	900	r500	100
Coal: Lignite	do.	2,184	2,193	2,071	e1,100	500

See footnotes at end of table.

TABLE 1—Continued

ALBANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
MINERAL FUELS AND RELATED MATERIALS—Continued						
Gas, natural, gross production[7]	million cubic meters	480	312	243	r170	100
Petroleum:						
Crude:						
Weight	thousand tons	1,167	1,129	1,069	r700	500
Converted	thousand 42-gallon barrels	7,786	7,533	7,132	r4,670	3,300
Refinery products[6]		9,000	9,000	5,000	3,000	1,000

eEstimated. rRevised.

[1]Table includes data available through May 1993.

[2]In addition to the commodities listed, a variety of industrial minerals and construction materials (common clay, quartz, titanomagnetite, sand and gravel, and stone) are produced, but output is not reported quantitatively, and available information is inadequate to make reliable estimates of output levels.

[3]Calculated from reported and estimated weight of nickeliferous ore; the amount of cobalt recovered, if any, is conjectural.

[4]Figures represent cobalt content of estimated production of commercially marketable cobalt salts produced within Albania from domestically mined nickeliferous iron ore.

[5]Reported figure.

[6]Includes petroleum refinery-produced asphalt and bitumen.

[7]Separate data on marketable production are not available, but gross and marketed output are regarded as nearly equal.

TABLE 2

ALBANIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990p	Destination, 1990	
				United States	Other (principal)
METALS					
Chromium: Ore and concentrate		405,758	279,458	—	China 80,728; Yugoslavia 68,255; Japan 41,550.
Cobalt: Metal including alloys, all forms	value, thousands	—	$34	—	All to Finland.
Copper:					
Ash and residue containing copper		8,250	—		
Metal including alloys:					
Scrap		595	284	—	All to Germany.
Unwrought		150	1,247	—	Greece 1,099; Germany 148.
Semimanufactures		2,419	1,443	—	Germany 1,349; Yugoslavia 94.
Iron and steel: Metal:					
Scrap		—	1,248	—	Yugoslavia 939; Thailand 258; Germany 51.
Pig iron, cast iron, related materials		2,570	54,416	—	All to Taiwan.
Ferroalloys:					
Ferrochromium		16,930	14,964	1,506	Japan 6,138; Netherlands 4,432;
Unspecified		3,232	—		
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		—	7	—	All to France.
Tubes, pipes, fittings		5,137	—		
Molybdenum: Metal including alloys, semimanufactures		—	2	—	All to Yugoslavia.
Nickel: Metal including alloys:					
Scrap		87	40	—	All to Germany.
Unwrought		1,228	440	—	Germany 127; Spain 101; Sweden 81.
Selenium, elemental		—	4	—	All to United Kingdom.

See footnotes at end of table.

TABLE 2—Continued

ALBANIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destination, 1990	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals:					
Waste and sweepings	value, thousands	$633	—		
Metals including alloys, unwrought and partly wrought:					
Platinum	kilograms	[2]16	—		
Titanium: Metal including alloys, semimanufactures		3	—		
Zinc:					
Ash and residue containing zinc		—	150	—	All to Germany.
Metal including alloys, unwrought		66	324	—	Do.
Other: Ashes and residues		—	14,931	—	Yugoslavia 14,659; Finland 272.
INDUSTRIAL MINERALS					
Cement		8,584	15,644	—	All to Yugoslavia.
Clays, crude:					
Chamotte earth		—	22	—	All to Germany.
Unspecified		18	—		
Diamond: Natural: Industrial stonescarats		1,814	([3])		
Lime		—	95	—	All to Greece.
Precious and semiprecious stones other than diamond: Natural	value, thousands	—	$3	—	All to Switzerland.
Pyrite, unroasted		—	15,008	—	All to Turkey.
Salt and brine		9,936	9,185	—	All to Yugoslavia.
Sodium compounds, n.e.s.: Sulfate, manufactured		—	5	—	All to United Kingdom.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		298	258	—	All to Greece.
Worked		2	2	—	All to Germany.
Sand other than metal-bearing		98,214	94,408	—	Greece 92,145; Yugoslavia 2,263.
Sulfur: Elemental: Crude including native and byproduct		2,203	3,951	—	All to Turkey.
Other:					
Crude		6,047	43	—	All to Germany.
Slag and dross, not metal-bearing		—	458	—	All to Yugoslavia.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		813	1,785	—	Do.
Petroleum refinery products:					
Lubricantsbarrels		168	—		
Liquefied petroleum gas	do.	9,000	—		
Gasoline	do.	189,899	1,128,477	—	All to Greece.
Bitumen and other residues	do.	—	157,396	—	All to China.
Bituminous mixtures	do.	—	61,258	—	Do.

[p]Preliminary.

[1]Table prepared by Ron Hatch and Jeremy Tidwell. Owing to a lack of official trade data published by Albania, this table should not be taken as a complete presentation of this country's mineral exports. These data have been compiled from United Nations information and data published by the partner trade countries.

[2]Excludes unreported quantity valued at $86,000 imported by Italy.

[3]Unreported quantity valued at $6,000, imported by France.

TABLE 3

ALBANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1989	1990[p]	Sources, 1990	
			United States	Other (principal)
METALS				
Aluminum: Metal including alloys:				
Scrap	—	16	—	All from Germany.
Unwrought	—	159	—	All from Yugoslavia.
Semimanufactures	49	422	—	Greece 404; Belgium-Luxembourg 9; Germany 7.
Copper: Metal including alloys:				
Unwrought	—	5	—	All from Germany.
Semimanufactures	194	233	—	Greece 146; Yugoslavia 52; Germany 35.
Iron and steel:				
Iron ore and concentrate	—	7,300	—	All from Morocco.
Metal:				
Scrap	—	1,135	—	All from United Kingdom.
Pig iron, cast iron, related materials	—	910	—	All from Turkey.
Ferroalloys:				
Ferromanganese	1,323	374	—	Yugoslavia 300; Norway 74.
Ferronickel	—	5	—	All from Yugoslavia.
Ferrosilicon	1,148	461	—	Do.
Unspecified	121	—		
Steel, primary forms	2,623	—		
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	—	3,522	—	Belgium-Luxembourg 2,986; Germany 301; Greece 217.
Clad, plated, coated	—	3,394	—	Greece 1,767; United Kingdom 1,516; Germany 99.
Of alloy steel	—	282	—	Germany 99; Belgium-Luxembourg 77; France 43.
Bars, rods, angles, shapes, sections	—	89	—	All from Germany.
Rails and accessories	108	—		
Wire	76	164	—	United Kingdom 64; Germany 53; Belgium-Luxembourg 44.
Tubes, pipes, fittings	2,238	6,516	—	Germany 3,897; Mexico 1,410; Greece 956.
Hoop and strip	24	—		
Lead:				
Oxides	—	15	—	All from France.
Metal including alloys, unwrought	—	75	—	All from Germany.
Mercury	—	1	—	Do.
Tin: Metal including alloys, unwrought	—	46	—	Do.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.: Artificial: Corundum	114	64	—	All from Yugoslavia.
Asbestos, crude	1,029	—		
Barite and witherite	8,500	7,982	—	All from Turkey.
Cement	—	50	—	All from France.
Clays, crude: Kaolin	—	336	—	United Kingdom 200; France 136.
Diatomite and other infusorial earth	—	24	—	All from Germany.
Feldspar, fluorspar, related materials:				
Feldspar	—	19	—	All from France.

See footnotes at end of table.

TABLE 3—Continued

ALBANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1989	1990[p]	Sources, 1990	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Fertilizer materials: Manufactured:				
Nitrogenous	1,500	1	—	All from Germany.
Potassic	—	85	—	France 79; Germany 6.
Magnesium compounds: Oxides and hydroxides	2,778	600	—	All from Greece.
Mica:				
Crude including splittings and waste	—	1	—	All from Germany.
Worked including agglomerated splittings	—	1	—	All from Switzerland.
Nitrates, crude	—	22	—	All from Germany.
Stone, sand and gravel: Sand other than metal-bearing	1,088	6,945	—	Belgium-Luxembourg 6,501; Yugoslavia 444.
Sulfur: Elemental: Colloidal, precipitated, sublimed	—	1	—	All from Germany.
Talc, steatite, soapstone, pyrophyllite	—	25	—	Do.
Other: Crude	—	44	—	All from Greece.
MINERAL FUELS AND RELATED MATERIALS				
Coal: Bituminous	108,699	175,412	161,530	China 13,882.
Petroleum refinery products:				
Gasoline, motor thousand 42-gallon barrels	—	22,049	—	All from Greece.
Mineral jelly and wax 42-gallon barrels	—	331	—	Yugoslavia 173; China 158.
Lubricants do.	273	4	—	All from Yugoslavia.
Bituminous mixtures do.	—	97	—	Germany 85; Greece 12.
Petroleum coke do.	—	55,000	—	All from Greece.

[p]Preliminary.

[1]Table prepared by Ron Hatch and Jeremy Tidwell. Owing to a lack of official trade data published by Albania, this table should not be taken as a complete presentation of this country's mineral imports. These data have been compiled from United Nations information and data published by the partner trade countries.

TABLE 4

ALBANIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Location of main facilities	Annual capacity
Cement	Elbasan, 32 km southeast of Tirana; Kruje, 20 km northwest of Tirana; Shkoder, 85 km northwest of Tirana; and Vlore, southwest of Tirana	1,200
Chromite	Bater (including Bater I & II and Martanesh), 40 km northeast of Tirana	450
Do.	Bulqize (including Bulqize south, Fush, Newpoints, Ternove, and Todo Maco), 35 km northeast of Tirana	450
Do.	Kalimash, 60 km north of Tirana	250
Do.	Kam, 70 km north of Tirana	100
Do.	Klos, 20 km northeast of Tirana	50
Do.	Pogradec (including Katjiel, Memelisht, Poljske, Pishkash, and Prenjas), 50 km east of Tirana	100
Ferrochromium	Burrel, 35 km northeast of Tirana	40
Do.	Elbasan, 32 km southeast of Tirana	36
Copper:		
Ore	Fushe-Arrez, 80 km north of Tirana	350
Do.	Gjegjan, 100 km northeast of Tirana	150

See footnotes at end of table.

TABLE 4—Continued

ALBANIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Location of main facilities	Annual capacity
Copper—Continued:			
Ore—Continued:		Golaj (including Nikoliq and Pus), 120 km northeast of Tirana	150
Do.		Kurbnesh-Perlat, 55 km northeast of Tirana	100
Do.		Rehove, 110 km southeast of Tirana	100
Do.		Reps (including Gurch, Lajo, Spac, and Thurr), 55 km north of Tirana	350
Do.		Rreshen, 50 km north of Tirana	50
Do.		Shkoder (including Palaj, Karma I & II), 85 km northwest of Tirana	100
Smelter		Kukes, 110 km northeast of Tirana	6
Do.		Lac, 35 km northwest of Tirana	7
Do.		Rubik, 50 km north of Tirana	3.5
Iron ore		Prenjas (Bushtrica, Prenjas, Skorska I & II), 70 km southeast of Tirana	650
Do.		Guri i Kuq (including Cervenake, Grasishta, Guri i Kuq, Hudenisht and Guri Pergjrgjur), 25 km east of Tirana	500
Steel		"Steel of the Party" Metallurgical Combine at Elbasan	150
Nickel, smelter		Elbasan	6
Coal lignite		Maneze, Mezes, and Valias Mines in Tirana Durres area; Krabe Mine, 20 km southeast of Tirana; Alarup and Cervnake Mines, in Pogradec area, 80 km southeast of Tirana; Mborje-Drenove Mine in Korce area, 85 km southwest of Tirana; and Memaliaj Mine in Tepelene are, 110 km south of Tirana	2,500
Natural gas	million cubic feet	Gasfields in southwest Albania between Ballsh and Fier	16,000
Petroleum:			
Crude	42-gallon barrels per day	Oilfields at Marineze, Ballsh, Shqisht, Patos, Kucova, Gorrisht, and others	35,000
Refined	do.	Refineries: Ballsh, Cerrik, Fier, and Stalin	33,000

TABLE 5

ALBANIA: APPARENT RESOURCES OF MAJOR MINERAL COMMODITIES FOR 1992

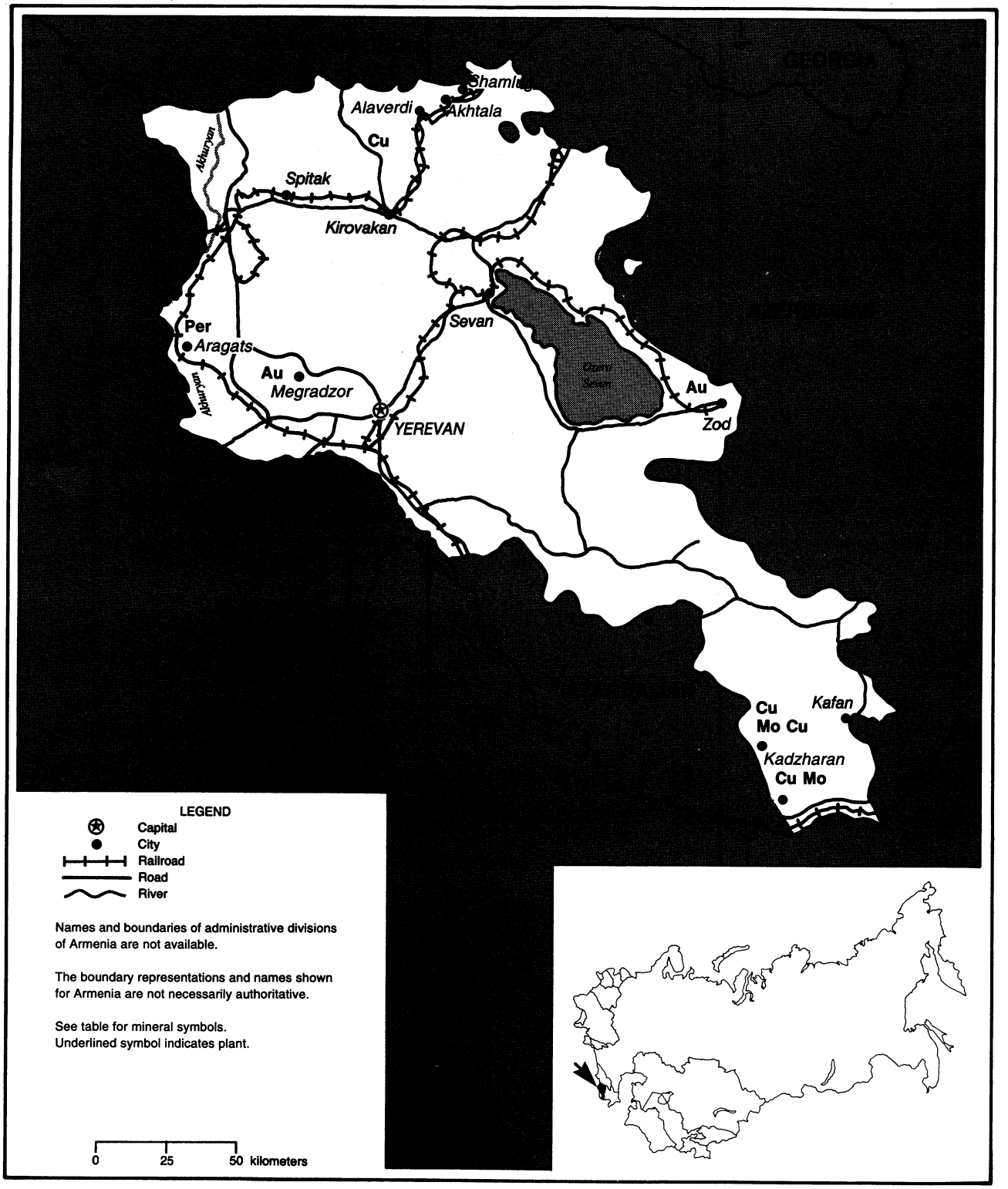
(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Bauxite		12,000
Chromite, 20% to 44% Cr_2O_3		30,000
Coal		158,000
Cobalt, recoverable in ore		60
Copper, recoverable in ore		700
Iron, recoverable in ore		70,000
Natural gas	billion cubic meters	20
Salt		80,000

Sources: Gornaya Entsiklopediya, v. 1, Moscow; Gazovaya Promyshlennost, Moscow, Dec. 1989. Commodities Research Unit Limited, London; Mining Journal, London, May 8, 1992, and Erzmetall, No. 3, 1992, Germany.

ARMENIA

AREA 29,800 km² **POPULATION 3.4 million**



THE MINERAL INDUSTRY OF

ARMENIA

By Richard M. Levine

The Armenian economy in 1992 was plagued by a severe energy shortage. Shortages of natural gas, according to Armenia's Premier, were due to the fact that shipments from Turkmenistan passed through the territory of other Commonwealth states that were each taking much larger volumes of gas than envisaged in their original quotas. Armenia, being at the end of the pipeline, was severely affected by this. Also, because of the armed conflict with Azerbaijan over sovereignty in the predominately Armenian enclave of Nagorno Karabakh in Azerbaijan, Armenia was subjected to a blockade of gas and oil produced in and passing through Azerbaijan, which greatly exacerbated the energy shortage in Armenia. Furthermore, civil unrest in Georgia and the North Caucuses through which much of Armenia's remaining pipeline and supply routes passed also seriously affected shipments to Armenia.

GOVERNMENT POLICIES AND PROGRAMS

To ease the energy shortage and reduce its vulnerability on outside supplies of energy, Armenia was considering restarting its nuclear powerplant that was closed because of safety concerns following the earthquake in 1988. The issue of reopening this facility involved analyzing ecological and safety concerns. Also, plans were under consideration to construct a gas pipeline to Iran.

Owing to Armenia's dependence on imported metals, the Armenian Ministries of Industry and Economics developed a program for Armenia to develop its ferrous and nonferrous mineral industries using domestic raw materials. The program envisions increasing ore extraction at existing deposits as well as developing new deposits. In this way Armenia plans to increase production of minerals currently being mined such as copper, gold, molybdenum, and silver; to recover ore constituents such as zinc that are not currently being recovered; and to begin mining minerals such as iron ore.

PRODUCTION

Armenia's mineral industry was primarily involved in mining nonferrous and industrial minerals. Armenia has large molybdenum reserves and was mining one-third of the former U.S.S.R.'s output of molybdenum. The molybdenum is associated with copper, but Armenia also separately mines copper-zinc deposits. Armenia has a native gold mining industry and its nonferrous ore byproducts include barite, gold, lead, rhenium, selenium, silver, tellurium, and zinc.

Armenia had a large metallurgical industry that was mostly shut down in the late 1980's for environmental reasons. Armenia had been the second largest producer of copper sulfate and third largest producer of refined copper among the republics of the former U.S.S.R. Armenia also had been producing primary aluminum and aluminum products and foil, but production of primary aluminum had ceased.

Armenia had a large industrial minerals industry and was the largest producer of perlite in the former U.S.S.R. It also produced a number of other industrial minerals, including clays, diatomite, dimension stone, limestone, salt, and semiprecious stones. Armenia, reportedly, also had significant high-quality iron ore reserves, which have not yet been exploited. However, Armenia had practically no mineral fuel production and was dependent on imported coal, gas, and oil, which led to significant economic difficulties in 1992.

Owing to the shortage of energy as a result of the warfare in Nagorno Karabakh, the Armenian Ministry of Industry projected that in 1992 copper, molybdenum, and gold output would only be 20% of the 1990 production total in comparison with 1991 when output was 40% of the 1990 total. Also, owing to a blockade on Armenia's shipments, Armenia was not able to export its concentrates abroad. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, most major mineral producing enterprises in Armenia were state owned, although as with all former Soviet republics, plans were being formulated and enacted for the privatization of enterprises. *(See table 2.)*

COMMODITY REVIEW

Metals

Copper.—Copper was mined at the Kadzharan and Agarak copper-molybdenum deposits, at which molybdenum is a major product, and from the Kafan, Akhtala, and Shamlug copper deposits. The Kadzharan deposit was exploited by the Zangezur copper-molybdenum mining and beneficiation complex. Armenia had been producing about 30,000 metric tons per year of copper concentrate. Plans called for expanding copper output to 40,000 tons of concentrate per year.

Copper smelting in Armenia had occurred at the Alaverdi copper smelter until 1989, when the smelter was closed because of environmental concerns. Armenia is now planning the construction of a new copper smelter in central Armenia in the Araratskiy region with a 40,000-ton-per-year copper concentrate processing capacity and has been negotiating with the U.S. firm GCL Financial Network concerning the construction of this smelter. Armenian enterprises are developing copper and copper-molybdenum deposits in the Kastakert, Alaverdi, and Kafan regions to supply raw material for the new complex. Ore reserves are estimated to be between 2.6 to 2.8 million tons averaging 1.3% to 1.5% copper. The joint venture also will extract bismuth, iron, selenium, and tellurium from the ore.

Gold.—Gold is mined in Armenia at the Zod deposit in eastern Armenia and the Megradzor deposit in central Armenia. Annual output was estimated to have been in the range of 2 tons per year.

However, in 1992, gold production was estimated to have fallen to less than 1 ton as Armenia's gold production, reportedly, was projected to be less than 20% of its 1990 level. Exploration work was being conducted at these two fields with the hope of increasing gold output. Plans call for increasing mining at existing fields and also developing the Lichvazsk-Teiskoye gold field in southern Armenia. Total gold output is planned to increase to 3 tons per year.

Molybdenum.—Armenia was one of the former U.S.S.R.'s major molybdenum mining regions, producing about one-third of the former U.S.S.R.'s mine output of molybdenum. The molybdenum was from copper-molybdenum ore from the Kadzharan deposit exploited by the Zangezur copper-molybdenum complex and from the Agarak deposit. Output of molybdenum in concentrate was estimated to be about 1,000 tons in 1992. Plans called for expanding molybdenum output at the Zangezur complex and for developing a molybdenum-rhenium production complex at the Agarak deposit and in the city of Yerevan.

Industrial Minerals

Armenia's diamond cutting and polishing factory in Nur Adjen produced $60 million worth of income in 1992, despite cutbacks in supply from Yakut-Sakha in Russia. The plant at Nur Adjen is one of Armenia's most important export-producing industries. Uncut diamonds imported from Yakut-Sakha, after cutting and polishing, are exported to Russia, Europe, and the United States. The factory was idle for 4 months in 1992 owing to a lack of supplies from Yakut-Sakha. The factory is on the Government's priority list for receiving energy and did not experience significant energy shortages. The factory uses primarily Soviet-made machinery. It employs 1,800 workers. One of the factory's problems is acquiring marketing expertise because previously all of its cut diamonds were sold in Moscow.

Mineral Fuels

Coal.—Owing to the country's critical energy shortage, the Government decided to reopen in January 1993 the Idzhevan coking coalfield with estimated reserves of 10 million tons; the field had not been exploited since the late 1940's. Coal extraction was projected to be about 250,000 tons per year. The energy crisis in Armenia had resulted in increased exploration work in the Gugarak region where coal reserves are estimated to be in the hundreds of thousands of tons. The coal reserves in this region are at a depth of 100 meters to 150 meters.

Natural Gas and Oil.—Exploration for oil and gas has been under way for three decades in Armenia; during this time 55 wells have been drilled. Four areas have been declared promising with reserves of 64 million tons of oil and 32 billion cubic meters of natural gas reported. Armenia's Minister of State declared that Armenia currently lacks the capital to invest in the exploitation of these deposits and is seeking investors; also, under the best of circumstances, he declared it would take 3 to 4 years before these deposits would contribute significantly to Armenia's energy supply.

Reserves

Reserves in Armenia were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the report on Russia. *(See table 3.)*

INFRASTRUCTURE

Armenia's severely strained economic conditions and fuel and minerals supply situation were in large measure due to Armenia being landlocked and surrounded by hostile or unstable countries or countries with which Armenia had not adequately developed political and economic relations. Armenia has 1,254 km of borders with Azerbaijan to the east, 566 km of borders with Azerbaijan to the south, 268 km of borders with Turkey and 35 km of borders with Iran to the south, and 164 km of borders with Georgia to the north. None of these bordering states were secure as either stable or friendly routes of transshipments of supplies to Armenia because of the warfare in Nagorno Karabakh that affected relations with Azerbaijan and Turkey, problems of civil unrest in Georgia and the North Caucasus that affected shipments to Armenia, and the lack of traditional economic and transport ties with Turkey and Iran. More than 85% of Armenia's raw materials supplies

from the countries of the former U.S.S.R. had been shipped by rail through Azerbaijan and 15% by rail through Georgia. Formerly, a large percentage of Armenia's oil and natural gas supply was piped via Azerbaijan and the remainder was piped via Georgia. To export its raw materials and manufactures, Armenia must contend with the same political and economic factors that affect imports.

Within Armenia there were, as of 1990, 840 km of rail lines and 11,300 km of highways, of which 10,500 km was hard surfaced. Armenia was the most ethnically homogeneous republic of the former U.S.S.R. with more than 93% of the population of Armenian ethnic origin.

OUTLOOK

The future development of Armenia's mineral industry as well as its general economic development depend on the resolution of the conflict in Nagorno Karabakh with Azerbaijan, the resolution of issues of civil unrest in Georgia and the North Caucasus, and the development of political ties with Turkey and Iran in a manner that will permit Armenia to have normal economic and transport relationships with its bordering states. Armenia has considerable potential to further develop its mineral industry and to supply both the countries of the former U.S.S.R. and world markets with nonferrous metals, but the development of these industries will depend on adequate fuel supplies and secure means for exporting this output.

Although suffering from political problems outside its borders, Armenia could also be viewed as one of the potentially most stable of the new countries of the former U.S.S.R. Its population, being more than 90% of Armenian ethnic origin and having a long historical tradition, a strong sense of unity brought about by historical oppression, and a large Armenian diaspora in western countries, has a stronger cohesiveness and sense of nationhood than many other countries of the former U.S.S.R.

TABLE 1
ARMENIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons)

Commodity	1992
Bentonite	200,000
Cement	500,000
Copper, ore:	
Gross weight, 1% Cu	200,000
Cu content, recoverable	2,000
Limestone	1,000,000
Molybdenum, mine output, Mo content	1,000
Perlite	50,000
Salt	100,000

TABLE 2
ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location of main facilities	Annual capacity
Copper (Cu content of ore)	Kafan copper mining directorate	Kafan region	10,000.[1]
Do.	Shamlug mining directorate	Shamlug	
Do.	Akhtala mining directorate	Akhtala	
Do.	Zangezur copper-molybdenum complex mining Kadzharan deposit	Kafan region	
Do.	Agarak copper-molybdenum mining and processing complex	Agarak	
Gold	Zod mining complex	Zod	2 (for both enterprises).
Do.	Megradzor deposit	Megradzor	
Molybdenum (Mo content of ore)	Zangezur copper-molybdenum complex mines Kadzharan deposit	Kadzharan	6,000 (total for both enterprises).
Do.	Agarak copper-molybdenum mining complex	Agarak	
Perlite	Aragats mining and beneficiation complex	Aragats	200,000.

[1]Copper content of ore total from all copper enterprises.

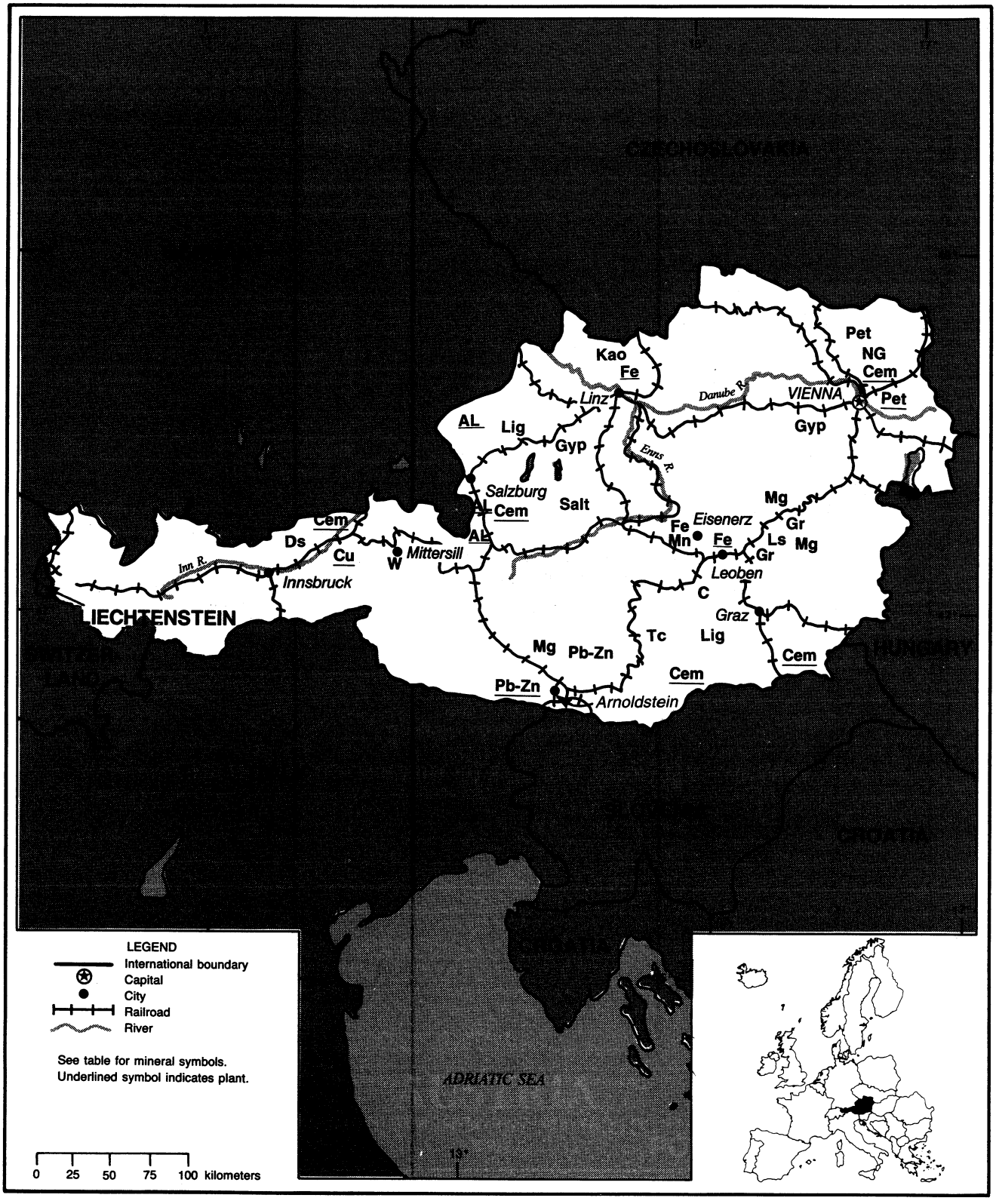
TABLE 3
ARMENIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Mineral	Quantity
Copper ore	6,000
Molybdenum	60 to 70
Natural gas million cubic meters	32,000
Perlite	160,000
Petroleum	64,000
Salt	400,000
Zinc	20 to 25

AUSTRIA

AREA 84,000 km² **POPULATION 7.7 million**



THE MINERAL INDUSTRY OF

AUSTRIA

By Jozef Plachy

The mining industry of Austria supplies about one-third of the country's mineral raw materials requirements. Production of metalliferous ores is dominated by iron, tungsten, and zinc, while cement, graphite, gypsum, kaolin, magnesite, and talc were the principal industrial minerals produced in 1992.

GOVERNMENT POLICIES AND PROGRAMS

In anticipation of joining the European Community (EC), the Osterreichische Industrieholding Aktiengesellschaft (OIAG), the Austrian State holding company, has been going through a restructuring process. This includes shutting down unprofitable enterprises, selling present investments in foreign operations, and personnel cutbacks. The wider plan reportedly includes the privatization of the oil and minerals company Osterreichische Mineralolverwaltungs AG (OMV).

PRODUCTION

With the exception of a few smelted or refined metals, such as copper and lead, there was a general decline in both mined metalliferous ore and primary metal production in 1992. Austria's only zinc smelter and one of the country's two aluminum smelters were shut down during the year.

While some industrial minerals increased in production in 1992 over that of 1991 and others showed decreases from 1991 production levels, refined petroleum production showed an overall 18% decrease from the previous year. *(See table 1.)*

TRADE

In 1992 Austria's raw materials and energy exports represented 5.3% of total exports. Raw materials and energy imports, on the other hand, represented 10.3% of total imports. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

Although structural changes are slowly taking place, the Supreme Mining Authority, a section of the Federal Ministry of Trade, is still the principal authority over the mineral mining and processing industry. Proprietorship is exercised by the State holding company, OIAG. The Government, through the Ministry of Trade, Commerce, and Industry and the Ministry of Science and Research, is also involved in exploration and research. Direct support of the mineral industry in 1992 has reportedly been reduced while subsidies for environmental protection were reportedly increased. Environmental expenditures averaged 1.9% of Austria's gross domestic product, reportedly the highest ratio in the world. Ownership of mineral resources is divided according to the commodity between Government, regional authorities (hydrocarbons, salt, thorium, and uranium) and private interests (dolomite, magnesium, mica, and other). *(See table 4.)*

COMMODITY REVIEW

Metals

Aluminum.—Reportedly because of increased energy costs, falling metal prices, and more stringent environmental restrictions, Austria Metall AG (Aktiengessellschaft) closed down its 85,000-mt/a-capacity aluminum smelter at Ranshofen. The only other aluminum smelter in Austria, the 15,000-mt/a-capacity smelter in Lend, which is operated by Salzburger Aluminum GmbH, was reportedly sold by Alusuisse-Lonza Holdings Ltd. in 1992 to a local management group.

Copper.—All production of copper metal in 1992 was from scrap and residues, either indigenous or imported. The smelter and refinery, owned and operated by Austria Metall AG, is in Brixlegg, 45 km northeast of Innsbruck. In addition to copper products (which include electrolytic cakes, cathodes, billets, and slabs), gold, silver and nickel chemicals are also recoverd. Most of the downstream production is concentrated at Amstetten, 110 km west of Vienna.

Iron and Steel.—In 1992, production of iron ore declined by 24% to 1.6 Mmt. The largest of two iron ore mines is the Steirischen Erzberg mine operated by Government-owned Voest-Alpine Erzberg Ges.m.b.H. The mine's proven and probable iron ore reserves, which grade 32% Fe and 2% Mn, are 25 Mmt and 150 Mmt, respectively. About 85% of production reportedly is open pit mined. Ore is locally beneficiated and railed to the nearby Donawitz and Linz steel mills for production of self-fluxing sinter, averaging 50% iron and 3% manganese. Both steel mills are operated by Voest-Alpine Stahl Ges.m.b.H.

The sinter plant at Linz has an estimated capacity of 3.3 Mmt/a. The steel plant has five blast furnaces (total capacity of 2.99 Mmt/a), three 130-ton basic oxygen converters (3.35 Mmt/a capacity), two continuous casting

machines, and a number of rolling mills.

The Donawitz works is equipped with a 1.5-Mmt/a-capacity sinter plant, three blast furnaces (total capacity of 2 Mmt/a), three basic oxygen converters (1.2 Mmt/a of capacity), and two continuous casting machines.

Lead and Zinc.—The only producer of lead-zinc ore in Austria is Bleiberger Bergwerks-Union AG (BBU) Rohstoffgewinnungs Ges.m.b.H. It is an integrated, Government-owned company, operating a lead-zinc mine, mill, smelter, and chemical plant. The Bleiberg-Kreuth Mine is located 230 km southwest of Vienna, near the Yugoslavian border. Ore is crushed underground and concentrated at the site, then trucked to BBU's Arnoldstein smelter, 20 km south of the mine.

The primary zinc smelter was shut down at the end of 1991 and the construction of a secondary smelter was postponed in 1992. Zinc concentrate is now exported to Germany.

Most of the 1992 production of 22,000 tons of lead metal originated from scrap, mainly from batteries. Only about one-fourth of total lead production was produced from lead concentrates, most of which was imported. It has been reported that the lead smelter may soon be closed down. The main reasons given included environmental considerations, high production costs, and high transportation costs.

Tungsten.—One of the largest tungsten mines in Europe is located at Mittersill, near Salzburg. The Mittersill Mine, which reportedly accounts for 30% of European tungsten production, is owned by Wolfram Bergbau und Huttengesellschaft m.b.H. The 10-Mmt reserve of scheelite ore contains only about 0.5% tungsten. Because of its location in a national park, all operations must be underground. Ore, after primary crushing on-site, is transported by a 2.7-km-long underground conveyor belt to the beneficiation plant. Concentrate is processed at the conversion plant in Bergla. Processing includes digestion, purification, solvent extraction, and ammonium paratungstate crystallization. The ensuing tungstic blue oxide is reduced with hydrogen. Final products include tungsten powder, carbide, and metal. Most of the production is exported to Germany.

Industrial Minerals

Graphite.—Austria produced 19,547 tons of graphite in 1992. More than two-thirds of this production was exported. At the beginning of 1989, the open pit mine at Trandorf was brought into operation by Industrie und Bergbaugesellschaft Pryssok & Co. KG. Currently, it produces 75% of the country's production. Graphite at the two underground mines at Kaisersberg and Trieben occurs in a large number of small lenses. Consequently, it is hard to mechanize the mining operation, reportedly keeping output per employee-hour low.

Gypsum.—The 1992 production of gypsum and anhydride in Austria increased by about 15% over the previous year. The 753,000-ton production (about 85% gypsum and 15% anhydride) was supplied by eight mines in five different regions along the northern Alps, between Mooseg in the west and Preinsfeld near Vienna. About 80% of the gypsum and 85% of the anhydride were reportedly open pit mined. About 15% of the gypsum was exported, mainly to Germany. Erste Salzburger Gipswerks-Gesellschaft Christian Moldan KG, which operates two adjacent mines near Salzburg, is the largest supplier of domestic gypsum and anhydride. Production at the Moosegg open pit mine is about 230,000 mt/a, and that at the Abtenau underground mine averages about 43,000 mt/a. The height of seven benches currently in operation at the Moosegg open pit is 15 m each. Raw gypsum, produced by conventional drill and blast, is transported by truck and cable ropeway to a 200,000-mt/a-capacity dressing plant 2.3 km away in Kuchl. The massive Abtenau deposit is accessible by three levels, two of which are presently in operation. Because of high NaCl occurrence, selective mining is reportedly performed with very accurate quality control.

Rigips Austria Ges.m.b.H. is the second largest producer of raw gypsum and also a leading manufacturer of plaster and plasterboard. It has mines at Grundlsee, Puchberg, Unterkainisch, and Weisenbach, and processing plants at Bad Aussee and Puchberg, all in northern Austria.

Kaolin.—In 1992, close to 344,000 tons of kaolin were produced by one surface and one underground mine, in Aspang-Zobern and Schwertberg, respectively. About three-fourths came from the open pit mine owned by Aspanger Baustoffe und Mineralien Ges.m.b.H. The deposit consists of several 10 m- to 40 m-thick seams. The average kaolin to waste ratio is about 2.5:1. From a bench of 4 m to 6 m, kaolin is dug out by hydraulic excavators and trucked to a processing plant.

Magnesite.—The largest convergence of magnesite mines is in the Steiermark region, in southeast Austria. With a controlling interest in 565,000-mt/a of dead-burned magnesia capacity, Radex-Heraklith Industriebeteiligungs AG (RHI) is the largest and the most integrated producer of magnesia and basic refractories in the country. One of RHI's most recent acquisitions, through Radex Austria AG, is Veitscher Magnesitwerke AG. It reportedly produced about 300,000 tons of dead-burned magnesia in 1992 from its two underground mines at Breitenau (470,000-mt/a-capacity) and Hohentauren (60,000-mt/a-capacity). Magnesite is processed at Breitenau, Trieben, and Veitsch.

The second largest producer in 1992 was Tiroler Magnesite AG, a subsidiary of Radex Austria AG. Its open pit Hochfilzen Mine will reportedly close in 1993, together with the underground Hohentauern Mine. Magnesite production at Radex Austria AG is based on a high-iron magnesite deposit at Millstatteralpe (200,000-mt/a-capacity) and a processing plant at Radentheim. Annual production averages about 80,000 tons of dead-burned magnesia and 45,000 tons of caustic calcined magnesia.

Mineral Fuels

Lignite, which is mined in three regions in Austria, is the only coal mined in the country. The most important region is Koflach, in the southeastern part of the country, where the Oberdorfer Mine is located. This is the largest opencast lignite mine, producing about 1.4 Mmt/a of lignite, or 60% of Austria's output. Lignite is excavated by hydraulic backhoe and loaded directly into mobile crushers and transported by conveyor belt to the processing plant.

The rest of Austria's lignite is mined in two underground mines at Trimmelkam (500,000 mt/a) and Ampflwang (280,000 mt/a) and in some small open pit mines in northern Austria. The Trimmelkam Mine, owned by Salzach-Kohlenbergbau Ges m.b.H., is reportedly running into difficulty because of environmental restrictions. Because the only remaining consumer is the local powerplant, the mine will reportedly be closed at the end of 1992.

Reserves

Most of the known reserves of metallic ores and mineral fuels in Austria are small and of relatively low quality. Only in the category of industrial minerals do reserves appear to be sufficient for long-term future requirements. *(See table 5.)*

INFRASTRUCTURE

Austria has 6,028 km of railroads, of which 5,388 km is Government owned. Roads total 95,412 km, of which 34,612 km is the primary network. There are 446 miles of inland waterways with major ports at Vienna and Linz.

OUTLOOK

Owing to the exhaustion of some of the existing deposits, increased competitiveness form foreign producers, and increased environmental restrictions, mining activities are being continually cut back.

Austria is reportedly planning to concentrate on processing recycled materials. A new lead and zinc secondary smelter may be added to the existing aluminum and copper smelters.

OTHER SOURCES OF INFORMATION

Agencies

Bundesministerium fur Wirtschaftliche Angelegenheiten
Oberste Bergbehorde-Roh-und Grundstoffe
Wien, Austria
Geologische Bundesanstalt
Wien, Austria

Publications

Osterreichisches Montan-Handbuch 1992, Wien, Austria.
OECD (Organisation for Economic Co-operation and Development) Economic Survey 1993, Paris, France.

TABLE 1
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
METALS						
Aluminum metal:						
Primary		95,494	92,933	89,434	r80,379	32,881
Secondary		29,400	r34,100	r35,700	r33,600	e44,100
Total		124,894	r127,033	r125,134	r113,979	76,981
Antimony, mine output, Sb content of concentrate		228	350	352	—	—
Cadmium, metal		26	49	44	r19	—
Copper:						
Smelter, secondary		34,500	39,100	41,000	e44,800	49,500
Refined:						
Primary		r3,378	7,178	8,690	r8,079	5,705
Secondary		r35,000	39,089	41,013	44,758	48,975
Total		r38,378	46,267	49,703	r52,837	54,680
Germanium, Ge content of concentrate	kilograms	6,000	r5,900	5,000	e5,000	e5,000
Gold, metal	do.	71	86	e70	60	e40
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand tons	2,311	2,410	2,301	r2,130	1,627
Fe content	do.	727	761	653	r481	e370
Metal:						
Pig iron	do.	3,665	3,823	3,452	r3,439	3,067
Ferroalloys, electric-furnace	do.	r20	r15	12	e12	e12
Crude steel	do.	4,560	4,718	4,292	r4,186	3,946
Semimanufactures	do.	3,752	3,732	3,719	e3,500	3,360
Lead:						
Mine output, Pb content of concentrate		2,281	1,571	1,494	r1,200	1,000
Metal:						
Smelter:						
Primary		6,753	e9,371	r5,165	r e5,300	e6,300
Secondary		15,651	r12,166	r15,934	r e15,808	e15,700
Total		22,404	r21,537	21,099	r21,108	22,000
Refined:						
Primary[e]		r8,300	r10,000	8,400	6,400	5,500
Secondary[e]		r14,100	r12,000	15,100	16,300	18,400
Total		r22,400	r22,000	23,500	22,700	23,900
Manganese, Mn content of domestic iron ore		40,917	46,287	42,669	e40,000	e30,000
Silver, metal		19	17	e20	29	e20
Tungsten, mine output, W content of concentrate		1,235	1,517	1,378	r1,314	1,600
Zinc:						
Mine output, Zn content of concentrate		17,051	r14,783	r16,727	14,800	15,800
Metal, refined		23,900	26,102	r26,041	r16,586	—
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	4,763	4,749	4,903	r5,016	5,020
Clays:						
Illite	do.	280	243	r191	r217	276
Kaolin:						
Crude	do.	485	492	473	r352	344
Marketable	do.	89	r85	81	e80	e80

See footnotes at end of table.

TABLE 1
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
INDUSTRIAL MINERALS—Continued						
Clays—Continued:						
Kaolin—Continued:						
Other	thousand tons	52	r17	31	r3,459	1,776
Feldspar, crude		8,222	7,251	8,788	r10,429	11,059
Graphite, crude		7,577	15,307	22,705	r19,750	19,547
Gypsum and anhydrite, crude		721,745	r805,654	751,645	r654,594	753,142
Lime	thousand tons	1,545	1,622	1,637	e1,600	1,716
Magnesite:						
Crude	do.	1,122	1,205	1,179	r961	985
Sintered or dead-burned	do.	360	360	r412	e400	e450
Caustic calcined	do.	67	60	55	e50	e50
Nitrogen: N content of ammonia[e]	do.	408	410	410	400	400
Pigments, mineral: Micaceous iron oxide		9,938	10,924	9,936	10,200	9,475
Pumice (trass)		7,359	8,130	8,954	r8,204	7,493
Salt:						
Rock	thousand tons	1	1	1	1	1
In brine:						
Evaporated[e]	do.	413	396	386	r400	400
Other[e]	do.	256	251	288	r363	298
Total	do.	669	647	674	r763	698
Sand and gravel:						
Quartz sand	do.	756	819	818	r2,090	2,310
Other sand and gravel	do.	14,700	16,057	16,064	r17,001	17,428
Total	do.	15,456	16,876	16,882	r19,091	19,738
Sodium compounds, n.e.s.:[e]						
Soda ash, manufactured	do.	145	150	150	150	150
Sulfate, manufactured	do.	118	120	120	120	120
Stone:[2]						
Dolomite	do.	1,521	1,645	1,880	r5,085	4,739
Quartz and quartzite	do.	167	263	249	r464	460
Other:						
Limestone and marble	do.	NA	NA	NA	15,371	10,482
Basalt	do.	NA	NA	NA	3,674	2,627
Marl	do.	NA	NA	NA	2,780	1,638
Undifferentiated	do.	12,324	12,700	12,800	10,651	10,570
Total	do.	14,012	14,608	14,929	r38,025	30,516
Sulfur:						
Byproduct:						
Of metallurgy		11,331	12,064	11,974	e12,000	e12,000
Of petroleum and natural gas		36,217	37,070	30,390	r e27,000	e30,000
Total		47,548	49,134	42,364	r e39,000	e42,000
Talc and soapstone		132,974	133,078	133,971	r161,425	145,664
MINERAL FUELS AND RELATED MATERIALS						
Coal, brown and lignite	thousand tons	2,129	2,066	2,448	r2,081	1,753
Coke	do.	1,744	1,771	1,725	e1,700	e1,700
Gas, natural:						
Gross	million cubic meters	1,265	1,323	1,288	r1,329	1,441

See footnotes at end of table.

TABLE 1—Continued
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Gas, natural—Continued:						
Marketed[e]	million cubic meters	[3]1,062	1,020	1,081	1,100	1,100
Oil shale		210	570	475	[r]290	430
Petroleum:						
Crude	thousand 42-gallon barrels	8,196	8,075	8,072	[r]8,926	8,229
Refinery products:						
Liquefied petroleum gas	do.	7,010	[e]6,000	5,288	[e]5,000	205
Gasoline	do.	20,516	19,935	22,237	[e]22,000	20,896
Kerosene and jet fuel	do.	1,772	2,226	2,398	[e]2,500	3,033
Distillate fuel oil	do.	18,288	20,920	22,504	[e]23,000	18,776
Lubricants	do.	—	—	416	[e]500	205
Residual fuel oil	do.	12,027	9,912	11,353	[e]11,000	4,757
Bitumen	do.	1,425	1,487	1,474	[e]1,500	3,099
Unspecified	do.	71	75	75	[e]75	1,859
Refinery fuel and losses	do.	3,458	2,387	2,124	[e]2,000	2,472
Total	do.	64,567	62,942	67,869	[e]67,575	55,302

[e]Estimated. [r]Revised. NA Not available.
[1]Table includes data available through July 1993.
[2]Excluding stone used by the cement and iron and steel industries.
[3]Reported figure.

TABLE 2
AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	2	1	—	Mainly to Germany.
Alkaline-earth metals	5	1	NA	NA.
Aluminum:				
Ore and concentrate	8	31	NA	NA.
Oxides and hydroxides	1,499	1,149	70	Germany 461; Italy 206; Yugoslavia 117.
Ash and residue containing aluminum	21,725	7,952	14	Germany 2,726; Italy 2,677; France 1,180.
Metal including alloys:				
Scrap	26,881	32,320	—	Germany 17,401; Italy 10,266; Hungary 1,543.
Unwrought	52,056	64,679	—	Italy 25,723; Germany 17,782; Japan 8,570.
Semimanufactures	139,882	137,889	714	Germany 62,469; Italy 20,742; Netherlands 9,435.
Antimony:				
Ore and concentrate	1	—		
Oxides	20	7	NA	NA.
Metal including alloys, all forms	5	9	(2)	Germany 4; France 3; Gambia 1.
Arsenic: Metal including alloys, all forms	5	5	—	All to Yugoslavia.
Beryllium: Metal including alloys, all forms value, thousands	—	$6	—	Germany $4; Italy $1; Norway $1.
Bismuth: Metal including alloys, all forms do.	—	$7	—	Poland $3; Switzerland $3; Hungary $1.
Cadmium: Metal including alloys, all forms	35	20	—	Mainly to Netherlands.

See footnotes at end of table.

TABLE 2—Continued

AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Chromium:					
Ore and concentrate		131	140	—	Italy 73; Yugoslavia 40; Germany 24.
Oxides and hydroxides		3	26	—	Germany 9; Hungary 7; Czechoslovakia 3.
Metal including alloys, all forms		4	13	(2)	Germany 8; Japan 3; Switzerland 1.
Cobalt:					
Oxides and hydroxides		3	2	—	United Kingdom 1.
Metal including alloys, all forms		8	28	1	Germany 23; Belgium 1; Yugoslavia 1.
Columbium and tantalum: Tantalum metal including alloys, all forms		56	34	(2)	Germany 17; Belgium 5; United Kingdom 5.
Copper:					
Ore and concentrate		—	18	—	All to Germany.
Matte and speiss including cement copper		13	7	—	Germany 6; Spain 1.
Oxides and hydroxides		1	(2)	—	NA.
Sulfate		18	12	NA	NA.
Ash and residue containing copper		16,676	6,327	—	Germany 4,238; Belgium 395; Switzerland 100.
Metal including alloys:					
Scrap		13,639	16,583	—	Germany 12,051; Italy 2,504; Belgium 817.
Unwrought		44,684	47,968	(2)	Italy 32,005; Germany 11,060; Switzerland 2,314.
Semimanufactures		28,820	29,146	157	Germany 13,514; Italy 2,762; Spain 1,816.
Germanium:					
Oxides and hydroxides[3]	kilograms	100	200	NA	NA.
Metal including alloys, all forms	value, thousands	—	$3	—	All to Netherlands.
Gold:					
Waste and sweepings	do.	$229	$15	—	Italy $8; Germany $6.
Metal including alloys, unwrought and partly wrought	kilograms	313	638	—	Italy 183; Germany 176; Switzerland 51.
Iron and steel:					
Iron ore and concentrate excluding roasted pyrite		88	47	—	All to Germany.
Metal:					
Scrap		342,438	503,861	—	Italy 446,398; Germany 32,874; Yugoslavia 16,927.
Pig iron, cast iron, related materials		8,801	14,812	—	Italy 13,249; Poland 438; France 336.
Ferroalloys:					
Ferroalloys		22,049	19,808	151	India 3,805; Germany 3,361; France 2,770.
Silicon metal		7	49	—	NA.
Steel, primary forms		13,954	9,395	118	Germany 5,572; Yugoslavia 1,155; Sweden 776.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		1,411,804	1,219,504	72,615	Germany 411,813; Italy 236,010; U.S.S.R. 77,243.
Clad, plated, coated		346,519	434,998	147	Germany 215,575; Italy 63,113; France 34,225.
Of alloy steel		137,787	141,135	25,086	Germany 69,447; Italy 15,267; United Kingdom 5,179.
Bars, rods, angles, shapes, sections		475,231	369,048	1,952	Germany 118,801; Italy 88,187; France 29,272.
Rails and accessories		142,512	178,196	4,794	Germany 42,123; Switzerland 31,990; Algeria 27,694.

See footnotes at end of table.

TABLE 2—Continued

AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Semimanufactures—Continued:					
Wire		65,816	53,063	1,167	Germany 33,061; Italy 6,013; Switzerland 4,890.
Tubes, pipes, fittings		620,959	537,216	11,050	U.S.S.R. 168,918; Germany 139,654; Italy 40,872.
Lead:					
Ore and concentrate		232	—		
Ash and residue containing lead		6,236	971	—	France 370; Germany 321; Yugoslavia 109.
Metal including alloys:					
Scrap		10,727	1,632	—	Germany 1,147; Yugoslavia 227; Czechoslovakia 194.
Unwrought		4,829	2,377	—	Italy 1,384; Yugoslavia 503; Germany 379.
Semimanufactures		42	42	NA	NA.
Lithium: Oxides and hydroxides		1	—		
Magnesium: Metal including alloys:					
Scrap		222	541	—	Germany 458; Belgium 47; Netherlands 25.
Unwrought		92	416	—	All to Germany.
Semimanufactures		800	1,553	—	Germany 190; Sweden 23; Belgium 3.
Manganese:					
Ore and concentrate		22	—		
Oxides		59	67	—	Hungary 40; Yugoslavia 23; Italy 3.
Metal including alloys, all forms	value, thousands	—	$9	—	Germany $8; Ethiopia $1.
Mercury		1	2	—	Czechoslovakia 1.
Molybdenum:					
Ore and concentrate, roasted		191	414	—	Italy 188; Belgium 81; India 76.
Oxides and hydroxides		7	—		
Metal including alloys, all forms		1,656	1,390	129	Germany 659; France 184; United Kingdom 145.
Nickel:					
Matte and speiss	kilograms	200	—		
Oxides and hydroxides		28	1	NA	NA.
Metal including alloys:					
Scrap		184	113	—	Germany 91; France 22.
Unwrought		99	184	(2)	Sweden 179; Germany 5.
Semimanufactures		700	601	—	Germany 289; Italy 32; Turkey 24.
Platinum-group metals:					
Waste and sweepings	value, thousands	$1,595	$1,863	—	Germany $1,593; United Kingdom $265; Syria $5.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	591	389	—	Germany 163; United Kingdom 148; France 39.
Platinum	do.	395	386	—	Germany 296; Yugoslavia 56; Hungary 23.
Rhodium	do.	265	281	NA	NA.
Iridium, osmium, ruthenium	do.	4	2	NA	NA.
Rare-earth metals including alloys, all forms		273	470	NA	NA.
Selenium, elemental		1	10	—	Germany 7; Belgium 2.
Silicon, high-purity		2	8	—	Germany 5; Japan 2; Belgium 1.

See footnotes at end of table.

TABLE 2—Continued

AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Silver:					
Waste and sweepings[4]	value, thousands	$7,320	$4,863	—	Germany $3,439; France $1,402; Czechoslovakia $1.
Metal including alloys, unwrought and partly wrought	kilograms	50,403	144,442	—	Germany 126,392; Switzerland 11,151; Yugoslavia 3,275.
Tin:					
Oxides and hydroxides	do.	—	200	—	NA.
Metal including alloys:					
Scrap		3	8	—	Germany 5; Belgium 3.
Unwrought		11	70	—	Hungary 41; Netherlands 24; Germany 4.
Semimanufactures		70	51	—	Hungary 39; Iran 5; Germany 2.
Titanium:					
Oxides		317	89	—	Czechoslovakia 22; United Kingdom 21; Yugoslavia 16.
Metal including alloys:					
Unwrought including scrap		1,695	262	—	Czechoslovakia 174; Germany 44; United Kingdom 44.
Semimanufactures		45	32	(2)	Switzerland 13; Germany 9; Czechoslovakia 3.
Tungsten:					
Ore and concentrate		18	—		
Oxides and hydroxides		8	11	—	All to Italy.
Metal including alloys, all forms		1,032	1,047	32	Germany 582; Israel 130; Indonesia 108.
Uranium and thorium:					
Oxides and other compounds	value, thousands	r—	$3	$1	China $1; Germany $1.
Metal including alloys, all forms	do.	$27	$21	$8	France $4; Germany $4; United Kingdom $3.
Vanadium: Oxides and hydroxides		384	365	—	Czechoslovakia 189; Brazil 68; France 34.
Zinc:					
Ore and concentrate		—	3,738	—	All to Germany.
Oxides		3,165	2,324	—	Germany 1,309; Yugoslavia 575; Hungary 432.
Blue powder		119	97	NA	Belgium 47.
Ash and residue containing zinc		5,940	5,305	—	Germany 2,794; Belgium 1,070; Spain 730.
Metal including alloys:					
Scrap		2,527	2,652	—	Taiwan 1,848; Germany 431; Belgium 341.
Unwrought		5,625	1,849	—	Yugoslavia 966; Italy 443; Hungary 198.
Semimanufactures		r255	497	—	Hungary 340; Switzerland 55; Germany 41.
Zirconium:					
Ore and concentrate		24	3	—	All to Yugoslavia.
Metal including alloys, all forms		(2)	1		Mainly to Germany.
Other:					
Ores and concentrates		67	150	—	All to Hungary.
Ashes and residues		686	745	91	Italy 310; Germany 214; Netherlands 91.
Base metals including alloys, all forms		3	44	—	Mainly to Germany.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		114	124	(2)	Libya 40; Yugoslavia 26; France 24.

See footnotes at end of table.

TABLE 2—Continued

AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Abrasives, n.e.s.—Continued:					
Artificial: Silicon carbide		60	27	NA	NA.
Dust and powder of precious and semiprecious stones excluding diamond	value, thousands	—	$4	—	NA.
Grinding and polishing wheels and stones		14,834	12,019	543	Germany 2,834; Italy 1,348; France 990.
Asbestos, crude		675	48	—	Hungary 36; Italy 12.
Barite and witherite		10	525	—	Yugoslavia 505; Yemen 20.
Boron materials:					
Crude natural borates		6	23	—	All to United Kingdom.
Oxides and acids		20	1	—	Mainly to Yugoslavia.
Bromine		2	—		
Cement		21,877	24,514	2	Germany 11,055; Italy 5,722; Switzerland 5,565.
Chalk		2,102	11,778	—	Czechoslovakia 9,580; Hungary 1,255; Germany 567.
Clays, crude:					
Bentonite		782	1,132	—	Switzerland 1,027; Germany 49; Poland 26.
Chamotte earth		318	158	—	Hungary 68; unspecified 83.
Fuller's earth		15	1	NA	NA.
Fire clay		183	2,696	NA	Germany 2,674.
Kaolin		39,967	34,931	—	Germany 10,071; Yugoslavia 9,745; Hungary 6,636.
Unspecified		151	171	—	Germany 110; Philippines 16; Taiwan 16.
Cryolite and chiolite		—	34	—	France 24; Switzerland 10.
Diamond, natural:					
Gem, not set or strung	value, thousands	$352	$764	$92	Israel $264; Germany $163; Belgium $81.
Industrial stones	do.	$276	$325	—	Germany $125; Yugoslavia $78; Belgium $57.
Dust and powder	kilograms	10	120	—	Switzerland 24; Yugoslavia 24; unspecified 68.
Diatomite and other infusorial earth		5,780	5,914	—	Germany 1,782; Yugoslavia 1,291; Hungary 1,128.
Feldspar		—	5	—	All to Yugoslavia.
Fertilizer materials:					
Crude, n.e.s.		4,254	10,149	—	Netherlands 6,379; Italy 1,569; Yugoslavia 1,569.
Manufactured:					
Ammonia		18	256	—	Yugoslavia 255.
Nitrogenous		542,626	558,928	(2)	Germany 295,746; Italy 116,135; Czechoslovakia 51,014.
Phosphatic		r35,986	9,000	—	All to Czechoslovakia.
Potassic		r2,369	1,161	—	Germany 855; Czechoslovakia 188; Yugoslavia 71.
Unspecified and mixed		283,333	269,399	163	Germany 149,754; Italy 66,715; Czechoslovakia 19,531.
Fluorspar		12	—		
Graphite, natural		8,376	6,017	20	Italy 2,118; Germany 2,051; Poland 589.
Gypsum and plaster		159,938	159,373	—	Germany 151,614; Italy 2,859; Hungary 2,675.
Kyanite and related materials		(2)	21	—	NA.
Lime		6,159	9,036	—	Germany 6,591; Switzerland 2,232; Italy 94.
Magnesium compounds:					
Magnesite, crude		347	81	—	Italy 46; Germany 29; Portugal 5.
Oxides and hydroxides		166,603	143,687	12,175	Germany 32,656; Venezuela 18,162; Italy 14,844.

See footnotes at end of table.

TABLE 2—Continued

AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Mica:					
Crude including splittings and waste		671	833	—	Germany 566; Italy 201; Netherlands 30.
Worked including agglomerated splittings		5,179	6,346	2	Yugoslavia 1,546; Czechoslovakia 1,535; Germany 1,120.
Phosphorus, elemental	value, thousands	—	$1	—	NA.
Pigments, mineral:					
Natural, crude		7,198	6,568	162	United Kingdom 1,420; Germany 1,369; Netherlands 722.
Iron oxides and hydroxides, processed		4,657	5,083	—	Taiwan 1,806; Italy 1,258; Germany 1,105.
Precious and semiprecious stones other than diamond:					
Natural	kilograms	8,377	9,086	62	Switzerland 1,219; Thailand 469; Netherlands 375.
Synthetic	do.	15,331	8,427	986	Thailand 1,292; Switzerland 1,282; Republic of Korea 1,253.
Pyrite, unroasted		40	11	—	Yugoslavia 10; Argentina 1.
Quartz crystal, piezoelectric	kilograms	16	69	—	Germany 61.
Sodium compounds, n.e.s.: Sulfate, manufactured		95,216	90,160	—	Italy 19,443; Germany 17,592; Yugoslavia 9,174.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		38,966	35,917	—	Germany 25,056; Switzerland 8,572; Hungary 576.
Worked		22,739	22,715	128	Germany 15,599; Switzerland 3,938; Italy 1,551.
Dolomite, chiefly refractory-grade		38,365	33,475	—	Germany 28,147; Switzerland 3,555; Belgium 896.
Gravel and crushed rock		r4,485,275	898,066	—	Germany 371,048; Switzerland 318,613; Italy 97,398.
Limestone other than dimension		776	566	—	Germany 401; Italy 132; Netherlands 25.
Quartz and quartzite		116	129	—	France 67; Yugoslavia 18; Switzerland 16.
Sand other than metal-bearing		76,833	68,441	—	Germany 28,798; Yugoslavia 3,095; Italy 2,325.
Sulfur:					
Elemental:					
Crude including native and byproduct		186	165	—	Hungary 51; Poland 46; Germany 45.
Colloidal, precipitated, sublimed		301	6	—	Czechoslovakia 4; Yugoslavia 2.
Dioxide		7	5	—	Yugoslavia 3; Germany 1.
Sulfuric acid		2,982	4,273	—	Italy 3,344; Germany 795; Switzerland 62.
Talc, steatite, soapstone, pyrophyllite		119,546	125,531	32	Germany 73,930; Italy 16,658; Switzerland 7,892.
Vermiculite, perlite, chlorite		184	91	—	Hungary 72; Italy 17.
Other:					
Crude		r14,768	13,161	—	Italy 4,469; Germany 3,472; Sweden 590.
Slag and dross, not metal-bearing		148,357	139,976	—	Germany 86,843; Yugoslavia 31,591; Norway 12,971.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		680	151	—	Hungary 123; Poland 20; Czechoslovakia 4.
Carbon black		48	253	1	Yugoslavia 160; Germany 81; Zimbabwe 1.
Coal:					
Anthracite and bituminous		31	35	—	Yugoslavia 29; Switzerland 6.
Briquets of anthracite and bituminous coal		62	21	—	All to Switzerland.
Lignite including briquets		3,496	2,690	—	Germany 2,604; Switzerland 86.
Coke and semicoke		969	2,193	—	Germany 2,119; Czechoslovakia 45; Switzerland 28.

See footnotes at end of table.

TABLE 2—Continued
AUSTRIA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Peat including briquets and litter		11,981	7,085	—	Germany 3,520; Italy 3,466; Yugoslavia 46.
Petroleum:					
Crude	42-gallon barrels	(2)	—		
Refinery products:					
Liquefied petroleum gas	thousand 42-gallon barrels	135	65	—	Italy 22; Hungary 15; Germany 12.
Gasoline	do.	2,391	1,100	—	
Mineral jelly and wax	do.	6	3	—	Germany 1.
Kerosene and jet fuel	do.	95	48	—	Germany 20; Yugoslavia 9; Hungary 5.
Distillate fuel oil	do.	57	305	—	Hungary 241; Czechoslovakia 40; Germany 17.
Lubricants	do.	227	231	(2)	Poland 47; Czechoslovakia 32; Iran 23.
Residual fuel oil	do.	35	392	—	Hungary 334; Czechoslovakia 33; Yugoslavia 17.
Bitumen and other residues	do.	15	100	—	Hungary 63; Yugoslavia 17; Czechoslovakia 8.
Bituminous mixtures	do.	107	93	—	Italy 50; Algeria 22; Yugoslavia 11.
Petroleum coke	do.	1	6		Yugoslavia 5; Germany 1.

[r]Revised. NA Not available.
[1]Table prepared by Douglas Rhoten, International Data Section. Austria reports exports to Belgium and Luxembourg separately; therefore, these two countries are listed separately in this table rather than as "Belgium-Luxembourg."
[2]Less than 1/2 unit.
[3]May include zirconium.
[4]May include other precious metals.
[5]Unreported quantity valued at $16,000.

TABLE 3
AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1990	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	4	2	1	United Kingdom 1.
Alkaline-earth metals	24	4	NA	NA.
Aluminum:				
Ore and concentrate	34,466	48,763	146	Australia 17,757; Guinea 16,554; China 4,906.
Oxides and hydroxides	231,050	185,212	26	Germany 139,386; Hungary 21,272; Jamaica 13,113.
Ash and residue containing aluminum	30,542	9,480	—	Germany 3,705; Hungary 2,677; Czechoslovakia 1,131.
Metal including alloys:				
Scrap	41,628	51,683	78	Germany 24,433; Czechoslovakia 7,131; Hungary 6,507.
Unwrought	150,098	150,198	232	Germany 58,925; Norway 25,529; Hungary 15,648.
Semimanufactures	83,116	90,003	36	Germany 37,555; Switzerland 11,553; France 6,851.
Antimony:				
Ore and concentrate, value, thousands	$1,451	$1,707	NA	NA.
Oxides	220	193	—	Belgium 103; China 35; United Kingdom 26.
Metal including alloys, all forms	49	68	(2)	China 49; U.S.S.R. 11; Germany 4.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1990	
			United States	Other (principal)
METALS—Continued				
Arsenic: Metals including alloys, all forms	22	17	NA	NA.
Beryllium: Metal including alloys, all forms kilograms	300	700	NA	NA.
Bismuth: Metal including alloys, all forms	39	4	—	Germany 3; United Kingdom 1.
Cadmium: Metal including alloys, all forms	3	2	—	All from Germany.
Chromium:				
Ore and concentrate	43,752	47,997	—	Republic of South Africa 42,307; Turkey 4,816; Germany 299.
Oxides and hydroxides	512	440	1	Germany 215; China 94; U.S.S.R. 82.
Metal including alloys, all forms	177	130	1	United Kingdom 98; Japan 17; U.S.S.R. 7.
Cobalt:				
Ore and concentrate	3	—		
Oxides and hydroxides	23	20	(2)	Germany 11; Finland 8; Japan 1.
Metal including alloys, all forms	405	286	11	Zaire 70; Belgium 60; Germany 59.
Columbium and tantalum:				
Ore and concentrate[3]	193	347	—	Republic of South Africa 196; Australia 124; Brazil 15.
Metal including alloys, all forms, tantalum	42	91	(2)	Germany 59; Niger 30; Belgium 15.
Copper:				
Ore and concentrate	154	—		
Matte and speiss including cement copper	39	3	—	All from Italy.
Oxides and hydroxides	50	62	—	Belgium 36; Germany 20.
Sulfate	1,235	981	—	U.S.S.R. 474; Italy 329; Yugoslavia 124.
Ash and residue containing copper	1,089	1,889	—	Germany 1,191; Hungary 488; Czechoslovakia 139.
Metal including alloys:				
Scrap	24,662	59,836	188	Germany 29,424; Czechoslovakia 6,339; Switzerland 6,217.
Unwrought	10,126	16,354	20	Republic of South Africa 6,656; Germany 5,131; Bulgaria 1,038.
Semimanufactures	98,273	97,517	294	Germany 51,822; Belgium 11,120; Italy 8,909.
Germanium:				
Oxides including zirconium oxides	28	211	—	France 207.
Metal including alloys, all forms	104	(2)	NA	NA.
Gold:				
Waste and sweepings value, thousands	$10	$15	—	Yugoslavia $14; Germany $1.
Metal including alloys, unwrought and partly wrought kilograms	16,646	2,871	2	Switzerland 1,333; Germany 1,056; Singapore 216.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite-thousand tons	3,892	3,968	—	U.S.S.R. 1,993; Republic of South Africa 1,259; Canada 394.
Pyrite, roasted do.	16	8	—	Mainly from Yugoslavia.
Metal:				
Scrap	54,560	49,791	69	Germany 25,977; Czechoslovakia 16,313; Yugoslavia 2,671.
Pig iron, cast iron, related materials	49,513	43,838	6	Canada 12,568; Germany 10,469; Italy 7,321.
Ferrochromium	19,427	13,073	20	Yugoslavia 4,733; U.S.S.R. 4,449; Czechoslovakia 2,229.
Ferrocolumbium	46	120	—	Netherlands 49; Brazil 43; Germany 24.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1990	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Ferroalloys—Continued:				
Ferromanganese	22,181	16,651	—	Germany 6,942; Norway 3,872; Czechoslovakia 1,469.
Ferromolybdenum	354	130	—	United Kingdom 38; Belgium 32; Chile 20.
Ferronickel	1,456	7	—	Canada 4; unspecified 3.
Ferrophosphorus	—	11	—	NA.
Ferrosilicochromium	401	187	NA	Hungary 152.
Ferrosilicomanganese	5,419	11,475	—	Germany 3,274; Norway 2,373; Czechoslovakia 2,318.
Ferrosilicon	19,641	13,928	83	Yugoslavia 3,677; Germany 3,295; Norway 2,384.
Ferrotitanium and ferrosilicotitanium	311	344	—	Hungary 101; Italy 78; Germany 49.
Ferrotungsten and ferrosilicotungsten	795	203	—	China 131; Germany 49; United Kingdom 23.
Ferrovanadium	137	168	—	Germany 146; Czechoslovakia 22.
Silicon metal	4,922	4,576	—	China 1,787; Germany 803; Norway 559.
Unspecified	1,733	1,744	20	Germany 731; U.S.S.R. 306; Netherlands 200.
Steel, primary forms	328,693	309,604	12	Germany 131,897; Belgium 111,815; Italy 20,121.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	350,326	411,677	87	Germany 192,472; Czechoslovakia 42,750; Italy 40,439.
Clad, plated, coated	147,942	163,024	1	Germany 67,655; France 28,435; Italy 23,009.
Of alloy steel	74,940	74,152	62	Germany 34,473; Sweden 12,626; France 6,367.
Bars, rods, angles, shapes, sections	563,575	569,988	192	Italy 238,887; Germany 147,439; Czechoslovakia 39,332.
Rails and accessories	4,634	4,546	—	Germany 3,530; Poland 283; Hungary 276.
Wire	53,543	51,899	16	Belgium 18,498; Germany 14,366; Italy 10,326.
Tubes, pipes, fittings	235,563	236,659	380	Germany 92,599; Italy 41,297; Czechoslovakia 28,504.
Lead:				
Ore and concentrate	17,836	6,588	—	Poland 4,409; Yugoslavia 1,857; Spain 221.
Oxides	1,052	2,423	—	Germany 2,361; Italy 40; United Kingdom 22.
Ash and residue containing lead	408	281	—	Hungary 263; unspecified 18.
Metal including alloys:				
Scrap	3,453	3,439	—	Hungary 1,077; Poland 812; Germany 779.
Unwrought	41,770	46,382	—	Germany 20,553; Yugoslavia 7,629; United Kingdom 7,350.
Semimanufactures	950	824	(2)	Germany 665; Sweden 46; Netherlands 44.
Lithium: Oxides and hydroxides	16	33	8	Germany 25.
Magnesium: Metal including alloys:				
Scrap	5	4	—	All from Germany.
Unwrought	1,979	3,622	1,080	Norway 984; France 736; Germany 402.
Semimanufactures	183	129	—	Turkey 43; Germany 40; Italy 36.
Manganese:				
Ore and concentrate, metallurgical-grade	801	488	—	Netherlands 337; Chile 73; France 72.
Oxides	172	230	—	Republic of South Africa 173; Netherlands 39; Japan 17.
Metal including alloys, all forms	429	1,484	1	Czechoslovakia 1,187; United Kingdom 140; Republic of South Africa 87.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1990	
				United States	Other (principal)
METALS—Continued					
Mercury		6	7	—	Switzerland 5; Germany 1.
Molybdenum:					
Ore and concentrate:					
Roasted		8,882	6,724	4,627	Germany 1,022; Belgium 798; Netherlands 105.
Unroasted		95	40	39	Germany 1.
Oxides and hydroxides		2,419	1,760	NA	NA.
Metal including alloys:					
Scrap		102	131	57	Germany 48; U.S.S.R. 25.
Unwrought		118	81	4	Germany 75.
Semimanufactures		87	91	—	France 68; Germany 21.
Nickel:					
Ore and concentrate		81	36	—	All from Germany.
Matte and speiss		843	597	(2)	Netherlands 433; Norway 49; Canada 39.
Oxides and hydroxides		790	1,571	—	Hungary 1,027; Romania 413; U.S.S.R. 55.
Metal including alloys:					
Scrap		200	504	—	Philippines 215; Czechoslovakia 70; United Kingdom 55.
Unwrought		2,709	2,506	15	U.S.S.R. 971; Canada 233; Republic of South Africa 218.
Semimanufactures		898	631	43	Germany 327; Sweden 172; France 23.
Platinum-group metals:					
Waste and sweepings	value, thousands	$654	$307	—	Yugoslavia $305; China $2.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	1,829	2,584	24	France 1,784; Germany 358; U.S.S.R. 334.
Platinum	do.	936	422	26	Germany 154; United Kingdom 145; Republic of South Africa 45.
Rhodium	do.	24	30	—	All from Germany.
Iridium, osmium, ruthenium	do.	5	5	NA	NA.
Rare-earth metals including alloys, all forms		255	995	—	China 465; U.S.S.R. 412; Switzerland 53.
Selenium, elemental		4	5	NA	NA.
Silicon, high-purity		3	9	—	Germany 7; Japan 2.
Silver:					
Ore and concentrate	kilograms	—	24,100	—	Republic of South Africa 24,000; United Kingdom 100.
Waste and sweepings[4]	value, thousands	$716	$1	—	All from China.
Metal including alloys, unwrought and partly wrought	kilograms	117,967	172,198	—	Germany 148,205; Switzerland 13,600; Italy 4,817.
Tellurium and boron, elemental		1	2	—	Mainly from China.
Tin:					
Oxides and hydroxides		4	10	—	Japan 4; unspecified 5.
Metal including alloys:					
Scrap		52	31	—	Hungary 19; Germany 12.
Unwrought		559	685	—	Brazil 351; Germany 120; Netherlands 109.
Semimanufactures		363	350	2	Germany 241; Netherlands 53; Belgium 37.
Titanium:					
Ore and concentrates		693	551	—	Australia 192; Republic of South Africa 190; Netherlands 129.
Oxides		2,959	2,000	6	Germany 527; Finland 478; United Kingdom 372.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1990	
			United States	Other (principal)
METALS—Continued				
Titanium—Continued:				
Metal including alloys:				
Unwrought including waste and scrap	412	84	6	Czechoslovakia 35; U.S.S.R. 23; Germany 12.
Semimanufactures	229	228	84	Japan 48; Germany 36; France 34.
Tungsten:				
Ore and concentrate	691	439	—	Australia 243; China 159; Portugal 20.
Oxides and hydroxides	299	320	NA	NA.
Metal including alloys:				
Scrap	836	622	74	Germany 316; Israel 117; United Kingdom 43.
Unwrought	225	41	5	Germany 34; Switzerland 2.
Semimanufactures	51	17	—	Germany 14; Belgium 1.
Vanadium:				
Oxides and hydroxides	972	804	134	Republic of South Africa 653; China 16.
Ash and residue containing vanadium	18,908	26,058	—	Republic of South Africa 26,049.
Metal including alloys, all forms	8	1	—	Mainly from Germany.
Zinc:				
Ore and concentrate	19,376	12,206	—	Yugoslavia 7,189; Poland 5,017.
Oxides	1,848	1,982	—	Germany 1,502; Netherlands 243; France 97.
Blue powder	2,108	1,330	—	Belgium 483; Norway 446; Germany 248.
Ash and residue containing zinc	4,174	2,882	—	Germany 1,491; Italy 659; Hungary 507.
Metal including alloys:				
Scrap	808	1,023	—	Hungary 497; Germany 261; Poland 133.
Unwrought	16,297	27,614	—	Belgium 11,920; Germany 9,602; Poland 2,629.
Semimanufactures	r4,405	5,308	2	Germany 3,430; France 580; Yugoslavia 516.
Zirconium:				
Ore and concentrate	1,606	1,434	—	Republic of South Africa 936; Germany 154; Australia 140.
Metal including alloys:				
Unwrought including waste and scrap	41	1	(2)	Mainly from India.
Semimanufactures kilograms	700	600	(2)	NA.
Other:				
Ores and concentrates	24	26	NA	NA.
Oxides and hydroxides	270	239	—	Belgium 90; Germany 73; Italy 50.
Ashes and residues	21,009	22,409	1,900	Germany 12,485; Netherlands 3,037; France 764.
Base metals including alloys, all forms	16	6	(2)	Mainly from Germany.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	663	1,864	20	Greece 861; Germany 660; United Kingdom 107.
Artificial:				
Corundum	19,120	11,726	466	Germany 4,519; France 2,046; Italy 1,394.
Silicon carbide	2,998	2,990	—	Germany 1,676; Norway 485; Italy 336.
Dust and powder of precious and semiprecious stones excluding diamond kilograms	155	149	18	Germany 22.
Grinding and polishing wheels and stones	2,095	2,069	10	Germany 970; Italy 374; Netherlands 143.
Asbestos, crude	6,167	1,613	60	Canada 1,103; U.S.S.R. 447; Japan 3.
Barite and witherite	2,948	3,251	—	Germany 2,326; Czechoslovakia 578; Netherlands 336.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Boron materials:					
Crude natural borates		26,325	21,856	889	Turkey 20,962; Germany 6.
Oxides and acids		850	450	1	Italy 145; Netherlands 107; Germany 95.
Bromine including flourine		69	76	—	Netherlands 70.
Cement		108,944	163,278	—	Czechoslovakia 51,201; Yugoslavia 44,621; Germany 23,952.
Chalk		3,583	5,234	(2)	Germany 3,193; France 1,989; Italy 28.
Clays, crude:					
Bentonite		12,722	20,662	32	Czechoslovakia 6,700; Germany 5,034; Bulgaria 2,669.
Chamotte earth		27,595	27,312	—	Czechoslovakia 15,611; Germany 7,315; France 3,117.
Fuller's earth		795	627	—	Germany 567; United Kingdom 55.
Fire clay		19,703	17,441	—	Germany 14,898; Czechoslovakia 1,401; United Kingdom 764.
Kaolin		188,342	183,517	27,291	Germany 44,396; United Kingdom 43,463; Czechoslovakia 36,779.
Unspecified		37,546	23,134	205	Czechoslovakia 12,121; Germany 9,278; United Kingdom 902.
Cryolite and chiolite		210	459	—	Bulgaria 289; Denmark 163; Germany 6.
Diamond, natural:					
Gem, not set or strung	value, thousands	$13,850	$6,732	$107	Israel $3,215; Belgium $2,186; India $548.
Industrial stones	do.	$1,134	$265	—	Belgium $146; Israel $36; Switzerland $29.
Dust and powder	kilograms	1,188	1,463	1,137	Switzerland 109; Germany 88; Ireland 75.
Diatomite and other infusorial earth		13,657	13,404	2,493	Czechoslovakia 4,697; Denmark 2,490; Iceland 1,679.
Feldspar, fluorspar, related materials:					
Feldspar		4,944	4,472	—	Sweden 2,561; Germany 1,517; Italy 285.
Fluorspar		19,756	15,994	—	Germany 13,158; France 2,576; Luxembourg 103.
Unspecified		104	114	NA	Norway 102.
Fertilizer materials:					
Crude, n.e.s.		3,025	2,894	—	Germany 1,027; France 332; Czechoslovakia 311.
Manufactured:					
Ammonia		36,558	18,510	NA	Germany 878; unspecified 17,632.
Nitrogenous		170,433	215,006	6	Czechoslovakia 122,179; Hungary 51,443; Italy 16,253.
Phosphatic		38,338	34,393	—	Germany 15,967; Luxembourg 15,842; Yugoslavia 1,846.
Potassic		190,859	187,646	—	Germany 126,097; U.S.S.R. 52,215; Hungary 3,747.
Unspecified and mixed		126,818	115,932	13,416	Yugoslavia 26,001; Italy 20,494; Czechoslovakia 18,997.
Graphite, natural		2,933	5,051	(2)	China 2,298; North Korea 1,781; Germany 338.
Gypsum and plaster		13,220	49,141	10	Czechoslovakia 33,827; Germany 13,539; Italy 1,514.
Iodine		3	4	—	Mainly from Japan.
Kyanite and related materials:					
Mullite		280	317	123	Germany 104; Hungary 90.
Unspecified		2,254	1,913	250	Republic of South Africa 969; France 508; Germany 113.
Lime		858	19,478	—	Czechoslovakia 17,803; Germany 899; Italy 436.
Magnesium compounds:					
Magnesite, crude		607	148	—	Turkey 100; Germany 35; Italy 13.
Oxides and hydroxides		134,807	145,166	2,261	Turkey 52,618; Italy 25,394; Ireland 17,613.
Sulfate		19,820	21,767	—	All from Germany.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Mica:					
Crude including splittings and waste		370	280	1	Germany 80; United Kingdom 60; Norway 56.
Worked including agglomerated splittings		304	286	35	France 110; Japan 34; India 30.
Nitrates, crude		850	585	—	Germany 505; Poland 80.
Phosphates, crude		440,217	296,957	NA	Germany 861; unspecified 296,047.
Phosphorus, elemental		2,868	1,991	—	Mainly from Netherlands.
Pigments, mineral:					
Natural, crude		274	865	—	Turkey 408; Spain 264; Italy 72.
Iron oxides and hydroxides, processed		4,088	4,181	53	Germany 2,920; Italy 508; United Kingdom 188.
Potassium salts, crude		16,730	13,959	—	All from Germany.
Precious and semiprecious stones other than diamond:					
Natural	kilograms	31,859	50,305	24,930	Brazil 10,804; Peru 5,005; Germany 2,296.
Synthetic	do.	48,919	20,889	12,212	Switzerland 2,540; Republic of Korea 2,500; Ireland 1,450.
Pyrite, unroasted		818	642	—	Italy 452; Germany 184; Peru 6.
Quartz crystal, piezoelectric	kilograms	11,121	9,071	6,796	Belgium 600; Japan 572; Germany 246.
Salt and brine		216	250	1	France 117; Germany 111; Israel 15.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		5,991	12,000	5,558	Germany 4,571; Romania 1,144; Yugoslavia 516.
Sulfate, manufactured		r5,827	6,797	2	Germany 5,722; Spain 423; France 321.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		44,306	40,250	20	Italy 19,348; Republic of South Africa 4,421; France 2,815.
Worked		114,477	115,185	36	Italy 78,750; Germany 11,524; Czechoslovakia 4,870.
Dolomite, chiefly refractory-grade		5,692	5,420	—	Germany 2,646; Italy 1,311; Belgium 500.
Gravel and crushed rock		r391,169	483,687	(2)	Germany 207,306; Hungary 179,742; Czechoslovakia 59,741.
Limestone other than dimension		33,258	40,602	—	Czechoslovakia 40,145; Germany 370; Yugoslavia 64.
Quartz and quartzite		8,081	6,925	5	Germany 5,789; Norway 637; Sweden 199.
Sand other than metal-bearing		280,975	279,545	1	Germany 204,845; Czechoslovakia 49,381; Yugoslavia 14,255.
Sulfur:					
Elemental:					
Crude including native and byproduct		59,329	48,267	—	Germany 19,636; Poland 16,964; Hungary 9,893.
Colloidal, precipitated, sublimed		2,657	374	—	Germany 181; Poland 175; Switzerland 19.
Dioxide		10,104	16,030	5	Germany 15,797; Poland 216; Switzerland 8.
Sulfuric acid		22,446	23,216	—	Czechoslovakia 16,611; Germany 4,590; Hungary 1,119.
Talc, steatite, soapstone, pyrophyllite		9,953	10,832	1	India 6,000; China 2,825; Netherlands 1,018.
Vermiculite[5]		43,387	46,683	32	Hungary 25,150; Greece 12,838; Republic of South Africa 7,911.
Other:					
Crude		33,059	27,823	1,461	Germany 13,885; Czechoslovakia 3,360; Yugoslavia 2,998.
Slag and dross, not metal-bearing		26,108	39,414	—	Germany 29,808; Italy 4,655; France 1,236.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		1,775	1,925	378	Trinidad and Tobago 1,242; Germany 120; Austria 114.
Carbon black		31,635	31,207	70	Germany 20,205; Italy 4,875; Netherlands 2,266.

See footnotes at end of table.

TABLE 3—Continued

AUSTRIA: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1990	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal:					
Anthracite and bituminous	thousand tons	3,596	3,777	299	Poland 2,150; Czechoslovakia 774; U.S.S.R. 477.
Briquets of anthracite and bituminous coal	do.	12	11	—	Germany 9; France 2.
Lignite including briquets	do.	330	339	—	Mainly from Germany.
Coke and semicoke		814,780	893,488	50	Czechoslovakia 287,363; Poland 225,625; Hungary 171,253.
Gas, natural: Gaseous-million cubic meters		5,220	5,129	NA	NA.
Peat including briquets and litter		89,876	99,679	—	Germany 75,495; U.S.S.R. 17,220; Hungary 4,512.
Petroleum:					
Crude	thousand 42-gallon barrels	50,624	52,278	—	Algeria 14,995; Nigeria 12,688; Iran 5,848.
Refinery products:					
Liquefied petroleum gas	do.	1,702	1,742	4	Germany 678; Czechoslovakia 473; U.S.S.R. 223.
Gasoline	do.	4,747	5,130	(2)	Germany 1,951; Italy 1,761; Hungary 544.
Mineral jelly and wax	do.	145	166	(2)	Germany 84; Poland 47; Hungary 17.
Kerosene and jet fuel	do.	575	755	(2)	U.S.S.R. 381; Germany 232; Hungary 76.
Distillate fuel oil	do.	8,410	10,541	(2)	Hungary 4,911; Germany 2,721; Italy 1,107.
Lubricants	do.	2,607	2,075	1	Yugoslavia 700; Syria 382; Germany 335.
Residual fuel oil	do.	4,329	3,681	—	Germany 2,101; Czechoslovakia 458; Poland 436.
Bitumen and other residues	do.	1,672	1,305	—	Germany 696; Yugoslavia 255; Hungary 238.
Bituminous mixtures	do.	49	95	—	Germany 59; Hungary 20; Italy 6.
Petroleum coke	do.	454	399	111	Germany 216; U.S.S.R. 36; United Kingdom 18.

[r]Revised. NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section. Austria reports exports to Belgium and Luxembourg separately; therefore, these two countries are listed separately in this table rather than as "Belgium-Luxembourg."

[2]Less than 1/2 unit.

[3]May include vanadium.

[4]May include other precious metals.

[5]May include perlite and/or chlorite.

TABLE 4

AUSTRIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Salzburger Aluminum G.m.b.H.	Smelter at Lend	15
Cement	Perlmooser Zementwerke AG	Plants at Kirchbichl, Mannesdorf, Retznei, and Rodaun	3,000
Do.	Gebr. Leube Portlanzementwerke	Plant at Gartenau	700
Do.	Zementwerke Eiberg	Plant at Eiberg	600
Do.	Wietersdorfer Zementwerke	Plant at Wietersdorf	600
Coal	Graz-Koflacher Eisenbahn und Bergbaugesellschaft m.b.H.	Oberdorf Mine	1,400
Do.	Salzach-Kohlenbergbau G.m.b.H.	Trimmelkam Mine	500
Do.	Wolfsegg-Traunthaler Kohlenwerks AG	Ampflwang Mine	280
Copper	Austria Metall AG (100% Government)	Plant at Brixlegg	55
Graphite	Industrie und Beergbaugesellschaft Pryssok & Co. KG	Trandorf Mine at Muhldorf	15

See footnotes at end of table.

TABLE 4—Continued

AUSTRIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Graphite	Grafitbergbau Kaisersber Franz Mayr-Melnhof & Co.	Kaisersberg Mine	3
Do.	Grafitbergbau Trieben G.m.b.HG.	Trieben Mine	3
Gypsum	Erste Salzburger Gipswerks-Gesellschaft Christian Moldan KG	Abtenau and Moosegg Mines	300
Do.	Rigips Austria G.m.b.H.	Grundlsee, Puchberg, Unterkainisch, and Weisenbach Mines	250
Do.	Knauf Gesellschaft m.b.H.	Hinterstein Mine	160
Iron ore	Voest-Alpine Erzberg Ges.m.b.H. (100% Government)	Erzberg Mine at Eisenerz	2,500
Lead-zinc	Bleiberger Bergwerks-Union AG Rohstoffgewinnungs-Ges.m.b.H. (100% Government)	Bleiberg-Kreuth Mine	300
Do.	do.	Lead smelter at Arnoldstein	25
Magnesite	Veitscher Magnesitwerke AG (51% Radex Austria AG)	Mines at Breitenau and Hohentauren	530
Do.	Tiroler Magnesite AG (100% Radex Austria AG)	Hochfilzen Mine	250
Do.	Radex Austria AG (100% Osterreichische Magnesit AG)	Millstatteralpe Mine	200
Natural gas Mm^3/a	Osterreichische Mineralolverwaltungs AG (100% Government)	Fields in Vienna Basin	1,500
Steel	Voest-Alpine Stahl Ges.m.b.H. (100% Government)	Plants at Donawitz and Linz	4,500
Tungsten ore	Wolfram Bergbau und Huttengesellschaft m.b.H. (47.5% Metallgesellschaft AG, 47.5% Voest-Alpine AG, and 5% Teledyne Wah Chang of USA)	Mine at Mittersil	350

TABLE 5

AUSTRIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

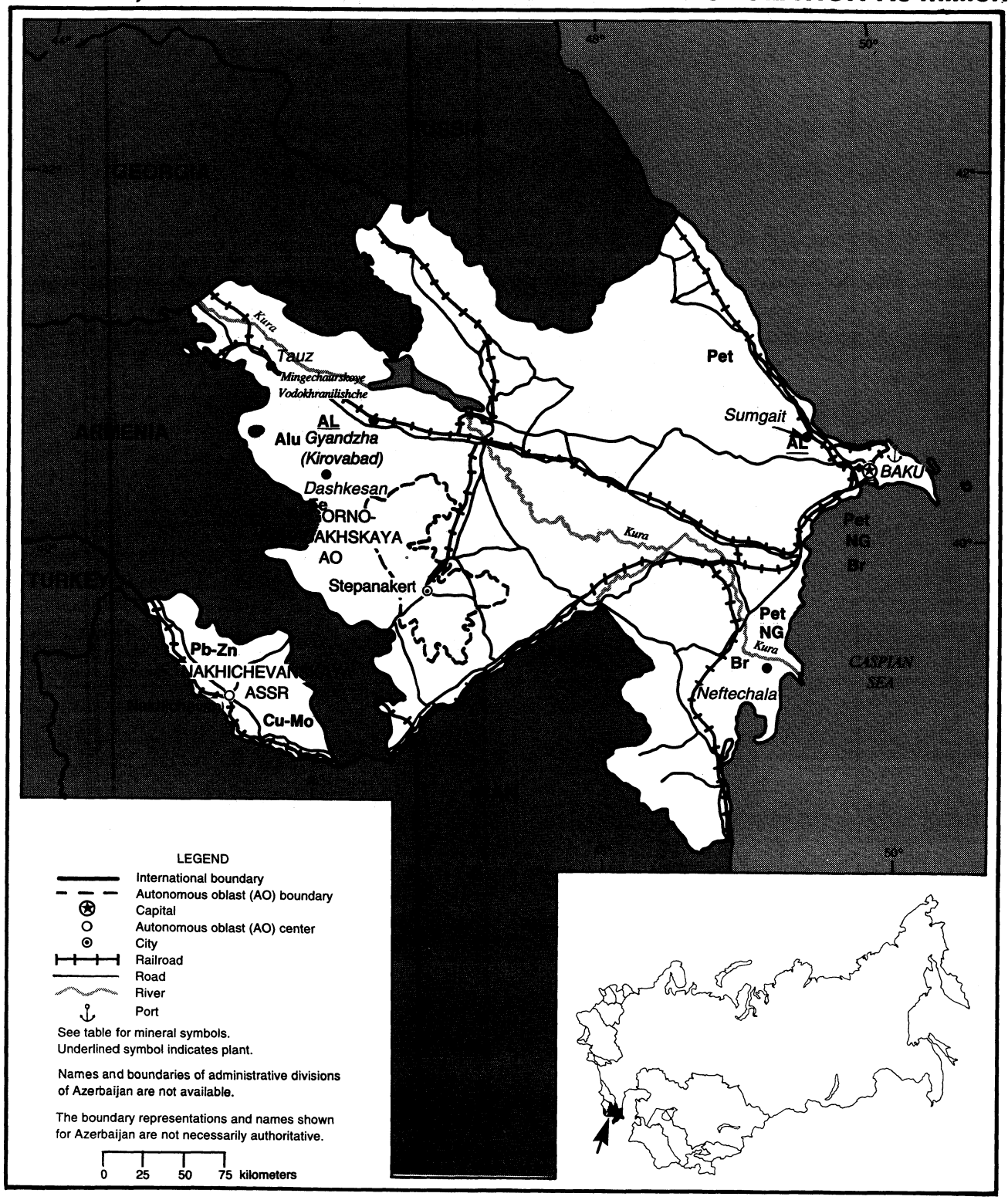
(Million metric tons unless otherwise specified)

Commodity	Reserves
Graphite[1]	1
Gypsum	250
Iron ore, gross weight	20
Lead-zinc ore, gross weight	3
Magnesium, Mg content	15
Tungsten, gross weight	8

[1]Inferred reserves.

AZERBAIJAN

AREA 86,600 km² **POPULATION 7.5 million**



THE MINERAL INDUSTRY OF

AZERBAIJAN

By Richard M. Levine

Azerbaijan's economy was in severe decline. Industrial production during the past 2 years reportedly fell by 60%, according to Azerbaijan's parliamentary commission on economic policy. In 1992 Azerbaijan's GNP reportedly decreased by 28% in comparison with that of 1991. This economic decline was in part the result of the break-down in economic links within the former U.S.S.R., but also was caused by the warfare in the predominately Armenian enclave of Nagorno Karabakh that was disrupting economic activity within Azerbaijan.

GOVERNMENT POLICIES AND PROGRAMS

Azerbaijan has a program to attract foreign investment to participate in the joint development of oilfields and gasfields on the Caspian shelf. Azerbaijan also has developed a program for modernizing its two oil refineries at Baku, which now have an annual combined capacity to produce 19 million metric tons of refinery products. The refineries, which used to process ten million tons per year of domestic production and 5 million tons per year of oil from Russia, are now working at less than 60% of capacity. With renovation, it is planned to increase total processing capacity and to increase the output of light refinery products. Foreign investment was being sought for this renovation.

PRODUCTION

Azerbaijan, since the late 19th century, has been an important oil and gas producer, and Azerbaijan is also a producer of alunite, alumina and aluminum, copper, iron ore, molybdenum, lead and zinc, and industrial minerals including bromine and iodine, clays, gypsum, limestone, marble, sand and gravel, decorative building stone, and precious and semiprecious stones. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, the major mineral-producing enterprises in Azerbaijan were state owned, although as with all former Soviet republics, plans were being formulated and enacted for some form of privatization. *(See table 2.)*

COMMODITY REVIEW

Metals

Azerbaijan produces aluminum from native alunite ore mined from open pits. It requires more than 6 tons of alunite ore to produce 1 ton of alumina, and alunite processing is relatively energy intensive. Alunite processing was started under the former Soviet system that made mineral production a priority irrespective of production costs. Nevertheless, the 450,000-ton-per-year-capacity Ghyandzha refinery in Azerbaijan, originally built to process alunite, was in the late 1970's expanded to process imported bauxite rather than alunite. Now only one section at Ghyandzha with a capacity to produce 100,000 tons per year of alumina processes alunite. The alumina from Ghyandzha is shipped to the Sumgait alumina smelter in Azerbaijan and to the Tajik smelter in Tajikistan. Political unrest in the Caucasus, however, interfered with shipments to Tajikistan and sharply reduced the amount of alumina shipped there. The Sumgait smelter in Azerbaijan, which has a 58,000-ton capacity, was working at less than one-half capacity in 1992 reportedly because of renovation work and also because of technical problems and environmental issues.

Industrial Minerals

At the Neftechalinsk iodine-bromine plant, which operates on domestic raw material, production declined. A leading official from the chemical industry stated that with investment in new equipment and modern technology, as well as restructuring management, he envisages that the plant could turn around and become highly profitable.

Mineral Fuels

Natural Gas.—Azerbaijan reached an agreement with Iran whereby Iran would supply Azerbaijan with 25 million cubic meters of natural gas in 1993 in exchange for 100,000 tons of diesel fuel.

Oil.—Azerbaijan was the major producer of offshore oil in the former U.S.S.R. with production from wells in the Caspian Sea; production began in the 19th century and peaked before the Second World War. Oil production in 1992 was 11 million tons, which was 660,000 tons below the 1991 level. Production had declined in the past 5 years from 13 million tons of output in 1987. One reason cited for low production in 1992 was an accident at the Neftyaniye Kamni offshore oilfield in December. Representatives of Amoco and the Caspian Petroleum Co. announced that they would engage in exploring Azerbaijan's oil resources. It

was believed that new oilfields discovered in Azerbaijan could be economically exploited with reserves adequate for 40 years.

Reserves

Azerbaijan has significant reserves of a number of mineral commodities, but data are not yet available to make adequate estimates of these reserves. Azerbaijan's most significant reserves in terms of value are its oil and gas reserves, and a number of foreign firms are investigating investment opportunities to develop these reserves. Azerbaijan also has numerous other mineral resources including for metals: alunite, arsenic, cobalt, copper, chromite, iron ore, lead and zinc, manganese, mercury, molybdenum, and tungsten, and for industrial minerals and nonmetallic minerals: barite, clays, refractory grade dolomite, gypsum, kaolin, limestone, pyrite, salt, zeolites, and semiprecious stones including amethyst, andalusite, and garnet, and a range of building materials.

INFRASTRUCTURE

Azerbaijan has its eastern border on the Caspian Sea, which is an inland sea bordered also by Russia, Kazakhstan, and Turkmenistan with no direct access to ocean routes. Azerbaijan's main port on the Caspian Sea is in the city of Baku. To the west Azerbaijan is bordered by Armenia and Georgia with the Nakhichevan district of Azerbaijan entirely surrounded by Armenia and Turkey and cut off from the rest of Azerbaijan.

Azerbaijan had, as of 1990, 2,090 kilometers of railroads and 36,700 kilometers of highways of which 31,800 kilometers was hard-surfaced. Oil and gas products are shipped through Azerbaijan to other countries of the former U.S.S.R. via pipelines. Azerbaijan is well situated to maintain commercial relations either via the Caspian Sea, via pipelines, or overland routes with Russia and with the countries of Central Asia and the Caucasus. It is now prevented from fully fulfilling this function because of the political and military turmoil resulting from the warfare in the predominately Armenian enclave of Nagorno Karabakh within Azerbaijan.

OUTLOOK

Although Azerbaijan has been an oil and gas producer since the 19th century, there are still indications that there are significant undeveloped hydrocarbon reserves offshore in the Caspian Sea. Upon acquiring independence, Azerbaijan has been trying to attract foreign investors to participate in the development of these reserves. It now appears that a number of major companies may engage in development of Azerbaijan's oil and gas resources, which could be a significant source of revenue for the country. The development of Azerbaijan's other mineral industries is more problematic. Aluminum production, for example, particularly that part which is based in part on domestically mined alunite, may prove unprofitable under market economy conditions. Development of Azerbaijan's other metallic and industrial mineral industries also now will have to be scrutinized in terms of market economy factors, including transport costs that may impede the development of these industries. There still, however, will be domestic markets for a number of Azerbaijan's industrial minerals and also markets in the newly independent states of the former U.S.S.R. for mineral commodities from Azerbaijan. It also remains to be determined if in the future Azerbaijan will be able to begin integrating its economy, including its mineral sector, with Turkey and other countries of the Mid East with which Azerbaijan shares cultural, religious, and geographic affinities. For Azerbaijan to make significant progress in its program for economic development, it will have to resolve issues of political instability brought about to a large extent by the continuing warfare in Nagorno Karabakh.

TABLE 1
AZERBAIJAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Alumina	300,000
Aluminum	25,000
Alunite	300,000
Cement	600,000
Gypsum	100,000
Iodine	50
Iron ore, marketable	400,000
Fe content	220,000
Limestone	1,000,000
Natural gas million cubic meters	7,000
Petroleum	11,000,000
Salt	50,000
Steel, crude	300,000

TABLE 2
AZERBAIJAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

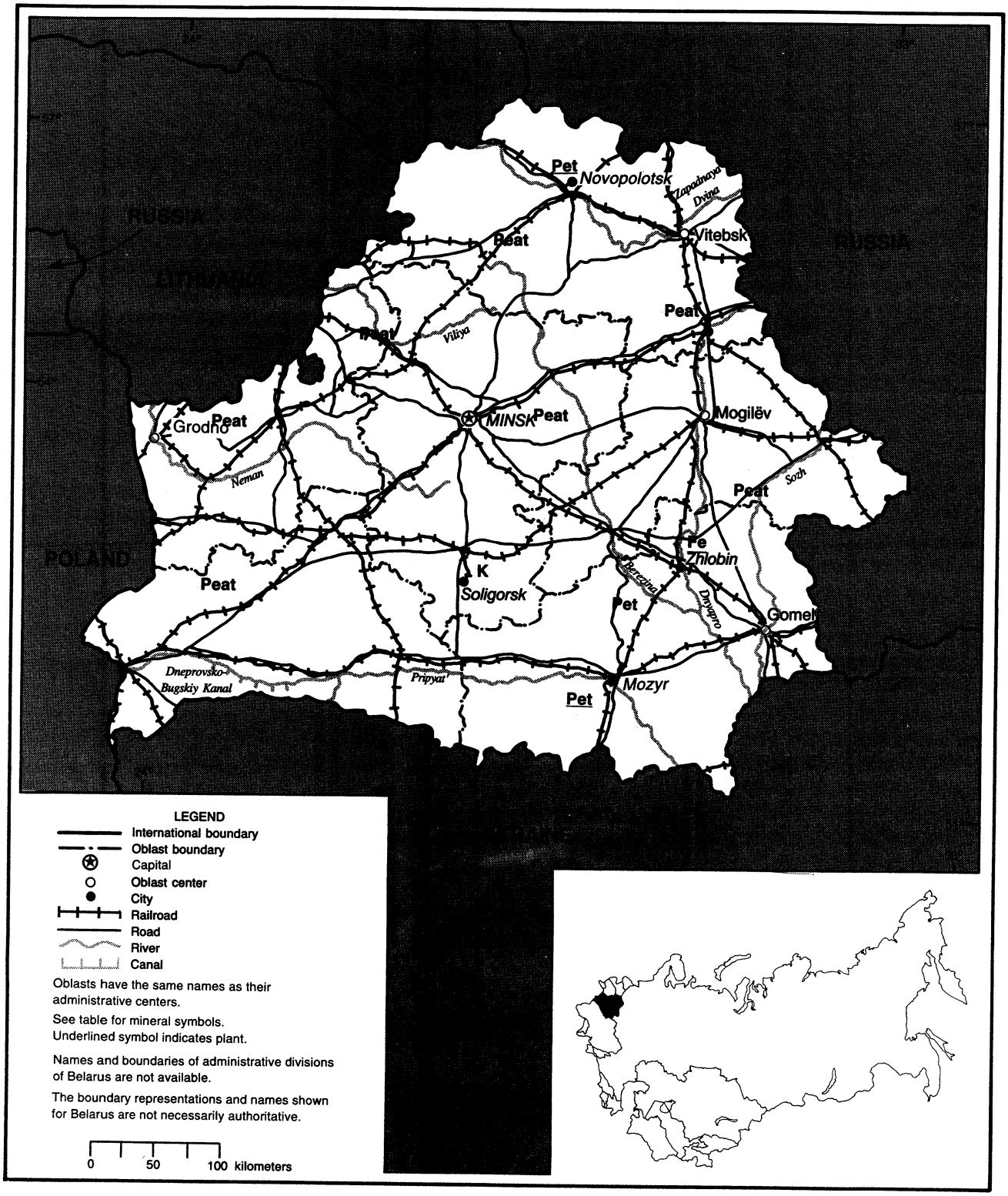
(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity[e]
Aluminum	Sumgait smelter	Sumgait	50,000.
Alumina	Ghyandzha refinery	Ghyandzha	450,000.
Alunite ore	Zaglik alunite mining directorate	Zaglik	600,000.
Cement	Karadag cement plant	Karadag	1,000,000 (total for both plants).
Do.	Tauz	Tauz	
Iodine and bromine	Baku, Karadag, Neftechala plants	Process oil well brines at plants in Baku, Karadag, and Neftechala	30,000 bromine, 100 iodine.
Iron ore	Dashkesan Mining Directorate	Dashkesan region	1,000,000.
Petroleum million tons	Produced at 40 deposits on land and 12 offshore deposits in Caspian Sea	Land deposits on Ashperon Peninsula, in the Nizhnekurin Valley and at the Muradkhanly and Zagly-Zegva deposits	12.
Natural gas billion cubic meters	do.	do.	8.

[e]Estimated.

BELARUS

AREA 207,600 km² **POPULATION 10.4 million**



LEGEND

- International boundary
- Oblast boundary
- Capital
- Oblast center
- City
- Railroad
- Road
- River
- Canal

Oblasts have the same names as their administrative centers.

See table for mineral symbols.
Underlined symbol indicates plant.

Names and boundaries of administrative divisions of Belarus are not available.

The boundary representations and names shown for Belarus are not necessarily authoritative.

0 50 100 kilometers

THE MINERAL INDUSTRY OF

BELARUS

Richard M. Levine

In Belarus, mineral production consisted primarily of the mining of potash and peat and the production of steel at one minimill. In 1992 there was a reported 11% decrease in national income, a 9.5% decrease in industrial production, and a 15% drop in capital investment in comparison with 1991.

GOVERNMENT POLICIES AND PROGRAMS

In 1992, Belarus' state statistical service reported discoveries of cobalt, germanium, gold, iron ore, oil shale, phosphates, silver, titanium, and vanadium. At the beginning of 1993, the Government of Belarus passed a "Program to Accelerate Geological Exploration to Develop the Raw Material Base," which calls for exploration and development of coal, iron ore, industrial minerals, rare metals, and oil and gas deposits.

The program calls for developing lignite deposits with an estimated 1 billion metric tons of coal and the exploration of the Okolovskoye iron deposit believed to have total reserves of 1 billion metric tons of ore with an iron content of 26% to 27%. Plans for iron ore development call for constructing a shaft at the deposit to produce 14 million tons per year of ore yielding close to 4 million tons per year of concentrate.

The program also calls for the development of the Diabazovoye rare metals deposit in the Gomel region to produce beryllium and rare metals of the cerium group, for exploration and assessment of kimberlite fields in the south and central regions of the country, and for exploration of new oilfields and gasfields. Plans also call for increasing production of potash.

The Government of Belarus approved a program for accelerating geological exploration for oil and gas. Estimates are that oil reserves in Belarus total 190 million tons. The program envisages a considerable expansion of exploratory drilling.

PRODUCTION

Mineral production in Belarus apparently declined along with national income and general industrial output. There was an apparent decrease in potash production, which was Belarus' main mineral product, and a reported decrease in crude steel production to one-half of its 1989 level. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, the major mineral-producing enterprises in Belarus remained state owned, although, as with all former republics, plans were being formulated for some form of privatization. The method of privatization and timetable for its completion at the end of 1992 were not established. *(See table 2.)*

COMMODITY REVIEW

Industrial Minerals

Amber.—Plans call for developing amber deposits in the Zhabinkov, Kobrinsk, Kamenetsk, and other regions. Reserves are estimated at 200 tons for each deposit with the amber at a depth of from 2 to 10 meters. The amber, reportedly, was equal in quality to Baltic amber.

Potash.—Belarus had produced more than one-half of the potash in the former U.S.S.R. from the Starobinsk group of deposits where the sylvite reserves average between 16% and 20% potassium oxide. However, reportedly only 7% of the former U.S.S.R.'s total potash reserves were in Belarus; total potash reserves in the former U.S.S.R. were estimated at 3.8 billion tons potassium oxide with reserves in Belarus totaling an estimated 260 million tons potassium oxide. Potash mining in Belarus was conducted by four mining directorates from underground mines. By 1991, reported potash production in Belarus had fallen from a historic high of 5.6 million tons in 1988 to 4.3 million tons in 1991. Production is estimated to have declined further in 1992 to 3.9 million tons.

Mineral Fuels

Energy.—All of Belarus' domestic electric energy production was generated by fossil fuels. A small amount of electric energy was imported from the Chernobyl nuclear powerplant in Ukraine, the Ignalina nuclear powerplant in Lithuania, and the Smolensk nuclear powerplant in Russia while fossil fuels were supplied by Russia. With the breakup of the former U.S.S.R., these supplies of imported energy were disrupted.

Nuclear Power.—Work began on a project to construct a nuclear powerplant in Belarus. Two options for a site were being considered. It would be the country's first nuclear powerplant. Public opposition to the plant was foreseen because of the Chernobyl disaster.

Peat.—Peat was produced primarily in the form of peat briquettes used for fuel,

although peat also was mined for agricultural use. In the 1980's, Belarus was producing more than 4 million tons of peat per year for fuel, which was about one-third of the production of peat for fuel in the former U.S.S.R. The largest briquetting plant was the Starobinsk plant with a capacity to produce 240,000 tons per year of briquettes; in addition, there were 36 other briquetting plants.

Petroleum.—Belarus produced only 2 million tons per year of its 20-million-ton-per-year annual oil consumption. The remaining 18 million tons was purchased mainly from Russia. Irregular oil supplies from Russia to Belarus led to serious shortages in the supply of gasoline, diesel fuel, and other petroleum products. To ameliorate this situation, Belarus was seeking to increase production at domestic oil deposits and to explore for new deposits. Plans also called for Belarus to participate in the development of oil and gas deposits in Russia in West Siberia in exchange for fuel.

Representatives from U.S. oil companies were engaged in negotiations in Belarus regarding prospecting for new deposits and investing in the development of already explored deposits and operating wells.

Reserves

Reserves in Belarus were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system was designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified under this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia.

INFRASTRUCTURE

Belarus is a landlocked state on the western edge of the former U.S.S.R. bordering Poland to the west, Lithuania and Latvia to the north, Russia to the east, and Ukraine to the south. Its major means for mineral transport are 5,570 kilometers of rail line not including industrial lines and 98,200 kilometers of highways, of which 66,1000 kilometers is hard surfaced. Belarus receives most of its gas and oil via pipelines. The country is well situated to transship minerals via land to and from Europe owing to its rail, road, and pipeline connections to Eastern Europe.

OUTLOOK

Belarus is heavily dependent on the countries of the former U.S.S.R. for its mineral and fuel requirements, and will have to maintain and further develop forms of economic cooperation with these countries to provide for its mineral requirements. The only mineral currently produced in Belarus that could be marketed in any substantial quantity on world markets is potash, and Belarus is seeking to market its potash to market economy countries to earn hard currency. Although cooperation with the countries of the former U.S.S.R. will remain the mainstay of Belarus' mineral supply, Belarus also will seek to encourage foreign investment from outside the former U.S.S.R. when it believes there is a potential for developing its domestic mineral industry.

TABLE 1
BELARUS: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity	1992
Cement	1,600
Nitrogen (N content of ammonia)	700
Peat, fuel use	4,000
Petroleum, crude	2,000
Potash, K_2O content	3,900
Salt	360
Steel, crude[1]	544

[1]Reported.

TABLE 2
BELARUS: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Cement	Volkovysskiy plant	Volkovysskiy	1,100
Do.	Krichevskiy plant	Krichevskiy region	1,100
Nitrogen, N content of ammonia	Grodno "Azot" Association	Grodno oblast	1,000
Peat (fuel use)	Production at 37 enterprises producing mainly briquetes		[1]5,000
Petroleum (crude)	Belarusneft Association	Gomel oblast	2,000
Petroleum (refining)	Mozyr refinery	Mozyr	[2]40,000
Do.	Novopolotsk refinery	Novopolotsk	
Potash (K_2O content)	Belaruskaliy Association	Soligorsk region	5,600
Steel (crude)	Belarus electric steelworks	Zhlobin	700

[1]Total for all 37 enterprises.
[2]Total for both refineries.

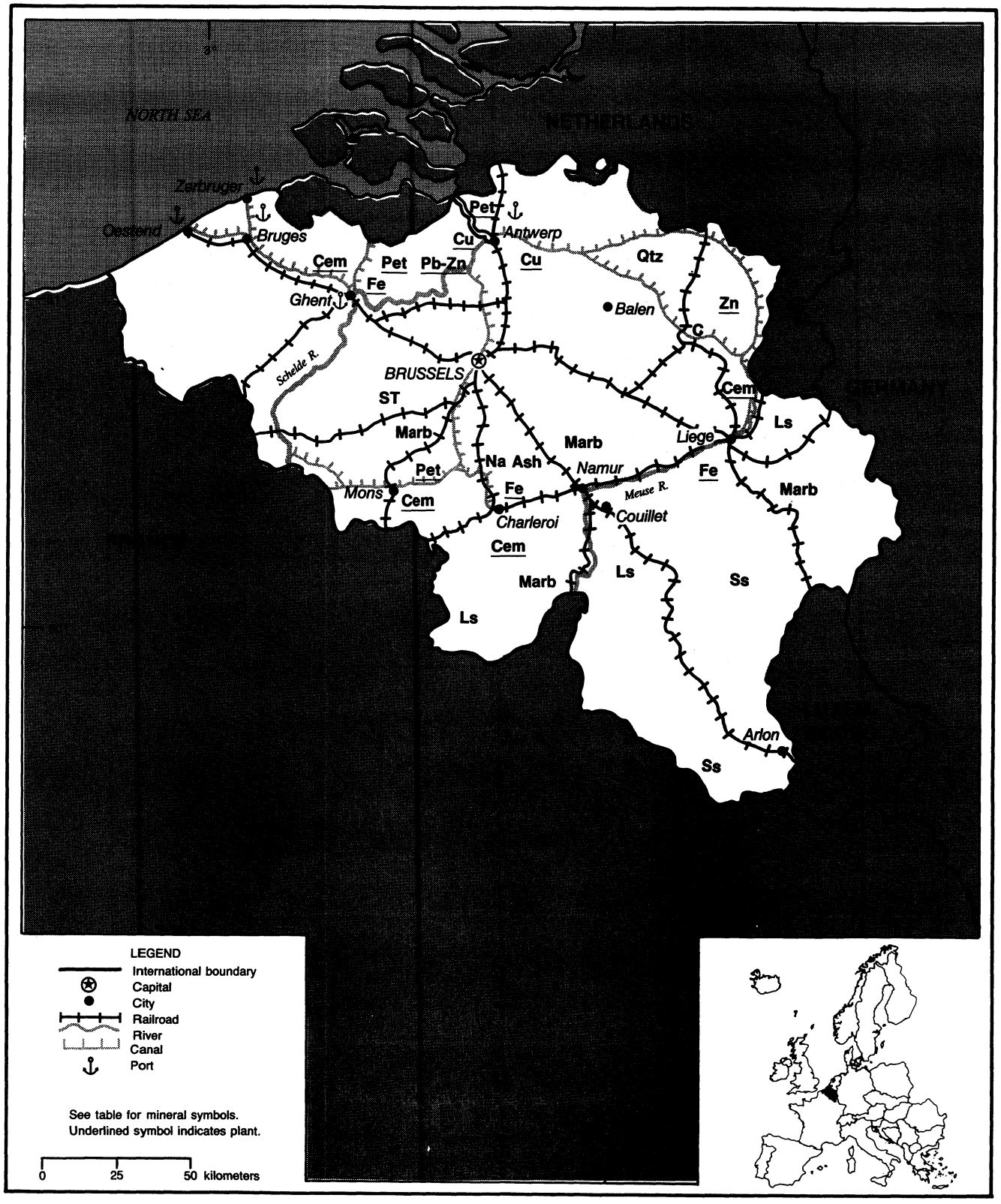
TABLE 3
BELARUS: ESTIMATED MAJOR MINERAL RESOURCES FOR 1992

(Thousand metric tons)

Commodity	Reserves
Coal	1,000,000
Iron ore	1,000,000
Oil shale	11,000,000
Peat	1,100,000
Petroleum	190,000
Potash; K_2O content	260,000
Salt	20,000,000

BELGIUM

AREA 30,500 km² **POPULATION 9.9 million**



THE MINERAL INDUSTRIES OF

BELGIUM AND LUXEMBOURG

By William Zajac

BELGIUM

Belgium's 3 years of high economic growth ended in 1992 as a result of the global recession, especially among its European Communities (EC) partners. The growth of the country's gross domestic product (GDP) averaged more than 4% in 1988-90, dropped to 1.9% in 1991, and dropped again in 1992 to 0.8%. As an export-oriented economy, Belgium suffers from the lack of markets in other countries. The country's relative dependence on what it earns on the international market is shown by the fact that its exports are equivalent to about two-thirds of its GDP and that it exports, per capita, almost twice as much as Germany, its largest trading partner. German reunification fueled exports for Belgium but the extent of German economic contraction hit the Belgian economy particularly hard. Nineteen ninety-two saw the first volume fall in exports by Belgium since 1975, leading to lost jobs. Unemployment rose from 8% in 1990 to 9.3% in 1991 and 11.3% in 1992.

With regard to the domestic mineral industry, Belgium is important as a processor rather than as a producer of raw materials. Internationally, Belgium is important as a market for raw materials and as an investor in mineral industry projects worldwide. For example, the Belgian company Union Minière (UM) has stakes in zinc mining in Sweden and the United States, copper mining in Mexico, lead and silver in Morocco, and placer gold in Guinea (although the mine was closed in August and a purchase option in the stake in the mine was concluded with an Australian concern). In processing raw materials, Belgium is a major refiner of imported copper-containing materials and zinc concentrates and imports the equivalent of almost two-thirds of the world's annual diamond production for processing.

Government Policies and Programs

The deteriorating economic climate worldwide, and especially in Belgium's principal trading partners, has caused the Belgian Government to take measures to try to soften the effects of the recession. Belgium and Luxembourg are the only two members of the EC that still had automatic wage indexing, which caused the industrial wages in these two countries to increase more than in other countries of the EC. The Organization for Economic Cooperation and Development (OECD) had calculated that industrial wages in Belgium will have risen 38% between 1988 and 1994 compared with 30% in France and 28% in the Netherlands. The Belgian Government, near the end of 1992, began to realize the problems this increase could cause for an export-oriented economy and started to take measures to end this automatic wage indexation.

Another measure started to help Belgium retain its competitive edge internationally was an effort to bring the budget deficit and Government debt under control. In the 10-year period 1981-91, the Government cut spending from 59.6% to 51.7% of GDP, with revenues falling only from 46.4% to 45.4%. This cut the deficit from 13.3% to 6.3% of the GDP. In late 1991, however, Government expenditure, excluding interest on the public debt, rose to 3.5% of the GDP compared with 1% in 1990. To help contain the deficit, the Government announced measures that were expected to produce savings of $2.5 billion,[1] but the Government fell in late 1991 and the measures were not implemented.

A new Government was formed in March 1992 and announced measures estimated to represent a savings of $5.9 billion. In addition to new measures to increase revenue and reduce expenditures, the proposals also included the corrective measures that were never implemented in late 1991. The total package was expected to produce almost $2.5 billion in additional revenue and reduce expenditures by almost $2.0 billion. Revenue was to be boosted by the realignment of value added tax and excise taxes, the selective suspension of investment tax credits, and increased social security contributions for employees and retired people. Budget cuts were to be principally in defense spending. Stricter limits were to be applied to the program of part-time work to avoid full-time employment and in health care expenditure. These measures were expected to produce a reduction of the deficit of the general government by about 0.5% to about 5.5% of the GDP. In reality, the deficit with interest rose to 6.9% and the net general government debt rose to 121% (112.7% in 1991) of GDP. Belgium has been a leader in the effort to bring about the EC's Economic and Monetary Union (EMU) under the terms of the Maastrict agreement, but must bring its economy under control if it is to achieve the required maximum 3% budget deficit by 1996 to be part of the EMU.

Production

As can be expected for an export-oriented economy in recession, Belgium's general industrial production index (excluding construction) dropped 0.2% in

1992 compared to that of 1991. The base metal production index dropped 7.6% and the metal fabrication production index dropped 4.3% in 1992 compared with those of 1991, reflecting the drop in production of copper commercial shapes, pig iron, primary refined lead, steel, and zinc. The production index for construction rose by 19.5% between 1991 and 1992, a statistic that is reflected in the increases in production of cement (12.4%) and of dimension stone. *(See tables 1 and 2.)*

Trade

Trade data for Belgium are presented in the context of the Belgium-Luxembourg Economic Union (BLEU), and as such contain the exports, reexports, and imports of Luxembourg as well. The value of total exports in 1992 amounted to $10.3 billion, a drop of 1.4% in value compared to that of 1991. However, the volume of exports remained steady compared to the previous year, reflecting the drop in unit values; e.g., in the internationally traded metals sector. For example, the average price of copper dropped 8.3% and the average price of lead dropped 8.9% between 1991 and 1992. The value of total imports in 1992 amounted to $10.4 billion, a decrease of 2.2% from that of the previous year. Nineteen ninety-two ended with a trade deficit of about $150 million, smaller than the $225 million deficit in 1991. In 1991, the latest year for which the U.S. Bureau of Mines had preliminary data available, total merchandise delivered for export totaled 48,937 kilotons, of which 34,984 kilotons (71.5%) was delivered to Antwerp, 6,792 kilotons (13.9%) was delivered to Ghent, 2,290 kilotons (4.7%) was delivered to Zeebruggen, 845 kilotons (1.7%) was delivered to Brussels, 756 kilotons (1.5%) was delivered to Ostende, and 3,270 (6.7%) kilotons was delivered to unspecified destinations. *(See tables 3 and 4.)*

Structure of the Mineral Industry

Table 5 shows the principal plants with their locations and capacities of mineral industry concerns in Belgium. With the end of coal mining in Belgium in 1992, the only mining activities left were in the production of sand and gravel and the quarrying of stone. The metal processing sector of the industry runs principally on imported raw materials, whether metal concentrates or scrap for refining; the sand and gravel and stone industries principally supply the domestic market and neighboring countries, with exports of some of the less common types of stone such as marbles and the Belgian blue-gray limestone called "petit granit" to worldwide destinations. *(See table 5.)*

Commodity Review

***Metals.*—Lead.**—Although the production of primary refined lead in Belgium dropped somewhat in 1992, production of secondary refined lead increased as a result of a new battery recycling and secondary lead production unit being brought on-stream in May 1992 in Beerse by Campine SA. Although the company reported unsatisfactory financial results for the new plant for 1992, it also reported satisfactory production results. The negative financial results were again, as with trade, the result of the drop in the price of lead. Despite the discouraging news for 1992, the company expressed high hopes for its "state of the art, high-powered production facilities" when the business cycle again turns positive.

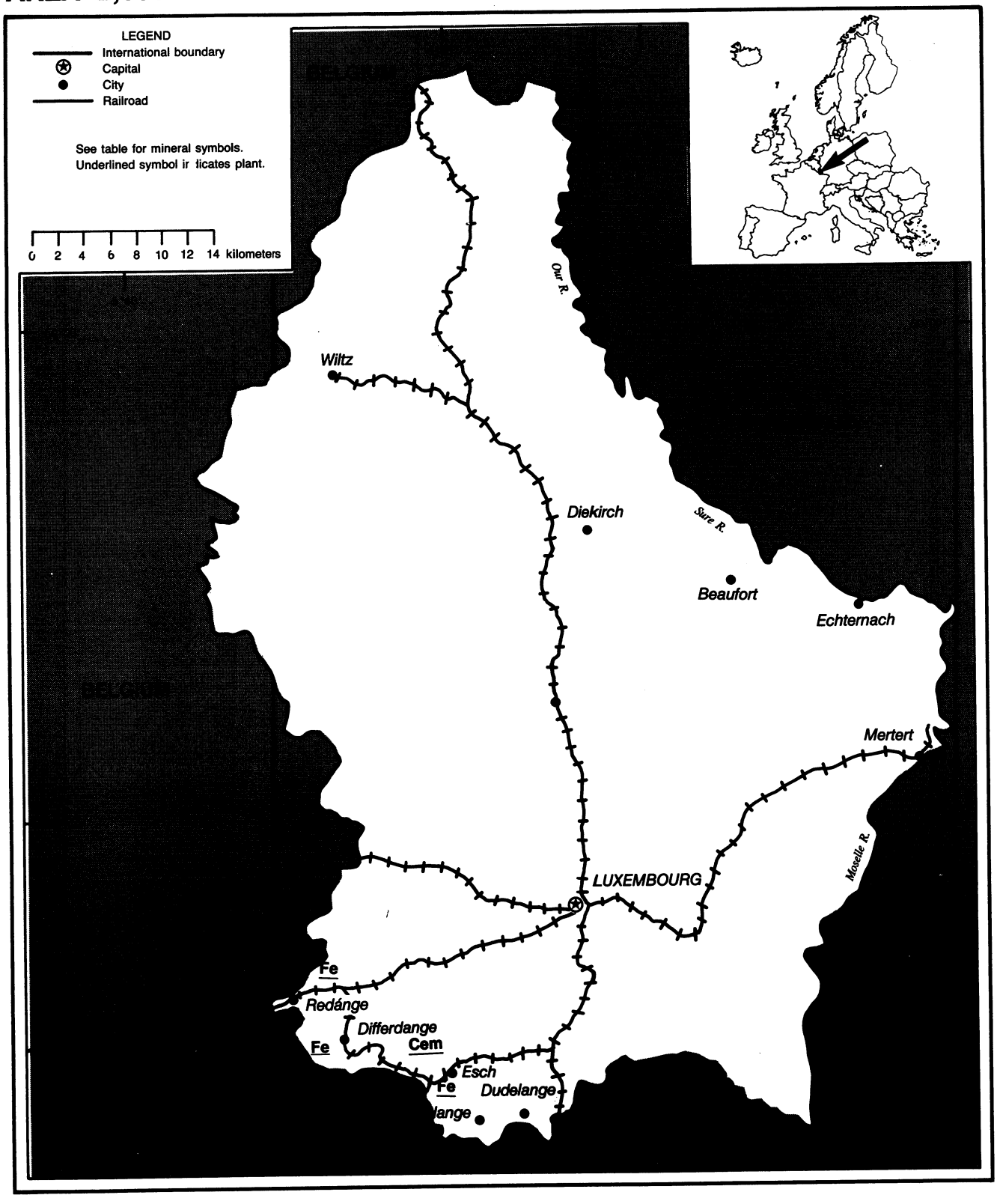
Steel.—The drop in steel production in Belgium reflected the generally negative situation in the steel industry of the EC as a whole. EC production overcapacity, cheaper imports from the nations of eastern Europe, threatened import sanctions by the United States, and the worldwide economic downturn all contributed to the deteriorated steel market. Even though declining steel production is seen as a problem, steel-producing corporations are far more concerned with the declining sales prices for steel, both crude and products. These prices, in 1992, were 30% to 40% lower, depending on product category, than at the beginning of 1990. Such prices can be catastrophic for a country such as Belgium, which has automatic wage increases, because production cannot continue for long if production costs are not covered by sales revenue.

***Industrial Minerals.*—Diamond.**—As is true for the metal processing industry in Belgium, the diamond industry is extremely important in the area of processing raw material, upgrading, and adding value. In the case of diamond, Belgium continues to be a major conduit, polishing and cutting stones from around the world despite competition in this area from other parts of the world, especially Southeast Asia. In 1992, Belgium had net imports of $367 million worth of crude stones and net exports of $656 million worth of worked stones, drops of 32.2% and 9.6%, respectively, compared to 1991, but still adding almost $300 million to the plus side of the trade balance. Belgium's diamond trade is sometimes cited as a mirror of the state of the global economy as well as the individual parts thereof. For example, imports of crude stones and exports of worked stones usually increase in times of economic prosperity in the major market countries (EC, Japan, United States) and decrease in times of economic hardship. This is evident in trade for 1992, a very bad year for the world economy. Imports of crude stones dropped by 8% for weight and by 4.3% for value while exports of worked stones declined by 2.3% for weight and 9.1% for value in 1992 compared with 1991, reflecting the general global recession.

Companies involved in the diamond industry in Belgium are similar to those involved in other mineral industry-related fields in that they are involved internationally and in more than one aspect of the industry. For example, Société d'Entreprise et d'Investissements S.A. (Sibeka), based in Brussels, is involved in all aspects of the diamond industry, from exploration, development,

LUXEMBOURG

AREA 2,600 km² **POPULATION 392,000**



and mining (in Brazil, the United States, Zaire), to marketing and the manufacture of diamond tools and related technology. In addition to the unfavorable global economy, civil unrest in Zaire, a major diamond producer with close ties to Belgium, caused disruption in the international supply-demand situation. Table 6 presents Belgium's exports and reexports of unworked and worked diamond for 1990-92 and table 7 presents Belgium's imports of crude and worked diamond for 1990-92, in both carats and value. It should be noted that the information presented in these two tables is figures for loose stones and the export data do not reflect the unworked stones that are imported, worked, and fashioned into jewelry that subsequently generates revenue for the Belgian Government either through being exported or through the taxes generated by domestic sales. *(See tables 6 and 7.)*

Stone.—With the end of coal mining late in 1992, the quarrying of stone and the production of sand and gravel were the only actual mining operations extant in Belgium. Production of dolomite, limestone, and marble all declined during 1992, reflecting the downturn in the construction industries in Belgium's neighbors, while the production of petit granite and dredged gravel increased. Exports of sand and gravel and unworked stone decreased by 8.6% by weight but increased by 1.9% by value in 1992 compared with 1991, indicating that higher value stone rather than sand and gravel was the predominant export commodity.

Mineral Fuels.—The last two coal mines in Belgium, the Beringen and Zolder Mines that produced high-volatile bituminous coal, were closed in October 1992, ending a long history of coal mining in a country that saw a peak production of more than 30 mt/a in the 1950's. As a result, Belgium must now import all its primary energy needs--coal, crude petroleum, and natural gas. Coal consumption has traditionally been divided among consuming industries as follows: coking plants, 51%; thermal electric powerplants, 34%; domestic and other small users, 5%; nonmetallic mineral product production; 4%, iron and steel industry, 4%; and other, 2%. The principal sources for imported coal have traditionally been, by approximate percent of amount furnished, the United States (40%), the Republic of South Africa (31%), Germany (9.5%), Australia (9%), Poland (2%), and others (8.5%).

Infrastructure

The Belgian National Railways (SNCB) operated 3,667 km of 1.435-m standard-gauge track, 2,563 km double track, 1,978 km electrified, and 191 km 1.000-m-gauge track, all Government owned. The country has a total of 103,396 km of roadways, of which 1,317 km is limited access, divided highways; 11,717 km is national highways; 1,362 km is provincial roads; and 38,000 km is paved and 51,000 km is unpaved rural roads. The inland waterway system consists of 2,043 km, of which about 1,528 km is in regular use. There are 1,167 km of pipeline for petroleum products, 161 km for crude petroleum, and 3,300 km for natural gas. The principal ports are Antwerp, Bruges, Ghent, Ostend, and Zeebrugge. In 1992, the merchant marine consisted of 23 ships of 1,000 gross weight tons or more, totalling 62,979 gross weight tons, of which 10 were cargo, 5 were chemical tankers, 4 were petroleum tankers, 2 were refrigerated cargo, 1 was a bulk carrier, and 1 was a liquefied gas tanker.

Outlook

The economic outlook for Belgium for the next few years is impossible to predict because of all the uncontrollable factors that come into play. Being an export-oriented economy, Belgium relies heavily on the markets in its trading partners, and if they do not recover economically, then Belgium will remain in a recession until they do. Much also depends on the will of the Belgian Government to bring the economy in line with the requirements of the Maastrict agreement for the economic and monetary union of the members of the EC.

LUXEMBOURG

Luxembourg's mineral industry consisted principally of processing raw materials and was dominated by the steel company Acieries Reunies de Burbach-Eich-Dudelange (ARBED) S.A., part of the ARBED Group of companies with interests in steelmaking and products, cement, copper foil production, engineering and steel construction, mining, information systems, trading, and others. Since its creation in 1882, ARBED has been the largest industrial group in the Grand Duchy of Luxembourg, and the group has had an average annual turnover of $6.2 billion.[2] In 1992, however, as a result of the generally poor global economic situation, ARBED's financial results dropped from a profit of about $140 million in 1991 to a loss of $95 million in 1992.

Production

Luxembourg's mineral industry is dominated by the steel company, ARBED S.A., which produces pig iron from imported ore, crude steel, and stainless steel and is involved in many other areas of the economy, such as the cement and brick industries. The country traditionally also has produced sand and gravel and crushed and dimension stone, but data on the actual production of these materials have not been published since the 1987 production year. However, national statistics indicated that 0.2% of the national work force (or about 400 persons) is engaged in the extraction of nonmetallic minerals and produced products valued at about $33 million.

Trade

As a member of BLEU, trade statistics for Luxembourg are inextricably linked with those of Belgium, and therefore are not able to be listed individually. However, preliminary information from Service Central de la Statistique et des Études Économiques (STATEC), the central statistical bureau, showed that the

value of exports dropped by 3.2% in 1992 compared to that of 1991 (when it increased 4.3%) and the value of imports dropped in 1992 by 4.2% compared to that of 1991 (when it increased by 10.5%). The trade balance of payment was a negative $1.7 billion, lower than the $2.1 billion of the previous year. Principal exports, based on value, in 1992 were base metals (33.0%), machines and precision instruments (15.9%), plastic and rubber products (13.2%), textiles and products thereof (7.2%), food products (6.4%), and all others (24.3%). Principal imports, based on value, in 1992 were machines and precision instruments (20.0%), base metals (14.7%), transport equipment (12.8%), mineral and energy products (11.3%), food products (10.3%), chemicals (8.0%), and all others (22.9%). Based on value, principal export destinations in 1992, as in prior years, were Germany (29.4%), France (16.8%), and Belgium (16.3%), with exports valued at 3.6% of the total sent to the United States. Based on value, principal imports sources, as in 1991, were Belgium (39.6%), Germany (31.3%), and France (11.2%), with imports from the United States amounting to 2.1% of the total.

Structure of the Mineral Industry

Luxembourg's principal producers of mineral industry products are shown in table 8. *(See table 8.)*

Commodity Review

Metals.—The iron and steel sector remained the most important industrial sector of the economy. However, as with the other nations of the EC, 1992 proved to be a bad year for the industry with various factors causing the drop in demand and production. The problem can be broken into three sections, according to ARBED, as follows:

1. Insufficient restructuring in certain countries, causing excess production capacities to be kept artificially and not determined by demand;

2. An incoherent policy within the EC that allows other countries to sell their products on the EC market at what is considered by the EC producers as unfair prices; and

3. An apparent resurgence of protectionism in the United States, causing third countries to shift their exports to the EC and the EC to seek new markets in an increasingly competitive market. EC steelmakers are to submit restructuring plans to the EC Commission in late 1993 in an attempt to help rectify the steel situation.

Mineral Fuels.—Luxembourg had no production of mineral fuel commodities and therefore imported all energy products required. All natural gas consumed in Luxembourg was imported from the Netherlands, and the vast majority of the petroleum refinery products consumed in Luxembourg were imported from other EC nations.

Infrastructure

Luxembourg is a landlocked country with 270 km of 1.435-m standard-gauge, 162 km double-track, and 162 km electrified railways operated by the Luxembourg National Railways (CFL). The country has a total of 5,108 km of roadways, of which 4,995 km is paved, 57 km is gravel, and 56 km is earth. Of the total roads, about 80 km is limited-access divided highway. A pipeline of 48 km delivers petroleum refinery products. The only waterway is the Moselle River, of which 37 km in Luxembourg is navigable and the only port is a river port, Mertert. In 1992, Luxembourg's merchant marine consisted of 49 ships of 1,000 gross tons or more and totaled 1,592,958 gross tons. Of the total, eight were bulk carriers, eight were liquefied gas tankers, six were combination bulk carriers, six were petroleum tankers, five were container ships, five were roll-on-roll-off carriers, four were chemical tankers, three were cargo ships, three were combination ore/oil carriers, and one was a passenger carrier.

[1]Where necessary, conversions from Belgian francs to U.S. dollars have been made at the rate of Bf32.15=US$1.00.

[2]Where necessary, conversions have been made from Luxembourg francs to U.S. dollars at the rate of Lf30.5=US$1.00.

OTHER SOURCES OF INFORMATION

Agencies

Administration des Mines, Ministère des Affaires Economiques (Administration of Mines, Ministry of Economic Affairs) Brussels, Belgium

Institute National des Industries Extractives (National Institute of Extractive Industries) Liege, Belgium

Service Geologique de Belgique (Belgian Geological Survey) Brussels, Belgium

Service Central de la Statistique et des Études Économique (STATEC) (Central Statistical and Economic Studies Service) Luxembourg, Luxembourg

Publications

Annales des Mines de Belgique: Administration des Mines (Annals of Mines: Administration of Mines) Brussels, Belgium, biannual.

Bulletin de Statistique: Institute National de Statistique (Statistical Bulletin: National Institute of Statistics) Brussels, Belgium, monthly.

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Various company annual reports.

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Bulletin du Statec, STATEC, Luxembourg, Luxembourg, monthly.

Indicateurs Rapides (Rapid Indicators), STATEC, Luxembourg, Luxembourg.

TABLE 1

BELGIUM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	1988	1989	1990	1991	1992
METALS					
Aluminum, secondary including unspecified metals	7,464	7,355	7,905	7,391	e7,000
Arsenic, white	e3,500	e3,500	e3,000	e2,500	e2,000
Bismuth, metal	e795	e800	e750	e700	e700
Cadmium, primary	1,836	r1,764	1,956	1,807	1,550
Copper:					
Blister:					
Primary	e200	—	e1,500	e1,000	e750
Secondary	e93,200	e93,400	e103,000	e105,000	e87,400
Total	e93,400	e93,400	e104,500	e106,000	e88,150
Unwrought, total of smelter and refined, primary and secondary	504,333	r563,328	542,458	r477,972	471,314
Refined, primary and secondary including alloys	354,300	329,200	331,857	297,593	293,000
Of which secondary (WBMS)	93,000	88,000	102,000	106,000	102,000
Iron and steel:					
Pig iron including ferroalloys	9,146,905	r8,868,000	9,416,000	9,354,000	8,524,000
Ferroalloys: Electric furnace ferromanganese	e95,000	e95,000	e90,000	e90,000	e90,000
Steel:					
Crude	11,220,478	r10,952,400	r11,419,200	11,334,800	10,333,600
Hot-rolled products	10,600,800	10,536,000	r10,966,800	r10,831,200	10,332,000
Lead:					
Smelter:					
Primary	e64,100	e70,000	e73,500	e65,000	e65,000
Secondary[3]	e22,000	e22,800	e21,800	e20,000	e20,000
Total	e86,100	e92,800	e95,300	e85,000	e85,000
Refined:					
Primary	83,200	72,669	69,812	r78,124	e75,297
Secondary	43,361	36,771	37,000	r32,560	e41,000
Total	126,564	109,440	r106,812	r110,684	116,297
Selenium	e250	e250	e250	e250	e250
Tin metal, secondary including alloys	4,972	r5,976	6,063	4,426	e5,260
Zinc:					
Slab:					
Primary	298,100	286,900	289,700	297,600	217,200
Secondary including remelt	25,658	19,124	66,832	87,453	93,420
Total	r323,760	r306,024	r356,532	r385,053	310,620
Powder	r37,704	r40,932	r52,632	52,416	e50,348
Other, nonferrous: Precious metals, unwrought, n.e.s.[4] kilograms	r1,233,492	r1,110,276	r1,348,788	r1,305,926	e1,675,000
INDUSTRIAL MINERALS					
Barite	e35,000	e40,000	e35,000	e35,000	e30,000
Cement, hydraulic	6,450,672	r6,720,168	6,929,256	7,184,234	8,072,718
Clays: Kaolin	143,637	165,520	r e175,000	260,000	e325,000
Lime and dead-burned dolomite: Quicklime	r1,896,000	r1,968,000	r2,076,000	2,021,000	1,871,000
Nitrogen: N content of ammonia	364,700	292,300	273,600	272,400	514,000
Phosphates: Thomas slag, gross weight	r—	r—	r—	r—	—
Sodium compounds:					
Soda ash	378,960	e380,000	e375,000	e380,000	e375,000

See footnotes at end of table.

TABLE 1—Continued

BELGIUM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992
INDUSTRIAL MINERALS—Continued						
Sodium compounds—Continued:						
Sulfate		e255,000	e255,000	e250,000	e260,000	e250,000
Stone, sand and gravel:						
Calcareous:						
Dolomite		4,684,452	r4,770,852	r4,294,236	4,033,802	3,984,354
Limestone		25,872,000	r28,944,000	r31,896,000	r34,255,000	33,394,000
Marble:						
In blocks	cubic meters	576	r624	480	358	232
Crushed and other		60	r72	r72	r80	e80
Petit granite (Belgian bluestone):						
Quarried	cubic meters	959,064	r1,074,636	r989,448	864,476	1,214,400
Sawed	do.	63,504	r67,716	70,524	67,683	e90,000
Worked	do.	12,000	r11,520	10,848	11,994	e15,000
Crushed and other	do.	651,912	r692,856	r530,604	r598,854	e800,000
Porphyry, all types		3,394,872	r3,789,756	r3,934,920	3,971,777	4,127,000
Quartz and quartzite		277,006	322,192	204,308	402,780	e500,000
Sandstone:						
Rough stone including crushed		2,248,152	r2,244,480	r2,080,476	r2,663,044	e2,400,000
Paving		13,152	r13,860	r17,628	r14,386	e14,000
Sand and gravel:						
Construction sand		8,988,000	r9,264,000	r9,336,000	9,163,000	e9,200,000
Foundry sand		595,000	595,818	r528,000	489,000	e525,000
Dredged sand		788,400	r937,394	r589,200	2,305,300	e2,300,000
Glass sand		r1,848,000	r1,908,747	r2,028,000	2,065,000	e1,950,000
Other sand		2,448,000	r2,532,000	r2,580,000	r2,785,000	e2,800,000
Gravel, dredged		5,832,000	r4,800,000	4,128,000	4,192,000	4,899,000
Sulfur:						
Byproduct:						
Elemental		e155,000	e160,000	e160,000	e160,000	e160,000
Other forms		e155,000	e160,000	e150,000	e140,000	e140,000
Total		e310,000	e320,000	e310,000	e300,000	e300,000
Sulfuric acid, oleum		2,135,508	1,947,348	1,905,732	1,935,921	1,906,281
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		e1,900	e1,800	e1,700	e1,700	e1,700
Coal, bituminous		r2,487,600	1,892,689	1,035,832	r636,000	226,100
Coke, all types		5,548,384	r5,458,820	5,420,351	4,887,000	2,693,000
Gas:						
Manufactured	thousand cubic meters	r689,076	r660,240	r654,612	r565,293	550,541
Natural (byproduct of coalmining):						
Gross	do.	24,205	20,139	e19,000	e11,000	e7,500
Marketable	do.	17,507	11,552	10,874	6,694	e4,000
Petroleum refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	13,135	r13,287	r11,807	r11,556	e11,000
Aviation gasoline	do.	139	113	70	12	—
Naphtha and white spirit	do.	r2,956	r3,063	r2,991	r3,072	e3,300
Gasoline	do.	41,848	r45,327	r44,740	r50,004	52,377

See footnotes at end of table.

TABLE 1—Continued

BELGIUM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum refinery products—Continued						
Jet fuel and kerosene	thousand 42-gallon barrels	r12,265	r13,546	r11,947	r12,883	e14,250
Distillate fuel oil	do.	68,416	r72,702	r76,309	r81,914	80,382
Residual fuel oil	do.	43,746	r38,269	r37,586	r48,523	41,412
Bitumen	do.	4,448	r4,623	r5,155	r5,055	e4,000
Other	do.	11,985	e12,000	e11,000	e10,000	e8,500
Refinery fuel and losses	do.	r e3,000	r e3,000	r e2,680	r e5,000	e4,000
Total[5]	do.	r e201,937	r e205,930	r e204,286	r e228,018	e219,220

eEstimated. rRevised.

[1]Table includes data available through July 31, 1993.

[2]In addition to the commodities listed, Belgium produced a number of other metals and alloys for which only aggregate output figures were available.

[3]Data represent secondary refined lead output less remelted lead; as such, the figures are probably high because they include some lead that was sufficiently pure as scrap that it did not require resmelting, but data are not adequate to permit differentiation.

[4]Includes gold, platinum-group metals, and silver.

[5]Totals may not add to detail shown owing to independent rounding.

TABLE 2

LUXEMBOURG: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	1988	1989	1990	1991	1992
Cement, hydraulic	563,426	590,193	635,571	687,786	720,000
Gypsum and anhydrite, crude	e450	e450	e400	e400	e400
Iron and steel: Metal:					
Pig iron	2,519,200	2,683,800	2,645,200	2,436,000	2,256,000
Steel:					
Crude	3,660,890	3,720,920	3,560,290	3,379,000	3,068,000
Semimanufactures	4,019,087	4,113,051	3,950,035	3,787,000	3,590,000
Phosphates: Thomas slag:					
Gross weight	663,877	672,141	602,877	e600,000	e550,000
P_2O_5 content	119,498	120,985	108,518	e108,000	e100,000

eEstimated.

[1]Table includes data available through July 1993.

[2]In addition to the commodities listed, Luxembourg also produces sand and gravel and stone, both crushed and dimension, but output is not reported and no basis exists for estimation of output.

TABLE 3

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	31	54	—	Germany 41; Republic of South Africa 5; Denmark 4.
Alkaline-earth metals	100	[2]75	19	France 35; Hungary 5; Italy 5.
Aluminum:				
Ore and concentrate	1,725	1,238	—	France 823; Germany 240; Netherlands 93.
Oxides and hydroxides	1,079	955	2	France 422; United Kingdom 265; Netherlands 113.
Ash and residue containing aluminum	17,103	NA	NA	NA.
Metal including alloys:				
Scrap	67,770	69,055	47	France 31,319; Netherlands 16,684; Germany 16,558.
Unwrought	32,897	53,726	104	Germany 32,557; Netherlands 6,521; France 5,228.
Semimanufactures	373,084	359,464	12,207	Germany 86,797; France 79,492; Netherlands 52,379.
Antimony:				
Ore and concentrate	265	NA	NA	NA.
Ash and residue containing antimony	134	NA	NA	NA.
Metal including alloys, all forms	44	40	—	Portugal 19; Zaire 5; Bangladesh 4.
Arsenic: Metal including alloys, all forms	4	NA	NA	NA.
Beryllium: Metal including alloys, all forms	39	24		Germany 22; United Kingdom 2.
Cadmium: Metal including alloys, all forms	1,168	1,390	[3]	Japan 680; Germany 338; France 233.
Chromium:				
Ore and concentrate	12,484	16,491	—	France 7,866; Germany 2,457; Italy 2,271.
Oxides and hydroxides	322	305	1	Germany 135; Spain 68; France 35.
Metal including alloys, all forms	65	12	—	Netherlands 6; France 3; Germany 2.
Cobalt:				
Ore and concentrate	12	10	—	Netherlands 6; Spain 4.
Ash and residue containing cobalt	341	NA	NA	NA.
Metal including alloys, all forms	22	36	3	Germany 13; United Kingdom 6; France 5.
Columbium and tantalum:				
Ash and residue containing columbium and tantalum	836	NA	NA	NA.
Metal including alloys, all forms:				
Columbium (niobium)[4]	68	NA	NA	NA.
Tantalum	2	1	—	Mainly to Netherlands.
Copper:				
Ore and concentrate	95	111	—	Spain 58; France 21; Italy 14.
Matte and speiss including cement copper	438	526	—	Germany 286; France 123; Netherlands 61.
Sulfate	515	NA	NA	NA.
Ash and residue containing copper	2,506	NA	NA	NA.
Metal including alloys:				
Scrap	55,629	55,978	62	Netherlands 18,396; Germany 15,021; France 8,882.
Unwrought	239,822	188,610	31	France 92,767; Germany 37,580; United Kingdom 33,816.
Semimanufactures	345,292	322,274	788	Germany 109,423; France 82,089; Netherlands 37,892.
Gallium, indium, thallium: Metals including alloys, all forms	22	NA	NA	NA.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Gold:				
Waste and sweepings value, thousands	$4,644	$4,588	$19	United Kingdom $3,312; Germany $1,063; Netherlands $163.
Metal including alloys, unwrought and partly wrought kilograms	r18,929	26,354	1,800	Switzerland 16,500; United Kingdom 2,900; Thailand 1,500.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite	15,791	12,612	—	France 6,383; Germany 2,564; Netherlands 2,493.
Pyrite, roasted	101,117	65,065	—	Germany 31,674; France 17,072; Netherlands 13,160.
Metal:				
Scrap	869,403	1,045,097	22	France 392,638; Turkey 330,187; Netherlands 134,844.
Pig iron, cast iron, related materials	15,367	7,639	5	Netherlands 2,773; Italy 2,048; Germany 1,425.
Ferroalloys:				
Ferrochromium	2,130	4,117	—	France 2,467; United Kingdom 673; Germany 398.
Ferrocolumbium	25	NA	NA	NA.
Ferromanganese	22,624	34,671	—	Germany 15,667; France 8,095; Sweden 3,656.
Ferronickel	3	5	—	France 1; Germany 1; United Kingdom 1.
Ferrophosphorus	70	NA	NA	NA.
Ferrosilicochromium	4	NA	NA	NA.
Ferrosilicomanganese	3,609	7,934	—	Sweden 3,100; France 2,739; Italy 664.
Ferrosilicon	2,439	6,641	—	France 4,049; Germany 1,572; United Kingdom 661.
Ferrotitanium and ferrosilicotitanium	330	NA	NA	NA.
Ferrotungsten and ferrosilicotungsten	5	NA	NA	NA.
Silicon metal	616	[5]633	—	France 373; Germany 171; Netherlands 46.
Unspecified	324	931	—	United Kingdom 312; France 217; Germany 203.
Steel, primary forms thousand tons	835	851	54	Germany 370; France 146; Austria 112.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated do.	7,196	7,090	236	France 2,480; Germany 1,721; Italy 788.
Clad, plated, coated do.	1,979	1,933	8	Germany 512; France 482; Netherlands 210.
Of alloy steel do.	593	599	15	France 212; Italy 125; Germany 97.
Bars, rods, angles, shapes, sections do.	3,099	2,957	114	Germany 729; France 676; Netherlands 477.
Rails and accessories do.	105	115	21	France 27; Germany 15; Italy 11.
Wire do.	455	446	34	France 102; Germany 91; Netherlands 52.
Tubes, pipes, fittings do.	485	541	4	Germany 106; France 92; Netherlands 71.
Lead:				
Ore and concentrate	—	3	—	All to United Kingdom.
Oxides	155	266	—	Germany 115; France 51; Netherlands 42.
Ash and residue containing lead	5,117	NA	NA	NA.
Metal including alloys:				
Scrap	14,077	20,689	—	France 18,506; Netherlands 1,062; Germany 420.
Unwrought	50,462	53,836	(6)	Germany 17,935; Netherlands 13,182; France 7,714.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Lead—Continued:				
Metal including alloys—Continued:				
Semimanufactures	25,841	24,336	(2)	Netherlands 8,040; United Kingdom 4,181; Italy 4,053.
Lithium: Oxides and hydroxides	41	NA	NA	NA.
Magnesium: Metal including alloys:				
Scrap	367	312	—	Italy 190; Netherlands 60; Germany 22.
Unwrought	44	67	—	Netherlands 41; Italy 17; France 7.
Semimanufactures	610	278	—	Germany 172; Italy 67; France 22.
Manganese:				
Ore and concentrate, metallurgical-grade	335	12,857	—	Netherlands 11,624; France 1,004; Germany 105.
Metal including alloys, all forms	2,489	1,884	—	France 577; Norway 505; Germany 388.
Mercury	37	51	—	Netherlands 18; United Kingdom 15; India 6.
Molybdenum:				
Ore and concentrate:				
Roasted	15,966	14,014	2,337	United Kingdom 3,164; Germany 2,314; Japan 1,261.
Unroasted	1,729	546	—	France 313; United Kingdom 234.
Oxides and hydroxides	195	NA	NA	NA.
Ash and residue containing molybdenum	37	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	75	26	(2)	France 15; United Kingdom 6; Netherlands 3.
Semimanufactures	121	54	(2)	Netherlands 23; Germany 10; Italy 10.
Nickel:				
Ore and concentrate	50	—		
Matte and speiss	4	1,048	2	Canada 1,023; Germany 19; France 4.
Oxides and hydroxides kilograms	400	NA	NA	NA.
Ash and residue containing nickel	979	NA	NA	NA.
Metal including alloys:				
Scrap	2,191	1,130	73	Netherlands 846; Germany 94; India 58.
Unwrought	788	946	123	Germany 249; Netherlands 223; United Kingdom 110.
Semimanufactures	438	253	6	Netherlands 107; Italy 39; United Kingdom 38.
Platinum-group metals:				
Waste and sweepings value, thousands	$6,926	$9,767	—	United Kingdom $8,271; Germany $730; Italy $354.
Metals including alloys, unwrought and partly wrought, all forms:				
Palladium kilograms	10,832	NA	NA	NA.
Platinum value, thousands	$40,524	$51,939	$26,134	United Kingdom $18,971; Germany $3,057; France $1,546.
Rhodium kilograms	319	NA	NA	NA.
Iridium, osmium, ruthenium do.	4	NA	NA	NA.
Unspecified value, thousands	—	$111,412	$48,556	United Kingdom $41,019; Germany $7,995; Switzerland $6,654.
Rare-earth metals including alloys, all forms	64	NA	NA	NA.
Silicon, high-purity value, thousands	$3	NA	NA	NA.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Silver:					
Ore and concentrate[6]	value, thousands	$96	$82	—	All to Germany.
Waste and sweepings[6]	do.	$2,219	$4,449	$807	United Kingdom $1,908; Germany $957; Canada $354.
Metal including alloys, unwrought and partly wrought	do.	$208,781	$152,145	$28,444	United Kingdom $51,278; Singapore $27,510; Germany $16,699.
Tellurium, elemental[7]		85	2,521	4	Germany 2,417; France 27; Netherlands 22.
Tin:					
Ore and concentrate		—	95	—	Germany 52; France 38; United Kingdom 5.
Oxides	kilograms	100	NA	NA	NA.
Ash and residue containing tin		1,089	NA	NA	NA.
Metal including alloys:					
Scrap		14	48	—	Mexico 24; Germany 15; Netherlands 6.
Unwrought		3,639	3,474	5	France 873; Germany 830; Netherlands 649.
Semimanufactures		248	471	—	Germany 130; France 89; Cote d'Ivoire 70.
Titanium:					
Ore and concentrate		1	2,571	—	Germany 2,545; Tunisia 26.
Ash and residue containing titanium		8,485	NA	NA	NA.
Oxides		27,228	33,654	3,610	Germany 10,157; France 6,395; United Kingdom 2,712.
Metal including alloys:					
Unwrought including waste and scrap		83	62	36	France 10; Germany 9; Republic of South Africa 5.
Semimanufactures		166	169	$6	Germany 45; Italy 38; France 21.
Tungsten:					
Ore and concentrate		67,609	104	—	United Kingdom 20; unspecified 84.
Metal including alloys:					
Unwrought including waste and scrap		101	106	32	Germany 28; United Kingdom 19; Netherlands 15.
Semimanufactures		56	42	2	Netherlands 18; Germany 9; Italy 7.
Uranium and thorium:					
Ore and concentrate	kilograms	400	—		
Oxides and other compounds	value, thousands	$51	$1,383	—	France $1,374; Spain $7; Netherlands $2.
Metal including alloys, all forms:					
Uranium	do.	$5,212	$4,903	$6	France $4,892; Netherlands $1.
Thorium		(3)	NA	NA	NA.
Vanadium:					
Ore and concentrate		5,692	[8]24	—	All to Netherlands.
Oxides and hydroxides		66	NA	NA	NA.
Ash and residue containing vanadium		10	NA	NA	NA.
Metal including alloys, all forms		1	(3)	—	Mainly to France.
Zinc:					
Ore and concentrate		50,881	40,128	—	France 39,520; Netherlands 607.
Oxides		7,388	6,993	(3)	France 2,649; Germany 1,834; Italy 846.
Blue powder		27,121	NA	NA	NA.
Ash and residue containing zinc		51,173	NA	NA	NA.
Metal including alloys:					
Scrap		18,881	14,450	—	France 4,020; Germany 3,105; unspecified 4,861.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Zinc—Continued:				
Metal including alloys—Continued:				
Unwrought	181,954	203,158	60	Germany 62,627; France 22,037; Hong Kong 18,699.
Semimanufactures	8,670	[9]33,383	24	Germany 15,366; France 11,179; Switzerland 1,556.
Zirconium:				
Ore and concentrate	626	144	—	Netherlands 72; France 48; Germany 17.
Oxides	3	NA	NA	NA.
Ash and residue containing zirconium	25	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	16	27	—	France 24; Netherlands 2.
Semimanufactures	15	19	(3)	Germany 7; Switzerland 4; Japan 2.
Other:				
Ores and concentrates:				
Of base metals	2,931	264	(3)	France 128; Netherlands 63; United Kingdom 49.
Of precious metals value, thousands	$2	$32	—	Portugal $21; Netherlands $6; France $5.
Oxides and hydroxides	2,298	2,886	138	France 821; Germany 598; Italy 290.
Ashes and residues	20,348	155,881	4,879	France 37,182; Germany 31,651; Netherlands 22,563.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	961	782	—	Netherlands 650; France 95; Italy 7.
Artificial:				
Corundum	2,774	3,794	(3)	France 2,430; Germany 646; Netherlands 558.
Silicon carbide	10,684	NA	NA	NA.
Dust and powder of precious and semi-precious stones including diamond value, thousands	$23,832	$21,525	$5,203	Spain $5,060; Greece $2,409; Netherlands $2,318.
Grinding and polishing wheels and stones	3,829	3,351	28	France 1,817; Germany 524; Netherlands 253.
Asbestos, crude	310	107	—	Germany 80; Poland 22; United Kingdom 4.
Barite and witherite	52,166	49,621	—	Germany 38,864; France 9,675; Netherlands 1,062.
Boron materials:				
Crude natural borates	26,287	19,642	—	Germany 9,634; Netherlands 9,135; Austria 430.
Oxides and acids	547	340	—	France 144; Netherlands 81; United Kingdom 40.
Bromine	53	[10]42	—	France 20; Netherlands 20; Israel 1.
Cement thousand tons	2,972	3,179	5	Netherlands 1,591; Germany 710; France 568.
Chalk	94,191	85,236	5	Germany 42,984; Netherlands 13,060; Saudi Arabia 8,166.
Clays, crude:				
Bentonite	1,498	12,461	—	Netherlands 10,372; Germany 1,938; Finland 48.
Chamotte and dinas earth	3,447	NA	NA	NA.
Fire clay	62	NA	NA	NA.
Fuller's earth	1,758	NA	NA	NA.
Kaolin	121,240	123,909	—	Netherlands 60,356; Germany 40,774; France 16,501.
Unspecified	10,127	19,885	—	Netherlands 17,142; Germany 1,493; France 806.
Cryolite and chiolite	35	675	—	All to Netherlands.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Diamond, natural:				
Gem, not set or strung value, thousands	$7,607,804	$7,598,724	$1,312,119	Israel $1,480,022; India $1,204,301; United Kingdom $931,332.
Industrial stones do.	$88,253	$70,696	$15,880	Japan $10,200; Germany $8,923; United Kingdom $5,565.
Dust and powder kilograms	4,023	NA	NA	NA.
Diatomite and other infusorial earth	2,202	2,665	—	France 1,444; Netherlands 399; Poland 207.
Feldspar, fluorspar, related materials:				
Feldspar	113	83	—	Netherlands 77; Mexico 2; Norway 2; Togo 2.
Fluorspar	4,131	3,753	—	Germany 3,240; Algeria 400; China 30.
Unspecified	144	NA	NA	NA.
Fertilizer materials:				
Crude, n.e.s.	98,909	129,591	—	Netherlands 82,096; France 44,706; Germany 2,559.
Manufactured:				
Ammonia	74,866	39,782	—	France 28,667; Netherlands 5,592; Germany 4,757.
Nitrogenous thousand tons	2,538	2,369	59	France 791; Germany 369; Netherlands 191.
Phosphatic do.	801	621	—	France 396; Germany 186; Austria 16.
Potassic do.	234	187	—	France 116; Netherlands 34; United Kingdom 32.
Unspecified and mixed do.	2,232	1,946	7	France 723; China 290; Germany 180.
Graphite, natural	398	47	1	Spain 28; Netherlands 7; Turkey 5.
Gypsum and plaster	128,027	135,745	—	Netherlands 92,122; Germany 26,463; France 16,463.
Iodine	26	NA	NA	NA.
Kyanite and related materials:				
Mullite	25	NA	NA	NA.
Unspecified	27	NA	NA	NA.
Lime	805,342	866,353	—	Netherlands 499,827; Germany 187,804; France 102,864.
Magnesium compounds:				
Magnesite, crude	373	3,037	1	Netherlands 2,951; Germany 83; Malta 2.
Oxides and hydroxides	7,022	2,080	5	Germany 1,026; France 317; Netherlands 309.
Sulfate	16,196	NA	NA	NA.
Mica:				
Crude including splittings and waste	5,165	487	7	Germany 148; France 134; Netherlands 68.
Worked including agglomerated splittings	81	47	—	France 23; Germany 22; Netherlands 1.
Nitrates, crude	34,614	38,552	—	Netherlands 18,846; France 13,844; Germany 3,022.
Phosphates, crude	16,438	15,301	—	France 11,355; Netherlands 2,245; Germany 945.
Phosphorus, elemental	4	NA	NA	NA.
Pigments, mineral:				
Natural, crude	87	NA	NA	NA.
Iron oxides and hydroxides, processed	15,588	16,885	378	Germany 7,493; France 2,657; Republic of Korea 2,101.
Potassium salts, crude	674	743	—	Netherlands 524; Germany 219.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$29,379	$39,438	$4,332	Germany $5,897; France $5,021; Switzerland $4,842.
Synthetic do.	$5,133	$4,089	$21	Spain $3,114; Israel $312; Thailand $171.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Pyrite, unroasted	206	166	—	Netherlands 162; France 2; Switzerland 1.
Quartz crystal, piezoelectric value, thousands	$1,452	$825	—	Republic of Korea $434; Austria $58; unspecified $306.
Salt and brine	81,417	89,171	46	France 76,144; Germany 10,889; Netherlands 1,310.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked thousand tons	377	400	(e)	Netherlands 322; France 62; Germany 12.
Worked do.	74	87	(e)	Netherlands 37; Germany 30; France 13.
Dolomite, chiefly refractory-grade do.	1,287	1,257	—	Netherlands 712; Germany 244; France 235.
Gravel and crushed rock do.	10,593	12,095	(e)	France 6,904; Netherlands 4,932; Germany 257.
Limestone other than dimension do.	1,121	1,114	—	Netherlands 841; France 239; Germany 33.
Quartz and quartzite do.	214	282	(e)	France 265; Sweden 7; Germany 5.
Sand other than metal-bearing do.	3,942	4,133	(e)	Netherlands 1,806; France 1,371; Italy 208.
Sulfur:				
Elemental:				
Crude including native and byproduct	29,326	16,574	—	United Kingdom 9,498; France 3,529; Netherlands 2,681.
Colloidal, precipitated, sublimed	34	112	—	Germany 28; France 25; Netherlands 25.
Sulfuric acid	157,304	198,003	—	Netherlands 107,839; France 51,679; Mexico 11,900.
Talc, steatite, soapstone, pyrophyllite	59,074	67,865	2	United Kingdom 20,746; Germany 11,792; France 9,415.
Vermiculite[11]	842	480	—	France 364; Germany 59; Sweden 55.
Other:				
Crude	389,800	486,702	1	Netherlands 348,559; France 101,275; Germany 21,942.
Slag and dross, not metal-bearing thousand tons	2,430	2,294	1	France 780; Netherlands 687; Germany 499.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	18,423	62,832	—	Netherlands 43,825; France 18,541; Germany 294.
Carbon black	3,678	6,315	506	France 2,343; Italy 976; United Kingdom 440.
Coal:				
Anthracite	96,709	254,128	—	Spain 110,711; France 75,576; Netherlands 39,851.
Bituminous	723,999	684,291	—	France 264,914; Netherlands 198,901; Germany 190,908.
Briquets of anthracite and bituminous coal	5,353	5,698	—	France 3,701; Ireland 1,430; Germany 180.
Lignite including briquets	17,632	9,194	—	France 8,530; Germany 388; Netherlands 277.
Coke and semicoke	726,152	502,161	54	Germany 247,532; France 129,434; Netherlands 43,175.
Gas, natural:				
Gaseous value, thousands	$13	$6	—	Netherlands $3; Germany $2; Norway $1.
Liquefied do.	$3,191	$391	—	France $183; Netherlands $120; Germany $71.
Peat including briquets and litter	89,421	78,432	—	France 65,917; Spain 5,585; Italy 1,891.
Petroleum:				
Crude barrels	1,117	861	—	Kuwait 204; Yemen 190; Poland 183.
Refinery products:				
Liquefied petroleum gas thousand 42-gallon barrels	3,914	3,666	—	Germany 1,379; Netherlands 1,035; France 534.

See footnotes at end of table.

TABLE 3—Continued

BELGIUM-LUXEMBOURG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum—Continued:					
Refinery products—Continued:					
Gasoline	thousand 42-gallon barrels	41,772	45,482	3,554	Germany 14,179; Netherlands 7,903; France 6,268.
Mineral jelly and wax	do.	r15	13	(3)	France 1,708; Germany 1,708; Italy 1,118.
Kerosene and jet fuel	do.	12,954	13,217	(3)	Germany 2,233; Switzerland 1,779; bunkers 5,198.
Distillate fuel oil	do.	24,025	31,482	(3)	Germany 15,164; Switzerland 4,509; France 3,944.
Lubricants	do.	2,602	2,523	1	Netherlands 664; Germany 259; bunkers 420.
Residual fuel oil	do.	57,541	63,364	3,046	Netherlands 8,163; United Kingdom 7,667; bunkers 24,370.
Bitumen and other residues	do.	3,500	3,176	—	France 972; Germany 788; United Kingdom 379.
Bituminous mixtures	do.	112	271	(3)	Netherlands 208; France 30; Germany 23.
Petroleum coke	do.	307	369	—	France 257; Netherlands 90; Sweden 16.

rRevised. NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]May include rare-earth metals.

[3]Less than 1/2 unit.

[4]May include rhenium.

[5]May include high-purity silicon.

[6]May include other precious metals.

[7]May include selenium and phosphorus.

[8]May include colombium and tantalum.

[9]Includes blue powder.

[10]May include fluorine and iodine.

[11]Includes perlite and chlorite.

TABLE 4

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	42	71	32	Germany 21; Canada 7; Italy 6.
Alkaline-earth metals	180	[2]314	3	France 191; Germany 54; Australia 35.
Aluminum:				
Ore and concentrate	37,310	44,774	—	Netherlands 20,031; China 12,512; Germany 7,306.
Oxides and hydroxides	58,126	63,410	2,749	Germany 45,995; France 7,762; Netherlands 4,321.
Ash and residue containing aluminum	5,688	NA	NA	NA.
Metal including alloys:				
Scrap	117,184	140,597	111	France 45,997; Germany 41,338; Netherlands 33,293.
Unwrought	367,492	370,628	419	Netherlands 238,433; Republic of South Africa 30,748; Germany 23,603.
Semimanufactures	161,237	172,554	1,453	Germany 54,175; Netherlands 35,183; France 33,913.
Antimony:				
Ore and concentrate	3,863	NA	NA	NA.
Oxides	1,299	NA	NA	NA.
Ash and residue containing antimony	107	NA	NA	NA.
Metal including alloys, all forms	2,952	1,986	3	Netherlands 696; China 593; Hong Kong 528.
Arsenic: Metal including alloys, all forms	97	NA	NA	NA.
Beryllium: Metal including alloys, all forms	47	27	—	Germany 21; Netherlands 4; United Kingdom 2.
Bismuth: Metal including alloys, all forms	45	107	(3)	United Kingdom 100; France 2; Japan 2.
Cadmium: Metal including alloys, all forms	1,925	2,223	31	Italy 517; France 423; Netherlands 404.
Chromium:				
Ore and concentrate	19,926	28,515	—	Republic of South Africa 15,222; Netherlands 13,178; Germany 52.
Oxides and hydroxides	863	654	(3)	Germany 399; Romania 140; China 36.
Metal including alloys, all forms	571	466	—	Netherlands 152; Germany 127; France 81.
Cobalt:				
Ore and concentrate	99	25	—	Mainly from Republic of South Africa.
Oxides and hydroxides	191	171	(3)	United Kingdom 89; Finland 63; Netherlands 18.
Ash and residue containing cobalt	1,177	NA	NA	NA.
Metal including alloys, all forms	84	201	—	Republic of South Africa 133; United Kingdom 29; France 24.
Columbium and tantalum:				
Ore and concentrate	13	NA	NA	NA.
Metal including alloys, all forms:				
Columbium (niobium)[4]	4	NA	NA	NA.
Tantalum	14	9	1	Mainly from Austria.
Copper:				
Ore and concentrate	4,968	3,150	40	Netherlands 2,410; Canada 422; Australia 195.
Oxides and hydroxides	759	NA	NA	NA.
Sulfate	3,183	NA	NA	NA.
Ash and residue containing copper	53,101	NA	NA	NA.
Metal including alloys:				
Scrap	158,411	201,245	750	Germany 49,557; France 43,467; Netherlands 37,592.
Unwrought	460,951	421,119	2,221	Zaire 131,917; Mexico 47,448; Netherlands 41,227.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Copper—Continued:					
Metal including alloys—Continued:					
Semimanufactures		59,294	62,360	299	Germany 32,710; France 11,033; Italy 5,773.
Gold:					
Waste and sweepings	value, thousands	$2,267	$7,925	$4,435	Netherlands $2,258; France $845; Germany $344.
Metal including alloys, unwrought and partly wrought	kilograms	26,948	45,695	58	Hungary 10,108; Israel 5,765; Hong Kong 2,917.
Hafnium: Metal including alloys, all forms	value, thousands	$20	NA	NA	NA.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite	thousand tons	20,278	18,950	—	Brazil 8,450; France 2,862; Sweden 2,296.
Pyrite, roasted		70,935	3,197	—	Sweden 1,771; Netherlands 1,129; Republic of South Africa 273.
Metal:					
Scrap	thousand tons	1,885	2,003	2	Germany 1,057; France 517; Netherlands 390.
Pig iron, cast iron, related materials		121,801	110,317	69	France 27,101; U.S.S.R. 17,708; Canada 16,668.
Ferroalloys:					
Ferrochromium		95,093	92,456	—	Republic of South Africa 25,789; Netherlands 13,448; Sweden 12,361.
Ferrocolumbium		530	NA	NA	NA.
Ferromanganese		47,496	64,373	—	France 22,372; United Kingdom 11,627; Norway 10,533.
Ferromolybdenum		2,882	NA	NA	NA.
Ferronickel		20,934	23,236	—	Greece 5,914; Indonesia 4,092; Colombia 3,757.
Ferrophosphorus		518	NA	NA	NA.
Ferrosilicochromium		2,806	4,153	—	Norway 2,507; Germany 1,203; Czechoslovakia 258.
Ferrosilicomanganese		44,363	46,312	—	Norway 22,440; France 7,092; Netherlands 7,020.
Ferrosilicon		36,955	36,944	5	Germany 12,809; Norway 6,754; Netherlands 4,091.
Ferrotitanium and ferrosilicotitanium		402	NA	NA	NA.
Ferrotungsten and ferrosilicotungsten		32	NA	NA	NA.
Ferrovanadium		487	NA	NA	NA.
Silicon metal		2,020	2,723	—	Norway 1,189; Netherlands 898; Germany 240.
Unspecified		5,322	8,713	34	France 3,355; Netherlands 1,925; Germany 1,167.
Steel, primary forms	thousand tons	909	1,146	5	France 821; Netherlands 174; Germany 109.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated	do.	1,335	1,304	(3)	Germany 378; Netherlands 364; France 309.
Clad, plated, coated	do.	366	429	1	France 114; Netherlands 97; Germany 87.
Of alloy steel	do.	408	362	1	Netherlands 6,744; Germany 311; France 23.
Bars, rods, angles, shapes, sections	do.	1,193	1,240	2	Germany 358; France 291; United Kingdom 223.
Rails and accessories	do.	8	11	(3)	France 5; Germany 2; Netherlands 2.
Wire	do.	94	89	(3)	Germany 33; Netherlands 24; France 8.
Tubes, pipes, fittings	do.	377	408	3	Netherlands 142; Germany 101; France 62.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Lead:				
Ore and concentrate	101,231	82,066	16,021	Peru 29,509; Greece 16,600; Australia 9,006.
Oxides	5,592	4,262	—	France 3,540; Germany 557; United Kingdom 155.
Ash and residue containing lead	61,473	NA	NA	NA.
Metal including alloys:				
Scrap	12,098	18,703	25	Netherlands 12,431; Germany 3,745; Ireland 470.
Unwrought	32,179	24,200	—	France 13,884; Germany 5,598; Netherlands 2,912.
Semimanufactures	6,627	6,351	2	United Kingdom 3,032; Germany 1,681; Netherlands 1,306.
Lithium: Oxides and hydroxides	143	NA	NA	NA.
Magnesium: Metal including alloys:				
Scrap	212	185	—	Germany 74; United Kingdom 68; Denmark 21.
Unwrought	2,346	2,420	25	Netherlands 965; Yugoslavia 347; Norway 297.
Semimanufactures	357	295	89	France 80; United Kingdom 40; Italy 37.
Manganese:				
Ore and concentrate, metallurgical-grade	164,337	138,156	5	Gabon 63,080; Brazil 45,378; Netherlands 12,869.
Oxides	3,108	1,460	157	Republic of South Africa 860; France 182; Netherlands 90.
Metal including alloys, all forms	3,166	2,782	114	Netherlands 1,657; France 371; Germany 263.
Mercury	74	88	—	France 24; Italy 24; Spain 24.
Molybdenum:				
Ore and concentrate:				
Roasted	19,454	11,223	927	Netherlands 5,083; Chile 2,648; China 623.
Unroasted	13,252	15,642	5,407	Canada 5,619; China 1,129; Iran 1,091.
Oxides and hydroxides	160	NA	NA	NA.
Ash and residue containing molybdenum	72	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	65	129	3	United Kingdom 58; Austria 26; Germany 11.
Semimanufactures	141	191	1	Netherlands 110; Austria 72; Germany 3.
Nickel:				
Ore and concentrate	1,459	439	438	Republic of South Africa 1.
Matte and speiss	7,826	5,310	369	Netherlands 3,064; Australia 936; Canada 909.
Oxides and hydroxides	166	NA	NA	NA.
Ash and residue containing nickel	478	NA	NA	NA.
Metal including alloys:				
Scrap	572	909	4	Netherlands 349; Germany 173; U.S.S.R. 170.
Unwrought	8,356	9,790	151	Netherlands 2,237; U.S.S.R. 1,970; Republic of South Africa 1,072.
Semimanufactures	774	757	40	Germany 320; United Kingdom 131; Netherlands 124.
Platinum-group metals:				
Waste and sweepings value, thousands	$31,419	$20,943	—	Netherlands $6,069; France $5,957; Germany $4,207.
Metals including alloys, unwrought and partly wrought:				
Palladium kilograms	1,752	NA	NA	NA.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals—Continued:					
Metals including alloys, unwrought and partly wrought—Continued:					
Platinum	value, thousands	$33,477	$21,588	$142	United Kingdom $20,851; Netherlands $328; unspecified $150.
Rhodium	kilograms	50	NA	NA	NA.
Iridium, osmium, ruthenium	do.	15	NA	NA	NA.
Unspecified	value, thousands	—	$44,138	$278	United Kingdom $30,597; Italy $5,632; Germany $3,162.
Rare-earth metals including alloys, all forms		147	NA	NA	NA.
Selenium, elemental		30	NA	NA	NA.
Silicon, high-purity		7	NA	NA	NA.
Silver:					
Ore and concentrate[6]	value, thousands	$1,614	$3,500	—	All from Republic of Korea.
Waste and sweepings[6]	do.	$15,360	$62,493	$34,633	Netherlands $13,604; Germany $9,809; United Kingdom $2,391.
Metal including alloys, unwrought and partly wrought	do.	$100,915	$90,586	$17,812	Netherlands $68,571; Germany $1,950; France $748.
Tellurium, elemental		23	NA	NA	NA.
Tin:					
Ore and concentrate		755	170	—	Hong Kong 60; China 50; Spain 25.
Oxides		19	NA	NA	NA.
Ash and residue containing tin		891q	NA	NA	NA.
Metal including alloys:					
Scrap		652	1,248	—	United Kingdom 554; Netherlands 396; unspecified 81.
Unwrought		2,331	2,558	45	Malaysia 640; Germany 382; Netherlands 377.
Semimanufactures		434	527	19	Germany 296; United Kingdom 102; France 51.
Titanium:					
Ore and concentrate		105,765	87,233	—	Republic of South Africa 49,822; Canada 35,479; Netherlands 1,921.
Oxides		8,237	6,643	789	Germany 3,145; France 1,326; United Kingdom 534.
Metal including alloys:					
Unwrought including waste and scrap		491	436	39	Netherlands 135; Germany 132; U.S.S.R. 117.
Semimanufactures		297	255	30	Germany 43; France 41; Italy 41.
Tungsten:					
Ore and concentrate		134	(3)	—	All from Germany.
Oxides and hydroxides		25	NA	NA	NA.
Metal including alloys:					
Unwrought including waste and scrap		65	68	1	United Kingdom 28; France 20; Austria 15.
Semimanufactures		126	394	298	Netherlands 87; Germany 4; Japan 2.
Uranium and thorium:					
Oxides and other compounds	value, thousands	$1,606	$1,543	—	Germany $1,187; France $356.
Metals including alloys, all forms, uranium	do.	$27	$174	—	Germany $158; Netherlands $16.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Vanadium:				
Ore and concentrate	45	[7]51	([3])	Rwanda 30; France 20.
Oxides and hydroxides	5,657	NA	NA	NA.
Metal including alloys, all forms	8	NA	NA	NA.
Zinc:				
Ore and concentrate	626,045	692,011	36,437	Mexico 126,797; Peru 86,901; Ireland 59,442.
Oxides	9,305	9,060	108	Netherlands 3,773; France 2,377; Germany 1,974.
Blue powder	1,062	NA	NA	NA.
Ash and residue containing zinc	81,262	NA	NA	NA.
Metal including alloys:				
Scrap	20,354	17,870	—	Netherlands 7,242; France 5,814; Germany 3,210.
Unwrought	35,156	46,465	176	France 15,856; Netherlands 12,822; Germany 9,648.
Semimanufactures	23,373	[8]24,650	1,558	France 18,223; Germany 3,094; Netherlands 622.
Zirconium:				
Ore and concentrate	1,756	1,142	16	Netherlands 969; France 151; Germany 5.
Oxides	62	NA	NA	NA.
Ash and residue containing zirconium	22	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	69	62	15	France 38; Netherlands 5; Germany 4.
Semimanufactures	120	150	6	France 124; Germany 18; United Kingdom 2.
Other:				
Ore and concentrate:				
Of base metals	151	1,888	298	Bolivia 812; Czechoslovakia 534; Germany 103.
Of precious metals value, thousands	$1,264	$221	—	Netherlands $162; Republic of South Africa $37; Germany $17.
Oxides and hydroxides	159	5,510	1,197	China 1,184; Republic of South Africa 906; Italy 548.
Ashes and residues	18,799	215,936	25,245	Germany 39,626; France 37,763; Netherlands 27,966.
Base metals including alloys, all forms value, thousands		$1,032	$99	Germany $568; United Kingdom $189; Netherlands $89.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	12,807	9,582	18	Turkey 4,218; Germany 3,180; Netherlands 1,915.
Artificial:				
Corundum	7,691	9,865	9	Brazil 3,232; France 2,005; Germany 1,524.
Silicon carbide	9,473	NA	NA	NA.
Dust and powder of precious and semi-precious stones including diamond value, thousands	$67,108	$39,088	$10,681	Ireland $24,984; Romania $1,068; Switzerland $493.
Grinding and polishing wheels and stones	4,766	4,516	156	Germany 1,233; Italy 670; Netherlands 594.
Asbestos, crude	26,514	24,601	18	Canada 14,709; Republic of South Africa 4,806; Hungary 2,301.
Barite and witherite	9,667	10,080	—	Germany 6,020; Netherlands 2,396; France 1,449.
Boron materials:				
Crude natural borates	15,481	15,988	—	Turkey 9,652; Netherlands 5,101; France 1,118.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Boron materials—Continued:					
Elemental		20	NA	NA	NA.
Oxides and acids		3,660	3,781	108	France 1,517; Italy 1,044; Netherlands 468.
Bromine		1,802	1,559	(2)	United Kingdom 1,017; Israel 474; Chile 22.
Cement		633,960	560,341	28	Netherlands 386,830; Germany 108,951; Greece 52,096.
Chalk		185,207	204,039	181	France 152,404; Netherlands 34,317; Germany 14,170.
Clays, crude:					
Bentonite		31,876	24,040	39	Germany 10,556; Netherlands 10,431; United Kingdom 2,449.
Chamotte and dinas earth		24,390	NA	NA	NA.
Fire clay		11,563	NA	NA	NA.
Fuller's earth		1,132	NA	NA	NA.
Kaolin		462,223	405,980	6,411	United Kingdom 164,918; Netherlands 138,107; Germany 51,576.
Unspecified		335,711	335,914	3,739	Germany 214,000; Netherlands 89,769; France 22,817.
Cryolite and chiolite		27	134	—	Italy 49; Denmark 40; France 23.
Diamond, natural:					
Gem, not set or strung	value, thousands	$7,836,105	$7,452,031	$495,911	United Kingdom $2,539,620; Israel $621,963; India $520,688.
Industrial stones	do.	$67,124	$69,030	$25,284	Ireland $16,172; Germany $4,996; Switzerland $4,460.
Dust and powder	kilograms	5,495	NA	NA	NA.
Diatomite and other infusorial earth		16,011	19,685	3,772	Denmark 8,302; Spain 2,719; Germany 2,207.
Feldspar, fluorspar, related materials:					
Feldspar		19,035	9 46,511	—	Norway 22,812; France 12,980; Netherlands 6,370.
Fluorspar		20,442	12,725	57	France 5,661; Mexico 4,627; Germany 1,456.
Unspecified		33,727	NA	NA	NA.
Fertilizer materials:					
Crude, n.e.s.		175,141	218,461	—	Netherlands 204,727; France 6,109; Germany 4,623.
Manufactured:					
Ammonia		25,654	7,764	12	Netherlands 6,499; France 915; Germany 327.
Nitrogenous	thousand tons	965	746	1	Netherlands 364; Germany 102; Poland 80.
Phosphatic	do.	143	87	(2)	Morocco 32; Netherlands 21; Sweden 7.
Potassic	do.	1,390	1,427	16	Germany 826; U.S.S.R. 267; France 122.
Unspecified and mixed	do.	665	458	51	Netherlands 90; Morocco 79; U.S.S.R. 75.
Graphite, natural		700	879	9	Germany 224; Netherlands 164; Switzerland 150.
Gypsum and plaster		702,650	729,372	223	France 433,457; Germany 259,158; Netherlands 35,454.
Iodine		32	NA	NA	NA.
Kyanite and related materials:					
Mullite		5,944	NA	NA	NA.
Unspecified		3,768	NA	NA	NA.
Lime		157,375	165,371	32	France 103,966; Germany 54,989; Netherlands 6,268.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Magnesium compounds:					
Magnesite, crude		1,738	959	—	Austria 326; Germany 245; Netherlands 241.
Oxides and hydroxides		27,834	27,114	258	Netherlands 6,461; Greece 6,040; China 4,314.
Other		47,802	NA	NA	NA.
Mica:					
Crude including splittings and waste		1,589	1,872	230	United Kingdom 670; France 522; Germany 171.
Worked including agglomerated splittings		58	87	(3)	Switzerland 45; Republic of Korea 12; Austria 8.
Nitrates, crude		53,466	49,549	—	Chile 47,493; Germany 991; Netherlands 572.
Phosphates, crude	thousand tons	2,212	2,162	369	Morocco 1,165; Republic of South Africa 500; Netherlands 42.
Phosphorus, elemental		328	[10]486	20	France 142; Netherlands 139; Germany 76.
Pigments, mineral:					
Natural, crude		626	NA	NA	NA.
Iron oxides and hydroxides, processed		28,429	52,067	1,091	Germany 48,948; United Kingdom 711; France 343.
Potassium salts, crude		32,899	29,455	—	Germany 27,064; France 2,369; Netherlands 22.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$40,354	$39,351	$4,298	Germany $6,463; Switzerland $4,365; Thailand $4,343.
Synthetic	do.	$13,001	$3,230	$305	Thailand $673; Ireland $616; Switzerland $503.
Pyrite, unroasted		85,356	78,625	—	Finland 43,779; Norway 34,656; Netherlands 77.
Quartz crystal, piezoelectric	value, thousands	$33	$16	—	Poland $10; Germany $3; Japan $3.
Salt and brine		960,257	998,997	213	Netherlands 464,788; Germany 458,900; France 66,121.
Sodium compounds, n.e.s.:					
Soda ash		76,635	157,132	3,957	Germany 65,118; Netherlands 55,237; France 26,985.
Sulfate, natural and manufactured		23,043	22,560	6	France 5,866; Spain 5,089; Netherlands 4,266.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked	thousand tons	276	270	(3)	France 119; Germany 34; Republic of South Africa 28.
Worked	do.	193	204	(3)	France 39; Italy 36; Portugal 33.
Dolomite, chiefly refractory-grade	do.	118	146	—	France 71; Germany 60; Netherlands 11.
Gravel and crushed rock	do.	4,780	5,365	(3)	Germany 1,242; France 1,214; United Kingdom 977.
Limestone other than dimension	do.	124	201	—	United Kingdom 139; France 42; Spain 18.
Quartz and quartzite	do.	122	106	(3)	Germany 83; Netherlands 6; Norway 6.
Sand other than metal-bearing	do.	15,680	14,478	3	Netherlands 11,424; Germany 1,996; France 552.
Sulfur:					
Elemental:					
Crude including native and byproduct		447,778	436,148	160,756	Netherlands 118,379; Germany 109,555; Poland 25,831.
Colloidal, precipitated, sublimed		390	638	38	Germany 545; France 55.
Dioxide		2,023	2,672	—	Germany 973; France 926; Zimbabwe 658.
Sulfuric acid		872,360	733,047	44	Germany 320,361; France 168,677; Netherlands 97,003.

See footnotes at end of table.

TABLE 4—Continued

BELGIUM-LUXEMBOURG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Talc, steatite, soapstone, pyrophyllite		91,721	82,132	46,100	Netherlands 8,493; France 8,033; Australia 5,094.
Vermiculite[11]		57,089	57,148	—	Turkey 34,855; Netherlands 9,121; Germany 6,564.
Other:					
Crude	thousand tons	2,211	1,996	12	France 1,356; Spain 315; Netherlands 128.
Slag and dross, not metal-bearing	do.	809	805	—	Netherlands 397; France 319; Germany 167.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		138,935	110,621	604	France 93,065; Germany 16,325; Trinidad and Tobago 277.
Carbon black		48,659	46,371	2,502	Netherlands 16,955; Germany 16,844; France 6,871.
Coal:					
Anthracite	thousand tons	911	1,181	52	Germany 449; Netherlands 167; U.S.S.R. 153.
Bituminous	do.	14,182	13,598	5,384	Republic of South Africa 4,260; Australia 1,535; Germany 527.
Briquets of anthracite and bituminous coal	do.	28	35	—	Germany 18; France 14; Netherlands 3.
Lignite including briquets	do.	319	314	—	Mainly from Germany.
Coke and semicoke	do.	2,158	1,940	37	Germany 1,086; Netherlands 441; Poland 310.
Gas, natural:					
Gaseous	value, thousands	$729,580	$805,673	—	Netherlands $521,792; Germany $276,762; France $7,118.
Liquefied	million cubic meters	4,568	4,433	(3)	Mainly from Algeria.
Peat including briquets and litter	do.	336	331	—	Netherlands 260; Germany 27; Finland 14.
Petroleum:					
Crude	thousand 42-gallon barrels	174,271	212,876	—	Iran 58,008; Norway 53,516; Saudi Arabia 33,211.
Refinery products:					
Liquefied petroleum gas	do.	r5,743	8,433	133	Netherlands 3,946; United Kingdom 819; France 769.
Gasoline	do.	23,544	24,697	17	Netherlands 12,589; Spain 2,181; United Kingdom 2,157.
Mineral jelly and wax	do.	194	219	4	Germany 114; France 41; Netherlands 31.
Kerosene and jet fuel	do.	3,478	3,163	12	Netherlands 3,116; Germany 13; France 10.
Distillate fuel oil	do.	38,724	41,533	422	Netherlands 32,956; U.S.S.R. 4,442; Canada 1,078.
Lubricants	do.	4,079	3,919	86	France 1,182; Netherlands 999; United Kingdom 575.
Residual fuel oil	do.	47,363	39,656	53	Netherlands 19,987; U.S.S.R. 9,880; Germany 2,526.
Bitumen and other residues	do.	878	805	(3)	Netherlands 324; Germany 255; France 166.
Bituminous mixtures	do.	198	144	5	Netherlands 97; France 32; Germany 7.
Petroleum coke	do.	1,890	2,515	2,077	Netherlands 376; Germany 146; United Kingdom 58.

rRevised. NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]May include rare-earth metals.

[3]Less than 1/2 unit.

[4]May include rhenium.

[5]May include high-purity silicon.

[6]May include other precious metals.

[7]May include niobium and tantalum.

[8]Includes blue powder.

[9]May include leucite, nepheline, and nepheline syenite.

[10]May include selenium and tellurium.

[11]Includes perlite and chlorite.

TABLE 5

BELGIUM: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cadmium, metal	Vieille-Montagne NV	Balen-Wezel	1,550.
Do.	NV Metallurgie Hoboken-Overpelt SA (NV MHO SA)	Overpelt	600.
Cement	Major companies:		8,400.
Do.	Cimenteries CBR SA (Societe Generale de Belgique, or SGB).	Plants at Lixhe, Mons/Obourg, Harmignies, Marchienne, Ghent, et al.	3,200.
Do.	Ciments d'Obourg SA	Plants at Obourg and Thieu	[1]2,800.
Do.	Compagnie des Ciment Belge (Ciments Francais)	Plant at Gaurain-Ramecroix	2,400.
Coal	NV Kempense Steenkolenmijnen (Mining ceased in 1992)	Open pits in northern Limbourg Province	
Copper	Metallurgie Hoboken-Overpelt SA (Union Minière SA-58.37%)	Smelter at Antwerp-Hoboken	50.
Do.	do.	Refinery at Olen	330.
Do.	Metallo-Chimique NV	Smelter at Beerse	80.
Dolomite	Carsambre SA Dolomeuse	Quarry at Floreffe	300.
Do.	do.	Quarry at Marche les Dames	600.
Do.	do.	Plant at Namur	37.
Do.	SA de Marche les Dames	Quarries at Vezin and Sclaigneaux Andenne	300.
Do.	do.	Plant at Vezin	35.
Do.	SA des Dolomies de Marche les Dames	Quarry at Nameche	300.
Do.	do.	Plant at Nameche, of which—	
Do.	do.	Soft-burned	500.
Do.	do.	Dead-burned	200.
Do.	SA Dolomies de Villers-le-Gambon	Quarry at Villers-le-Gambon	300.
Lead, metal	Metallurgie Hoboken-Overpelt SA (Union Miniere SA)	Smelter at Antwerp-Hoboken	90.
Do.	do.	Refinery at Antwerp-Hoboken	125.
Petroleum, refined thousand 42-gallon barrels	Refineries:		602,000 of which:
Do. do.	Fina Raffinaderji Antwerpen	Refinery at Antwerp	(268,000).
Do. do.	SA Esso NV	do.	(239,000).
Do. do.	Belgian Refining Corp.	do.	(80,000).
Do. do.	Nynas Petroleum NV	do.	(125,000).
Steel	Companies:		14,000 of which:
Do.	Cockerill Sambre SA (Government, 98%)	Plants at Liège and Charleroi	(5,000).
Do.	Sidmar NV (Belgian government 28.11%; ARBED in Luxembourg, 66.97%)	Plant at Ghent	(3,960).
Do.	Usines Gustave Boël NV	Plant at La Louviere	(2,020).
Do.	Forges de Clabecq SA	Plant at Clabecq	(1,500).
Do.	SA Fabrique de Fer de Charleroi	Plant at Charleroi	(600).
Do.	ALZ NV	Plant at Genk-Zuid	(360).
Do.	New Tubemeuse (NTW) SA	Plant at Flemalle	(300).
Zinc, metal	Vieille-Montagne SA (Union Miniere SA)	Smelter at Balen-Wezel	385.

[1]Includes the capacity of the company SA Ciments de Haccourt.

TABLE 6

BELGIUM: EXPORTS AND REEXPORTS OF DIAMOND FOR 1990-92

Destinations	1990		1991		1992	
	Quantity (carats)	Value (thousands)	Quantity (carats)	Value (thousands)	Quantity (carats)	Value (thousands)
Sorted, unworked or simply sawn, cleaved, or bruted:						
Hong Kong	404,169	$42,667	826,699	$68,129	629,001	$44,217
India	38,783,380	1,230,233	55,944,848	1,192,14	53,749,387	1,117,313
Israel	5,105,338	1,193,232	4,650,085	1,229,877	5,900,172	1,516,278
Malaysia	276,793	51,821	306,856	52,818	377,084	61,178
Republic of South Africa	112,455	46,707	67,529	39,319	65,925	33,504
Sri Lanka	297,885	46,032	381,230	55,805	539,147	76,899
Switzerland	251,683	24,969	72,529	10,962	404,372	10,944
Thailand	658,241	121,688	827,822	145,072	898,454	143,205
Tunisia	80,377	14,546	39,565	6,477	30,998	4,949
United Kingdom	13,776,254	955,606	9,948,627	789,986	6,119,348	585,850
United States	652,776	252,933	699,559	222,512	508,033	230,431
Unspecified	817,721	108,712	1,975,812	114,099	809,961	83,781
Total	61,217,072	4,089,146	75,741,161	3,927,201	70,031,882	3,908,549
Worked but not mounted or set:						
Germany	348,519	227,470	351,113	229,612	312,968	202,109
Hong Kong	364,277	352,872	440,643	358,295	649,215	499,156
Israel	247,738	184,449	351,656	246,045	305,570	217,631
Italy	147,856	88,544	155,681	87,021	151,852	75,783
Japan	602,688	739,748	627,450	652,467	450,296	502,218
Switzerland	293,179	302,892	284,755	275,131	282,612	251,494
Thailand	161,341	148,511	195,390	161,173	116,186	70,335
United Kingdom	184,403	140,401	162,918	140,493	138,778	104,358
United States	1,357,421	1,009,860	1,386,304	1,106,494	1,414,597	990,572
Unspecified	630,312	395,203	690,667	419,725	716,532	426,728
Total	4,337,734	3,589,950	4,646,577	3,676,456	4,538,606	3,340,384

Source: Diamond International, Mar.-Apr. 1992, No. 16; Nov.-Dec. 1992, No. 20; and July-Aug. 1993, No. 24, London, United Kingdom.

TABLE 7

BELGIUM: IMPORTS OF DIAMOND FOR 1990-92

Sources	1990		1991		1992	
	Quantity (carats)	Value (thousands)	Quantity (carats)	Value (thousands)	Quantity (carats)	Value (thousands)
Natural rough, unsorted, and sorted, unworked or simply sawn, cleaved, or bruted:						
Angola	857,367	$140,420	257,800	$39,094	636,812	$146,825
Australia	6,243,185	48,202	7,996,982	50,524	8,474,381	60,208
Brazil	1,663,248	34,063	641,552	27,602	NA	NA
Commonwealth of Independent States[1]	NA	NA	75,955	19,669	59,880	6,132
Congo	2,719,750	104,494	3,275,824	158,588	NA	NA
Côte d'Ivoire	794,553	85,867	946,578	88,801	868,163	88,322
Israel	1,285,303	233,309	1,238,483	212,020	1,285,198	218,260
Liberia	5,283,348	356,033	658,565	134,615	1,909,299	293,704
Sierra Leone	NA	NA	534,173	118,039	831,366	179,446
Switzerland	5,334,349	179,202	959,633	106,280	796,144	45,720
United Kingdom	25,025,188	2,543,036	32,905,846	2,423,576	24,899,237	1,947,833
United States	955,038	120,031	2,365,808	116,565	1,133,411	81,343
Zaire	5,711,332	204,179	[2]17,766,223	[2]548,141	[2]18,907,387	[2]589,438
Unspecified	7,116,905	804,162	1,217,415	424,700	5,376,045	617,886
Total	62,989,566	4,852,998	70,840,837	4,468,214	65,177,323	4,275,117
Worked but not mounted or set:						
Commonwealth of Independent States[1]	319,675	$336,993	363,463	$374,458	347,981	$376,082
Germany	121,735	90,259	127,828	84,999	144,809	88,732
Hong Kong	270,581	143,167	309,799	144,769	304,550	155,800
India	1,413,228	550,138	1,464,058	516,187	1,296,681	425,226
Israel	479,173	445,851	461,323	406,195	428,031	383,840
Republic of South Africa	170,066	154,922	188,405	164,496	128,845	141,251
Sri Lanka	157,276	79,019	162,935	73,700	199,477	83,269
Switzerland	116,131	160,412	114,911	157,580	89,610	122,299
Thailand	215,875	127,742	236,606	129,942	264,194	124,560
United Kingdom	114,827	138,538	85,520	100,703	89,838	84,817
United States	378,173	330,526	478,706	377,037	429,423	356,088
Unspecified	508,870	420,279	589,078	420,724	530,838	342,769
Total	4,265,610	2,977,846	4,582,632	2,950,790	4,254,277	2,684,733

NA Not available.
[1]Since Apr. 1992; formerly U.S.S.R.
[2]Includes Congo.
Source: Diamond International, Mar.-Apr. 1992, No. 16; Nov.-Dec. 1992, No. 20; and July-Aug. 1993, No. 24, London, United Kingdom.

TABLE 8

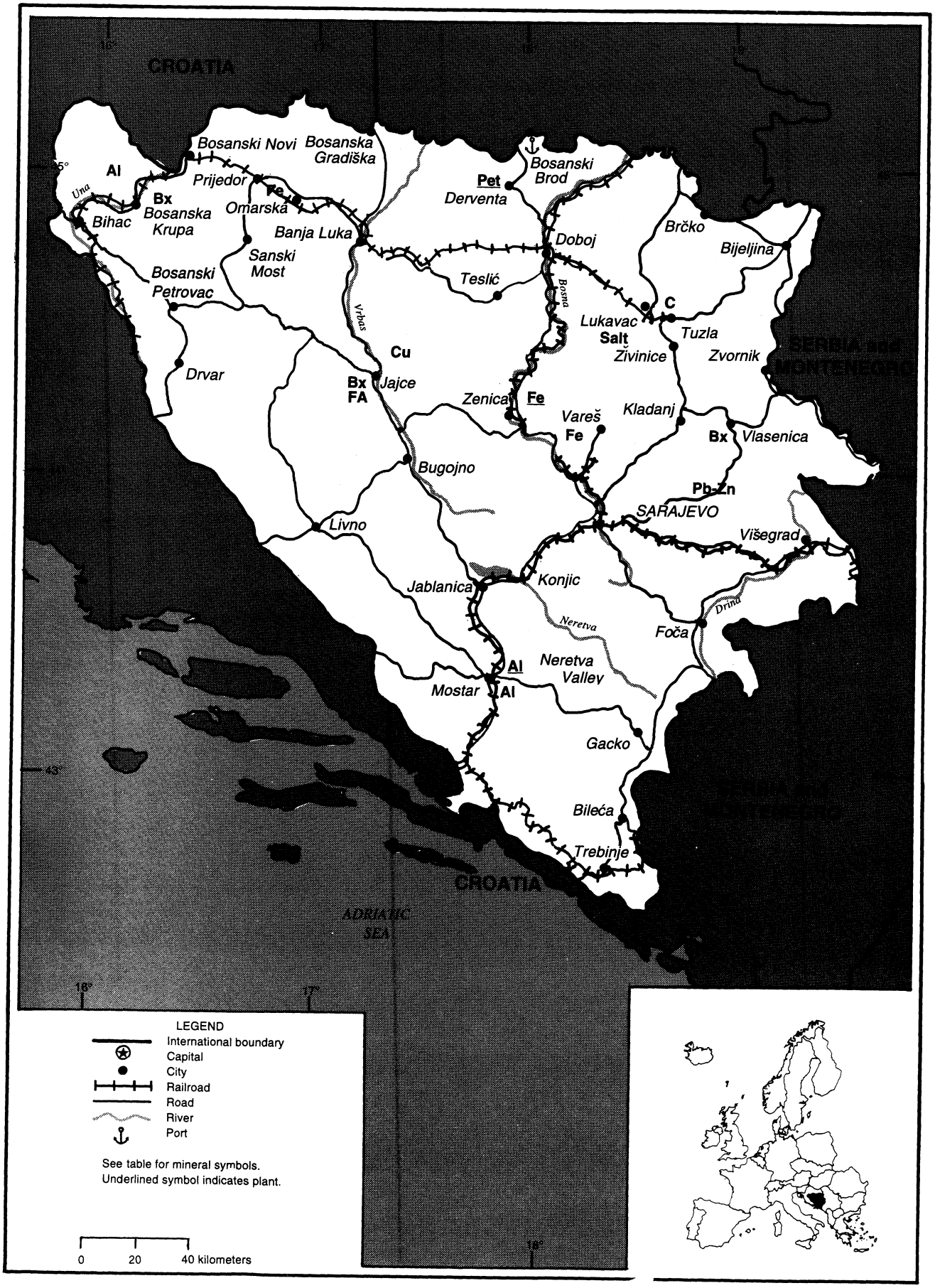
LUXEMBOURG: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	SA des Ciments Luxembourgeois (ARBED, 50%; SGB, 25%)	Plant at Esch-sur-Alzette	450
Do.	Intermoselle SARL (ARBED, 33%)	Plant at Rumelange	1,000
Steel	Acieries Reunies de Burbach-Eich-Dudelange (ARBED) (SGB, 25%, Belgium Government, 31%, and others)	Plants at Differdange, Dudelange, Esch-Schifflange, and Esch-Belval	5,320

BOSNIA and HERCEGOVINA

AREA 51,233 km² **POPULATION 4.4 million**



LEGEND

- International boundary
- Capital
- City
- Railroad
- Road
- River
- Port

See table for mineral symbols.
Underlined symbol indicates plant.

0 20 40 kilometers

THE MINERAL INDUSTRY OF

BOSNIA AND HERCEGOVINA

By Walter G. Steblez

In 1992, the Federal Republic of Yugoslavia, as an internationally recognized entity, ceased to exist. The civil war that began in the second half of 1991, involving the Federal Government (supported by the Republics of Serbia and Montenegro) and the Republics of Croatia and Slovenia, spread to the Republic of Bosnia and Hercegovina in 1992. Although the fighting between the Federal Government of Yugoslavia and the Republics of Slovenia and Croatia, respectively, ceased and subsided by mid-1991 and early 1992, heavy and almost continuous military actions were conducted throughout the year in Bosnia and Hercegovina between ethnic factions of Bosnians, Croatians, and Serbians over the control of large areas of Bosnia and Hercegovina that included several of the major industrial cities within the former Yugoslavia. Before the outbreak of the civil war, Bosnia and Hercegovina was a major producer of minerals and heavy industrial products in the former Yugoslavia. In 1992, the operational status of many of these industries, however, was uncertain largely because of the continuous fighting that reportedly occurred in close proximity to these facilities.

GOVERNMENT POLICIES AND PROGRAMS

The Government of Bosnia and Hercegovina was placed under extreme hardship by warfare that affected practically every district in the country. Presumably, when and where possible, the Government provided assistance to industries, including those in the minerals sector, that could help maintain employment and assist in the country's defense.

PRODUCTION

The production table for Bosnia and Hercegovina was compiled from data presented in a variety of statistical publications of the former Yugoslavia through 1991. The major portion of the country's production statistics, however, was obtained from "Industrijska Proizvodnja," an annual statistical compendium published in Belgrade through 1990 that presented production data by constituent Federal republics, as well as by total output for the former Yugoslavia. *(See table 1.)*

TRADE

Detailed official information concerning foreign trade for 1992 largely was unavailable. However, aggregated data available for trade returns for 1990 for the value of the country's exports and imports showed Bosnia and Hercegovina's exports, valued in U.S. dollars, reportedly amounted to about 14.3% of Yugoslavia's total exports during that year. Similarly, Bosnia and Hercegovina's total imports in 1990 amounted to about 10% of total imports by the former Yugoslavia. The value of the country's exports of crude materials (including minerals) and mineral fuels amounted to more than 29% of the total exports for 1990 by the former Yugoslavia. Bosnia and Hercegovina's total imports in these categories amounted to about 16% of the former Yugoslav total.

STRUCTURE OF THE MINERAL INDUSTRY

Table 2 lists the apparent administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Before the dissolution of the Federal Republic of Yugoslavia and the subsequent civil war, Bosnia and Hercegovina was a major center of metallurgical industries in the former Yugoslavia. The country's total output of steel, in recent years, ranged between 38% and 39% of total steel production for Yugoslavia during the same periods. Rudarsko Metalurški Kombinat's plant at Zenica, with a combined producing capacity in excess of 2 Mmt/a, in 1990, accounted for 53% of the former Yugoslavia's output of steel produced in oxygen converters and 62% produced by open-hearth method.

Bosnia and Hercegovina also was a major producer of bauxite, alumina, and aluminum in the former Yugoslavia, respectively accounting for about 58%, 68%, and 26% of total output of these commodities in the former Yugoslavia in 1990. Production of bauxite, alumina, and aluminum was administered by Energoinvest at mines in Vlasenica, Jajce, and Bosansksa Krupa, among others. Alumina refineries were operated at Birac-Zvornik and Mostar; the aluminum smelter also was at Mostar, the center of the aluminum fabricating and aircraft industries in the former Yugoslavia. Other production of nonferrous metals included only a relatively small amount of lead and zinc ore mined and milled at Srebrenica, the focal point of major battles during the year.

Industrial Minerals

Bosnia and Hercegovina was a major producer of asbestos, barite, gypsum, and salt, accounting respectively for about

81%, 92%, 63%, and 100% of the total output of these commodities in the former Yugoslavia in 1990. The country also produced clays, cement, dolomite, sand and gravel, dimension stone, as well as other industrial minerals that met most of its industrial needs.

Mineral Fuels

Bosnia and Hercegovina's SOUR Totovi Rudnici Uglja Tuzla, the country's dominant coal producer, mined brown coal and lignite that were consumed primarily by the country's thermal electric power stations. Bosnia and Hercegovina's refineries, operated by Energoinvest at Bosanski Brod, were entirely dependent on deliveries of natural gas and petroleum from outside the country. Reportedly, the Basanski Brod refineries were extensively damaged in April during local fighting.

Reserves

The eventual transformation of Bosnia and Hercegovina's economy to a market-base system would require a reevaluation of the country's mineral resources from a market perspective. Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other non-market-economy countries, such as Yugoslavia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether or not the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade.

In category A, the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained; and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of mineral cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes.

INFRASTRUCTURE

Bosnia and Hercegovina's inland system of ways and communications consisted of railroads and highways and waterways. Although data in respect to the total lengths of the railroad and inland waterway systems had not yet been officially reported, the highway and road system reportedly consisted of 21,168 km of paved, gravel, and earth-surfaced road, of which 11,436 km was paved, 8,146 km was gravel, and 1,586 km was earth surfaced. The country was entirely landlocked and did not possess a merchant marine fleet. Pipelines for the carriage of petroleum were 174 km in length; however, data for those carrying natural gas were not available.

OUTLOOK

Most of Bosnia and Hercegovina's heavy industrial facilities, including those in the minerals sector, reportedly had been heavily damaged during the year. Although the extent of the damage was not clear, general information released from the areas of conflict showed significant destruction of the country's infrastructure and massive dislocations of regional populations. The process of reconstruction that should follow the resolution of the country's conflicts should be extensive and would call for maximum use of the country's domestic sources of metals, industrial minerals, and fuels.

OTHER SOURCES OF INFORMATION

Agency

"Energoinvest," SP
Sarajevo 71000 Tvornicka 3, vidi str. 74.
Bosnia and Hercegovina

Publication

Privredni Adresar SFRJ, 27/1991 (Trade Directory of Yugoslavia) Belgrade, 1991.

TABLE 1

BOSNIA AND HERCEGOVINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	1988	1989	1990	1991	1992e
METALS					
Aluminum:					
Bauxite	1,814,671	1,908,000	1,703,000	e900,000	200,000
Alumina	686,680	804,000	735,000	e500,000	100,000
Metal, ingot; primary and secondary	77,132	82,000	89,000	e84,000	30,000
Iron and steel:					
Ore and concentrate:					
Ore, gross weight	5,360,570	4,668,000	4,088,000	e2,500,000	500,000
Ore, Fe content	1,820,196	1,603,000	1,578,000	e800,000	150,000
Agglomerate	2,492,110	2,376,000	1,894,000	e1,000,000	200,000
Metal:					
Ferroalloys:					
Ferrosilicon	32,333	40,000	34,000	e17,000	5,000
Silicon	21,486	14,000	12,000	e7,000	2,000
Pig iron	1,799	1,639,000	1,284,000	e1,000,000	150,000
Crude steel:					
From oxygen converters	1,067,334	1,006,000	907,000	e600,000	100,000
From Siemens-martin furnaces	789,877	715,000	490,000	e150,000	30,000
From electric furnaces	34,098	31,000	251,000	e18,000	5,000
Total	1,891,309	1,752,000	1,648,000	e768,000	135,000
Semimanufactures[e]	[3]1,453,000	[3]1,376,000	1,100,000	800,000	200,000
Lead:					
Mineral concentrator output:					
Ore, gross weight (Pb Zn ore)	391,803	487,000	608,000	e300,000	50,000
Pb content of ores	7,284	8,692	11,068	e5,000	800
Pb concentrate	9,932	11,475	14,999	e7,000	2,000
Metal, smelter, primary and secondary	2,041	1,012	260	e400	250
Manganese ore:					
Gross weight	41,100	38,920	50,863	e40,000	10,000
Mn content	14,036	13,622	17,803	e14,000	3,500
Zinc:					
Zinc content of Pb-Zn ore	11,492	12,303	15,232	e10,000	2,000
Concentrate output, gross weight	18,913	19,584	25,035	e13,000	3,000
INDUSTRIAL MINERALS					
Asbestos, all kinds	5,557	5,603	3,966	e4,400	500
Barite concentrate	20,652	22,772	23,601	e17,000	3,000
Cement thousand tons	793	793	797	e750	150
Clays:					
Bentonite	8,928	10,000	—	e6,000	1,000
Ceramic clay, crude	179,770	228,000	140,000	e100,000	20,000
Kaolin:					
Crude	27,080	93,000	31,000	e19,000	3,000
Calcined[e]	[3]14,633	17,000	12,000	10,000	1,500
Gypsum:					
Crude	318,665	310,000	370,000	e230,000	50,000
Calcined	40,711	31,000	47,000	e21,000	4,000
Lime thousand tons	516	512	520	e350	50

See footnotes at end of table.

TABLE 1—Continued

BOSNIA AND HERCEGOVINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued					
Magnesite, crude	6,700	12,000	16,000	e10,000	2,000
Nitrogen: N content of ammonia	28,344	29,000	25,000	e20,000	5,000
Quartz, quartzite, glass sand:					
Quartz and quartzite	19,375	—	—	e—	—
Glass sand	446,000	570,000	324,000	e400,000	50,000
Total	465,375	570,000	324,000	e400,000	50,000
Salt, all sources	320,000	318,000	303,000	e300,000	70,000
Sand and gravel, excluding glass sand thousand cubic meters	3,406	3,600	2,500	e2,500	500
Sodium compounds:					
Soda ash	213,891	204,050	173,000	e140,000	25,000
Caustic soda[e]	[3]325,000	[3]99,000	95,000	70,000	20,000
Sodium bicarbonate[e]	[3]18,016	15,000	15,000	10,000	2,000
Stone, excluding quartz and quartzite:[e]					
Dimension: Crude:					
Ornamental square meters	[3]318,000	[3]294,000	3,000,000	250,000	50,000
Other cubic meters	[3]15,000	[3]16,000	16,000	15,000	5,000
Crushed and brown, n.e.s. thousand cubic meters	[3]3,098	[3]3,217	3,000	3,000	500
Sulfur: Byproduct of metallurgy[e]	9	9	9	8	2
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Brown coal thousand tons	9,560	9,615	9,626	e9,500	2,500
Lignite do.	8,228	8,359	8,531	e8,000	2,000
Coke	2,468	2,506	1,750	e850	150
Refinery products[e] thousand 42-gallon barrels	15,000	20,000	23,000	18,000	2,000

[e]Estimated.

[1]Table includes data available through Aug. 1993.

[2]In addition to commodities listed, common clay was also produced, but available information is inadequate to make reliable estimates of output levels.

[3]Reported figure.

TABLE 2

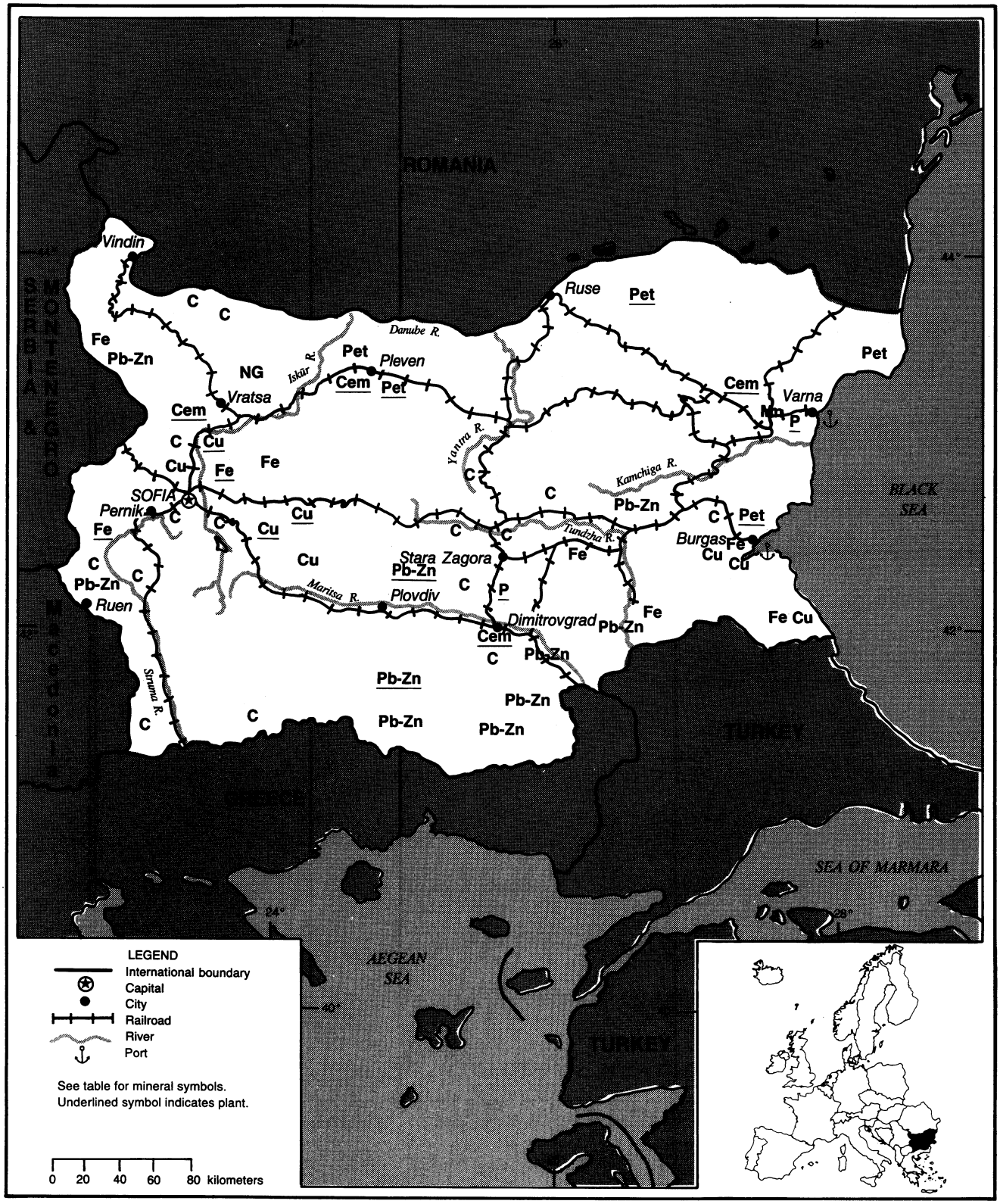
BOSNIA AND HERCEGOVINA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Energoinvest	Plants at Birac-Zvornik, BiH	600
Do.	do.	Plant at Mostar, BiH	280
Aluminum	do.	Smelter at Mostar, BiH	92
Bauxite	do.	Mines in BiH at Vlasenica, Jajce, Bosanska Krupa, Posusje, Listica, Citluk, and other locations	2,000
Coal:			
Brown	SOUR Titovi Rudnici Uglja, Tuzla, BiH	Mines in BiH	12,000
Lignite	do.	do.	7,000
Cement	Gik Hidrogradnja, Tvornica Cementa BiH	Plant at Kakanj	650
Ferroalloys	Elektrobosna, Elektrohemijska i Eletrotermijska Industrija	Plant at Jajce	80
Iron ore	Rudarsko Metalurški Kombinat Zenica	Mines at Vareš, Ljubija, and Radovan, BiH	5,000
Lead-zinc ore	Energoinvest	Mine and mill at Srebrenica, BiH	300
Manganese, ore	Mangan-Energoinvest	Mine and concentrator at Buzim, BiH	100
Petroleum:			
Refined thousand barrels per day	Energoinvest: Rafinerija Nafte Bosanski Brod	Refinery at Bosanski Brod, BiH	100
Pig iron	Rudarsko Metalurški Kombinat Zenica (RMK Zenica)	4 blast furnaces at Zenica, BiH	2,250
Do.	do.	2 blast furnaces at Vareš, BiH	100
Do.	do.	Electric reduction furnaces at Iljaš, BiH	100
Salt	Hemijski Kombinat "Sodaso," Rudnik Soli i Solni Bunari	Rock salt: Mines at Tušanj, BiH	120,000
Do. cubic meters per year	do.	Production from brine at Tuzla, BiH	2,000,000
Steel, crude	Rudarsko Metalurški Kombinat Zenica	Plant at Zenica, BiH	2,060

BULGARIA

AREA 112,000 km² **POPULATION 8.9 million**



THE MINERAL INDUSTRY OF

BULGARIA

By Walter G. Steblez

Bulgaria continued to be remained a modest producer of nonferrous metal ores and concentrates that met most domestic needs, as well as relatively small quantities of iron and manganese ores. Bulgaria also mined and quarried a variety of industrial minerals that included asbestos, barite, fluorspar, gypsum, and limestone, largely for domestic consumption. The country, however, remained a net importer of iron ore, steel, and mineral fuels.

In 1992, the transition by Bulgaria's economy to a market-based system continued and was accompanied by a declining trend in industrial production, including the production of most mineral commodities. This was largely owing to the abolition of central economic planning, the dissolution of a guaranteed CMEA-based barter trade network, and, in a number of cases, scaled-down mineral production because of environmental considerations. The issue of national income and industrial production accounts that could accurately reflect the economic status of Bulgaria and that of several other former centrally planned economy fellow-CMEA countries for 1992 was moot mainly because many "transitional" economy countries had not changed or sufficiently modified their accounting systems to reflect the actual economic transformations that have occurred. In 1992, Bulgaria's economy, on balance, reportedly, appeared to have improved as reflected in an increasing availability of consumer goods, although, in many cases, at high market prices.

The chief event in the country's minerals industry involved strikes by miners during the year protesting the impending closure of several of the country's major mining and mineral processing facilities.

GOVERNMENT POLICIES AND PROGRAMS

In 1992, Bulgaria's Government continued to vigorously implement social and market economic reforms that began in 1989. The country's severe industry generated environmental pollution and pressure from the large domestic environmental protection movement to address the problem also were among the principal issues that the Government continued to face during the year.

The interdependence between the future of the minerals industry of Bulgaria and the abatement of industrial point sources of pollution was clearly indicated during the year. The country's extensive miners' strikes and protests during the year were largely the result of closures and Government announcements of impending closures of a number of mining and mineral processing facilities, partly owing to severe pollution problems associated with these facilities.

As in other former member countries of CMEA, the development of heavy industries in Bulgaria, including those for steel production and the mining and processing of metals, fossil fuels, and industrial minerals, was carried out largely without reference to market economy considerations from 1946 to 1989. The Government's industrial policy during this period was to promote the development of heavy industries in conjunction with a policy of self-sufficiency in mineral raw materials at all costs.

Reliance on the world market was to have been abolished or reduced to a minimum. Intra-CMEA barter-based trade was the principal structure for ensuring adequate mineral raw material supplies to the former CMEA-member states. During the 1970's and 1980's, the CMEA also encouraged its members to create similar barter trade arrangements with developing countries. Bulgaria and other CMEA-member countries would assist in the development of mineral deposits in developing countries in exchange for a percentage of the mineral product over an agreed upon period of time. However, Government programs such as rapid industrialization, central economic planning, and associated policies resulted in the loss of flexibility in Bulgaria's industry, including the minerals sector, needed to maintain competitiveness with market economy countries.

In common with other former CMEA-member countries, Bulgaria's industry, compared with those of market economy countries, became relatively inefficient and polluting. Although, in many cases, the Government's environmental policies were codified into law, these laws were rarely, if ever, enforced. Industrial pollution in Bulgaria has been severe, largely from point sources associated with nonferrous metals mining, processing, and smelting operations; steelmaking; low-grade, coal burning electric powerplants; as well as the country's cement and chemical industries. As in other former centrally planned economy countries of Europe, severe air pollution has been caused by the use of high-sulfur, low-grade coal and lignite to power the country's thermal electric power stations.

Reportedly, concentrations of SO_2 in Bulgaria were the highest in the former CMEA block, with the exception of Poland. In all areas affected by coal-burning point sources of atmospheric pollution, concentrations of SO_2, NO_x, and particulates, reportedly, were above the health safety level. In 1989, Bulgaria

reported the emission of 1.7 Mmt of SO_2, 0.3 Mmt of NO_x, and more than 2 Mmt of other pollutants.

Reportedly, only 1 out of the 13 major rivers in the country was found to be relatively clean. The rest of Bulgaria's rivers were contaminated to varying degrees along numerous stretches by heavy industry's discharges, discharges from open pit mines, and agricultural runoff. Reportedly, heavy metals leached from industrial dumps and mine tailings dumps had seriously compounded an already severe water quality problem in the country caused by Bulgaria's relatively poor sewage treatment system. Very high concentrations of lead and arsenic have been found in surface waters near Mikhaylovgrad and Vrasta in northwestern Bulgaria and in central Bulgaria near the mining region of Srednogorie. Radioactive wastes also reportedly were discharged into the Danube River from the Kozloduy nuclear electric powerplant.

Waste and mine tailings dumps, additionally, were a major source of soil and ground water contamination. The extent of mine waste and tailings dumps in Bulgaria was reportedly estimated to have exceeded an area of 84,948 ha. Significant uncontained concentrations of heavy metals at many of these facilities were found to be leaching into ground water. It was estimated that about 2.5 Mmt of hazardous waste has been generated annually in Bulgaria.

In 1992, however, it was reported that the total level of pollution generated during the year was 30% to 40% less than that in 1991. This was attributed primarily to the decline in the level of the country's industrial output during this period. Secondary factors that led to the decline of pollution in 1992 were closures of several major polluting industrial facilities, substantial nationwide investment in new waste treatment technology, and much stricter enforcement of environmental laws and regulations by the Government.

The country's environmental movement was a key element in the general reform process that began in 1989. In response to the public's environmental concerns, the Government of Bulgaria added its commitment to actively clean up and protect the environment through the adoption of articles 15 and 55 of the Constitution of July 1991 and the enactment of the Environmental Protection Law, No. 86/18.10.1991. Because of the anticipated high cost of cleaning up areas contaminated by mining and minerals processing activities, the large debts accumulated at the country's nonferrous metal mining and processing facilities, and the low, uneconomic grades of ore at most of these deposits, the Government of Bulgaria began to plan closure of most of the country's mining industry. In March, in response to this program, Bulgaria's mining unions went on strike to avert the closure of the country's metal and coal mining and processing industries and to ensure the continuation of wage payments to miners and associated employees at these facilities.

During negotiations with the country's mining unions, spokespersons for Bulgaria's Ministry of the Environment and Industry indicated that not all of the 56 mines under review by the Government would be closed; mines that would be closed would require up to 3 years of work by mineworkers for restoration of the land at the former mining properties. But the same Government officials, reportedly, also indicated that in subsequent year unemployment in the country's former mining and mineral processing regions could become extensive without adequate retraining and job placement of redundant mine employees.

In July, the Government and the miners' unions reached an agreement that reportedly would halt the miners' strike for at least a 6-month period in exchange for the full publication by the Government of the list of major mining and minerals processing enterprises scheduled for closure. It was disclosed that a majority of the country's nonferrous metals mining and processing enterprises would be closed by 1994. The major properties scheduled for closure included the Asarel-Medet, Burgas, and Eliseina copper mining and beneficiation complexes and 20 mines belonging to the Gorubso, Madzarovo, Ossogovo, and Ustrem lead and zinc mining and beneficiation complexes. The coordination of closures of mining and mineral processing enterprises would be handled by the Commission for Geology and Mineral Resources, the Ministry of Finance, and the Ministry of the Environment and Industry. This group also would implement the modernization, restructuring, and privatization of the country's remaining mining and mineral processing facilities.

PRODUCTION

The largely negative trend in the country's output of mineral commodities from 1989 to 1992 was primarily the result of the structural reformation of Bulgaria's economy from a centrally planned to a market-based system. To survive, industrial enterprises had to adjust production to real market requirements. Without guaranteed domestic and CMEA outlets for mineral and other industrial products, output could no longer be sustained at pre-1989 production levels. Indicative of this situation was the liquidation of large-scale, state-financed capital construction projects that forced steel and other metal producers to seek outside export markets or to significantly cut back on capacity utilization. *(See table 1.)*

TRADE

Until 1989, the largest share of Bulgaria's foreign trade was conducted within the CMEA barter-based trading system. Within CMEA, the former U.S.S.R. was Bulgaria's principal source of mineral raw materials, especially mineral fuels, ferroalloys, steel, and metal ores and concentrates. Following the dissolution of CMEA, Bulgaria's traditional state-owned industries experienced shortages of many of these materials, especially mineral fuels, owing to numerous interrupted deliveries of natural gas and petroleum from the former U.S.S.R. Consequently, among the most important commercial

transactions during the year was the firming up of commercial links with Russia, especially in regard to regular deliveries of natural gas and petroleum to Bulgaria.

STRUCTURE OF THE MINERAL INDUSTRY

Table 2 lists the administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Copper.—Among the country's copper mining and processing enterprises scheduled for closure, apparently the Elatzite copper mining and beneficiation complex, at Srednogorie in the Sofia district, would remain the only major domestic producer of copper ore and concentrate. Also, according to industry officials, Energocabel, a now independent corporate enterprise and one of the country's major producers of copper semimanufactures, would earmark about 80% of its output for foreign markets. Energocabel was one of the more profitable operations in the copper industry using modern continuous casting technology.

Iron and Steel.—In July, officials at the Stomana steelworks near Pernik announced the closure of all seven of the enterprise's open-hearth furnaces. Only the enterprise's electric furnaces, which only use scrap, would continue to operate. The shortage of iron ore and concentrate for the country's steel industry remained a major issue during the year. The Kremikovtsi steelworks, the country's only fully integrated iron- and steel-producing complex, was built in 1965 on the basis of Bulgaria's domestic iron ore resources. However, the country's resources of iron ore proved to be uneconomic even by the conventions of the country's central economic planning system. The iron deposit only graded 29% Fe. Feedstock for the steel plant ultimately had to be imported from the former U.S.S.R. With the dissolution of CMEA, routine barted-based access to Soviet iron ore concentrates, billets, and slabs was no longer guaranteed, because most foreign commercial transactions between former CMEA-member countries had to be handled on a hard currency basis. Bulgaria's steel producers had to look for not only new sources of raw material supplies for their steelworks, but also new markets. This was especially the case for the Kremikovtsi steelworks when, reportedly in 1992, Japan's demand for billets and hot-rolled coils declined. In recent years, Bulgaria was able to export a substantial share of its steel output to Japan as well as to the Republic of Korea and Taiwan.

Lead and Zinc.—In early 1992, Bulgaria reported that the Dimitur Blagoev lead smelter at Plovdiv would be closed for at least several months while environmental damage in the area caused by the plant would be corrected. To modernize the country's lead and zinc sector, officials for the industry indicated that a new and environmentally less polluting 50,000-mt/a zinc smelter would be built at the Georgi Dimitrov lead and zinc smelting and refining complex. Construction of the new facility was to have started in 1993, reportedly, in partnership with undisclosed U.S. investors.

Industrial Minerals

Bulgaria produced a variety of industrial minerals that included bentonite, dolomite, fluorite, gypsum, kaolin, marble, and perlite, largely for domestic consumption. Industrial minerals will obtain a greater prominence in the country's economy owing to the eventual needs of the construction materials and chemical sectors to meet the country's requirements for a modern infrastructure.

Mineral Fuels

Coupled with financial and safety problems that arose at the Kozloduy nuclear powerplant, in October, the Government announced plans to close the first 5 of the country's 42 uranium mines that have been scheduled for decommissioning by 1994.

Reserves

In view of Bulgaria's effort to transform its economy to a market-based system, the country's mineral resources will be subject to reevaluation from a market economy perspective. Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other non-market-economy countries, such as Czechoslovakia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade.

The first system determined whether or not the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data have been gathered relative to the size of the deposit and its mineral grade.

In category A, the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory, workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of projected exploitations have been ascertained. The quality and technological properties of the ore are

ascertained in detail, ensuring the projected reliability of beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of beneficiation system. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of mineral cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes. Taking this system into account, Czechoslovakia's mineral resources in categories $A+B+C_1$ are given in table 3. *(See table 3.)*

INFRASTRUCTURE

Bulgaria's inland system of ways and communications consisted of 43,161 km of railroads, highways, and waterways. The railroad system consisted of 4,049 km of 1.435-m standard-gauge track and 245 km of narrow-gauge track. About 908 km of the total was double track, and 2,342 km was electrified. The highway system consisted of 33,397 km of hard-surface roads, including 228 km of superhighways, and 4,045 km of earth roads. There were also 470 km of inland waterways, with ports at Ruse, Vidin, and Lom on the Danube River. The country's merchant fleet consisted of 108 ships totaling 1,240,204 gross register tons or 1,872,723 dwt. These included 32 cargo, 2 container, 5 roll-on/roll-off ships; 16 petroleum, oils, and lubricant tankers; 2 railcar carriers; and 48 bulkers. The country's major ports were at Burgas, Varna, and Varna West. Bulgaria's pipeline system consisted of 192 km of crude petroleum pipe, 418 km of refined products pipe, and 1,400 km of pipe for natural gas.

OUTLOOK

Given years of official neglect of severe industrial pollution and associated health-related problems, the new democratically elected Government of Bulgaria determined not to continue the industrial policies of the former Communist Government. To survive, the country's minerals industry had to meet two major criteria: (1) social demands for strict observance of industrial environmental standards, and (2) market demands that require industrial enterprises to strictly meet the specific needs of consumers of their output. In 1992, it became clear that Bulgaria's mineral industry, in meeting the aforementioned criteria, would become smaller in scale, more efficient, and less polluting.

OTHER SOURCES OF INFORMATION

Agencies

The Geological Institute of the Bulgarian Academy of Science
Sofia, Bulgaria
Lead and Zinc Co.
Plovdiv, Bulgaria
Polimet
Sofia, Bulgaria

Publications

Mino Delo (Mining Issues), monthly.
Statisticheski Godishnik (Statistical Yearbook), annual.

TABLE 1

BULGARIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992 e
METALS						
Aluminum metal, secondary		7,273	7,402	4,554	e4,000	4,000
Bismuth metal		51	48	e45	e40	40
Cadmium metal, smelter		r270	r235	309	r232	200
Copper:						
Ore:						
Gross weight	thousand tons	e12,500	12,634	8,712	r e15,500	12,000
Cu content	do.	r50	r39	r33	r47	36
Concentrate:						
Gross weight	do.	290	296	200	r e360	270
Cu content	do.	37	39	26	r46	35
Metal, primary and secondary:						
Smelter		r57,400	r59,200	r30,300	r27,800	25,000
Refined		r50,000	55,800	24,333	r12,600	13,000
Gold metal e	kilograms	2,500	2,500	2,400	2,000	2,000
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	1,826	1,613	1,079	e1,000	1,000
Fe content	do.	528	482	321	e300	300
Iron concentrates	do.	629	r589	r447	r e450	450
Metal:						
Pig iron for steelmaking	do.	1,437	1,484	1,143	r1,000	1,000
Ferroalloys, electric furnace, all types e 3	do.	47	45	15	15	15
Steel, crude	do.	2,875	2,899	2,185	r1,615	1,550
Semimanufactures, rolled	do.	3,320	r3,029	r2,156	r e1,500	1,500
Lead:						
Mine output, Pb content		e69,000	65,300	66,570	e50,000	45,000
Concentrate: e						
Gross weight		86,000	e81,400	81,000	62,300	60,000
Pb content		60,000	e57,000	57,000	43,600	39,000
Metal, refined, primary and secondary		r101,027	r101,477	r66,570	r56,600	55,000
Manganese ore:						
Gross weight		34,500	32,400	r39,000	r e40,000	40,000
Mn content		9,900	10,800	r11,000	r e11,000	11,000
Molybdenum, mine output, Mo content e		200	190	150	120	120
Silver, mine output, Ag content e		r71	r59	r54	r37	35
Tin metal		83	64	64	e60	60
Uranium, oxide, U content e		r800	r700	r700	r700	600
Zinc:						
Mine output, Zn content		r44,100	r39,700	r34,700	r29,100	29,000
Concentrate: e						
Gross weight		79,000	79,200	79,000	70,000	70,000
Zn content		41,000	e41,000	35,000	31,000	31,000
Metal, smelter, primary and secondary		r82,000	86,800	75,457	r46,100	45,000
INDUSTRIAL MINERALS						
Asbestos		300	300	500	r e400	400

See footnotes at end of table.

TABLE 1—CONTINUED

BULGARIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued						
Cement, hydraulic	thousand tons	5,535	r5,036	r4,710	e4,500	4,500
Clays: Kaolin	do.	220	r203	186	e180	180
Gypsum and anhydrite:						
Crude	do.	401	r538	494	e450	450
Calcined		113	r114	102	e100	100
Lime: Industrial	thousand tons	r1,515	r1,538	r1,557	re1,500	1,500
Nitrogen: N content of ammonia	do.	1,342	r1,326	1,309	e1,300	1,300
Pyrites, gross weight[e]	do.	185	180	180	170	170
Salt, all types	do.	103	r93	r93	re90	90
Sodium carbonate, calcined	do.	1,100	r1,153	1,046	e1,000	1,000
Sulfur:[e]						
S content of pyrites		70,000	70,000	70,000	60,000	60,000
Byproduct, all sources		60,000	60,000	60,000	50,000	50,000
Total		130,000	130,000	130,000	110,000	110,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, marketable:						
Anthracite	thousand tons	65	r63	43	e40	40
Bituminous	do.	131	r130	r100	e100	100
Brown	do.	4,762	r4,596	3,705	e3,000	3,000
Lignite	do.	29,189	r29,509	27,827	e25,000	25,000
Total	do.	34,147	r34,298	r31,675	e28,140	28,140
Coke	do.	1,457	r1,561	1,376	re1,300	1,300
Gas, natural, marketed	million cubic meters	r102	r93	r136	100	100
Petroleum:						
Crude: As reported	thousand tons	r77	r73	r60	r50	50
Refinery products[e]	thousand 42-gallon barrels	100,000	110,000	65,000	20,000	20,000

[e]Estimated. [r]Revised.

[1]Table includes data available through May 1993.

[2]In addition to the commodities listed, barite, chromite, fluorspar, magnesite, palladium, platinum, tellurium, uranium, and a variety of crude construction materials (common clays, sand and gravel, dimension stone, and crushed stone) are produced, but available information is inadequate to make reliable estimates of output levels.

[3]1988-89 production includes ferromanganese; since 1990 only ferrosilicon is produced.

[4]Reported figure.

TABLE 2

BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	Reka Devnia	Devnia	1,825.
Do.	Zlatna Panega	Panega	1,300.
Do.	Others	Temelkovo, Dimitrovgrad, Pleven, and Beli Izvor	1,590.
Coal:			
Bituminous	Economic Mining and Power Combine (SMEK) Balkanbass	Balkan coal basin in central Bulgaria, northwest of Silven	445.
Brown	G. Dimitrov	Pernik coal basin, southwest of Sofia	4,000.
Do.	Others	Bobov Dol and Pirin in western Bulgaria	3,100.
Lignite	SMEK East Maritsa	East Maritsa coal basin near Zagora	25,000.
Do.	Others	Marbas, Pernik, Bobov Dol, and Pirnik coal basins	5,300.
Copper:			
Concentrate (Cu content)	Medet-Asarel	Panagurishte, Pazardzhik district	25.
Do.	Chelopech	Srednogorie, Sofia district	5.
Do.	Bradtze	Malko Turnovo	2.
Do.	Elatzite	Srednogorie, Sofia district	15.
Do.	Rosen	Burgas, near the Black Sea	1.
Do.	Tsar Asen	Srednogorie, Sofia district	2.
Do.	Zidrovo	Burgas, near the Black Sea	0.5.
Metal, refined	Georgi Damyanov	Srednogorie, Sofia district	120.
Iron ore	Kremikovtsi Iron and Steel Combine	Kremikovtsi	2,000.
Lead-zinc:			
Concentrate (Pb and Zn content)	Gorubso	Erma Reka, Kurdjali, Laki, and Rudozem, all in Madan area near Greek border	59 Pb, 47Zn.
Do.	Madzarovo	Near Plovdiv	3 Pb, 2 Zn.
Do.	Ossogovo	Ossogovo mountains, western Bulgaria	3 Pb, 2 Zn.
Do.	Ustrem	On Thundza River, eastern Bulgaria	3.5 Pb, 0.8 Zn.
Metal:			
Pb refined	Dimitur Blagoev	Plovdiv	65.
Do.	Georgi Dimitrov	Kurdjali	60.
Zn smelter	Dimitur Blagoev	Plovdiv	60.
Do.	Georgi Dimitrov	Kurdjali	30.
Manganese ore	Obrotchishte	Varna district	50.
Natural gas	Ministry of Power Supply	Chiren Field, in the northwest	(1).
Petroleum:			
Crude	do.	do.	(1).
Refined barrels per day	Economic Trust for Petroleum Products	Refineries in Burgas, Pleven, and Ruse	260,000.
Steel, crude	Kremikovtsi Iron and Steelworks	Near Sofia	1,800.
Do.	Lenin Metallurgical Complex	Pernik (Dimitrov)	1,300.

[1]Insignificant capacity.

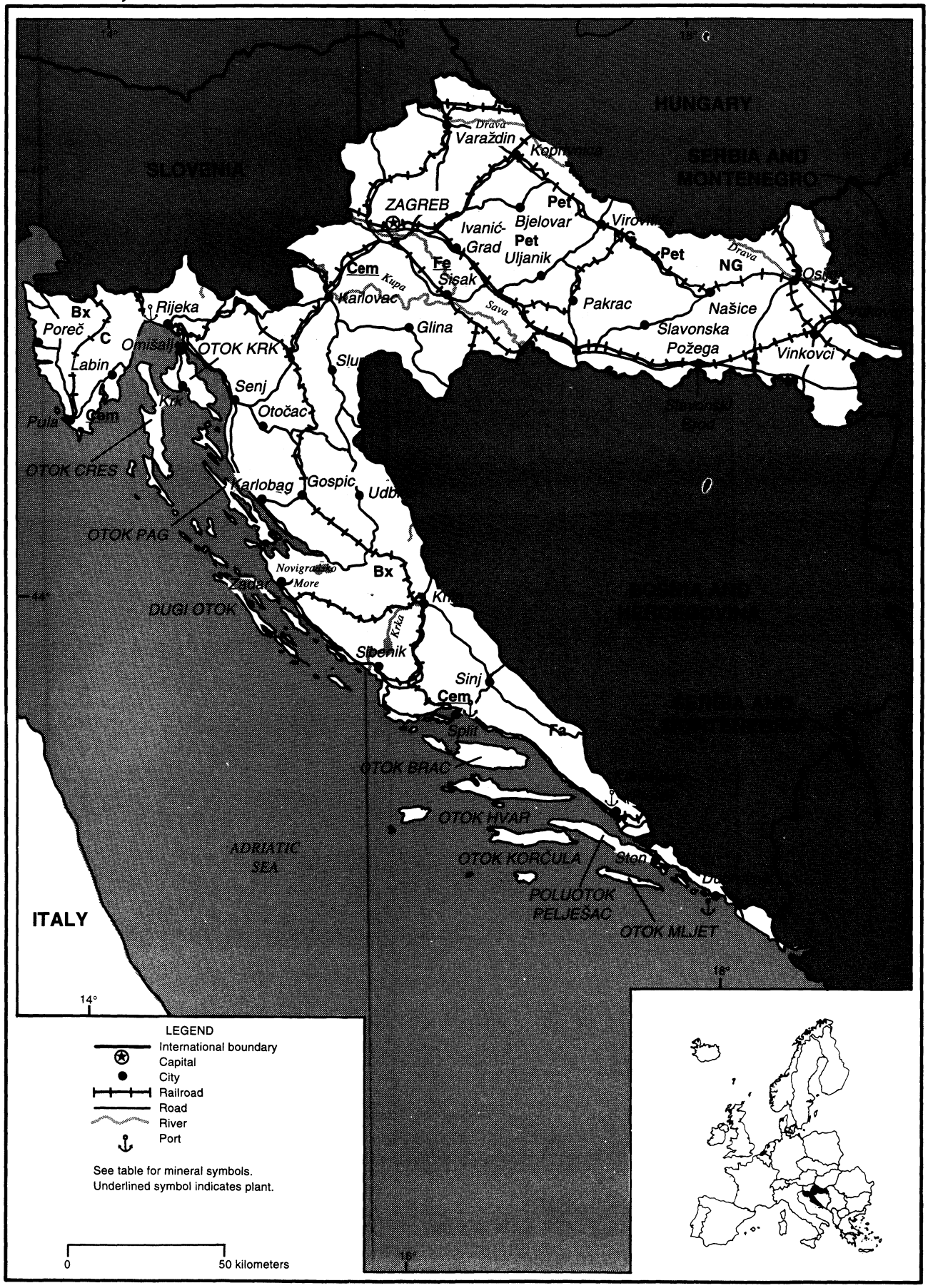
TABLE 3
BULGARIA: APPARENT RESOURCES OF SELECTED MINERAL COMMODITIES FOR 1992

(Thousand metric tons)

Commodity	Resources
Barite	30,000
Bentonite	55,000
Copper, contained in ore	4,600
Gypsum	200,000
Iron, contained in ore	55,000
Lead, contained in ore	1,500
Manganese, contained in ore	31,000
Zinc, contained in ore	1,400

CROATIA

AREA 56,538 km² **POPULATION 4.8 million**



THE MINERAL INDUSTRY OF

CROATIA

By Walter G. Steblez

In 1992, the Federal Republic of Yugoslavia, as an internationally recognized entity, ceased to exist. The civil war that began in the second half of 1991, involving the Federal Government (supported by the Republics of Serbia and Montenegro) and the Republics of Croatia and Slovenia, spread to the Republic of Bosnia and Hercegovina in 1992. Although the fighting between the Federal Government of Yugoslavia and the Republics of Slovenia and Croatia, respectively, ceased and subsided by mid-1991 and early 1992, heavy and almost continuous military actions were conducted throughout the year in Bosnia and Hercegovina between ethnic factions of Bosnians, Croatians, and Serbians over the control of large areas of Bosnia and Hercegovina that included several of the major industrial cities within the former Yugoslavia. While the Republics of Bosnia and Hercegovina, Croatia, Macedonia, and Slovenia seceded from the Yugoslav Federation and, with the exception of Macedonia, were recognized by the international community, Serbia and Montenegro continued to preserve a Federal union, claiming continuity as the Federal Republic of Yugoslavia. However, neither the Government of the United States nor the governments of most of the members of the international community recognized this claim.

Before 1992, Croatia was Yugoslavia's chief producer of natural gas and petroleum and a leading producer of iron and steel and a variety of industrial minerals that included bentonite, cement, and gypsum. However, from mid-1991 to early 1992, Croatia was actively involved in a civil war mainly within the country's own borders. The mainly Serbian population in Croatia's Kraina region declared independence from Croatia when certain demands concerning Serbian autonomy within this region apparently were not met. The Serbian secessionist elements within Kraina were supported initially by the Federal Government of Yugoslavia and the Yugoslav army and subsequently by the Government and army of Serbia and Montenegro, which claimed political continuity from the old Yugoslav Federation. By mid-1992, the UN supervised a cessation of hostilities within Croatia on the basis of status quo. Reportedly, the warring sides agreed to negotiate their political differences. However, the economy of Croatia reportedly was severely damaged by the conflict. The country's minerals industry apparently suffered extensive damage at facilities in the aluminum, petroleum, and steel sectors. Shortages of raw materials that were obtained in the past from other Republics of the former Yugoslavia also negatively impacted the country's mineral production.

GOVERNMENT POLICIES AND PROGRAMS

In view of the civil war that was fought within Croatia for almost 1 year, the country's Government presumably focused most of its attention on maintaining Croatia's integrity and independence. Some activities by the Government apparently were directed at maintaining mineral industry operations when possible to support the country's war effort and to help maintain socially acceptable levels of employment. However, few details were available during the year concerning specific Government policies that addressed both economic reform or long-term plans to rationalize the major enterprises in Croatia's mineral industry.

PRODUCTION

The production table for Croatia was compiled from data presented in a variety of statistical publications of the former Yugoslavia through 1991. The major portion of the country's production statistics, however, was obtained from "Industrijska Proizvodnja," an annual statistical compendium published in Belgrade through 1990 that presented production data by constituent Federal Republics, as well as by total output for the former Yugoslavia. In addition, statistical production data were obtained from "Statisticki Ljetopis 1992" published by the Central Bureau of Statistics in Zagreb, Croatia, for a limited number of commodities through 1991. Although stoppages and dislocations in Croatia's mineral industry were reported from mid-1991 through 1992 by a variety of sources published outside the former Yugoslavia, some production was believed to have occurred at most of the country's mineral industry facilities, although at perhaps significantly reduced levels of output in 1991 and 1992. *(See table 1.)*

TRADE

Detailed official information concerning foreign trade for 1992 largely was unavailable. However, aggregated data available for trade returns for 1990 for the value of the country's exports and imports showed Croatia's exports, valued in U.S. dollars, to have amounted to about 21% of Yugoslavia's exports during that year. Similarly, Croatia's imports in 1990 amounted to about 24% of total imports by the former Yugoslavia. The

value of the country's exports of crude materials (including minerals) and mineral fuels amounted to more than 25% of the total exports for 1990 by the former Yugoslavia. Croatia's imports in these categories also amounted to about 25% of the total.

STRUCTURE OF THE MINERAL INDUSTRY

Table 2 lists the apparent administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Aluminum and Bauxite.—Energoinvest operated bauxite mines in the Republics of Bosnia and Hercegovina and Croatia. Jadranski Aluminijum's (Jadral) operations were entirely in Croatia. The country's monohydrate (boehmitic) bauxite deposits were suitable for metallurgical end use. These deposits were formed into lenticular or irregular-shaped bodies occurring in Triassic and Eocene carbonate rocks.

The war in Croatia in 1991 did not affect the country's aluminum industry except at the end of the year when reportedly the Boris Kidric aluminum smelter at Sibenik in Croatia was damaged and reportedly remained closed through most of 1992. Before the conflict damaged the aluminum smelter at Sibenik, Croatia's primary aluminum smelting capacity was approximately 25% of the total for the former Yugoslavia.

Ferroalloys.—Dalmacija Dugi Rat Carbide and Ferro Alloy Works, a producer of ferrochromium near Split in Croatia, reported disruptions of production during the year because of damage from military conflict in the area. The extent of the production shortfall was not reported for 1992; however, industry spokespersons reported that production could reach 80% of capacity by yearend. Operations also were disrupted by the fighting at the Pef Sibenik ferromanganese plant, although they reportedly resumed later in the year.

Iron and Steel.—Reportedly, Croatia's steel industry facilities were severely damaged in the fighting at the SP MK Zeljezare Sisak in the central part of the country and at the Jadranska Zeljezara at Split on the Dalmatian coast. During the fighting from 1991 to 1992, according to industry officials, steel production at these facilities declined by more than 50% compared with that of 1990.

Industrial Minerals

Croatia produced sufficient quantities of cement, clays, lime, nitrogen, pumice, stone, and other industrial minerals to meet most of the needs of the country's construction and construction materials industries, as well as some of the requirements of the domestic chemical industry. The importance of industrial minerals will grow because of needs of postwar reconstruction and rationalization of Croatia's economy, including its infrastructure.

Mineral Fuels

Croatia's natural gas and petroleum industry apparently did not suffer sustained damage during the fighting from 1991 to 1992, and production of both natural gas and petroleum reportedly continued but at somewhat lower levels of output. In March, Croatia's INA-INTKO, a division of Industrija Nafte, the national natural gas and petroleum company, reported concluding an agreement worth more than $3 million with Libya that called for INA-INTKO to maintain operations at four petroleum and natural gas fields in Libya.

Reserves

The eventual development and transformation of Croatia's economy to a market-based system would require a reevaluation of the country's mineral resources from a market perspective. Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other nonmarket economy countries, such as Yugoslavia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade. In category A the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained, and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and

the hydrogeological environment are known in good detail.

In category C_1 the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of mineral cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively. The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes.

INFRASTRUCTURE

Croatia's inland system of ways and communications consisted of 35,554 km of railroads, highways, and inland waterways. The railroad system consisted of 2,698 km of 1.435-meter gauge track, of which about 930 km was electrified. The highway and road system amounted to a total of 32,071 km of surface, of which paved surface amounted to 23,305 km, 8,439 km was gravel, and 327 km was earth surfaced. The country's merchant marine fleet consisted of 11 ships totaling 65,601 dwt. Pipelines for crude petroleum were 670 km in length, while those for refinery products and natural gas were 310 km and 20 km, respectively.

OUTLOOK

The future profile of Croatia's mineral industries will depend on the final resolution of the political and territorial dispute between the Government of Croatia and the leadership of the predominantly Serbian population in the Kraina region, as well as on the extent to which policies of the Government of Croatia will affect a transition of the country's economy to a market-based economic system.

OTHER SOURCES OF INFORMATION

Agency

Central Bureau of Statistics
Zagreb, Croatia

Publication

Statisticki Ljetopis 1992 (Statistical Yearbook for 1992), Zagreb, Croatia.

TABLE 1

CROATIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Bauxite		285,021	365,514	309,109	112,379	[3]—
Metal, ingot; primary and secondary		74,016	72,719	74,037	54,530	20,000
Iron and steel:						
Concentrate, Fe agglomerate		266,429	340,000	[e]248,000	[e]150,000	75,000
Metal:						
Ferroalloys:						
Ferrochromium		70,456	63,837	37,532	40,000	35,000
Ferromanganese		45,078	33,868	31,822	[e]22,000	10,000
Ferrosilicomanganese		46,804	52,588	60,601	[e]60,000	40,000
Pig iron		208,041	239,999	209,308	69,132	40,000
Crude steel:						
From Siemens-Martin furnaces		281,944	296,601	253,205	94,394	40,000
From electric furnaces		175,651	189,852	170,328	119,759	60,000
Total		457,595	486,453	423,533	214,153	100,000
Semimanufactures[e]		580,000	577,000	450,000	300,000	20,000
Silver	kilograms	2,960	3,400	[e]2,000	[e]1,600	800
INDUSTRIAL MINERALS						
Barite concentrate[e]		[3]2,698	3,400	2,500	2,200	1,500
Cement	thousand tons	3,090	2,891	2,653	1,705	2,000
Clays:						
Bentonite		24,774	36,000	30,000	[e]15,000	10,000
Ceramic clay		19,931	18,000	10,000	[e]15,000	10,000
Fire clay, crude		58,188	63,000	43,000	[e]50,000	30,000
Gypsum:						
Crude		115,431	109,000	99,000	[e]80,000	50,000
Calcined		20,113	17,000	11,000	[e]11,000	7,000
Lime	thousand tons	475	490	436	261	200
Nitrogen: N content of ammonia	do.	492	471	345	348	300
Pumice and related materials, volcanic tuff[e]		[3]723	700	700	650	600
Quartz, quartzite, glass sand		336,113	318,454	234,352	159,410	150,000
Salt, all sources		22,025	17,512	24,030	18,250	15,000
Sand and gravel, excluding glass sand	thousand cubic meters	3,506	3,607	[e]3,000	[e]2,000	2,000
Stone, excluding quartz and quartzite:						
Dimension: Crude:						
Ornamental	cubic meters	1,588,000	1,587,000	1,705,000	1,508,000	1,000,000
Crushed and brown, n.e.s.[e]	thousand cubic meters	6,679	6,896	6,250	4,448	3,000
Other	cubic meters	49,000	48,000	45,000	30,000	25,000
Sulfur, byproduct of petroleum[e]		2,000	2,000	2,000	2,000	2,000
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		34,797	37,505	30,624	18,783	15,000
Coal:						
Bituminous	thousand tons	215	160	155	146	150
Brown	do.	—	27	—	—	—
Lignite	do.	15	10	—	—	—
Coke	do.	740	767	556	442	350

See footnotes at end of table.

TABLE 1—Continued

CROATIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Natural gas, gross production	million cubic meters	2,123	2,177	1,989	1,839	1,700
Petroleum:[e]						
Crude:						
As reported	thousand tons	2,565	2,299	2,079	1,903	1,900
Converted	thousand 42-gallon barrels	19,027	17,061	15,422	14,116	14,094
Refinery products	do.	68,000	65,000	65,000	43,000	40,000

[e]Estimated.
[1]Table includes data available through July 1993.
[2]In addition to commodities listed, common clay and diatomite also were produced, but available information was inadequate to make reliable estimates of output levels.
[3]Reported figure.

TABLE 2

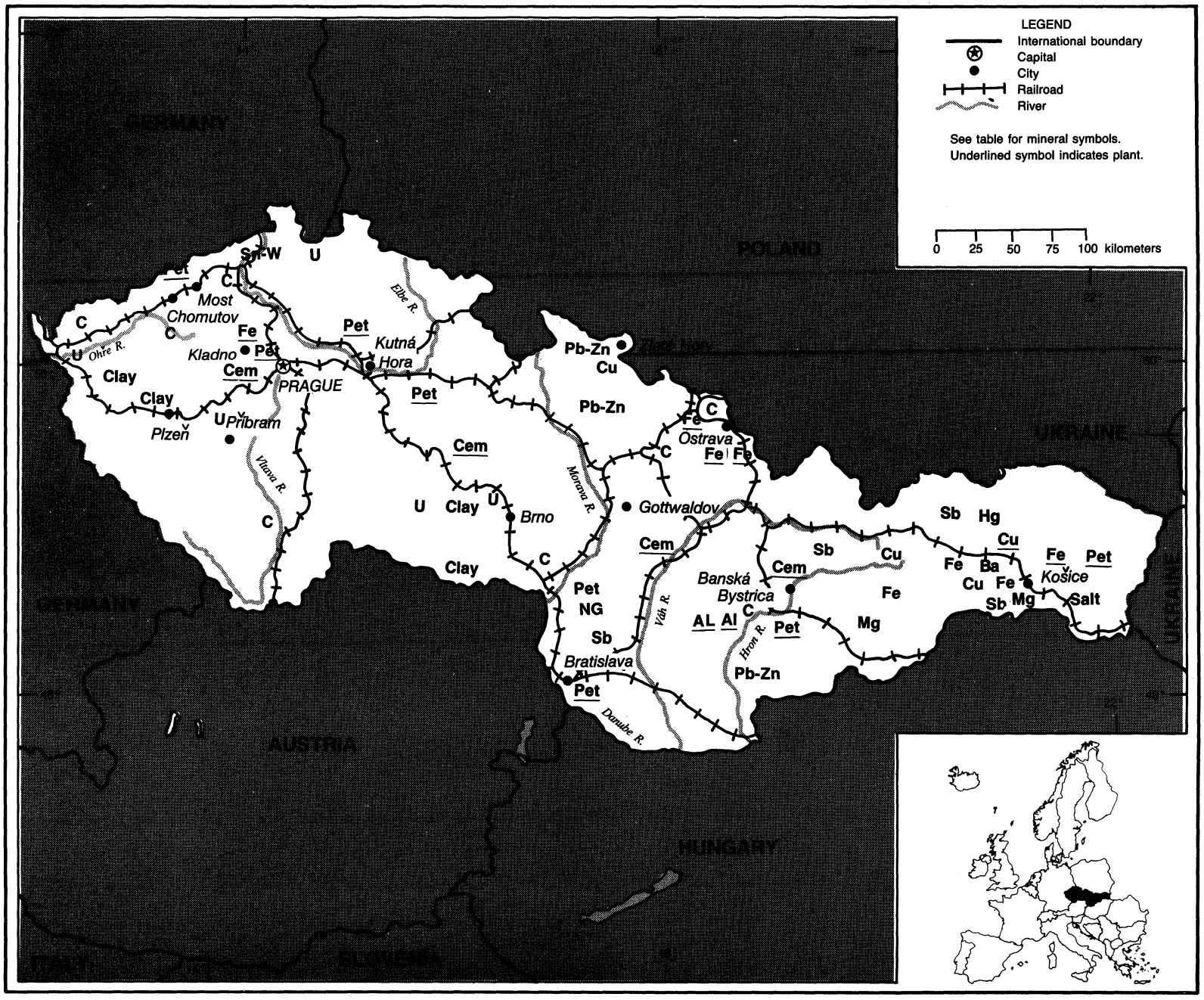
CROATIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Aluminum		Boris Kidric, Tvornica Lakih Metala		75
Bauxite		Jadral, Jadranski Aluminijum	Mines in Croatia at Obrovac, Drniš, and other locations	450
Coal: Bituminous		Istarski Ugljenokopi Raša	Mines at Labin and Potpićan, Croatia	500
Cement		Dalmacija Cement	Partizan plant at Kaštel Sućurac, Croatia	1,525
Do.		do.	Prvoborac plant at Solin, Croatia "10 Kolovoz" plant at Solin Majdan, Croatia	884 440
Do.		do.	Renko Šperac plant at Omiš, Croatia	140
Natural gas	million cubic feet	Industrija Nafte (INA)	Natural gas fields in Croatia: Bogšic Lug, Molve, and others	70,000
Do.	do.	Naftaplin (Naftagas), RO za Istrazivanje, i Proizvodnju Nafte i Gasa	Natural gas fields in Serbia: Kikinda and others	30,000
Petroleum:				
Crude	thousand barrels per day	Industrija Nafte (INA)	Oilfields in Croatia and Slovenia: Benicanci, Zutica, Struzec, Ivanic Grad, Lendava, and others	70
Refined				
Do.	do.	Industrija Nafte (INA): Rafinerija Nafte Rijeka	Refineries at Urinj and Rijeka, Croatia	160
Do.	do.	Rafinerija Nafte Sisak	Refinery at Sisak, Croatia	150
Pig iron		Metalurški Kimbinat "Zeljezara Sisak"	2 blast furnaces at Sisak, Croatia	235
Salt	cubic meters	Solana "Pag," Solana "Ante Festin"	Marine Salt: Pag Island, Croatia	13
Steel, crude		SP MK Zeljezare Sisak	Plant at Sisak, Croatia	401
Do.		Jadranska Zelejezara Split	Plant at Split, Croatia	120

CZECHOSLOVAKIA

AREA 128,000 km² **POPULATION 15.7 million**



THE MINERAL INDUSTRY OF

CZECHOSLOVAKIA

By Walter G. Steblez

In 1992, events in Czechoslovakia were dominated by nationwide discussions and plebiscite on the dissolution of the country into its constituent components: the Czech Republic and Slovakia. By yearend, the certainty of Czechoslovakia's dissolution into two states became evident following Slovakia's decision to establish a fully sovereign and diplomatically recognized state but within a loose confederative association with the Czech Republic. The Czech Republic refused this proposal, and both sides agreed to formally separate on January 1, 1993. Reportedly, in 1992, Czechoslovakia's economy showed signs of stabilization compared with the economy's performance during several of the previous years that reflected significant structural changes accompanying the country's transition to a market-based economic system. Czechoslovakia remained an important Central European producer of steel and heavy producer durables.

GOVERNMENT POLICIES AND PROGRAMS

During 1992, especially during the second half of the year, the Governments of the Czech Republic, the Slovak Republic, and the Federal Government were concerned mainly with ways and means to divide the country into its constituent parts. This process involved creating systems to divide all state-owned property common to both the Czech and Slovak Republics and the establishment of border and customs controls. The minerals industries of Czechoslovakia would become properties belonging to the respective Rebublics in which they had been situated.

A major issue was the currency agreement between the two Republics. Reportedly, both the Czech and Slovak Republics would maintain a single currency at least until mid-1993 to allow for an even separation of the two countries' economies.

PRODUCTION

The decline in the production of most minerals continued in 1992, but at a generally slower rate than in 1991 and 1990. The decline in the output of minerals was consonant with the country's reordered economic priorities during Czechoslovakia's transition to a market economy system. Arguably, one of the factors that had prevented even a greater decline of output in industry was social opposition to rapid closure of economically and environmentally unsustainable industrial facilites. (*See table 1.*)

TRADE

Czechoslovakia's trade data by commodity and country for 1991 was not available as in past years. Instead, the Government released foreign trade statistics that displayed aggregated values of commodity groups that were imported and exported in 1992. In 1992, Czechoslovakia's imports from developed market economy countries rose by more than 33% compared with those in 1991, while exports to these countries during this period rose by 21%. Czechoslovakia's imports from the former constituent Republics of the U.S.S.R. and former European CMEA trading partners declined by about 10% and 24%, respectively, compared with those of 1991, and respective exports to these areas also declined by about 45% and 26%.

Czechoslovakia's trade by commodity grouping for 1992 with developed market economy countries showed a 25% decline in the value of imports of crude materials, which included metallic ores and concentrates and industrial minerals, while exports in this category rose by more than 13%; imports of mineral fuels and related products increased by more than 98% and exports by about 5%; imports of chemicals rose by 14% and exports increased slightly. Trade with former European members of CMEA in 1992 in the category crude materials showed a 10% decline in imports and a 24% increase in exports; imports of mineral fuels declined by 23% during this period, while exports fell by 2%; imports of chemicals rose by about 2% and exports by about 3%. Commercial activity with the Republics of the former U.S.S.R. reflected a 13% decline in imports of crude materials (including mineral commodities) by Czechoslovakia in 1992 and a 42% decline in exports from this category to the former Republics of the U.S.S.R. Additionally, imports of mineral fuels from the former U.S.S.R. declined by about 8%, while exports to the former U.S.S.R. registered little change from those of 1991. Significantly, Czechoslovakia's imports of minerals and mineral fuels from the former Republics of the U.S.S.R. continued to be substantial or dominant shares of total imports of these categories. In 1992, the value of Czechoslovakia's imports of crude materials, which included minerals, from the Republics of the former U.S.S.R. amounted to 41% of the country's total imports in this category. Similarly, the value of imports of mineral fuels and related products from the former U.S.S.R. amounted to 89% of total imports in this category.

The trade tables presented in this report for 1989 and 1990 were compiled mainly from selectively reported official trade returns of Czechoslovakia and the available trade returns of the countrys trading partners. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

Table 4 lists the administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1991. (*See table 4.*)

COMMODITY REVIEW

Metals

Iron and Steel.—Despite the process of dissolution of Czechoslovakia into separate constituent Republics, in 1992 the Government of Czechoslovakia continued to promote the restructuring of the country's steel industry. Reportedly, during the year the Government of Czechoslovakia studied a proposal by EC steel consultants. The proposal, a result of a year-long study of the country's steel industry, would reduce the country's output of crude steel by about 33% and cut the output of finished steel products by up to 40% by the year 2000 compared with the production levels of 1991. Czechoslovakia's residual steel capacities would be modernized at a cost of about $3 billion.

Late in the year, officials of the Czech Republic's steel industry indicated that by the year 2000 the annual upper limit of crude steel production in the Czech Republic, reportedly, would be about 6 Mmt, compared with about 10 Mmt produced in 1989. Additionally, Czech Government officials indicated that the rate of privatization in the steel industry was too slow and that until substantial privatization of the industry is achieved the Government would continue to demand greater restructuring of the industry, involving cuts in administrative costs and reductions in production levels.

Nickel and Cobalt.—In midyear, the Government of the Slovak Republic reported planning the closure of the Sered Niklova plant in the second half of 1992 because of environmental problems at the site. The Sered nickel and cobalt plant, operated by the Huta S.P. enterprise, was Czechoslovakia's sole producer of nickel cathode and cobalt products. The Sered plant operated entirely on the basis of imported Albanian laterite ores as well as some ores and concentrates from the former U.S.S.R. and Cuba. The environmental problems associated with the closure of this facility, reportedly, were attributed to the total lack of pollution control equipment to abate the emissions of sulfur dioxide, dust, and gas generated at the plant. Reportedly, millions of gallons of water had to be sprayed on the waste piles to prevent the toxic materials from being dispersed atmospherically into the neighboring town.

Industrial Minerals

Czechoslovakia was well endowed both in quantity and range of industrial minerals that met the needs of the country's chemical and construction materials sectors as well as its export trade. Industrial minerals should acquire added importance during Czechoslovakia's transition to a market economy system, especially given the unifying forces in Europe generated by the EC's integration policies. EC-set standards, including those prescribed for the construction materials manufacturers, will be increasingly adopted by European countries, regardless of their immediate EC membership status, because the adoption of these standards would be among the prerequisites for EC membership. Additionally, non-EC countries wanting to conduct foreign commerce with the EC would be required to ensure that their export products meet EC standards and specifications. The need to modernize Czechoslovakia's infrastructure (airports, commercial buildings, highways, railroads, riverine port facilities) and the requirements of both the country's domestic and export markets should significantly increase the importance of construction materials and the industrial minerals sector in general.

Cement.—Following an agreement at the end of 1991 between SA des Cimentaries "CBR" (CBR) of Belgium and the Government of Czechoslovakia, in January 1992, CBR acquired a reported 35% share in Cementarny a Vapenky Mokra A.S. (CeVa Mokra), the major cement producer in the southern Moravian and Bohemian regions of the Czech Republic. Reportedly, CBR would acquire a majority stake in CeVa Mokra by 1995. CeVa Mokra operated six cement and lime producing facilities near Brno in Moravia. CeVa Mokra's cement sales and total revenues reportedly increased in 1992 by 15% and 14%, respectively, compared with those of 1991. Capital investment at CeVa Mokra during the year included the modernization of quarry equipment and clinker kiln burners at Mokra, the installation of a dry mortar production facility at Cebin, and the upgrading of the grinding unit at Malomerice.

Magnesite.—All of the country's exploitable resources of magnesite were in Slovakia between Lucenec and Kosice in the eastern part of the Republic. Reportedly, Slovenske Magnezitove Zavody (SMZ) of Kosice stopped production in December because of failure to convert to a new joint-stock company during the year. The Government of Slovakia planned to convert the large-scale magnesite-producing enterprise into 10 separate enterprises in 1993 as a first stage to full denationalization. SMZ was among the top 10 producers of magnesite in the world with exploitable resources, reportedly, approaching 800 Mmt.

Mineral Fuels

Coal.—Domestic coal mining annually has supplied Czechoslovakia with about 55% of its energy needs and has amounted to about 87% of the country's total primary energy production. In 1992, there were seven brown coal- and lignite-producing districts in the country. In the Czech Republic, the brown coal-lignite-producing areas were at Brno, Kladno, Most, Plzen, Skokolov, and Trutnov. In the Slovak Republic, only

Prievidza (Handlovan) produced brown coal. Overall recoverable resources of brown coal and lignite in Czechoslovakia amounted to 8,850 Mmt. Reportedly, 90% of the brown coal-lignite was extracted by surface mining and is typically a high ash and sulfur product ranging from 6.6% to 41.1% ash content (30% average). The coal's sulfur content ranged from 0.7% to 6.0% (1.8% average). Most of the brown coal and lignite has been consumed by the country's electric power generating industry, causing a significant SO_2-emission problem.

Bituminous coal was mined entirely underground (longwall method) at the East Bohemia, West Bohemia, Kladno, and Ostrava-Karvina Coalfields in the Czech Republic. The Kladno and Ostrava-Karvina Coalfields were the largest producers of bituminous coal, respectively accounting for about 6% and 88% of Czechoslovakia's total bituminous coal output. About 73% of the coal produced at Ostrava-Karvina has been suitable as coking coal. Kladno's entire output consisted of steam coal.

Natural Gas and Petroleum.—Major issues in the country's petroleum and natural gas sector continued to center on uninterrupted deliveries of natural gas and petroleum from the former Republics of the U.S.S.R. Reportedly, in early 1992, Czhechoslovakia and Russia reached an agreement that called for the delivery of 7.5 Mmt of petroleum in 1992 to Czechoslovakia. Czechoslovakia agreed to pay for the petroleum, reportedly, valued at about $1 billion, partly in hard currency and through exports to Russia.

At yearend, the Czech and Slovak Republics reportedly agreed to divide the management of the Russian-Czechoslovak natural gas pipeline between respective Czech and Slovak stock companies. However, Metalimpex of the Czech Republic and SPP of the Slovak Republic would continue to act as partners in the 1993 agreement with Gazexport of Russia for deliveries of natural gas.

Nuclear Energy.—The major issues in the nuclear power sector in 1992 concerned the reconstruction and modernization of the nuclear powerplant at Bohunice in Slovakia, and the decision not to build any additional nuclear power capacities in the Czech Republic. Modernization at the Bohunice nuclear powerplant was to include improved systems for fire prevention and seismic resistance, as well as more effective radioactive waste processing. Because of environmental considerations, the Czech Government decided to halt the construction of all nuclear power facilities in the Czech Republic for at least 10 years.

Reserves

In view of Czechoslovakia's transition to a market-based economy, the country's mineral resources will be subject to reevaluation to conform with market-derived definitions of ore and mineral reserves. Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other non-market-economy countries, such as Czechoslovakia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data.

The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether or not the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade.

In category A, the "reserves" are known in detail. The ore bounderies are outlined by trenching, exploratory, workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of projected exploitations have been ascertained. The quality and technological properties of the ore are ascertained in detail, ensuring the projected reliability of beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of beneficiation system. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of mineral cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of $A+B+C_1$ categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes. Taking this system into account, Czechoslovakia's mineral resources in categories $A+B+C_1$ are given in table 5. (*See table 5.*)

INFRASTRUCTURE

Czechoslovakia's inland system of ways and communications consisted of

87,118 km of railroads, highways, and internal waterways. The railroad system consisted of 12,855 km of 1.435-m-gauge track, 102 km of 1.520-m track, and 146 km of 0.750-m and 0.760-m narrow-gauge track; 2,861 km was double track and 3,798 km was electrified. The highway and road system was 73,450 km in total length, of which 517 km was classified as superhighways. Czechoslovakia had 475 km of navigable inland waterways with riverine ports at Prague on the Vltava River, Decin on the Elbe River, and Komarno and Bratislava on the Danube. The country's maritime outlets are entirely in neighboring countries: Poland (ports at Gdynia, Gdansk, Szczecin), Croatia (port at Rijeka), Slovenia (port at Koper), and Germany (ports at Hamburg and Rostock). The country's merchant fleet totaled 437,291 dwt and included 13 cargo vessels and 9 bulkers. Pipelines consisted of 1,448 km of pipe for crude petroleum, 1,500 km of pipe for petroleum products, and 8,100 km of pipe for natural gas.

OUTLOOK

In the near term, the profile of Czechoslavakia's mineral industry will be determined by the country's economic restructuring to a market system, as well as social demands for both Government action on environmental protection and the maintenance of acceptable levels of employment. However, the rate at which economic change within the Republics of Czech and Slovakia occurs also would depend on factors such as the division of common properties (including infrastructure) and the establishment of "formal" commercial relationships between the Czech and Slovak Republics as newly emerging countries.

OTHER SOURCES OF INFORMATION

Federalni statisticky urad
Sokolovska 142
18613 Prague 8
Czechoslovakia
Ministerstvo zahranicneho obchodu
Politickych veznu 20
11001 Prague 1
Czechoslovakia
GEOFOND
Kostelni 26
17021 Prague 7
Czechoslovakia
GEOFOND
Bukurestska 4
81104 Bratislava
Czechoslovakia
Ustredni ustav geologicky
Malstranske nam. 19
11821 Prague 1
Czechoslovakia
Slovensky geologicky ustav
Bukurestska 4
81104 Bratislava
Czechoslovakia

TABLE 1

CZECHOSLOVAKIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Alumina		137,500	205,000	175,000	186,600	[2]142,685
Aluminum ingot, primary		31,435	32,576	30,067	49,387	[2]60,425
Antimony, mine output, Sb content		2,921	1,187	1,272	[e]1,100	1,000
Cobalt metal		[e]50	50	59	60	[2]68
Copper:						
Mine output:						
Ore, gross weight		796,000	743,000	517,000	225,000	[2]156,000
Concentrate:						
Gross weight		23,303	20,895	16,899	11,313	[2]2,205
Cu content		[r e]4,800	4,900	3,308	[e]2,600	[2]537
Metal:						
Smelter, primary[e]		5,000	5,500	[2]4,300	3,500	3,000
Refined, primary and secondary		27,076	26,920	24,606	25,273	[2]28,061
Gallium metal	kilograms	[e]3,700	2,000	1,345	[e]1,400	1,300
Gold metal[e]	do.	600	550	550	300	300
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	1,773	1,780	1,831	1,738	[2]1,414
Fe content	do.	[e]440	470	480	[e]460	370
Metal:						
Pig iron	do.	9,706	9,911	9,667	8,479	[2]8,033
Ferroalloys, total electric furnace	do.	162	166	169	162	[2]122
Ferrochromium[3]	do.	29	30	32	34	[2]38
Crude steel	do.	15,319	15,465	[r]14,877	12,071	[2]10,844
Semimanufactures	do.	12,999	12,929	12,555	10,442	[2]10,060
Lead:						
Mine output:						
Concentrate, gross weight		5,429	5,351	5,898	6,645	5,000
Pb content[e]		2,800	2,700	[2]2,997	3,400	[2]1,700
Metal, secondary		26,045	26,008	23,665	17,835	[2]24,000
Mercury		168	131	126	75	[2]60
Nickel metal, primary		[e]3,800	3,800	2,970	[e]2,400	[2]1,621
Silver[e]	kilograms	30,000	30,000	25,000	20,000	20,000
Tin:						
Mine output, Sn content		600	500	300	—	—
Metal, primary and secondary		515	562	613	118	115
Tungsten, mine output, W content		[e]50	74	83	85	[2]—
Uranium		[e]2,300	2,300	1,900	[e]1,900	1,900
Zinc:						
Mine output:						
Ore, gross weight		694,000	682,000	664,000	533,000	520,000
Concentrate, gross weight		13,870	14,137	15,423	16,611	16,000
Zn content		[e]7,000	7,067	7,500	7,800	[2]5,900
Metal, secondary		1,357	1,296	978	811	[2]1,070
INDUSTRIAL MINERALS						
Barite		60,794	50,800	87,000	[e]85,000	[2]31,313
Cement, hydraulic	thousand tons	10,974	10,888	10,215	8,299	[2]9,485

See footnotes at end of table.

TABLE 1

CZECHOSLOVAKIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
INDUSTRIAL MINERALS—Continued						
Clays:						
Bentonite[e]		30,000	30,000	30,000	25,000	25,000
Kaolin		685,958	698,000	812,000	705,000	[2]505,000
Diamond, synthetic[e]	carats	5,000	5,000	5,000	5,000	5,000
Fertilizer, manufactured:						
Nitrogenous, N content		596,420	603,848	513,897	356,700	[2]414,100
Phosphatic, P_2O_5 content		313,009	295,643	256,811	168,329	160,000
Potassic, K_2O content		115,625	108,420	105,784	34,625	35,000
Mixed		478,001	410,631	[r]410,000	111,040	111,000
Fluorspar[e]		60,000	60,000	60,000	55,000	55,000
Feldspar		[e]95,000	68,910	46,966	[e]45,000	55,000
Graphite		[e]15,000	14,676	12,171	[e]12,000	11,500
Gypsum and anhydrite, crude		774,133	796,000	744,000	624,000	600,000
Lime, hydrated and quicklime	thousand tons	3,311	3,346	3,350	3,230	3,000
Magnesite, crude		630,786	642,000	561,000	328,000	[2]1,267,000
Nitrogen: N content of ammonia		771,100	603,848	513,807	[e]400,000	550,000
Perlite		43,390	[e]44,000	41,700	[e]41,000	35,000
Pyrite, gross weight[e]		140,000	140,000	140,000	140,000	130,000
Salt		350,201	344,201	331,809	309,989	[2]98,000
Sodium compounds, n.e.s.:						
Caustic soda		337,062	337,053	334,754	334,000	300,000
Soda ash		112,217	[e]110,000	104,360	104,000	100,000
Stone:						
Limestone and other calcareous stones	thousand tons	23,244	19,494	12,146	7,442	7,000
Quarry stone, not further described	thousand cubic meters	[r]35,346	[r]24,904	[r]20,179	[r]11,974	12,000
Sulfur:[e]						
Native		6,000	6,000	6,000	6,000	6,000
From pyrites		60,000	50,000	50,000	50,000	50,000
Byproducts, all sources		40,000	40,000	40,000	40,000	40,000
Total		106,000	96,000	96,000	96,000	96,000
Sulfuric acid	thousand tons	1,249	1,142	1,033	682	700
Talc[e]		30,000	30,000	26,000	25,000	25,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand tons	25,504	25,070	22,082	19,459	19,000
Brown and lignite	do.	99,919	94,263	85,168	82,507	82,000
Coke:						
Metallurgical	do.	8,349	8,130	6,173	5,539	[2]5,783
Unspecified	do.	2,237	2,017	3,464	3,037	[2]1,947
Fuel briquets from brown coal	do.	1,128	1,147	1,051	892	800
Gas:						
Manufactured, all types	million cubic meters	6,782	6,334	5,939	5,376	5,000
Natural, marketed[4]	do.	732	683	457	418	400
Petroleum:						
Crude:						
As reported	thousand tons	142	144	123	[e]140	140
Converted	thousand 42-gallon barrels	963	976	834	[e]949	949
Refinery products[e]	do.	126,000	120,000	[2]95,462	90,000	90,000

[e]Estimated. [r]Revised.

[1]Table includes data available through May 1993. In addition to the commodities listed, arsenic, diatomite, dolomite, feldspar, illite, and zeolite are produced, but information is inadequate to make reliable estimates of output levels.

[2]Reported figure.

[3]May include some FeCrSi and FeNi, if any was produced.

[4]Includes gas produced from coal mines. Gross output of natural gas is not reported, but it is believed to exceed reported marketed output by a relatively inconsequential amount.

TABLE 2

CZECHOSLOVAKIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destinations, 1990	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals		—	10	—	All to France.
Aluminum:					
Oxides and hydroxides		12	171	—	Morocco 106; Taiwan 40; West Germany 25.
Ash and residue containing aluminum		2,089	20	—	All to West Germany.
Metal including alloys:					
Scrap		442	1,270	—	West Germany 1,054; Japan 213; Belgium-Luxembourg 3.
Unwrought		13,823	14,398	—	Japan 12,130; West Germany 2,268.
Semimanufactures		1,018	2,869	990	West Germany 1,473; Finland 205; France 86.
Antimony:					
Ore and concentrate		579	409	—	All to Belgium-Luxembourg.
Ash and residue containing antimony		27	—		
Metal including alloys, all forms		58	—		
Chromium: Metal including alloys, all forms		—	35	—	West Germany 34; France 1.
Copper:					
Sulfate		3,306	2,705	—	West Germany 1,916; France 295; Switzerland 225.
Ash and residue containing copper		2,618	204	—	All to West Germany.
Metal including alloys:					
Scrap		3,458	1,185	—	Do.
Unwrought		686	460	—	West Germany 433; Netherlands 25; Finland 1.
Semimanufactures		[2]74	258	—	Switzerland 61; West Germany 57; Greece 50.
Gallium: Metal including alloys, all forms		1	1	—	All to United Kingdom.
Gold:					
Waste and sweepings	value, thousands	$1,146	$2,130	—	West Germany $2,124; Finland $6.
Metal including alloys, unwrought and partly wrought	do.	$333	$1,183	—	All to West Germany.
Iron and steel:					
Metal:					
Scrap		185,071	16,024	—	West Germany 6,950; Thailand 5,067; Yugoslavia 3,985.
Pig iron, cast iron, related materials		13,400	26,926	—	Yugoslavia 22,536; West Germany 1,873; France 1,257.
Ferroalloys:					
Ferrochromium		2,699	534	—	United Kingdom 339; West Germany 193; France 2.
Ferromanganese		—	1,540	—	Yugoslavia 1,508; Belgium-Luxembourg 29; France 3.
Ferromolybdenum		—	10	—	All to Taiwan.
Ferrosilicomanganese		16,974	8,032	—	All to West Germany.
Ferrosilicon		2,575	3,550	—	West Germany 3,504; Switzerland 45; Netherlands 1.
Ferrovanadium		57	—		
Silicon metal		—	1	—	All to West Germany.
Unspecified		4	5	—	All to Switzerland.
Steel, primary forms	thousand tons	615	664	—	Hungary 58; France 50; West Germany 49.
Semimanufactures:					
Universals, plates, sheets	do.	755	765	—	West Germany 124; France 77; U.S.S.R. 46.
Tubes, pipes, fittings	do.	611	689	2	U.S.S.R. 389; Hungary 175; West Germany 28.
Unspecified	do.	2,592	2,991	2	Yugoslavia 592; West Germany 355; France 234; Austria 207.

See footnotes at end of table.

TABLE 2—Continued

CZECHOSLOVAKIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destinations, 1990	
				United States	Other (principal)
METALS—Continued					
Lead:					
Ore and concentrate		5,789	6,332	—	West Germany 6,240; Belgium-Luxembourg 92.
Ash and residue containing lead		4,041	5,173	—	All to West Germany.
Metal including alloys:					
Scrap		785	121	—	Do.
Unwrought		5,124	1,030	—	Do.
Semimanufactures	value, thousands	—	$1	—	Do.
Magnesium: Metal including alloys, all forms		79	—		
Molybdenum: Metal including alloys, semimanufactures	value, thousands	—	$4	—	Argentina $3; Turkey $1.
Nickel:					
Oxides and hydroxides		42	19	—	All to West Germany.
Ash and residue containing nickel		44	—		
Metal including alloys:					
Scrap		57	80	—	Do.
Semimanufactures		2	—		
Platinum-group metals:					
Waste and sweepings	value, thousands	$1,906	$1,662	—	West Germany $1,632; United Kingdom $30.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	7	7	—	All to West Germany.
Platinum	do.	25	65	—	Do.
Rhodium	do.	—	6	—	Do.
Silver:					
Waste and sweepings	value, thousands	—	$1,058	—	Do.
Metal including alloys, unwrought and partly wrought	kilograms	4	545	—	Do.
Tin: Ash and residue containing tin		143	—		
Titanium:					
Oxides		3,200	1,906	—	West Germany 1,318; United Kingdom 247; Turkey 130.
Metal including alloys, semimanufactures		15	—		
Tungsten: Metal including alloys, unwrought		—	10	—	All to West Germany.
Uranium and thorium: Metal including alloys, all forms: Uranium		—	1	—	Do.
Zinc:					
Ore and concentrate		1,856	6,049	—	West Germany 4,416; Belgium-Luxembourg 1,633.
Oxides		1,030	772	—	Yugoslavia 695; West Germany 77.
Ash and residue containing zinc		4,364	4,144	—	All to West Germany.
Metal including alloys:					
Scrap		130	229	—	Do.
Unwrought		—	24	—	Do.
Zirconium: Ore and concentrate		1	—		
Other:					
Oxides and hydroxides		29	4	—	All to Chile.

See footnotes at end of table.

TABLE 2—Continued

CZECHOSLOVAKIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destinations, 1990	
				United States	Other (principal)
METALS—Continued					
Other—Continued:					
Ashes and residues		369	127	—	All to West Germany.
Base metals including alloys, all forms		(2)	1	—	All to United Kingdom.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		42	(4)	—	All to Ecuador.
Artificial:					
Corundum		5,753	2,382	—	Netherlands 902; West Germany 710; Turkey 399.
Silicon carbide		501	1,075	—	West Germany 594; Sweden 481.
Dust and powder of precious and semiprecious stones including diamond	value, thousands	—	$5	—	All to Ireland.
Grinding and polishing wheels and stones		652	[3]313	—	Turkey 73; West Germany 55; Thailand 46.
Barite and witherite		310	21,468	—	West Germany 21,318; France 110; Yugoslavia 40.
Boron materials: Oxides and acids		40	40	—	All to West Germany.
Bromine		11	—		
Cement	thousand tons	219	385	—	West Germany 243; Poland 55; Hungary 29.
Chalk		—	27	—	All to Netherlands.
Clays, crude:					
Bentonite		1,036	6,402	—	West Germany 5,972; Sweden 305; Finland 101.
Chamotte earth		31,962	16,187	—	West Germany 5,029; France 3,068; Sweden 1,843.
Fire clay		34,093	31,424	—	West Germany 28,482; Sweden 2,942.
Kaolin	thousand tons	388	358	—	West Germany 142; Austria 43; Poland 43.
Unspecified		62,517	69,323	—	West Germany 44,594; Yugoslavia 21,139; Norway 3,590.
Diamond:					
Natural:					
Industrial stones	carats	30	—		
Gem, not set or strung	do.	—	[5]37	—	All to West Germany.
Diatomite and other infusorial earth		5,362	—		
Feldspar, fluorspar, related materials:					
Feldspar		—	104	—	Do.
Fluorspar		810	760		All to Yugoslavia.
Nepheline syenite		—	900	—	Do.
Fertilizer materials:					
Crude, n.e.s.		7	215	—	All to United Kingdom.
Manufactured:					
Ammonia		45,590	51,473	17	Yugoslavia 39,972; West Germany 10,678; Switzerland 433.
Nitrogenous		234,100	211,905	—	West Germany 71,535; Yugoslavia 65,298; Turkey 25,600.
Phosphatic		3	20	—	All to Jordan.
Potassic		13,980	35,572	—	Yugoslavia 32,253; Belgium-Luxembourg 3,000; West Germany 319.
Unspecified and mixed		45,673	38,026	30	China 25,488; West Germany 11,451; Yugoslavia 997.
Graphite, natural		1,916	1,055	—	Yugoslavia 995; Greece 55; Sweden 5.
Lime		20,526	22,909	—	All to West Germany.

See footnotes at end of table.

TABLE 2—Continued

CZECHOSLOVAKIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destinations, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Magnesium compounds:					
Magnesite, crude	thousand tons	248	583	—	U.S.S.R. 70; West Germany 35; Hungary 34; Poland 32.
Oxides and hydroxides		73,231	52,972	100	West Germany 37,979; France 5,093; United Kingdom 3,920.
Mica:					
Crude including splittings and waste		25	—		
Worked including agglomerated splittings		78	37	—	Yugoslavia 16; United Kingdom 12; West Germany 9.
Nitrates, crude		270	127	—	West Germany 40; Turkey 40; France 22.
Phosphorus, elemental		51	540	—	All to Switzerland.
Pigments, mineral: Iron oxides and hydroxides, processed		279	70	—	All to Yugoslavia.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$75	$246	—	Switzerland $128; Taiwan $85; Canada $31.
Synthetic	do.	$44	$31	—	Belgium-Luxembourg $24; Canada $7.
Pyrite, unroasted		—	29	—	All to Norway.
Quartz crystal, piezoelectric	kilograms	—	6	—	All to Switzerland.
Salt and brine		—	1	—	All to West Germany.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		6,888	1,082	—	West Germany 970; Jordan 100; Sweden 12.
Sulfate, natural and manufactured		1,258	1,202	—	United Kingdom 848; Yugoslavia 354.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		5,015	4,814	—	West Germany 4,752; Belgium-Luxembourg 46; Switzerland 13.
Worked		112,511	13,531	52	West Germany 12,826; Switzerland 649; Mexico 4.
Dolomite, chiefly refractory-grade		—	1,999	—	All to West Germany.
Gravel and crushed rock		7,508	41,330	—	West Germany 40,472; Switzerland 820; United Kingdom 22.
Limestone, other than dimension		41,271	47,510	—	All to West Germany.
Sand other than metal-bearing		118,430	71,084	—	Yugoslavia 43,230; Germany 27,833; Norway 21.
Sulfur:					
Elemental: Crude including native and byproduct		1	1,850	—	West Germany 1,847; Yugoslavia 3.
Sulfuric acid		4,331	25	—	All to Sweden.
Talc, steatite, soapstone, pyrophyllite		614	369	—	West Germany 304; Yugoslavia 60; Indonesia 5.
Vermiculite		1,817	368	—	All to West Germany.
Other:					
Crude		8,667	4,136	—	West Germany 4,114; France 22.
Slag and dross, not metal-bearing		13,137	9,361	—	West Germany 9,337; Japan 24.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		3,550	2,938	—	All to Yugoslavia.
Carbon black		511	540	50	West Germany 489; Yugoslavia 1.
Coal:					
Anthracite		34	77	—	All to Greece.
Bituminous	thousand tons	2,202	1,557		Austria 877; West Germany 319; Hungary 82.

See footnotes at end of table.

TABLE 2—Continued

CZECHOSLOVAKIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destinations, 1990	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal—Continued:					
Lignite including briquets	thousand tons	2,303	2,515	—	West Germany 2,076.
Coke and semicoke	do.	1,433	1,009	—	East Germany 252; Austria 169; West Germany 169.
Peat including briquets and litter		43	—		
Petroleum refinery products:					
Liquefied petroleum gas	thousand 42-gallon barrels	1,104	531	—	West Germany 482; France 49.
Gasoline	do.	824	71		West Germany 69; Switzerland 2.
Mineral jelly and wax	do.	1	1	—	Mainly to West Germany.
Kerosene and jet fuel	do.	416	251	—	West Germany 181; Yugoslavia 70.
Distillate fuel oil	do.	6,269	2,632	—	West Germany 2,575; Yugoslavia 37; France 20.
Lubricants	do.	1,709	81	—	Belgium-Luxembourg 42; West Germany 20; Yugoslavia 19.
Residual fuel oil	do.	3,057	656	—	All to West Germany.
Bitumen and other residues	do.	146	132	—	Mainly to West Germany.
Bituminous mixtures	do.	19	—		
Unspecified	do.	88,439	—		

[p]Preliminary.

[1]Table prepared by Ronald L. Hatch and Jeremy Tidwell. Owing to a lack of official trade data published by Czechoslovakia, this table should not be taken as a complete presentation of this country's mineral exports. These data have been compiled from United Nations information, Facts on Czechoslovakia Foreign Trade, 1991, and data published by the partner trade countries.

[2]Excludes unreported quantity valued at $9,000 imported by Ecuador ($8,000) and Egypt ($1,000).

[3]Unreported quantity valued at $81,000 imported by Japan.

[4]Excludes unreported quantity valued at $1,000.

[5]Excludes unreported quantity valued at $30,000 imported by France ($23,000), Sri Lanka ($5,000), New Zealand ($1,000), and Singapore ($1,000).

[6]Excludes unreported quantity valued at $2,592,000 imported by Belgium-Luxembourg ($2,575,000) and Switzerland ($17,000).

TABLE 3

CZECHOSLOVAKIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
METALS					
Alkali and akaline-earth metals		—	378	—	All from United Kingdom.
Aluminum:					
Ore and concentrate	thousand tons	478	581	—	Hungary 277; Yugoslavia 252.
Oxides and hydroxides		8,680	667	1	West Germany 649; Japan 17.
Ash and residue containing aluminum		—	44	—	All from West Germany.
Metal including alloys, all forms	thousand tons	106	102	—	U.S.S.R. 85; Hungary 2; Yugoslavia 2.
Antimony:					
Oxides		15	27	—	West Germany 17; France 10.
Metal including alloys, all forms	value, thousands	—	$4	—	All from Sweden.
Arsenic: Metal including alloys, all forms	do.	$3	$4	—	All from West Germany.
Beryllium: Metal including alloys, all forms	do.	$7	—		

See footnotes at end of table.

TABLE 3—Continued

CZECHOSLOVAKIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
METALS—Continued					
Bismuth: Metal including alloys, all forms	value thousands	$1	$2	—	All from West Germany.
Cadmium: Metal including alloys, all forms		137	134	—	United Kingdom 46; Belgium-Luxembourg 40; Hungary 23; Bulgaria 16.
Chromium:					
Ore and concentrate	thousand tons	171	170	—	U.S.S.R. 146; Albania 18; Turkey 5.
Metal including alloys, all forms	value, thousands	$38	$18	—	All from West Germany.
Cobalt:					
Oxides and hydroxides		6	1	1	
Metal including alloys, all forms	value, thousands	$52	$18	—	Do.
Columbium and tantalum: Metal including alloys, all forms:					
Columbium	kilograms	302	—		
Tantalum	value, thousands	—	$3	—	All from Sweden.
Copper:					
Oxides and hydroxides	do.	$1	—		
Sulfate		—	3	—	All from West Germany.
Metal including alloys, all forms	thousand tons	32	35	—	U.S.S.R. 24; United Kingdom 6; Poland 2.
Germanium:					
Oxides	value, thousands	$1	$1	—	All from West Germany.
Metal including alloys, all forms	do.	—	$1	—	Do.
Gold: Metal including alloys, unwrought and partly wrought	kilograms	[2]187	738	—	West Germany 505; Norway 168; Belgium-Luxembourg 65.
Iron and steel:					
Iron ore and concentrate, including roasted pyrite	thousand tons	9,765	10,123	—	U.S.S.R. 8,571; Brazil 1,057; Venezuela 235.
Metal:					
Scrap		9,600	4,910	—	All from West Germany.
Pig iron, cast iron, related materials	thousand tons	671	668	—	Mainly from U.S.S.R
Ferroalloys:					
Ferrochromium		1,208	398	—	All from West Germany.
Ferrocolumbium		—	28	—	Do.
Ferromanganese		—	1,000	—	Belgium-Luxembourg 500; Brazil 500.
Ferrosilicon		28	[3]15	—	France 8; West Germany 5; Belgium-Luxembourg 2.
Ferrotitanium		551	14	—	All from West Germany.
Ferrovanadium		1	15	—	Do.
Silicon metal		—	1,076	378	Norway 917; West Germany 51.
Unspecified		702	447	—	United Kingdom 398; France 48; Norway 1.
Steel, primary forms		2,104	87	—	All from West Germany.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		4,526	12,004	—	West Germany 11,613; United Kingdom 173; Belgium-Luxembourg 144.
Clad, plated, coated		3,709	4,146	—	West Germany 3,857; Belgium-Luxembourg 159; France 125.
Of alloy steel		507	636	13	West Germany 313; Sweden 167; United Kingdom 67.
Bars, rods, angles, shapes, sections		[4]1,536	4,321	—	West Germany 3,940; Switzerland 162; Belgium-Luxembourg 93.

See footnotes at end of table.

TABLE 3—Continued

CZECHOSLOVAKIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Semimanufactures—Continued:					
Rails and accessories		2	5	—	All from West Germany.
Wire		6,757	1,323	—	West Germany 819; Belgium-Luxembourg 308.
Tubes, pipes, fittings		7,413	13,647	—	West Germany 12,757; France 587; Sweden 168.
Lead:					
Oxides		1,673	756	—	France 755; Germany 1.
Metal including alloys, all forms	thousand tons	18	16	—	United Kingdom 4; Yugoslavia 3; Belgium-Luxembourg 2.
Magnesium: Metal including alloys:					
Scrap		6	76	—	Yugoslavia 75; West Germany 1.
Semimanufactures		33	6	—	West Germany 5; Norway 1.
Manganese:					
Ore and concentrate	thousand tons	871	951	—	U.S.S.R. 670; Brazil 118; Bulgaria 14.
Oxides		570	1,093	—	Spain 1,082; Japan 11.
Metal including alloys, all forms		60	[5]215	—	France 135; Belgium-Luxembourg 80.
Mercury	value, thousands	$4,410	—		
Molybdenum:					
Ore and concentrate		634	741		Belgium-Luxembourg 341; West Germany 223; Sweden 177.
Metal including alloys, all forms		25	3	—	Japan 2; United Kingdom 1.
Nickel:					
Ash and residue containing nickel		40	—		
Metal including alloys, all forms		6,093	7,072	—	U.S.S.R. 3,567; United Kingdom 1,991; Finland 90.
Platinum-group metals: Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	[6]112	437	—	West Germany 435; United Kingdom 2.
Platinum	do.	[7]305	513	—	West Germany 447; Switzerland 66.
Rhodium	do.	[8]6	2	—	All from West Germany.
Iridium, osmium, ruthenium	do.	—	14	—	All from United Kingdom.
Unspecified	do.	[9]34	—		
Rare-earth metals including alloys, all forms	do.	[10]4	4,132	—	All from Japan.
Silver: Metal including alloys, unwrought and partly wrought	do.	[11]5	7,860	—	West Germany 7,324; Switzerland 531; Yugoslavia 5.
Tin: Metal including alloys, all forms		2,619	2,424	—	Indonesia 560; Bolivia 402; United Kingdom 135.
Titanium:					
Ore and concentrate		301	220	—	All from West Germany.
Oxides		593	336	—	United Kingdom 225; West Germany 111.
Metal including alloys, all forms		[12]10	2	—	Mainly from Switzerland.
Tungsten:					
Ore and concentrate		3,275	1,228	—	All from China.
Metal including alloys, all forms[13]		1	53	([14])	Switzerland 49; Japan 3; United Kingdom 1.
Uranium and thorium: Ore and concentrate		7,387	2,141	—	All from West Germany.
Vanadium:					
Oxides and hydroxides		45	—		
Ash and residue containing vanadium		8	—		

See footnotes at end of table.

TABLE 3—Continued

CZECHOSLOVAKIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
METALS—Continued					
Zinc:					
Oxides		2	—		
Metal including alloys, all forms	thousand tons	62	54	—	Finland 10; United Kingdom 9; West Germany 6.
Zirconium:					
Ore and concentrate		810	244	—	All from West Germany.
Oxides and hydroxides		—	4	—	Do.
Metal including alloys, all forms	value, thousands	$23	$76		Do.
Other:					
Ores and concentrates		139	—		
Ashes and residues		385	—		
Oxides and hydroxides		—	1	—	Do.
Metalloids[15]		—	40	—	All from China.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		[16]199	122	—	Turkey 100; Yugoslavia 20; West Germany 2.
Artificial:					
Corundum		3,651	46	—	West Germany 23; Japan 11.
Silicon carbide		279	94	—	Yugoslavia 63; China 30.
Dust and powder of precious and semiprecious stones including diamond	kilograms	15	67	—	Switzerland 53; United Kingdom 5.
Grinding and polishing wheels and stones		731	542	—	West Germany 283; France 178; Yugoslavia 29.
Asbestos, crude		40,360	32,776	—	U.S.S.R. 27,297; Canada 1,763; Zimbabwe 749.
Barite and witherite		4,100	50	—	All from West Germany.
Boron materials:					
Crude natural borates		[17]470	761	—	All from Belgium-Luxembourg.
Oxides and acids		600	520	—	West Germany 320; China 200.
Bromine	value, thousands	—	$3	—	All from West Germany.
Cement	thousand tons	251	118	—	U.S.S.R. 70; East Germany 16.
Chalk		1,343	862	—	France 840; West Germany 22.
Clays, crude:					
Bentonite		72	8	—	All from France.
Chamotte earth		66	3	—	Do.
Fire clay		307	402	—	West Germany 217; France 185.
Kaolin		615	102	—	All from West Germany.
Unspecified		3	—		
Cryolite and chiolite		6	—		
Diamond:					
Natural:					
Gem, not set or strung	carats	—	[18]32,196	—	All from United Kingdom.
Industrial stones[19]	do.	21,800	141	—	All from West Germany.
Diatomite and other infusorial earth		711	19	—	France 10; West Germany 9.
Feldspar, fluorspar, related materials:					
Feldspar		18,701	807	—	Finland 805; Norway 2.
Fluorspar		1,104	17,004	—	China 16,380; West Germany 624.
Fertilizer materials:					
Crude, n.e.s.		6,159	—		

See footnotes at end of table.

TABLE 3—Continued

CZECHOSLOVAKIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued					
Manufactured:					
Ammonia		3	23	—	All from West Germany.
Nitrogenous	thousand tons	209	171	—	U.S.S.R. 153.
Phosphatic		108,642	24,274	6,362	Yugoslavia 10,012; Tunisia 7,900.
Potassic	thousand tons	557	470	—	East Germany 307; U.S.S.R. 146.
Unspecified and mixed		59,970	7	—	Spain 6; West Germany 1.
Graphite, natural		719	588	—	China 399; West Germany 129; United Kingdom 60.
Gypsum and plaster	thousand tons	23	23	—	East Germany 22.
Iodine		10	30	—	All from Japan.
Kyanite and related materials:					
Mullite		—	136	—	All from United Kingdom.
Unspecified		84	163	—	Do.
Lime		35	10	—	All from West Germany.
Magnesium compounds:					
Magnesite, crude		2,900	3,220	—	All from China.
Oxides and hydroxides		938	450	—	France 356; West Germany 94.
Sulfate		467	993	—	All from West Germany.
Mica:					
Crude including splittings and waste		7	5	—	All from France.
Worked including agglomerated splittings		831	[20]3	—	France 2; West Germany 1.
Phosphates, crude, P_2O_5 content	thousand tons	199	92	—	Morocco 38; Jordan 32; Tunisia 3.
Phosphorus, elemental	kilograms	50	—		
Pigments, mineral:					
Natural, crude		18	17	—	All from West Germany.
Iron oxides and hydroxides, processed		575	18	—	All from Argentina.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$18	$15	—	West Germany $11; Australia $4.
Synthetic	do.	—	$26	$26	
Quartz crystal, piezoelectric	kilograms	—	178	—	All from Switzerland.
Salt and brine		7	21	—	All from Sweden.
Sodium compounds, n.e.s.:					
Soda ash, natural and manufactured	thousand tons	164	207	—	East Germany 91; Poland 50; Bulgaria 34; Romania 25.
Sulfate, manufactured		21	29	—	West Germany 27; United Kingdom 2.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		8,355	586	—	All from Sweden.
Worked		1,351	9,326	39	Yugoslavia 9,200; West Germany 66; Belgium-Luxembourg 21.
Dolomite, chiefly refractory-grade		136	82	—	All from West Germany.
Gravel and crushed rock		9,807	1,080	—	All from France.
Quartz and quartzite		1,352	1,160	—	All from West Germany.
Sand other than metal-bearing		911	1,288	—	United Kingdom 815; Belgium-Luxembourg 473.
Sulfur:					
Elemental	thousand tons	419	396	—	Mainly from Poland.
Dioxide		690	632	—	All from West Germany.
Sulfuric acid		57,735	76,064	—	U.S.S.R. 74,048.

See footnotes at end of table.

TABLE 3—Continued

CZECHOSLOVAKIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Talc, steatite, soapstone, pyrophyllite		2,399	580	—	All from West Germany.
Vermiculite		4	2	—	Do.
Other:					
Crude		3,731	3,990	([14])	West Germany 2,948; Finland 1,040; United Kingdom 2.
Slag and dross, not metal-bearing		49	121	—	All from West Germany.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		67	30	—	All from West Germany.
Carbon black		2,772	4,932	—	West Germany 3,161; Turkey 1,528; Switzerland 128.
Coal:					
Bituminous	thousand tons	4,503	4,736	—	U.S.S.R. 3,109; Poland 1,627.
Lignite including briquets	do.	766	198	—	All from East Germany.
Coke and semicoke		—	1	—	All from West Germany.
Gas, natural, gaseous	million cubic meters	13,609	20,182	—	U.S.S.R. 15,014; unspecified 5,168.
Peat including briquets and litter		5	—		
Petroleum:					
Crude	thousand 42-gallon barrels	129,545	99,803	—	Mainly from U.S.S.R
Refinery products:					
Liquefied petroleum gas	42-gallon barrels	35	232	—	France 139; West Germany 93.
Gasoline	do.	58,956	249,513		Greece 31,561; Yugoslavia 169,881; West Germany 47,569.
Mineral jelly and wax	do.	15,630	23,374	—	West Germany 18,251; China 3,935; Belgium-Luxembourg 1,062.
Kerosene and jet fuel	do.	30,368	14,012	—	Yugoslavia 4,580; Austria 8,882; West Germany 372.
Distillate fuel oil	do.	43,947	20,179	—	Austria 15,241; West Germany 4,886; United Kingdom 276.
Lubricants	do.	147,047	63,231	—	Austria 42,455; Belgium-Luxembourg 6,286; Yugoslavia 5,194.
Residual fuel oil	do.	21,505	7,632	—	All from West Germany.
Bitumen and other residues	do.	1,515	—		
Bituminous mixtures	do.	17,647	606	—	Austria 418; West Germany 145; Belgium-Luxembourg 18.
Petroleum coke	do.	10,687	15,697	—	All from West Germany.

[p]Preliminary.

[1]Table prepared by Ronald L. Hatch and Jeremy Tidwell. Owing to a lack of official trade data published by Czechoslovakia, this table should not be taken as a complete presentation of this country's mineral imports. These data have been compiled from United Nations information, Facts on Czechoslovakia Foreign Trade, 1991, and data published by the partner trade countries.

[2]Excludes unreported quantity valued at $2,100,000.

[3]Excludes unreported quantity valued at $139,000 exported by Norway.

[4]Excludes unreported quantity valued at $19,000.

[5]Excludes unreported quantity valued at $54,000 exported by Sweden.

[6]Excludes unreported quantity valued at $561,000 exported by West Germany ($345,000) and the United Kingdom ($216,000).

[7]Excludes unreported quantity valued at $5,650,000 exported by West Germany ($4,418,000) the United Kingdom ($1,226,000), and Italy ($6,000).

[8]Excludes unreported quantity valued at $270,000 exported by West Germany.

[9]Excludes unreported quantity valued at $107,000 exported by the United Kingdom ($91,500) and West Germany ($15,500).

[10]Excludes unreported quantity valued at $10,000 exported by the United Kingdom.

[11]Excludes unreported quantity valued at $840,000 exported by West Germany ($828,000), Belgium-Luxembourg ($11,000), and Italy ($1,000).

[12]Excludes unreported quantity valued at $25,000 exported by West Germany ($19,000) and the United Kingdom ($6,000).

[13]Excludes unreported quantities valued at $43,000 in 1989, exported by the Netherlands ($20,000), the United Kingdom ($11,000), and France ($4,000); and $10,000 in 1990, exported by Sweden ($8,000) and France ($2,000).

[14]Less than 1/2 unit.

[15]Reported under SITC item 522.120 as "selenium, tellurium, phosphorus, arsenic, etc."

[16]Excludes unreported quantity valued at $304,000 exported by China.

[17]Excludes unreported quantity valued at $1,297,000 exported by Turkey.

[18]Excludes unreported quantity valued at $39,000 exported by Switzerland.

[19]Excludes unreported quantity valued at $72,000 in 1989, exported by Belgium-Luxembourg; and $4,000 in 1990, exported by West Germany.

[20]Excludes unreported quantity valued at $41,000 exported by Norway.

TABLE 4

CZECHOSLOVAKIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies[1]	Location of main facilities[2]	Annual capacity
Aluminum		SNP Aluminum Works	Ziar nad Hronom, central Slovakia	60
Antimony:				
Ore		Krasna Hora	Central Bohemia	NA
Do.		Liptovska Dubrava	Central Slovakia	50
Do.		Pezinok	West Slovakia	50
Smelter		Vajskova	Central Slovakia	2
Cement		Cizkovice, Hranice, Karlov Dvor, Lochkov, Pracovice, and Velary	Bohemia	3,500
Do.		Bystre, Malomerice, Mokra, Ostrava-Kunice, and Zahorie	Moravia	2,800
Do.		Banska Bystrica, Horne Srnie, Ladce, Lietavska Lucka, Stupava, and Turna	Slovakia	5,400
Clay, kaolin		Mines in Karlove Vary area	West Bohemia	450
Do.		Mines in Plzen area	Central Bohemia	150
Coal:				
Bituminous		Mines in OKD coal basin	Ostrava-Karvina, north Moravia	22,100
Do.		Mines in KD coal basin	Kladno, central Bohemia	3,000
Brown		SHD administration	Most, northwest Bohemia	61,200
Do.		HDB administration	Sokolov, west Bohemia	17,000
Do.		ULB administration	Prievidza, central Slovakia	6,800
Lignite		JLD administration	Hodonin, south Moravia	5,000
Copper:				
Ore		Slovinky, Hodrusa-Hamre, and Rudnany	Central Slovakia	500
Do.		Zlate Hory	North Moravia	300
Refinery		Krompachy	Central Slovakia	27
Gallium	kilograms	SNP Aluminum Works	Ziar nad Hronom, central Slovakia	4,000
Iron:				
Ore		Nizna Slana and Rudnan	Central Slovakia	1,600
Concentrate		do.	do.	1,300
Lead-zinc, ore		Horni Benesov and Zlate Hory	North Moravia	400
Do.		Banska Stiavnica	Central Slovakia	200
Lead, metal secondary:				
Refined		Kovohute Pribram	Czech Republic, Pribram	26
Magnesite		SMZ administration	East Slovakia	550
Mercury	metric tons	Dubnik, Malachov, and Rudnany	Central Slovakia	150
Nickel, smelter		Niklova Huta	Sered, south Slovakia	5
Natural gas	billion cubic meters	Gasfields around Hodonin	South Moravia	25
Petroleum:				
Crude		Oilfields around Hodonin	South Moravia	140
Refinery		Kolin, Kralupy, Pardubice, and Zaluzi	Bohemia	NA
Do.		Bratislava, Strazske, and Zvolen	Slovakia	NA
Steel, crude		Vychodoslovenske Zeleziarne sp. (East Slovak Iron and Steel Works)	Slovakia, Kosice	4,000
Do.		Nova Hut sp (Ostrava)	Czech Republic, Kunice-Ostrava	3,800
Do.		Zelezarne Vitkovice	Czech Republic, Vitkovice-Ostrava	1,900
Do.		Trinecke Zelezarny (Trinec Iron and Steel Works)	Czech Republic, Trinec	3,000
Do.		Poldi United Steel Works	Czech Republic, Kladno-Prague	1,700
Do.		Svermove Zeleziarne	Slovakia, Podbrezova	600
Do.		Zelezarny Bila Cerkev	Czech Republic, Hradek-Rokycany	300

See footnotes at end of table.

TABLE 4
CZECHOSLOVAKIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies[1]	Location of main facilities[2]	Annual capacity
Steel, crude	Zelazarny Veseli	Czech Republic, Veseli nad Moravou	300
Do.	Zelezarny Chomutov sp.	Czech Republic, Chomutov	350
Do.	Bohumin Iron and Steel Works	Czech Republic, Bohumin	400
Tin, ore	Krasno (Stannum) and Cinovec	Northwest Bohemia	300

NA Not available.
[1]All mining companies are Government owned.
[2]Names and locations of mines and crude oil refineries are identical.

TABLE 5
CZECHOSLOVAKIA: APPARENT RESOURCES OF MAJOR MINERAL COMMODITIES FOR 1992

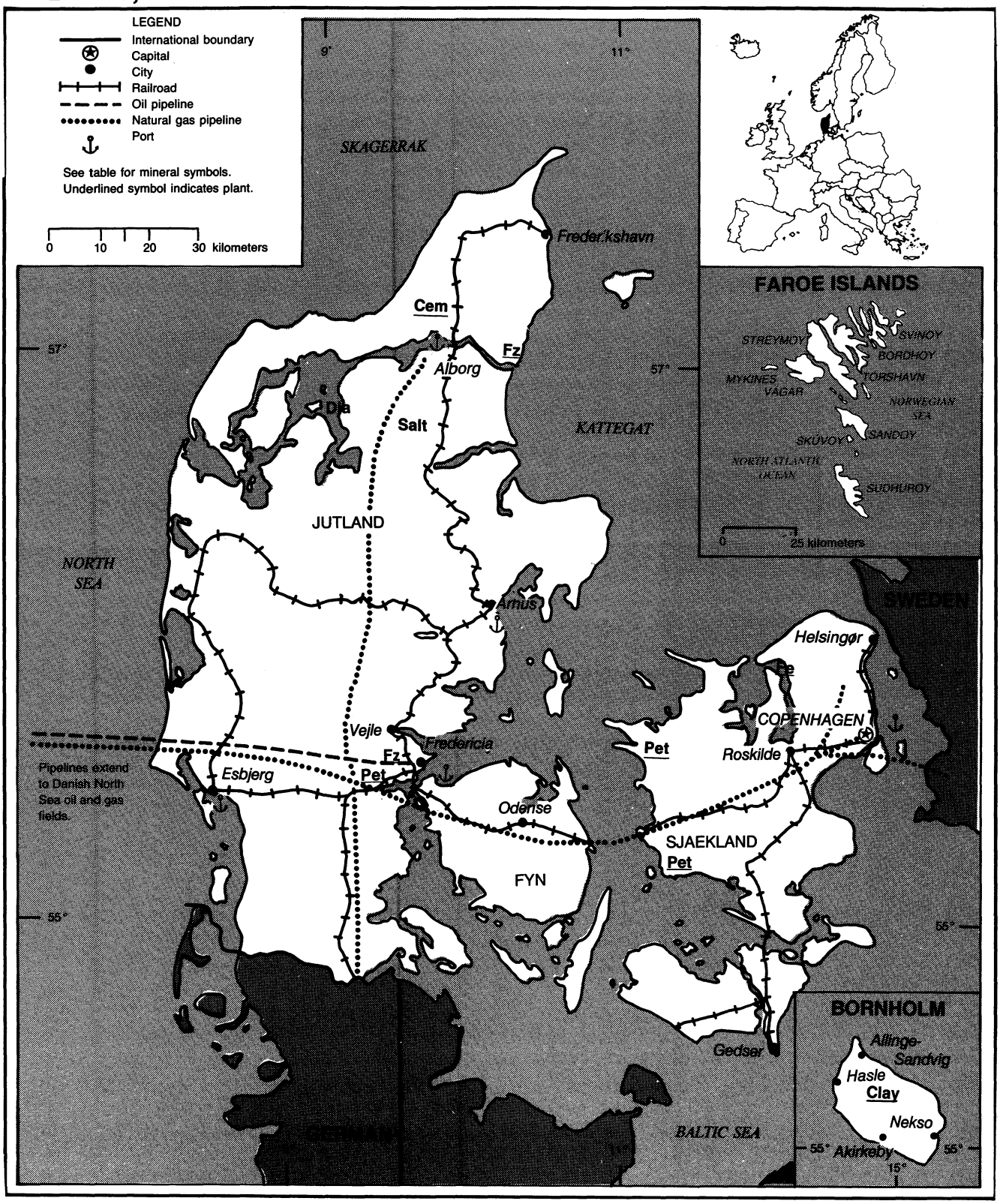
(Thousand metric tons unless otherwise specified)

Commodity	Resources
Clays:	
Bentonite	50,000
Kaolin	180,000
Refractory	148,000
Copper, ore 0.6% to 0.9% Cu	44,846
Coal:	
Bituminous	1,791,000
Brown	4,179,000
Lignite	221,000
Diatomite	8,800
Feldspar	20,800
Fluorspar	1,800
Graphite	2,000
Gypsum	117,000
Iron ore	91,869
Limestone	3,104,000
Magnesite	800,000
Rock salt	263,000
Sand:	
Glass	97,000
Foundry	221,000
Talc	400

Source: Primarily Gornaya Entsiklopediya, Moscow: Sovetskaya Entsiklopediya, 1991.

DENMARK

AREA 43,000 km² **POPULATION 5.2 million**



THE MINERAL INDUSTRIES OF

DENMARK AND GREENLAND

By William Zajac

DENMARK

The mining and quarrying and the metals processing sectors traditionally have not been a driving factor in Denmark's economy. Employment in the mining and quarrying sectors accounts for about 0.15% of total employment in Denmark, while employment in the manufacture of nonmetallic mineral products accounts for about 0.7%, in the basic metals industry for about 0.3%, in petroleum refining for about 0.15%, and in the energy, gas, and water supply sector for about 0.8%. In contrast, employment in the agricultural sector accounts for about 2.5% of total employment, in the food preparation sector for about 3.5%, and in the social services sector (public administration, teachers, social workers, etc.) for about 36.5% of total employment. With respect to sales of the products of the various sectors, mining and quarrying accounted for only about 0.5% of the total while agriculture accounted for almost 5%, services accounted for about 8%, and the manufacturing sector (all products) accounted for about 25% of the total.

Government Policies and Programs

The Government economic policy in 1992 was aimed at consolidating earlier price stabilization gains and maintaining the trade balance in a surplus. The Government's commitment to fixed exchange rates in the context of membership in the Exchange Rate Mechanism (ERM) has provided a solid foundation for a noninflationary environment, notwithstanding the Danish public's rejection of the Maastricht Treaty in June 1992. This rejection was not expected to weaken confidence in the krone, and the public's acceptance of the treaty was eventually expected after some adjustments to the conditions of the treaty. The Government also made efforts to repay the foreign debt, thereby reducing the budget expenditures by cutting the high servicing charges on foreign liabilities.

Considering the generally poor global economic situation, Denmark has maintained a relatively good economic situation, despite its export-oriented economy. During 1992, the inflation rate (about 2.5%) was one of the lowest in the OECD, earlier fiscal stabilization gains were consolidated, and the current account surplus rose. A major concern was the rising unemployment (11% in mid-1992), and, in an effort to stem this rise, the Government adopted the following measures, to be in effect through 1993:

1. More timely offers of temporary employment or education to welfare recipients aged 20 through 24;
2. Introduction of a job-rotation scheme;
3. Increased resources to subsidize child care and care of the elderly by local authorities; and
4. The establishment of more tightly regulated and taxed business zones in areas particularly hard hit by unemployment.

Production

Denmark does not, with a few exceptions, report production of mineral commodities but rather sales of domestically produced materials. As a result, the majority of the data presented in table 1 do not reflect the actual state of the minerals industry in Denmark because they do not include the materials produced but processed and used by the producing company and sold in the form of a finished product. Also, materials from stockpiles are included in the sales figures so that material that had been mined in previous years has been included in the data for a particular year. Because Denmark does not have a diverse metals producing industry, most of the materials that are needed to support the domestic industries must be imported. As a result, imports cover all the aluminum, cadmium, lead, magnesium, nickel, pig iron, and zinc consumed in the country. *(See tables 1 and 3.)*

Trade

Denmark continued to rely heavily on imports to meet its needs for metals and a number of industrial minerals for which it has no resources. On the other hand, exports of both fuel and nonfuel minerals and mineral products provide a part of the needed foreign exchange essential to preserving some sense of balance in trade. Growth in exports of both crude and refined oil exceeded growth in imports of these two commodities, and when coupled with the substantial increase in natural gas exports, Denmark's mineral fuels industry on its own has made an appreciable contribution to improving the foreign trade balance.

Through 1992, Germany remained Denmark's largest single trading partner in terms of the value of trade, both with regard to Denmark's exports and imports. Sweden ranked second and the United Kingdom third in terms of the total value of both exports and imports. The United States ranked eighth after Norway, France, Italy, and the Netherlands among destinations for Danish exports, and ranked sixth after France and the Netherlands, but ahead of seventh-ranked Norway and eighth-ranked Italy among sources of Danish imports. Table 3

provides data on the export and reexport trade of Denmark proper for 1990 and 1991, while table 4 gives corresponding import data. Table 5 provides similar data for the Faroe Islands, the self-governing overseas administrative division of Denmark situated about 330 km north of Scotland and 440 km southeast of Iceland, between the Norwegian Sea and the North Atlantic Ocean. These islands thus far have proven unimportant from the viewpoint of mineral commodity supply, but they do have a modest but measurable requirement for mineral materials—mostly fuels and fabricated metals. *(See tables 2, 3, and 4.)*

Structure of the Mineral Industry

All Danish companies involved in the minerals industry are privately held, but are regulated by Government ministries: those in the nonfuel sector by the Ministry of Industry and those in the fuels sector by the Ministry of Energy.

The major producing and processing companies in Denmark are listed in table 5. *(See table 5.)*

Commodity Review

Metals.—Crude steel production in Denmark declined by 6.6% in 1992 to 591,000 tons from 633,000 tons the previous year. Production of rolled steel, plates, and sections increased slightly to 525,000 tons in 1992 from 518,000 tons in 1991. The decline of crude steel production in 1992 is the result not only of declining demand (5% drop in Europe during the past 2 years) and serious price deterioration, but also of the excess capacity in the European steel industry, which causes much greater sensitivity to changes in demand. Other factors also were felt during 1992, namely low-priced imports from Eastern European countries, increased supply from developing countries, and antidumping investigations against EC steel producers by Canada and the United States. All of these factors have caused the sales price to drop 25% in the past 4 years and 11% in 1992 alone. Sales of Danish plates, sections, and semis increased slightly in 1992 to 525,300 tons from 517,500 tons in 1991, the result of increased sales within the EC. Exports accounted for 71% of total sales.

Production costs at the Danish Steel Works, Ltd. decreased between 1991 and 1992 by 15%. This decrease in costs was the result of lower prices for scrap and pig iron, improved efficiency, and company efforts to compensate for the lower turnover and earnings. Operating time at the steel plant was reduced in 1992 so that production was only at night and on weekends, thus taking advantage of lower electricity rates at those times. Operation during the day would not have been profitable at the level of daytime electricity rates. At the end of 1992, the Danish Steel Works, Ltd. had 1,252 employees, of which about 75% were steel technicians and skilled workers and 25% were white-collar workers. A 6.7% reduction of the work force in 1992 was in line with the company's plan eventually to reduce the number of workers to about 1,100, a level that management feels is appropriate for the production departments.

During 1992, the company continued its efforts to improve the environment both inside and outside the actual plant. The aim of the company is to have the plant function as a giant recycling filter in which materials that are detrimental to the environment, and which come into the plant in raw materials, are either tied into products of the plant or are sent for recycling or storage to minimize the effects on the environment. The connection of the furnaces and the scarfing plant to filters was completed in 1992, thus bringing the largest sources of dust emission under control. Also during 1992, coastal protection of the reclaimed area at the steel plant was completed, a measure that prevents potential leakage from the area and potential erosion of the coast. A new rolling line and modernization of the water-processing plant in the bar mill contributed to the reduction of the noise level produced at the plant. The Danish Steel Works, Ltd. also continued its involvement in a project investigating new environmentally suitable and economical methods of extracting the valuable raw materials contained in filter dusts. Waste heat from the plant is not only consumed at the plant, but the company also supplies 58% of the central heating in the municipality of Frederiksvaerk.

Industrial Minerals.—Cement.—Aalborg Portland Holding, the sole cement producer in Denmark, reported an increase of 10% in cement production during 1992 despite a continuing recession in the Danish building industry that resulted in a decrease in private housing starts and commercial enterprises. Domestic sales of cement dropped by 4% to 1,054,000 tons in 1992 from 1,099,000 tons in the previous year. The increase in production was the result of increased demand for exports, which increased in 1992 by almost 33% to 1,246,000 tons from 940,000 tons in 1991. This increase in exports was, in particular, the result of increased shipments to Nigeria and, especially important for the company, to a German company to satisfy demand in the new states in the eastern part of that country. White cement continues to be the most important export product of the company and, in 1992, reached record sales levels. To remain competitive in the cement market, the company has continued to work on the development of new products and innovations in cement production technology. The development of new products in 1992 focused on improved cement qualities and especially on high-strength cement. The development of new production processes is geared to an improved utilization of raw materials and energy, thereby reducing sales prices and gaining market share.

Limestone.—Limestone and its related products, lime and chalk, are growing in importance to the minerals industry of Denmark owing to the growing importance of environmental concerns of Denmark and its neighboring countries. The production of limestone products used for the desulfurization of flue gases and the treatment of wastewater has continued to grow while the use of lime for

agricultural purposes varies with the state of the agricultural industry. Yearend results reported by Faxe Kalk, a principal player in the Danish limestone industry, are representative of the industry as a whole. Although the sales of agricultural lime by the company declined by 33% in 1992 compared with 1991, the sales of burnt and hydrated lime increased by 4.5% and the sales of other limestone products increased by 9.2% during the same period. This is a noteworthy increase in sales because of the generally poor economic conditions in the world economy during 1992, the general recession in the building industry in the north European area, and the Danish currency remained strong and stable during the period while the currencies in some of its neighboring countries fluctuated. The commissioning of new desulfurization units will contribute to increased growth in the industry but probably at a slower rate as a result of increased use of low-sulfur coal at power stations. Exports again accounted for almost one-half of the sales reported by Faxe Kalk in 1992. Despite the strong Danish currency and that limestone and lime are relatively heavy and transportation costs can exceed the value of the product, depending on the distance, these exports (as well as Denmark's imports) demonstrate an increasing concern of the environmental conditions in Denmark and its neighboring countries.

Mineral Fuels.—Danish production of crude petroleum and natural gas, all from offshore facilities, increased by 12.1% and 3.3%, respectively, in 1992 compared with the previous year. Denmark is self-sufficient in meeting domestic demand for natural gas, consuming about 57% of its production domestically. The remainder is exported to Germany and Sweden. With regard to crude petroleum, Denmark's production covers about 85% of annual apparent consumption, with the remainder being imported, using percentages for 1992 trade, from Norway (59% of total crude petroleum imports), the United Kingdom (28% of total imports), Russia (10% of total imports), Latvia (2% of total imports), and Germany (1% of total imports). Of the apparent consumption of crude petroleum for 1992, 97% was delivered to refineries and the remainder to unspecified industry. Denmark produces no coal so all consumption requirements must be imported. The availability of imported coal in 1992 reached 12,098 kilotons, a decrease of 4% from the amount available in 1991. This reduction is in keeping with Denmark's plans to become as self-sufficient in energy production as possible, substituting domestically produced crude petroleum and natural gas for imported coal. The top six suppliers of coal to Denmark and their ranking did not change from 1991 although the amounts supplied did change. These suppliers, in order from first to sixth in 1992 along with the percentage change from the amount provided in 1991, were the United States (down 20.7%), Colombia (down 24.0%), Australia (down 14.7%), states of the former U.S.S.R. (down 4.7%), Canada (up 91.6%), and Poland (up 50.4%).

Reserves.—Denmark has no known economically exploitable reserves of metal ores but has large reserves of nonmetallic materials such as chalk, diatomaceous earths, limestone, and sand and gravel. No reserve figures are available for these materials because of the varied uses for them and the changing technologies that produce marketable products from the raw materials. For example, chalk that a few years ago was considered unusable because of its lack of whiteness can now be used. This reversal has been made because of a new bleaching capacity based on new technology developed by Faxe Kalk and put into use in 1992. Reserve figures for materials such as sand and gravel would cover an extremely wide range, depending on the prospective use of the sand and gravel, whether for landfill, industrial use, building material, etc. At the end of 1992, reserves of crude petroleum were given at 729,618,000 barrels and reserves of natural gas were given at 113 million cubic meters, all offshore.

Infrastructure

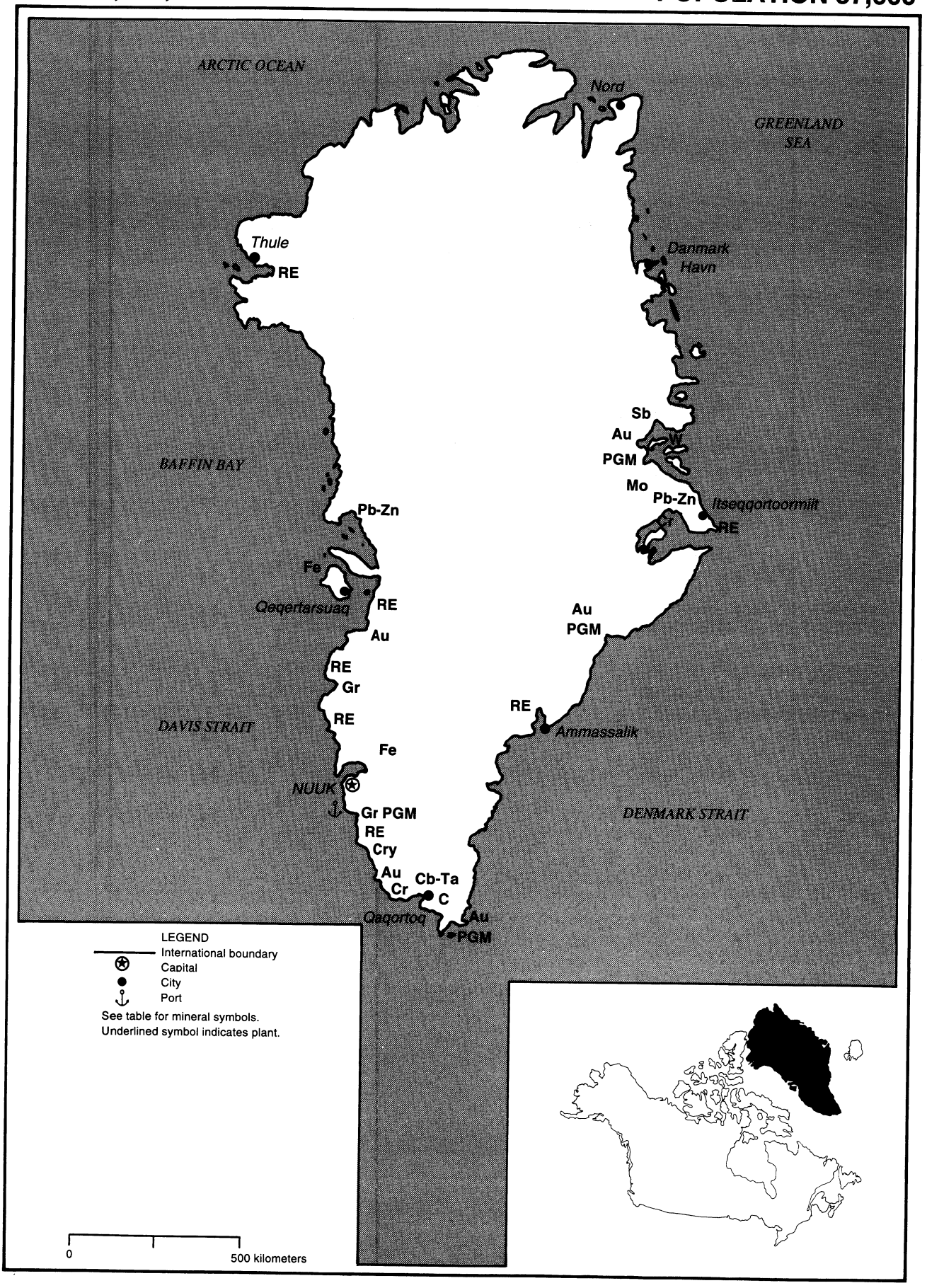
Denmark has a well-developed, modern transportation system. Rail lines total 2,675 km, of which 2,120 km is operated by the Danish State Railways and 655 km is privately owned and operated. The rails are 1.435-meter standard gauge, and 121 km of the Danish State Railways is rail ferry service. Highways consist of 66,482 km, of which 64,551 km is concrete, bitumen, or stone block and 1,931 km is gravel, crushed stone, or improved earth. Inland waterways total 417 km. Pipelines total 1,388 km, of which 110 km is for crude petroleum, 578 km is for petroleum refinery products, and 700 km are for natural gas. Denmark has 108 usable airports, of which 27 have permanent-surface runways. The Danish merchant marine totals 317 vessels of 1,000 gross weight tons or more totaling 5,367,063 gross weight tons (7,921,891 deadweight tons). Of the total vessels, 13 are short-sea passenger vessels, 94 cargo, 21 refrigerated cargo, 38 container ships, 39 roll-on/roll-off, 1 railcar carrier, 42 petroleum tankers, 14 chemical tankers, 33 liquefied gas tankers, 4 livestock carriers, 17 bulk carriers, and 1 combination bulk carrier. In the late 1980's, Denmark created its own internal ship register, the Danish International Ship register (DIS), whose ships do not have to meet Danish staffing standards and amounts to a flag of convenience within the Danish register. At the beginning of 1992, 258 Danish flag ships belonged to the DIS. Denmark's principal ports were Ålborg, Århus, Copenhagen, Esjberg, and Fredericia, and there were numerous secondary and minor ports.

Outlook

The OECD expected, for the next couple of years, a broadly neutral stance of the central Government finances, with stabilizers expected to generate some reduction in the deficit. The sluggish economic performance in 1991 and 1992 was expected to give way to an upturn in 1993, continuing into 1994. The weather, however, will determine annual

GREENLAND

AREA 2,175,600 km² **POPULATION 57,000**



growth owing to its effect on the agricultural sector of the economy, an important sector in Denmark. The impetus to growth was expected to shift from net imports to domestic demand.

FAROE ISLANDS

The Faroe Islands, a self-governing overseas administrative division of Denmark, has no known mineral resources. The economy of the islands is based on the fishing and agricultural industries. Exports of fish and fish products account for almost 90% of total exports, but the depletion of fish stocks in surrounding waters and the loss of long-range fishing opportunities in the late 1970's have consistently depressed this major industry, resulting in greater subsidies from the Danish Government to meet budget requirements. The 10 ships of the merchant marine of the Faroe Islands are included in the Danish registry. The involvement of the Faroe Islands in the international minerals industry consists primarily as the market for imported materials to support the local economy. These imports are principally fuels, fertilizer materials, and building products such as cement.

GREENLAND

Greenland, which has been under home rule since 1979, is a self-governing overseas administrative division of Denmark and as such maintains strong ties to the EC. The Greenland Home Rule authorities and the Danish Government work together determining rules and regulations for taxation, natural resource exploitation, etc. Under former regulations, the gap, and thereby tax revenue, left by the closing of the Black Angel lead-zinc mine on the west coast in 1990 and the cryolite mine at Ivittuut in 1987 was not being filled because of prohibitive factors toward exploration and successful mining ventures. Since the end of mining operations, the economy has been based almost entirely on the fishing and hunting industries. To change this situation, a minerals resource system was established in 1991 and revised in 1992 with the commitment to developing the country's mineral resources. The administration of mineral resources in Greenland is the responsibility of the Danish Minister of Energy, and the day-to-day administration is performed by the Mineral Resources Administration for Greenland (MRA). The MRA is a separate part of the Ministry of Energy and works within bounds of the Mineral Resources Act. The role of the MRA is to supervise the exploration and development of Greenland's mineral wealth. The Gronlands Geologiske Undersogelse (GGU) (Geological Society of Greenland) is an agency associated with the MRA and provides geological information. It is also charged with assisting the MRA in the inspection of field activities, evaluation of exploration results, and the consideration of strategies for the development of Greenland's mineral wealth. The Greenland Environmental Research Institute is associated with the MRA and assists the MRA with environmental studies and regulations in connection with mineral resource projects. Because all land is held by the Danish crown, there is no private land, a situation that facilitates obtaining licenses for mineral prospecting, exploration, production, and processing.

In addition to the exploration for mineral commodities to revive the mining industry, the Greenland Cabinet also has shown interest in the prospect of smelters and refineries in Greenland, an attempt to diversify the economy as much as possible. One prospect that was submitted to the Cabinet late in 1992 was for a zinc refinery near Nuuk. An attraction for this site is the Buksefjord hydroelectric plant being built 55 km south of the city. With the hydroelectric plant to provide power and a probable supply of ore from northern Canada, the possibility of such refineries and smelters seems very probable. Feasibility studies were being started at the end of the year.

Government Policies and Programs

The latest regulations for mineral exploration and development in Greenland include the following:

1. An effective corporate tax rate of 35% with no royalties or production fees with the company choosing the rate of asset write-down.
2. Postproduction back-in rights by the state have been abolished.
3. A Government promise to keep red tape to a minimum. This includes a simplified approach to regulatory approvals. The MRA, assisted by the GGU, handles all communications from an applicant company, processing license applications, granting licenses, regulating exploration, monitoring development, etc.
4. Potential tax breaks are possible for mining companies that build mineral processing plants on- or near-site.

The new regulations have already had an effect and, during 1992, exploration activity revealed the potential for economic exploitation of antimony, barite, beryllium, chromite, coal (high volatile subbituminous), columbium, copper, cryolite, diamond, gold, graphite, ilmenite, iron, lead, molybdenum, nickel, platinum-group metals, rare earths, tantalum, thorium, tungsten, uranium, zinc, and zirconium. However, owing to the inhospitable terrain and arctic climate, the vast majority of the island remains unexplored, although modern exploration techniques now being used might be able to conquer these obstacles.

Production

Greenland has not produced any mineral commodities since 1990. The minerals indicated on the accompanying map are deposits that have been identified by recent exploration.

Trade

Since the cessation of mining in Greenland, the principal mineral commodity exports and reexports have been metal scrap, mostly to Denmark and Germany. Imports of mineral commodities consist of all the materials needed to sustain a modern economy but are principally processed metals, fertilizer materials, building materials, and petroleum refinery products. Imports are principally, by magnitude, from Denmark,

Norway, the United States, and Germany. *(See tables 7 and 8.)*

Infrastructure

Greenland is the largest island in the world, but the great majority of the land is inaccessible. The total land area is 2,175,600 km^2 with 341,700 km^2 ice free. The remainder of the island is covered by an icecap up to 3,000 m thick.

The population of Greenland is concentrated on the southern half of the west coast of the island, and the cities there are served by a system of air and sea links. All the major cities and towns have modern harbor facilities. The 80 km of highways on the island is within cities but do not connect cities. The only vessel in Greenland's merchant marine, a 1,778-deadweight tons refrigerated cargo ship, operates under the registry of Denmark.

OTHER SOURCES OF INFORMATION

Agencies

Danmarks Geologiske Undersogelse
(Geological Survey of Denmark)
Copenhagen, Denmark
Danmarks Statistik
Copenhagen, Denmark
Ministry of Economic Affairs
Copenhagen, Denmark
Ministry of Environment
Copenhagen, Denmark
Ministry of Energy
Copenhagen, Denmark
Organization for Economic Cooperation and Development
2, rue André-Pascal
75775 Paris Cedex 16
France
Mineral Resources Administration of Greenland
Slotsholmsgade 1, 4th floor
DK-1216 Copenhagen K
Denmark
Geological Survey of Greenland
Oster Voldgade 10
DK-1350 Copenhagen K
Denmark
Minerals Office
The Secretariat
Greenland Home Rule Government
P.O. Box 1015
DK-3900 Nuuk
Greenland

Publications

Varestatistik for industri, Serie A, B, C, D, Danmarks Statistiks Copenhagen, Denmark.
Statistisk Ågbog, Danmarks Statistik Copenhagen, Denmark.
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TABLE 1

DENMARK: SALES OF DOMESTICALLY PRODUCED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992
Cement, hydraulic		1,681,000	2,004,000	1,656,000	2,016,000	2,072,081
Chalk		e210,000	e250,000	e275,000	e310,000	354,989
Clays:						
Kaolin		39,324	r16,029	17,423	r17,057	3,503
Other		230	e250	—	—	—
Cryolite		e18,000	e18,000	r e15,000	—	—
Diatomaceous materials:						
Diatomite		e6,000	e6,000	e1,000	r e1,000	e1,000
Moler[3]		r e94,500	r e75,500	r e97,000	r e95,000	e95,000
Gas:						
Manufactured	million cubic meters	117	106	102	e100	e100
Natural:						
Gross[3]	do.	r e4,700	r5,330	r5,140	5,760	e6,000
Marketable	do.	2,405	2,836	2,914	3,723	3,847
Iron and steel metal: Steel:[3]						
Crude		650,000	625,000	610,000	633,000	591,000
Semimanufactures		580,000	619,000	539,000	518,000	525,000
Lime, hydrated and quicklime		114,000	131,000	134,000	r156,000	163,000
Natural gas plant liquids[3]	thousand 42-gallon barrels	e34,300	e38,900	e37,500	e42,000	e43,500
Peat		r e180,282	r e259,155	r e224,789	r e200,000	194,983
Petroleum:						
Crude[3]	thousand 42-gallon barrels	36,222	42,304	45,387	51,929	58,227
Refinery products:						
Liquefied petroleum gas	do.	1,752	1,624	1,659	1,670	1,445
Gasoline	do.	11,042	11,951	11,203	13,184	14,193
Naphtha	do.	2,057	2,414	2,134	1,292	1,907
Mineral jelly and wax	do.	(4)	(4)	(4)	(4)	4
Jet fuel	do.	1,848	1,992	1,992	e2,000	e1,700
Kerosene	do.	357	411	589	e300	126
Distillate fuel oil	do.	24,215	25,357	24,543	27,878	28,732
Refinery gas	do.	1,855	1,989	1,940	e1,900	e1,900
Lubricants	do.	7	e3	3	e100	324
Residual fuel oil	do.	15,684	16,217	14,785	13,307	13,270
Bitumen and bituminous mixtures	do.	345	291	164	61	63
Petroleum coke	do.	e3	e3	e3	e3	3
Total e	do.	59,164	62,252	59,014	61,694	63,667
Salt, all forms		548,085	551,871	522,206	550,150	528,429
Sand and gravel:[3]						
On shore	thousand cubic meters	28,356	27,979	22,444	e22,000	e20,000
Off shore	do.	3,566	7,701	6,223	e6,000	e5,000
Total	do.	r31,922	r35,680	r28,667	r e28,000	e25,000
Of which: Sand, industrial (sales)	do.	r179	r221	r133	r e130	e125
Stone:						
Dimension (mostly granite)[3]	do.	r392	r370	r810	r e500	e385
Limestone, other than dimension:						
Agricultural		1,795,000	e1,800,000	1,482,000	r e1,000,000	806,169
Industrial		172,000	e180,000	205,000	r e210,000	217,411
Sulfur, byproduct		13,571	r18,842	12,118	r6,264	9,916

eEstimated. rRevised.

[1]Table includes data available through June 1993.

[2]The commodity "Soda ash" has been deleted from this table because there is no indication that it is now being, or has been for several years, produced. If it is produced, the entire amount is probably consumed by the producer and none enters the market. The commodity "Flint," listed under "Stone" in previous editions of this table, has been removed because listing it separately was double counting because it had already been included with "Sand and gravel."

[3]Production.

[4]Less than ½ unit.

TABLE 2

DENMARK: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali metals	1	(2)	—	All to United Kingdom.
Aluminum:				
Ore and concentrate	31	25	6	Finland 19.
Oxides and hydroxides	174	196	82	United Kingdom 51; Netherlands 18.
Metal including alloys:				
Scrap	28,989	26,763	172	Germany 11,806; Netherlands 4,934; Belgium-Luxembourg 2,817.
Unwrought	9,464	8,207	—	Germany 5,642; Austria 1,505; Belgium-Luxembourg 292.
Semimanufactures	24,160	24,357	62	Germany 11,241; Sweden 2,965; France 2,220.
Beryllium: Metal including alloys, all forms kilograms	—	(2)	—	All to Norway.
Bismuth: Metal including alloys, all forms value, thousands	$8	$31	—	Italy $11; Sweden $5; Jordan $4.
Chromium:				
Ore and concentrate	—	47	—	All to Italy.
Oxides and hydroxides	2	9	—	Sweden 8; United Kingdom 1.
Metal including alloys, all forms	159	126	—	Sweden 93; Germany 32.
Cobalt:				
Ore and concentrate	—	2	—	All to United Kingdom.
Oxides and hydroxides	(2)	(2)	—	NA.
Metal including alloys, all forms	9	(2)	—	NA.
Columbium and tantalum: Tantalum metal including alloys, all forms	—	41	—	Sweden 40; Germany 1.
Copper:				
Ore and concentrate	—	5	—	All to Norway.
Matte and speiss including cement copper	—	23	—	All to Germany.
Oxides and hydroxides	21	NA		
Sulfate	2	NA		
Ash and residue containing copper	1,290	NA		
Metal including alloys:				
Scrap	22,079	22,641	111	Germany 16,355; Belgium-Luxembourg 2,346; France 1,229.
Unwrought	272	471	—	Germany 319; Sweden 136; Iceland 8.
Semimanufactures	8,305	9,046	6	Germany 3,700; Italy 1,103; France 902.
Gallium	(2)	—		
Gold:				
Waste and sweepings value, thousands	$36,096	$21,468	—	Germany $20,451; United Kingdom $624; Sweden $220.
Metal including alloys, unwrought and partly wrought kilograms	1,941	953	1	Germany 532; Norway 143; Sweden 112.
Iron and steel:				
Iron ore and concentrate: Excluding roasted pyrite	4,265	1,122	—	All to Germany.
Metal:				
Scrap	310,496	289,888	—	Germany 119,396; Netherlands 106,804; Sweden 36,300.
Pig iron, cast iron, related materials	236	463	—	Poland 318; Sweden 50; Austria 24.

See footnotes at end of table.

TABLE 2—Continued

DENMARK: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Ferroalloys:				
Ferrochromium	27	9	—	All to Germany.
Ferromanganese	1	32	—	Sweden 31; Iceland 1.
Ferrosilicon	1	NA		
Ferrosilicomanganese	1	NA		
Silicon metal kilograms	2,000	1	1	
Unspecified	5	6	—	Sweden 4; Sri Lanka 2.
Steel, primary forms	6,089	15,499	—	Germany 9,870; United Kingdom 3,511; Sweden 928.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel: Not clad, plated, coated	336,936	369,212	3,400	Germany 141,693; Sweden 82,051; United Kingdom 29,947.
Clad, plated, coated	24,627	24,771	—	Sweden 14,345; Norway 2,657; Finland 2,479.
Of alloy steel	2,721	2,278	1	Sweden 1,048; Norway 231; Iceland 227.
Bars, rods, angles, shapes, sections	137,083	127,281	6	Germany 57,985; Sweden 23,327; United Kingdom 17,367.
Rails and accessories	4,151	1,076	—	Germany 963; Italy 53; Faroe Islands 30.
Wire	1,671	1,604	3	Germany 1,101; Sweden 248; Belgium-Luxembourg 59.
Tubes, pipes, fittings	92,199	115,022	187	Sweden 34,838; Germany 29,543; United Kingdom 10,821.
Lead:				
Oxides	20	1	—	Mostly to Sweden.
Ash and residue containing lead	1,493	NA		
Metal including alloys:				
Scrap	14,392	16,350	—	Sweden 9,570; Germany 5,126; Belgium-Luxembourg 760.
Unwrought	1,142	403	—	Sweden 255; Iceland 36; Germany 27.
Semimanufactures	194	183	—	Sweden 53; Germany 42; France 24.
Magnesium: Metal including alloys:				
Scrap	39	94	—	United Kingdom 61; Belgium-Luxembourg 21; Germany 12.
Semimanufactures	6	3	—	Sweden 2; Germany 1.
Manganese: Oxides	2	—		
Metal including alloys, all forms	127	82	—	Sweden 62; Greenland 20.
Mercury	6	—		
Molybdenum: Metal including alloys, semimanufactures kilograms	100	NA		
Nickel:				
Ore and concentrate	51	31	—	All to Sweden.
Matte and speiss	—	(2)	—	All to Germany.
Ash and residue containing nickel	31	NA		

See footnotes at end of table.

TABLE 2—Continued

DENMARK: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Nickel—Continued:					
Metal including alloys:					
Scrap		110	150	—	Germany 104; Austria 46.
Semimanufactures		7	20	—	United Kingdom 17; Netherlands 3.
Platinum-group metals:					
Waste and sweepings	value, thousands	$3,419	$516	—	Netherlands $376; United Kingdom $99; Germany $38.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	106,000	NA		
Platinum	value, thousands	$206	$177	—	All to United Kingdom.
Rhodium	grams	6,551	NA		
Iridium, osmium, ruthenium	do.	5,413	NA		
Unspecified	value, thousands	—	$1,729	—	Sweden $1,645; Finland $30; Switzerland $18.
Rare-earth metals including alloys, all forms		10	NA		
Selenium, elemental		3	5	—	Sweden 4; Italy 1.
Silver:					
Ore and concentrate	kilograms	—	4,958	—	Germany 4,890; Sweden 68.
Waste and sweepings[3]	value, thousands	$8,970	$7,703	$126	Switzerland $2,486; Germany $2,378; United Kingdom $2,043.
Metal including alloys, unwrought and partly wrought	do.	$4,506	$4,366	$2	Sweden $1,947; Finland $1,251.
Tin:					
Ash and residue containing tin		43	NA		
Metal including alloys:					
Scrap		663	880	—	Netherlands 549; Germany 185; Sweden 145.
Unwrought		13	9	—	Sweden 3; Iran 2; Italy 1.
Semimanufactures		189	113	—	Netherlands 95; France 13; Sweden 3.
Titanium:					
Oxides		118	169	—	Norway 56; Sweden 40; Iceland 22.
Metal including alloys:					
Unwrought, including scrap		24	17	—	All to Germany.
Semimanufactures		18	3	—	Do.
Tungsten: Metal including alloys:					
Unwrought, including scrap		3	2	—	Do.
Semimanufactures		2	5	—	Norway 3; Sweden 2.
Vanadium: Oxides		4	NA		
Zinc:					
Ore and concentrate		—	37	—	All to Norway.
Oxides		169	108	—	Germany 92; Sweden 7; Iceland 5.
Blue powder		214	147	—	Germany 23; Norway 22; Italy 15.
Ash and residue containing zinc		2,721	NA		
Metal including alloys:					
Scrap		4,843	4,272	—	Germany 1,155; Norway 1,145; France 151.

See footnotes at end of table.

TABLE 2—Continued

DENMARK: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Zinc—Continued:				
Metal including alloys—Continued:				
Unwrought	680	215	—	Germany 122; Norway 57; Sweden 30.
Semimanufactures	94	64	—	Norway 27; Greenland 11.
Zirconium:				
Ore and concentrate	70	40	—	All to Sweden.
Metal including alloys, semimanufactures kilograms	(2)	(2)	—	NA.
Other:				
Ores and concentrates	—	(2)	—	All to Poland.
Oxides and hydroxides	(2)	18	—	Belgium-Luxembourg 16; Cyprus 1; Netherlands 1.
Ashes and residues	32	4,853	—	Norway 2,934; Germany 1,288; Sweden 267.
Base metals including alloys, all forms	(2)	—		
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	67	61	—	Germany 50; Sweden 5; Iceland 3.
Artificial:				
Corundum	3	10	—	Germany 5; Iceland 5.
Silicon carbide	40	NA		
Dust and powder of precious and semiprecious stones excluding diamond value, thousands	$3	$2	—	All to Norway.
Grinding and polishing wheels and stones	1,602	1,294	7	Ethiopia 663; Yemen 111; Saudi Arabia 97.
Barite and witherite	18	43	—	Norway 30; United Kingdom 13.
Boron materials:				
Crude natural borates	9	—		
Elemental kilograms	(2)	NA		
Oxides and acids	125	111	—	Sweden 45; Finland 43; Norway 21.
Cement	389,927	884,536	1	United Kingdom 198,843; Nigeria 181,371; unspecified 443,978.
Chalk	268,598	307,117	—	Finland 211,511; Sweden 67,742; Portugal 18,661.
Clays, crude:				
Bentonite	237	1,354	—	Finland 887; Sweden 262; Norway 198.
Chamotte earth	11	NA		
Fuller's earth	26	NA		
Kaolin	531	505	—	Sweden 182; Finland 128; Germany 105.
Unspecified	15,497	14,152	—	Netherlands 8,452; Germany 3,588; Sweden 1,377.
Cryolite and chiolite	10,384	2,537	—	NA.
Diamond:				
Gem, not set or strung value, thousands	$544	$636	—	Belgium-Luxembourg $387; France $116; Switzerland $41.
Industrial stones do.	$8	—		
Dust and powder do.	$3	$2	—	All to Norway.
Diatomite and other infusorial earth	84,587	84,988	26	Germany 23,270; United Kingdom 21,233; Netherlands 14,707.
Feldspar	25	71	—	All to Germany.

See footnotes at end of table.

TABLE 2—Continued

DENMARK: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Fertilizer materials:				
Crude, n.e.s.	1,670	2,816	—	Germany 1,655; Norway 588; Sweden 340.
Manufactured:				
Ammonia	359	3,127	—	Sweden 3,087; Faroe Islands 14; Iceland 10.
Nitrogenous	11,648	3,744	—	Germany 2,455; Sweden 665; Faroe Islands 371.
Phosphatic	67,845	1,816	—	Sweden 290; Finland 98; unspecified 1,348.
Potassic	25	50	—	Japan 26; Germany 14; Netherlands 9.
Unspecified and mixed	377,733	356,150	22	Germany 1,415; Sweden 716; unspecified 353,612.
Graphite, natural	3	51	—	All to Germany.
Gypsum and plaster	3,544	34,960	—	Sweden 32,544; Norway 2,140; Netherlands 24.
Iodine	(2)	—		
Lime	7,512	14,190	—	Norway 8,464; Germany 3,226; Sweden 2,146.
Magnesium compounds:				
Magnesite, crude	3	34	—	Norway 17; Spain 12; Finland 5.
Oxides and hydroxides	424	32	—	Germany 28; Finland 4.
Sulfate	32	NA		
Mica:				
Crude including splittings and waste	13	—		
Worked including agglomerated splittings	16	19	—	Finland 8; United Kingdom 5; Sweden 3.
Phosphates, crude	1,267	1,113	22	Sweden 807; Japan 119; United Kingdom 110.
Pigments, mineral:				
Natural, crude	85	NA		
Iron oxides and hydroxides, processed	122	124	—	Canada 39; Sweden 21; Iceland 16.
Potassium salts, crude	—	1	—	Mainly from United Kingdom.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$580	$536	$1	Hong Kong $173; Belgium-Luxembourg $116; Germany $62.
Synthetic grams	210	—		
Pyrite, unroasted	38	60	—	Norway 33; Sweden 25; Faroe Islands 2.
Salt and brine	305,012	301,908	2	Sweden 187,382; Norway 91,464; Finland 11,662.
Sodium compounds, n.e.s.:				
Soda ash, manufactured	118	15	—	Germany 11; Faroe Islands 4.
Sulfate, manufactured	95	465	—	Norway 242; Belgium-Luxembourg 116; Netherlands 58.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	28,309	66,245	—	Germany 65,510; Norway 489; Netherlands 89.
Worked	14,651	17,216	—	Germany 12,999; Sweden 2,666; United Kingdom 625.
Dolomite, chiefly refractory-grade	110	1,470	—	Germany 1,450; Sweden 15; Cyprus 5.
Gravel and crushed rock	760,306	1,121,085	—	Germany 1,102,796; United Kingdom 9,270; Sweden 4,548.
Limestone other than dimension	119,846	122,410	5	Germany 70,791; Sweden 26,426; Norway 20,949.
Quartz and quartzite	119	307	—	Germany 125; United Kingdom 74; Sweden 55.
Sand other than metal-bearing	240,851	238,001	—	Sweden 137,810; Germany 79,670; Norway 8,466.
Sulfur:				
Elemental:				
Crude including native and byproduct	3,379	5,155	—	Germany 5,140; Austria 7; Sweden 5.

See footnotes at end of table.

TABLE 2—Continued

DENMARK: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur—Continued:					
Elemental:					
Colloidal, precipitated, sublimed		67	—		
Dioxide		—	27	—	Germany 15; Sweden 12.
Sulfuric acid		68,334	11,773	—	Germany 7,827; Belgium-Luxembourg 3,825; Norway 49.
Talc, steatite, soapstone, pyrophyllite		29	54	—	Cyprus 27; Sweden 15; Germany 10.
Vermiculite[4]		18	12	—	Norway 6; Sweden 6.
Other:					
Crude		215	356	—	Norway 191; Germany 68; Sweden 19.
Slag and dross, not metal-bearing		121,374	72,798	—	Norway 53,999; Germany 10,912; Iceland 3,154.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		1,672	1,417	—	Germany 1,373; Faroe Islands 13; Sweden 13.
Carbon black		21	13	—	Indonesia 3; Sweden 2; Spain 2.
Coal:					
Anthracite		143	76	—	All to Germany.
Bituminous		41,220	33,469	—	Sweden 7,518; Germany 7,071; Norway 6,560.
Briquets of anthracite and bituminous coal		183	97	—	Greenland 82; Norway 15.
Lignite including briquets		1,748	1,285	—	All to Ireland.
Coke and semicoke		510	1,353	—	Sweden 1,278; Czechoslovakia 45; Belgium-Luxembourg 25.
Gas, natural: Liquefied	cubic meters	—	67,200	—	All to Sweden.
Peat including briquets and litter		10,879	11,651	—	Spain 2,733; Sweden 2,619; Netherlands 1,566.
Petroleum:					
Crude	thousand 42-gallon barrels	20,866	30,994	—	Sweden 13,028; United Kingdom 6,391; Norway 4,717.
Refinery products:					
Liquefied petroleum gas	do.	737	762	19	Netherlands 209; United Kingdom 161; Switzerland 109.
Gasoline	do.	23,114	6,408	—	Sweden 4,253; Netherlands 1,375; Germany 307.
Mineral jelly and wax	do.	5	6	(2)	Sweden 4; Germany 1.
Kerosene and jet fuel	do.	—	108	—	Sweden 105; Germany 3.
Distillate fuel oil	do.	—	8,095	—	Sweden 3,152; Germany 2,078; Poland 431.
Lubricants	do.	—	92	—	Iceland 21; Norway 21; Faroe Islands 11.
Residual fuel oil	do.	—	8,319	262	Italy 4,256; Netherlands 851; United Kingdom 679.
Bitumen and other residues	do.	7	6	—	Germany 4; Norway 1; Sweden 1.
Bituminous mixtures	do.	13	12	—	Germany 3; Finland 2; Sweden 2.

NA Not available.
[1]Table prepared by Theodore T. Spittal.
[2]Less than 1/2 unit.
[3]May include other precious metals.
[4]Includes perlite and chlorite.

TABLE 3

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	11	3	1	Netherlands 2.
Alkaline-earth metals	60	10	(2)	Germany 9.
Aluminum:				
Ore and concentrate	2,667	2,185	2	Germany 925; China 508; Belgium-Luxembourg 383.
Oxides and hydroxides	5,329	5,448	1,061	United Kingdom 2,696; Germany 1,608.
Ash and residue containing aluminum	2	NA		
Metal including alloys:				
Scrap	6,074	9,637	—	Germany 6,312; Sweden 2,085; Norway 633.
Unwrought	29,789	29,610	23	Norway 13,255; Netherlands 8,279; Germany 3,872.
Semimanufactures	75,549	57,356	54	Germany 13,737; Sweden 13,600; Norway 6,717.
Antimony:				
Oxides	83	NA		
Metal including alloys, all forms value, thousands	$22	$31	—	All from Sweden.
Beryllium: Metal including alloys all forms	(2)	(2)	(2)	NA.
Bismuth: Metal including alloys, all forms value, thousands	$57	$60	—	United Kingdom $47; Switzerland $8; Germany $5.
Cadmium: Metal including alloys, all forms do.	$13	NA		
Chromium:				
Ore and concentrate	14,770	2,879	—	Norway 2,232; Germany 572; Netherlands 24.
Oxides and hydroxides	312	353	(2)	Italy 200; Germany 132; Poland 18.
Metal including alloys, all forms	16	25	—	Zimbabwe 11; Germany 10; Italy 4.
Cobalt:				
Ore and concentrate	—	1	—	All from Netherlands.
Oxides and hydroxides	2	31	—	France 24; Germany 5; Canada 2.
Metal including alloys, all forms	24	16	—	Finland 8; France 3; Sweden 2.
Columbium and tantalum: Metal including alloys, all forms:				
Columbium (niobium) kilograms	400	—		
Tantalum value, thousands	$3	$33	$6	Germany $19; Austria $8.
Copper:				
Ore and concentrate	156	76	—	All from Germany.
Matte and speiss including cement copper	7	—		
Oxides and hydroxides	1,182	NA		
Sulfate	1,777	NA		
Ash and residue containing copper	190	NA		
Metal including alloys:				
Scrap	19,774	19,612	—	Sweden 8,400; Germany 7,542; Norway 1,701.
Unwrought	2,844	2,797	—	Sweden 1,564; United Kingdom 870; Germany 141.
Semimanufactures	36,268	38,543	37	Germany 15,848; Sweden 11,123; France 3,366.
Gallium: Metal including alloys, all forms kilograms[3]	100	—		
Germanium: Metal including alloys, all forms	5	(2)	(2)	NA.

See footnotes at end of table.

TABLE 3—Continued

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Gold:				
Waste and sweepings value, thousands	$1,563	$1,267	—	Sweden $872; Norway $265; Finland $83.
Metal including alloys, unwrought and partly wrought kilograms	1,218	1,328	4	Switzerland 490; Germany 461; Netherlands 301.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite	2,733	2,544	—	Sweden 2,482; Netherlands 53; France 9.
Pyrite, roasted	26,438	25,805	—	Norway 25,804; United Kingdom 1.
Metal:				
Scrap	74,290	124,666	1	Germany 95,098; Sweden 17,022; United Kingdom 6,415.
Pig iron, cast iron, related materials	112,350	112,951	4	U.S.S.R. 86,377; Brazil 7,057; Poland 6,292.
Ferroalloys:				
Ferrocolumbium	50	NA		
Ferrochromium	103	50	—	Germany 42; Sweden 7; United Kingdom 1.
Ferromanganese	2,523	2,474	—	Norway 1,317; United Kingdom 1,104; Germany 27.
Ferromolybdenum	7	NA		
Ferronickel	(2)	(2)	—	All from Sweden.
Ferrosilicochromium	10	NA		
Ferrosilicomanganese	2,807	4,601	—	Norway 4,600; Germany 1.
Ferrosilicon	3,629	3,725	—	Norway 3,176; Germany 390; France 74.
Ferrotitanium[4]	10	NA		
Ferrovanadium	14	NA		
Silicon metal[5]	1,024	902	1	Norway 526; Netherlands 223; Germany 52.
Unspecified	1,155	984	—	Norway 469; Germany 403; United Kingdom 81.
Steel, primary forms	40,525	10,022	(2)	Germany 6,285; Sweden 2,256; Italy 523.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	659,495	732,459	—	Sweden 198,469; Finland 134,234; Germany 128,280.
Clad, plated, coated	276,951	287,360	38	Germany 59,059; France 48,004; Sweden 43,953.
Of alloy steel	58,342	60,900	59	Sweden 17,693; Germany 17,085; Finland 11,228.
Bars, rods, angles, shapes, sections	376,612	341,605	5	Germany 87,867; United Kingdom 47,944; Sweden 47,373.
Rails and accessories	11,784	13,029	8	Austria 10,622; Belgium-Luxembourg 442; Sweden 278.
Wire	44,934	45,174	(2)	Germany 25,196; Belgium-Luxembourg 7,063; Sweden 5,372.
Tubes, pipes, fittings	240,581	236,818	598	Germany 83,067; United Kingdom 25,643; Netherlands 21,211.
Lead:				
Oxides	212	182	—	Germany 172; United Kingdom 7; France 3.
Metal including alloys:				
Scrap	814	723	—	Germany 321; Sweden 179; Norway 149.
Unwrought	5,842	5,329	—	Sweden 2,557; Germany 2,190; Poland 70.
Semimanufactures	4,967	5,151	—	Germany 4,442; Norway 280; Sweden 202.

See footnotes at end of table.

TABLE 3—Continued

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Magnesium:					
Metal including alloys:					
Unwrought		88	68	(2)	Norway 66.
Semimanufactures		103	67	46	Switzerland 17; Germany 3.
Manganese:					
Ore and concentrate: Metallurgical-grade		174	264	—	Netherlands 278; Germany 24; United Kingdom 2.
Oxides		1,076	903	—	Netherlands 371; Belgium-Luxembourg 225; Greece 168.
Metal including alloys, all forms		1,672	434	—	Norway 400; Netherlands 26; Germany 4.
Mercury		4	15	—	Germany 10; Finland 3.
Molybdenum:					
Ore and concentrate		—	4	—	All from Netherlands.
Oxides and hydroxides		45	NA		
Metal including alloys:					
Scrap		(2)	(2)	—	All from Germany.
Unwrought		5	NA		
Semimanufactures		1	1	—	NA.
Nickel:					
Ore and concentrate		846	—		
Matte and speiss		760	518	—	Germany 515; Italy 2.
Oxides and hydroxides		9	NA		
Ash and residue		—	NA		
Metal including alloys:					
Scrap		38	47	—	Sweden 36; Poland 9; Germany 2.
Unwrought		131	21	—	Germany 20.
Semimanufactures		302	350	8	United Kingdom 222; Germany 89; Switzerland 9.
Platinum-group metals:					
Waste and sweepings	value, thousands	$1,144	$325	—	Sweden $285; Finland $38; Norway $1.
Metals including alloys, unwrought and partly wrought:					
Platinum	do.	—	$24	—	Japan $16; Switzerland $6; Germany $2.
Unspecified[6]	do.	$6,054	$5,127	$181	Netherlands $2,186; Switzerland $1,674; Germany $635.
Rare-earth metals including alloys, all forms	kilograms	10	NA		
Selenium, elemental		36	r57	(2)	Italy 36; United Kingdom 10.
Silver:					
Ore and concentrate		6	2,908		All from Sweden.
Waste and sweepings[5]	value, thousands	$1,483	$1,335	—	Sweden $446; Norway $311; Germany $27.
Metal including alloys, unwrought and partly wrought	do.	$13,552	$8,696	$7	Switzerland $2,726; Germany $2,330; Italy $1,267.
Tin:					
Oxides		3	NA		
Metal including alloys:					
Scrap		15	1	—	All from United Kingdom.
Unwrought		121	68	(2)	Sweden 48; United Kingdom 9; Brazil 5.
Semimanufactures		448	738	(2)	Spain 497; Germany 90; Sweden 56.

See footnotes at end of table.

TABLE 3—Continued

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Titanium:					
Oxides		3,636	3,307	21	Norway 1,898; Finland 727; France 125.
Ore and concentrate		131	46	—	All from Finland.
Metal including alloys:					
Unwrought, including scrap		9	72	—	Finland 50; Germany 21.
Semimanufactures		206	202	5	Germany 19; Norway 9; unspecified 163.
Tungsten:					
Ore and concentrates		25	—		
Metal including alloys:					
Unwrought, including scrap		3	3	2	Germany 1.
Semimanufactures	kilograms	7,200	1,000	NA	NA.
Uranium and thorium:					
Ore and concentrate: Uranium		(2)	—		
Oxides and other compounds	value, thousands	$18	$348	$336	Germany $5; United Kingdom $2.
Metal including alloys, all forms:					
Uranium	do.	$65	$2	—	All from United Kingdom.
Vanadium:					
Oxides and hydroxides		4	NA		
Metal including alloys, all forms		6	11	—	Netherlands 7; Germany 4.
Zinc:					
Oxides		2,919	3,606	250	Germany 2,713; Netherlands 223; France 168.
Blue powder		1,741	2,065	(2)	Norway 859; Belgium-Luxembourg 453; France 325.
Matte		(2)	—		
Ash and residue containing zinc		676	NA		
Metal including alloys:					
Scrap		244	182	—	Germany 150; Sweden 17; Poland 14.
Unwrought		15,878	16,399	—	Finland 7,252; Norway 7,007; United Kingdom 1,305.
Semimanufactures		3,914	2,490	—	France 1,905; Germany 935; Netherlands 515.
Zirconium:					
Ore and concentrate		113	104	—	United Kingdom 77; Germany 27.
Oxides		2	NA		
Metal including alloys:					
Unwrought		(2)	(2)	—	All from Netherlands.
Semimanufactures		22	2	—	Germany 1. Sweden 1.
Other:					
Ores and concentrates		95	222	75	Canada 96; Germany 27.
Oxides and hydroxides		1,482	NA		
Ashes and residues		1,804	1,290	—	France 921; Finland 192; Norway 86.
Base metals including alloys, all forms		(2)	(2)	NA	NA.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		8,346	12,918	—	Iceland 11,818; Germany 454; Turkey 269.
Artificial:					
Corundum		325	513	(2)	Germany 484; Netherlands 17; United Kingdom 12.
Silicon carbide		596	NA		

See footnotes at end of table.

TABLE 3—Continued

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Abrasives, n.e.s.—Continued:					
Dust and powder of precious and semi-precious stones excluding diamond	value, thousands	$992	$654	$401	Switzerland $109; France $69.
Grinding and polishing wheels and stones		1,151	981	3	Germany 371; Austria 262; Netherlands 102.
Asbestos, crude		800	802	—	Canada 793; United Kingdom 9.
Barite and witherite		16,917	29,902	—	Netherlands 19,351; Norway 8,911; United Kingdom 817.
Boron materials:					
Crude natural borates		1,108	66	—	Germany 44; Belgium-Luxembourg 22.
Elemental		7	NA		
Oxides and acids		614	695	240	France 137; Turkey 95.
Bromine		24	[9]23	3	Netherlands 14; Germany 4.
Cement		196,984	184,695	—	Poland 135,737; United Kingdom 29,423; Germany 15,253.
Chalk		21,332	17,116	—	Germany 13,005; Sweden 1,504; Netherlands 51.
Clays, crude:					
Bentonite		12,301	13,214	16	Germany 8,882; Cyprus 1,470; United Kingdom 1,164.
Chamotte earth		4,791	NA		
Fire clay		500	NA		
Fuller's earth		738	NA		
Kaolin		24,899	22,687	1,538	United Kingdom 15,729; Germany 1,841.
Unspecified		6,039	10,342	517	Germany 6,293; France 766; United Kingdom 708.
Cryolite and chiolite		—	11	—	Germany 6; United Kingdom 5.
Diamond:					
Gem, not set or strung	value, thousands	$3,592	$3,562	$13	Belgium-Luxembourg $2,706; United Kingdom $254; Israel $204.
Unsorted stones	do.	$216	$118	—	Belgium-Luxembourg $101; United Kingdom $17.
Industrial stones	do.	$276	$181	—	Belgium-Luxembourg $177; Netherlands $4.
Dust and powder	do.	$992	$654	$401	Switzerland $109; France $69.
Diatomite and other infusorial earth		4,470	4,915	409	Germany 258; Belgium-Luxembourg 86; unspecified 3,974.
Feldspar, fluorspar, related materials:					
Feldspar		4,994	5,657	—	Norway 5,099; Sweden 454; Germany 90.
Fluorspar		453	448	—	France 442; Netherlands 6.
Unspecified		911	NA		
Fertilizer materials:					
Crude, n.e.s.		123	2,167	—	Germany 2,165; United Kingdom 2.
Manufactured:					
Ammonia		345,317	305,704	—	Netherlands 155,329; United Kingdom 59,051; Germany 37,500.
Nitrogenous		453,871	396,358	—	Sweden 109,408; Poland 70,513; Netherlands 50,874.
Phosphatic		7,463	9,002	—	Netherlands 4,473; Poland 3,049; Sweden 240.
Potassic		294,138	217,787	1,544	Germany 12,390; Netherlands 167; unspecified 203,486.

See footnotes at end of table.

TABLE 3—Continued

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued:					
Manufactured—Continued:					
Unspecified and mixed		507,243	456,172	5,590	Norway 245,128; Poland 42,169; Netherlands 40,141.
Graphite, natural		1,748	1,604	64	Germany 1,443; China 46.
Gypsum and plaster		321,486	314,937	43	Spain 237,970; Germany 72,935; Sweden 6,308.
Iodine		7	NA		
Kyanite and related materials:					
Kyanite		1,145	10,342	1,443	Germany 6,293; France 766.
Mullite		998	NA		
Lime		51,170	83,856	—	Belgium-Luxembourg 38,561; Sweden 36,848; Germany 6,792.
Magnesium compounds:					
Magnesite, crude		5,730	7,218	1	Spain 5,110; China 736; Netherlands 645.
Oxides and hydroxides		9,746	9,149	32	Austria 4,353; Netherlands 2,111; Germany 760.
Sulfate		42,021	NA		
Mica:					
Crude including splittings and waste		228	221	—	Canada 51; Norway 42; United Kingdom 38.
Worked including agglomerated splittings		10	42	—	Germany 35; France 5; Belgium-Luxembourg 2.
Nitrates crude		161	2,227	—	Sweden 1,920; Germany 287; Poland 20.
Phosphates, crude		172,962	27	—	Mainly from Sweden.
Pigments, mineral:					
Natural, crude		229	NA		
Iron oxides and hydroxides, processed		3,824	3,497	22	Germany 2,357; Spain 534; Italy 289.
Potassium salts, crude		26	24	—	All from Germany.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$1,686	$2,175	$108	Germany $760; Belgium-Luxembourg $285; Colombia $267.
Synthetic	do.	$125	$83	$7	Germany $41; Ireland $26.
Pyrite, unroasted		42	68	—	All from Germany.
Quartz crystal, piezoelectric	value, thousands	$20	$30	$4	Japan $15; Germany $11.
Salt and brine		127,150	190,794	42	U.S.S.R. 41,192; Germany 87,552; Netherlands 20,008.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		54,569	55,819	1,239	Germany 35,568; Netherlands 9,262; United Kingdom 7,421.
Sulfate, manufactured		27,465	31,824	—	Sweden 18,380; Germany 5,253; Austria 4,055.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		355,188	296,544	38	Norway 146,695; Sweden 125,753; Germany 12,306.
Worked		55,349	52,254	17	Portugal 22,750; Italy 7,038; Sweden 4,841.
Dolomite, chiefly refractory-grade		66,052	54,869	—	France 42,607; Germany 3,819; Belgium-Luxembourg 3,459.
Gravel and crushed rock	thousand tons	1,453	1,461	(2)	Norway 862; Sweden 520; United Kingdom 46.
Limestone other than dimension		312,541	248,845	—	United Kingdom 141,795; Sweden 81,730; Norway 18,367.
Quartz and quartzite		1,056	1,464	—	Côte d'Ivoire 1,050; Germany 172; Norway 117.
Sand other than metal-bearing		107,860	130,259	1,684	Sweden 53,541; Norway 31,800; Belgium-Luxembourg 29,848.

See footnotes at end of table.

TABLE 3—Continued

DENMARK: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur:					
Elemental:					
Crude including native and byproduct		52,867	27,371	—	Germany 27,163; Poland 190; Belgium-Luxembourg 10.
Colloidal, precipitated, sublimed		41	89	—	Germany 86; United Kingdom 2; Netherlands 1.
Dioxide		1,340	682	—	Sweden 521; Germany 160.
Sulfuric acid		8,140	3,927	—	Norway 2,185; Germany 1,231; Netherlands 509.
Talc, steatite, soapstone, pyrophyllite		10,279	10,398	849	Finland 4,326; Norway 3,249; China 52.
Vermiculite[10]		3,362	725	—	NA.
Other:					
Crude		5,066	27,042	93	Germany 24,741; Norway 422; Netherlands 391.
Slag and dross, not metal-bearing		114,235	97,591	1,243	Germany 50,487; Norway 36,230; Sweden 8,989.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		12,657	17,742	87	Germany 13,165; Finland 3,382; France 812.
Carbon:					
Carbon black		4,844	4,014	—	Sweden 2,209; Germany 839; Netherlands 633.
Gas carbon		593	NA		
Coal:					
Anthracite	thousand tons	134	118	(2)	Poland 100; U.S.S.R. 15.
Bituminous	do.	9,811	NA		
Briquets of anthracite and bituminous coal		(2)	80	80	
Lignite including briquets		8,103	10,223	—	Germany 5,917; Italy 25.
Coke and semicoke		43,084	[11]58,189	210	United Kingdom 28,159; France 10,268; Germany 8,110.
Gas, natural: Liquefied		[r]29,400	44,800	—	All from Germany.
Peat including briquets and litter		32,974	32,824	—	Germany 10,884; Sweden 15,393; U.S.S.R. 2,718.
Petroleum:					
Crude	42-gallon barrels	30,178,840	35,492,084	—	Norway 23,526,077; United Kingdom 9,165,179; Saudi Arabia 1,456,688.
Refinery products:					
Liquefied petroleum gas	do.	197,768	199,010	58	Sweden 69,554; Norway 53,279; Poland 41,308.
Gasoline	do.	32,382,110	6,275,941	153	Sweden 2,954,966; Netherlands 1,382,304; Norway 1,316,922.
Mineral jelly and wax	do.	105,308	121,670	637	Germany 79,086; Sweden 11,435; Hungary 8,822.
Kerosene	do.	—	4,746,178	—	Spain 1,162,864; United Kingdom 861,645; Norway 800,164.
Distillate fuel oil	do.	—	11,879,998	284,935	Sweden 7,044,769; Norway 2,748,525; U.S.S.R. 615,487.
Lubricants	do.	—	490,665	4,333	Germany 156,884; Netherlands 99,869; Poland 57,652.
Residual fuel oil	do.	—	5,696,564	—	U.S.S.R. 3,504,226; Poland 1,148,943; Sweden 628,611.
Bitumen and other residues	do.	1,226,738	1,155,612	—	Sweden 606,745; Germany 317,520; Netherlands 123,806.
Bituminous mixtures	do.	12,562	17,647	188	Germany 12,562; France 2,745.
Petroleum coke	do.	878,212	893,310	—	NA.

[r]Revised. NA Not available.
[1]Table prepared by Theodore T. Spittal.
[2]Less than 1/2 unit.
[3]Includes indium and thallium.
[4]May include ferrosilicotitanium.
[5]May include high-purity silicon.
[6]May include other platinum-group metals.
[7]May include elemental phosphorus.
[8]May include other precious metals.
[9]May include fluorine and iodine.
[10]Includes perlite and chlorite.
[11]May include gas carbon.

TABLE 4

FAROE ISLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Aluminum: Metal including alloys, all forms	186	190	—	Denmark 94; Germany 36; France 27.
Copper: Metals including alloys:				
Unwrought	—	1	—	All from Denmark.
Semimanufactures	76	83	—	Germany 31; Sweden 31; Denmark 11.
Iron and steel: Metal:				
Pig iron, cast iron, related materials	—	5	—	Denmark 4; Spain 1.
Scrap	50	48	—	Denmark 27; Belgium-Luxembourg 13; Netherlands 7.
Steel, primary forms	11	4	—	All from Denmark.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	1,014	787	—	Denmark 410; Norway 272; United Kingdom 76.
Clad, plated, coated:	274	278	—	Denmark 245; United Kingdom 24; Sweden 4.
Of alloy steel	33	65	—	Denmark 52; Germany 11; Sweden 2.
Bars, rods, angles, shapes, sections	1,003	918	—	Denmark 491; Norway 351; Sweden 54.
Rails and accessories	138	30	—	All from Denmark.
Wire	15	48	—	Denmark 43; Sweden 2; United Kingdom 2.
Tubes, pipes, fittings	573	482	—	Denmark 321; United Kingdom 77; Germany 51.
Lead: Metal including alloys:				
Scrap	58	49	—	All from Denmark.
Unwrought	6	18	—	Germany 9; Denmark 5; Italy 3.
Semimanufactures	20	8	—	Denmark 4; Germany 3.
Manganese: Metal including alloys all forms	—	4	—	All from Norway.
Tin: Metal including alloys all forms value, thousands	—	$2	—	Germany $1.
Titanium: Oxides	10	5	—	United Kingdom 3; Norway 2.
Zinc:				
Unwrought	29	41	—	All from Norway.
Semimanufactures	6	5	—	Denmark 2; Germany 2; Netherlands 1.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Artificial: Corundum	1	—		
Dust and powder of precious and semi-precious stones excluding diamond value, thousands	$1	—		
Grinding and polishing wheels and stones	2	—		
Barite and witherite	1	—		
Cement	15,862	13,899	—	Denmark 10,108; Netherlands 3,599; Australia 163.
Chalk	2	5	—	Denmark 3; Sweden 2.
Clays, crude:				
Bentonite	5	9	—	Spain 7; Denmark 2.
Kaolin	—	2	—	All from Norway.
Unspecified	8	5	—	All from Denmark.
Cryolite and chiolite	2	—		

See footnotes at end of table.

TABLE 4—Continued

FAROE ISLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Diatomite and other infusorial earth		16	15	11	Denmark 4.
Fertilizer materials:					
Crude, n.e.s.		8	7	—	All from Denmark.
Manufactured:					
Ammonia		12	15	—	Denmark 7; Norway 7; France 1.
Nitrogenous		443	461	—	Denmark 371; Norway 90.
Phosphatic		8	12	—	All from Denmark.
Unspecified and mixed		1,152	1,348	—	Denmark 1,346; Germany 1; Sweden 1.
Gypsum and plaster		(2)	—		
Lime		23	13	—	All from Denmark.
Pigments, mineral: Iron oxides and hydroxides, processed		3	3	—	All from Germany.
Precious and semiprecious stones other than diamond: Natural	value, thousands	$1	—		
Pyrite, unroasted		1	3	—	All from Denmark.
Salt and brine		15,994	16,438	—	Spain 14,034; Germany 1,922; Denmark 439.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		8	14	—	Norway 8; Denmark 6.
Worked		215	82	—	Denmark 70; Norway 8; Portugal 2.
Gravel and crushed rock		22	3	—	All from Denmark.
Limestone other than dimension		162	135	—	Do.
Sand other than metal-bearing		5,082	4,320	—	Denmark 4,054; Germany 266.
Sulfuric acid		—	3	—	Mainly from Denmark.
Talc, steatite, soapstone, pyrophyllite		8	10	—	All from Norway.
Other:					
Crude		5	1	—	All from Denmark.
Slag and dross, not metal-bearing		43	8	—	Do.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		7,537	5,227	—	Germany 2,616; Norway 2,598; Denmark 13.
Coal: Bituminous		50	1	—	All from Denmark.
Peat, including briquets and litter		101	186	—	Do.
Petroleum:					
Crude	42-gallon barrels	(2)	—		
Refinery products:					
Liquefied petroleum gas	do.	1,369	1,299	—	All from Denmark.
Gasoline	do.	1,718,488	1,604,265	26	Norway 1,360,417; Denmark 197,753.
Mineral jelly and wax	do.	8	(2)	—	NA.
Bitumen and other residues	do.	(2)	—		
Bituminous mixtures	do.	812	673	—	Denmark 539; Belgium-Luxembourg 109; Norway 12.

NA Not available.

[1]The Faroe Islands did not report exports of any mineral commodities in 1991; however, 1,125 tons of salt and brine was exported in 1990. Table prepared by Theodore T. Spittal.

[2]Less than 1/2 unit.

TABLE 5
DENMARK: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons per year unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	Aalborg Portland A/S	Plant at Rordal	3,000
Chalk	A/S Faxe Kalkbrud	Quarries at Stevns and Sigerslev	250
Diatomite (moler)	Skamol-Skarrehage Molervaerk A/S	Quarries on Mors and Fur (Fyr) Islands	85
Do.	Dansk Moler Industri A/S	Quarries on Fur Island	50
Kaolin	Aalborg Portland A/S	Mine and plant on Bornholm Island	25
Lime	A/S Faxe Kalkbrud (Aalborg Portland Holding A/S	Plant at Stubberup, near Fakse, on Zealand Island	190
Natural gas million cubic meters	Maersk Olie og Gas A/S	Roar and Tyra gas Gasfields, Danish North Sea	2,550
Petroleum: Crude barrels per day	Dansk Undergrounds Consortium	Dan, Gorm, Rolf, Skjold and Tyra oilfields, Danish North Sea	127,000
Refined	A/S Dansk Shell	Fredericia	55,000
Do.	Kuwait Petroleum Refining A/S	Gulfhavn	56,500
Do.	Statoil A/S	Kalundborg	65,000
Salt	Dansk Salt I/S	Mine (brine) at Hvornum, processing plant at Mariager	600
Steel	Danish Steel Works Ltd. (Det Danske Stalvalse-vaerk A/S)	Plant at Frederiksvaerk	650

TABLE 6
GREENLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992
Lead: Concentrate, Pb content		23,120	24,120	16,000	—	—
Silver: In lead concentrate, Ag content	kilograms	13,001	14,712	9,176	—	—
Zinc: Concentrate, Zn content		77,520	71,500	47,850	—	—

[1]Table includes data available through May 1993.

TABLE 7
GREENLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Principal destinations, 1991
METALS			
Aluminum: Metal including alloys, scrap	10	4	All to Denmark.
Copper: Metal including alloys, all forms	33	18	Do.
Iron and steel: Metal:			
Scrap	97	256	Do.
Pig iron, cast iron, related materials	—	(2)	Do.
Semimanufactures:			Do.
Wire	—	(2)	Do.
Tubes, pipes, fittings	2	2	Do.
Lead:			
Ore and concentrate	27,573	—	
Metal including alloys, scrap	38	—	

See footnotes at end of table.

TABLE 7—Continued

GREENLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Principal destinations, 1991
METALS—Continued				
Zinc: Ore and concentrate		95,544	—	
Other:				
Base metals including alloys, all forms		—	9	All to Denmark.
INDUSTRIAL MINERALS				
Stone, sand, and gravel:				
Dimension stone:				
Crude and partly worked		16	—	
Worked	value, thousands	—	(2)	Do.
Gravel and crushed rock		—	1	Do.
Quartz and quartzite		—	36	All to Iceland.
MINERAL FUELS AND RELATED MATERIALS				
Petroleum refinery products:				
Gasoline	42-gallon barrels	904	51,000	NA.
Kerosene and jet fuel	do.	47,152	—	
Distillate fuel oil	do.	15,024	—	

NA Not available.

[1]Table prepared by Theodore T. Spittal. Greenland did not report any exports of mineral commodities to the United States during 1991.

TABLE 8

GREENLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Aluminum: Metal including alloys, all forms	42	52	(2)	Denmark 26; Germany 26.
Copper: Metal including alloys, all forms	60	44	—	Denmark 35; Germany 5; Norway 2.
Iron and Steel: Metal:				
Pig iron, cast iron, related materials	—	(2)	—	NA.
Steel, primary forms	59	53	—	Denmark 42; Ecuador 8; Norway 4.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	251	384	—	Denmark 361; Germany 20; Greece 3.
Clad, plated, coated	21	55	—	Denmark 53; Germany 2.
Of alloy steel	40	17	—	Denmark 13; Germany 4.
Bars, rods, angles, shapes, sections	2,043	1,396	—	Denmark 604; Sweden 301; Belgium-Luxembourg 291.
Rails and accessories	15	2	—	All from Norway.
Wire	5	5	—	Mainly from Denmark.
Tubes, pipes, fittings	733	806	—	Denmark 556; Norway 174; Germany 69.
Lead: Metal including alloys:				
Oxides	—	1	—	All from Denmark.
Unwrought	23	10	—	Denmark 5; Sweden 5.
Semimanufactures	20	2	—	Denmark 1; Germany 1.

See footnotes at end of table.

TABLE 8—Continued

GREENLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Manganese: Metal including alloys all forms	25	20	—	All from Denmark.
Silver:				
Waste and sweepings kilograms	—	1	—	Do.
Metal including alloys, unwrought and partly wrought thousands	$7	—		
Zinc:				
Blue powder	1	1	—	Do.
Metal including alloys, semimanufactures	14	15	—	Denmark 12; Germany 3.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.: Grinding and polishing wheels and stones	2	1	(2)	NA.
Cement	4,615	6,933	—	Denmark 5,385; Canada 1,508; Norway 38.
Clays, crude:				
Kaolin	—	4	2	Denmark 1; Germany 1.
Unspecified	2	4	—	All from Denmark.
Diamond: Gem, not set or strung value, thousands	$1	$1	—	Do.
Diatomite and other infusorial earth	30	2	—	All from Canada.
Fertilizer materials:				
Manufactured:				
Ammonia	8	5	—	Norway 3; Denmark 2.
Nitrogenous	24	552	—	Norway 540; Denmark 6; Sweden 6.
Phosphatic	14	—		
Unspecified and mixed	406	449	—	Denmark 448; Germany 1.
Gypsum and plaster	45	4	—	All from Denmark.
Lime	450	2	—	Do.
Precious and semiprecious stones other than diamond: Natural value, thousands	$5	$2	$1	Sweden $1.
Salt and brine	5,037	3,914	—	Denmark 2,747; Iceland 600; Germany 531.
Sodium compounds, n.e.s.: Soda ash manufactured	1	—		
Stone, sand and gravel:				
Dimension stone: Worked	2	—		
Gravel and crushed rock	4,924	10	—	All from Denmark.
Limestone other than dimension	21	—		
Sand other than metal-bearing	127	177	—	Do.
Sulfur: Sulfuric acid	8	10	—	Do.
Talc, steatite, soapstone, pyrophyllite value, thousands	—	$1	—	All from United Kingdom.
Other:				
Crude	36	39	—	All from Denmark.
Slag and dross, not metal bearing	—	16	—	All from Norway.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	268	2	—	All from Switzerland.
Carbon black	(2)	1	—	All from Denmark.

See footnotes at end of table.

TABLE 8—Continued

GREENLAND: IMPORTS OF MINERAL COMMODITIES[1]

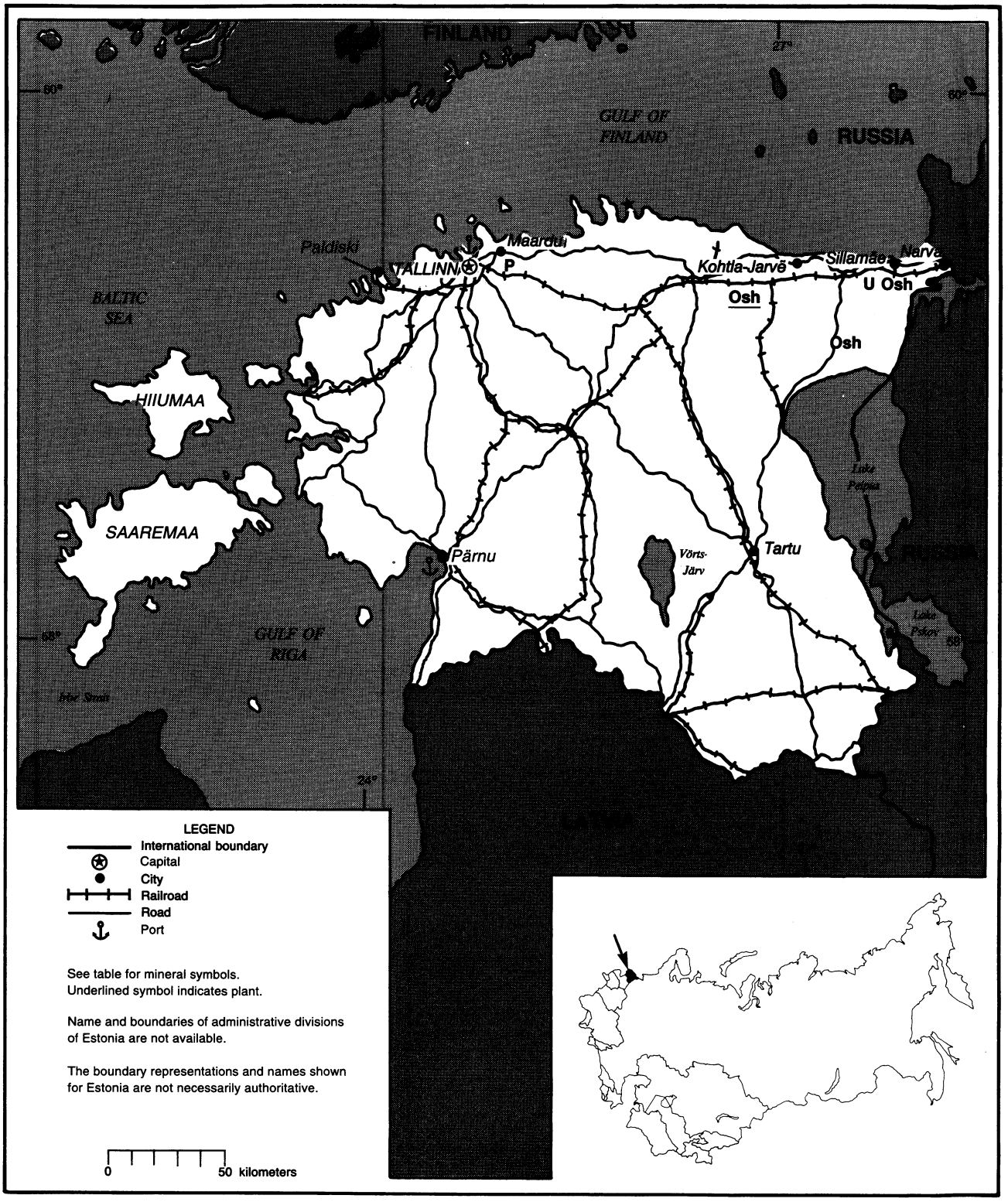
(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal:					
Bituminous		2	—		
Briquets of anthracite and bituminous coal		139	82	—	All from Poland.
Peat including briquets and litter		4	2	—	All from Denmark.
Petroleum refinery products:					
Liquefied petroleum gas	42-gallon barrels	3,306	2,842	—	Do.
Gasoline	do.	1,497,122	1,563,405	102	Norway 1,089,046; Denmark 473,918; United Kingdom 145.
Mineral jelly and wax	do.	(2)	(2)	—	All from Denmark.
Bitumen and other residues	do.	91	—		
Bituminous mixtures	do.	4,375	1,600	—	Do.

[1]Table prepared by Theodore T. Spittal.
[2]Less than 1/2 unit.

ESTONIA

AREA 45,100 km² **POPULATION 1.6 million**



THE MINERAL INDUSTRY OF

ESTONIA

By Richard M. Levine

In 1992, Estonia experienced a 40% decline in industrial production compared with that of 1991, with reported production of building materials down by about 40%, of metal processing by more than 55%, and of chemical production by almost 45%.

Estonia was a large exporter of nonferrous metals from the states of the former U.S.S.R., as a large percentage of metals was transshipped through Estonian ports. Mineral exports through Estonia and the other Baltic states were not under the control of the other countries of the former U.S.S.R., resulting in a percentage of mineral shipments through the Baltic countries occurring without the official auspices of the producing countries' governments and contrary to their regulations.

GOVERNMENT POLICIES AND PROGRAMS

To lessen its fuel dependence on Russia, at the beginning of 1993 Estonia opened a new oil terminal at the Port of Tallinn. The Finnish company Neste owns a 55% interest in the terminal and the Estonian company Eesti Kutus the remaining 45%. The first stage was opened with eight receptacles now being used to store gasoline imported from Finland. Upon completion of the second stage, the terminal will have a 50,000-cubic-meter storage capacity and after completion of the third stage a 100,000-cubic-meter storage capacity.

PRODUCTION

Estonia's mineral industry consisted primarily of mining oil shale, peat, and industrial minerals including clays, limestone, and sand and gravel; phosphate mining in Estonia had recently ceased because of environmental concerns. Oil shale was a major source of energy, but its use was causing serious environmental problems. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, most major mineral-producing enterprises in Estonia were state owned, although as with all former Soviet republics, plans were being formulated and enacted for the privatization of enterprises. *(See table 2.)*

COMMODITY REVIEW

Oil Shale.—Estonia was the major producer of oil shale in the former U.S.S.R., producing 80% of the former U.S.S.R. total output. Eighty percent of the oil shale is used for energy generation and the remaining 20% for chemical production. About one-half of the oil shale was mined from open pits and the other one-half from underground mines with five mines and three open pits in operation. More than 60% of the ore undergoes beneficiation. The main consumers of oil shale are the Pribaltiskiy and Estonskaya powerplants, the Kokhtla-Jarve oil shale processing plant, the Kiviyli oil shale chemical plant in the city of Slantsy in Russia, and a powerplant in Kokhtla-Jarve. Estonia was experiencing serious environmental problems because of its use of oil shale for fuel in powerplants, but Estonia at present does not have any good economic alternatives to its use of oil shale.

Phosphate.—Ground phosphate for direct application was being produced at the Maardu deposit east of Tallinn, but both as a result of the depletion of this deposit and the serious environmental effects of phosphate mining, production has apparently ceased. Plans were being considered to develop two new deposits, the Tools and Kabala, in the Rakvere area, but no decision has been made to develop these deposits because of serious environmental concerns.

Reserves

Reserves in Estonia were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

INFRASTRUCTURE

Estonia, which has a 1,393-kilometer long Baltic coastline to the west, is bounded on the east by Russia and to the south by Latvia. The major maritime ports are Tallinn and Parnu. The inland port of Narva is on the Narva River, which flows into the Gulf of Finland less than 50 miles from Narva. Estonia had, as of 1990, 1,030 km of rail lines and 30,300 km of highways, of which 29,200 km is hard surfaced. Pipelines supply oil and natural gas from Russia. Ethnically, the population is reportedly, as of 1989, 61.5% Estonian, 30.3% Russian, and less

than 2% Belarussians, Ukrainians, Finns, and other nationalities.

As the Baltic state closest to Scandinavia and also on the western border of the former U.S.S.R., Estonia is well positioned to develop economic ties with northern Europe as well as with Russia and the other Baltic states. Estonia's economic ties will depend on its process of economic transformation and the processes of economic transformation occurring in the neighboring countries of the former U.S.S.R. Its future economic ties also will depend to some extent both on political and economic decisions in the Scandinavian and other European countries regarding the amount of assistance and cooperation that will be given to the Baltic countries for integrating their economies with the market economies of Western Europe and on the activities of foreign investors in developing industries in these countries.

OUTLOOK

Estonia is the one Baltic state that has significant fuel production from its oil shale and that also has significant phosphate reserves that could be of economic significance. However, both of these industries pose serious environmental problems, and the future of both of these mineral industries will depend on a resolution of these problems. If adequate solutions are not found, then Estonia will be left with mineral industries similar to the other Baltic states, which mainly mine peat and construction materials. If solutions are found, then Estonia will be able to continue supplying a much larger percentage of its fuel requirements than the other Baltic countries and also could become a phosphate exporter.

TABLE 1
ESTONIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity		1992
Cement		600,000
Clays:		
For bricks	cubic meters	100,000
For cement		70,000
Oil shale		20,000,000
Peat		3,000,000
Sand and gravel	cubic meters	15,000,000
Industrial silica	tons	30,000

TABLE 2
ESTONIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Cement	Punane-Kunda plant	Punane-Kunda	1,500
Limestone, for cement	Punane and Kunda deposits	Punane-Kunda region	NA
Oil shale	Estonslanets association, includes seven mines, four open pits, and five beneficiation plants	Kokhtla-Jarve	30,000
Peat	388 deposits under exploitation	Production in all regions of country, but major facilities in northern and southeastern part of country	6,000
Phosphate rock	Maardu (operations, apparently suspended)	Maardu	500
Sand, for glass	Piuza deposit	Southeastern part of country	50
Sand and gravel cubic meters	Production at more than 700 deposits, largest enterprises: Silikat association exploiting Tallinn deposit	Tallinn region	2,000,000
Do. do.	Akhtmeskiy industrial materials complex exploiting Panyarve deposit	Pannyarve region	1,500,000
Do. do.	Vyrukivi plant exploiting Abissaare, Koryusmyae, Pyussa-palu deposits	Southeastern part of country	1,500,000
Do. do.	Tartu construction materials plant exploiting Vooremyagi and Kukemetsa deposits	Tartu region	800,000

NA Not available.

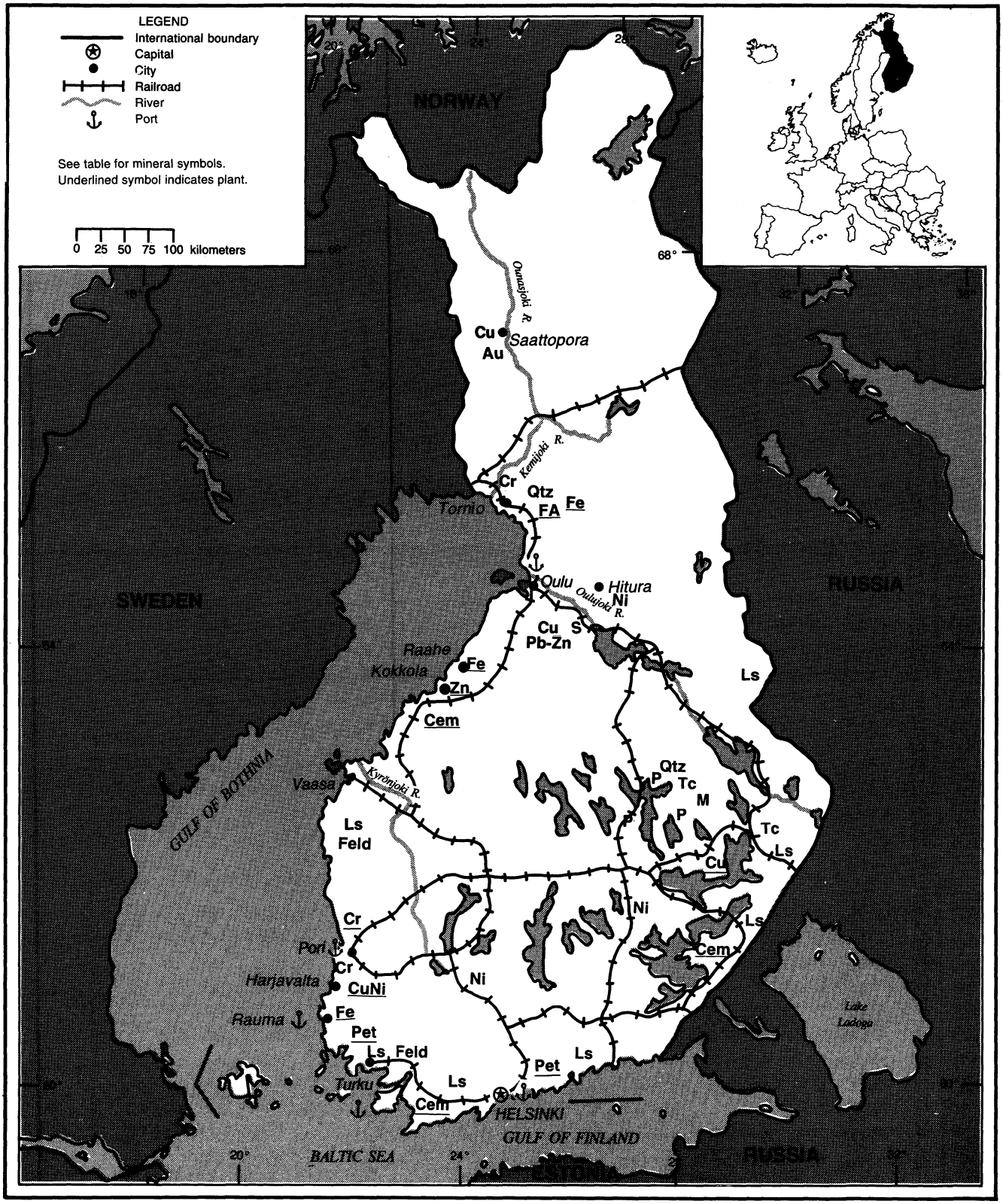
TABLE 3
ESTONIA: RESOURCES OF MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Resources
Clays:		
For ceramics	cubic meters	40,000,000
For cement		65,000
Oil shale		5,700,000
Peat		2,000,000
Phosphate ore, 12% P_2O_5 content		1,300,000

FINLAND

AREA 337,000 km² **POPULATION 4.9 million**



THE MINERAL INDUSTRY OF

FINLAND

By Jozef Plachy

Historically, the Finnish mineral industry has been noted for its domestic metalliferous mines. These mines have been important domestic sources of chromium, copper, nickel, and zinc. However, the metalliferous resources and deposits have been progressively exhausted by extensive mining activity over the past 400 years. Most of the mines that are now operating were started less than 25 years ago. With the reduction of available raw materials, Finland has become more dependent on imported metallic ores. Furthermore, emphasis has shifted to exploration of industrial minerals that would benefit the paper industry and decrease the need to import products for that industry.

GOVERNMENT POLICIES AND PROGRAMS

State-owned companies account for more than 20% of Finland's industrial production. Government ownership is higher in the mineral sector, where majority state-owned companies Kemira Oy, Outokumpu Oy, and Rautaruukki Oy dominate the domestic industry. The State Geologic Research Institute and the State Technological Research Center are active in exploration and mineral processing technology. The Government also is involved in promoting and assisting in the export of mining and processing equipment.

The decision by the Finnish Government to apply for full membership in the European Community (EC) in March 1992 forced the Government to undertake structural reforms of the economy and the country's social services. The reforms will start with a partial opening of the Helsinki Stock Exchange to foreign investors and will continue with reduced involvement of Government in the mineral industry and eventual removal of all barriers to foreign participation. According to a new amendment to the Mining Law, any individual, corporation, or foundation having its principal place of business or central administration in an EC country will enjoy the same rights to explore and exploit mineral and ore deposits in Finland as any Finnish citizen or corporation.

PRODUCTION

With the exception of chromite, 1992 saw a continuation in the decrease of mined metalliferous ores in Finland, while, with increases in imported ores, there was increased production of some smelted and refined metal products. Peat production, which is used extensively for energy purposes, more than doubled from the previous year. *(See table 1.)*

TRADE

The reduced production of ores and concentrates in Finland has made the import of foreign raw materials necessary to supply the nation's smelters and refineries. In 1992, Finland imported all of its iron ore requirements, 80% of its zinc concentrates, 70% of its copper concentrates, and 60% of its nickel matte and nickel concentrates. Lacking indigenous resources, most of Finland's primary energy needs are covered by imports. Until recently, the bilateral trade agreement with the former U.S.S.R. specified that Finnish exports to the U.S.S.R. were mostly paid for with crude oil. This trade ceased with the collapse of the U.S.S.R. and the ensuing political changes in Russia.

Exports of metals and metal products account for 40% of total exports, matched only by wood and wood products. Metal exports in 1992 went to the EC (45%), the United States (28%), and other European Free Trade Association countries (19%). *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

During 1992, the major portion of Finland's mineral industry was still Government-controlled. The Government holds a 57% share of Outokumpu Oy, the largest mining and metallurgical enterprise in Finland and the only producer of nonferrous metal ores and metals in the country. Sales in 1992 amounted to more than $2.5 billion.

Outokumpu Oy is divided into four segments: Base Metals Production, Copper Products, Stainless Steel, and Technology. The largest segment is the Copper Products segment, specializing in copper semimanufactures and downstream products. It has manufacturing facilities in Finland, the United States, Spain, and Sweden. The second largest segment of Outokumpu Oy, with 28% of sales, is the Base Metals Production segment. It encompasses exploration, production, and processing of base metal ores in Finland and other countries. As the domestic mines became exhausted, Outokumpu Mining Oy (a part of the Base Metal Production segment) acquired interest in the Tara zinc mine in Ireland, the Zaldivar copper mine in Chile, the Viscaria Mine in Sweden, and the Forrestania and Mount Keith nickel mines

in Australia. The newest and reportedly most successful segment of Outokumpu Oy is the Stainless Steel segment. This operation comprises of a chromite mine near Kemi and ferrochrome and stainless steel plants in Tornio. The smallest, but most internationally oriented segment, is the Technology segment. It comprises of 60 production facilities and marketing offices around the world.

With a crude steel production of about 2.5 Mmt in 1992, the Rautaruukki Group was the largest steel producer in Finland.

Together with five other divisions, Kemira is the largest chemical enterprise in Finland. It specializes in chemicals, fertilizers, fibers, and pigments and has production plants in 13 countries on three continents. About 50% of Kemira's sales are generated by Kemira Agro, a producer of fertilizers. Kemira's TiO_2 Division is the fifth largest producer of titanium oxide in the world. *(See table 4.)*

COMMODITY REVIEW

Metals

Chromium.—Outokumpu's Kemi Mine in Elijarvi, 7 km northwest of Kemi on the coast of the Gulf of Bothnia, is the only chromite mine in Finland. Discovered in 1959, the present production from its two open pits is about 1 Mmt/a of run-of-mine ore. The Kemi deposit consists of chromite seams associated with a layered ultrabasic sill-like intrusion between a pegmatite-granite massif and a large schist area. While the deposit is large, 140 Mmt of measured, indicated, and inferred ore reserves, the chromium trioxide content is reportedly only 26% and the chromium-iron ratio is reportedly 1.55:1. The open pit operation selectively mines thick deposits (averaging 40 m), which are located some 40 km from the Tornio ferrochrome plant and 20 km from the port of Ajos on the country's southwestern coast. Ore beneficiation includes crushing, heavy-media separation, grinding, cone concentrating, high-intensity magnetic separation, tabling, and dewatering. About 0.5 Mmt of ore and concentrate was produced in 1992, of which about 250,000 tons was lump ore, 230,000 tons concentrate, and 20,000 tons foundry sand.

Cobalt.—In 1983, production of cobalt salt began at the Kokkola plant, which in 5 years grew into the world's leading producer. By 1987, after termination of the indigenous production of cobalt concentrate, the manufacture of cobalt metal was replaced by production of cobalt salt and cobalt powder. In 1992, most of the cobalt concentrate feed was imported from Australia. An additional, though marginal, amount of cobalt cake feed is obtained during the purification process in zinc production. The Kokkola cobalt plant is owned by the Outokumpu-Mooney Group (OMG). The plant was upgraded in 1992 to accept low-grade cobalt and nickel feedstock. OMG, with a capacity of 3,000 mt/a of cobalt chemicals and 6,000 mt/a of nickel chemicals, is reportedly the world's largest producer of cobalt-base and nickel-base chemicals. About 70% of 1992 sales were derived from sales of cobalt-base products.

On April 1, 1992, Outokumpu Oy reportedly filed a registration statement with the U.S. Securities and Exchange Commission for a public sale of its 96% share in OMG. In addition to the Kokkola plant in Finland, OMG owns production facilities in France and the United States.

Copper.—During the last decade, Outokumpu Oy has depleted and closed down a significant number of copper mines in Finland and now operates two polymetallic copper-containing ore mines in Finland: Pyhasalmi in central Finland and Saattopora in the northern part of the country. As these mines become depleted, Outokumpu is seeking ore feed from other sources and presently owns a part of the Zaldivar Project in Chile.

All concentrates, domestic or imported (from Outokumpu-owned mines or through long-term purchase agreements), are smelted at Outokumpu's Harjavalta or Pori plants, both in the southwestern part of Finland.

In addition to electrolytic copper, gold, selenium, and silver are recovered from the anode slimes at Pori.

Ferrochrome.—Kemi chromite ore is smelted in Tornio in northern Finland, close to the Gulf of Bothnia. The plant is only 40 km from the Kemi chromite mine. The capacity of the plant is 230,000 mt/a of high-carbon ferrochrome. In 1992, production was 187,000 tons of ferrochrome containing 52% chromium and 6-8% carbon. About 40% (70% of which is in molten form) is used at the local stainless steel plant.

Gold.—The Geological Survey of Finland reported a gold deposit find in the Ilomantsi district, close to the Russian border. Based on 51 drill holes, the Geological Survey of Finland estimated possible reserves to be 0.7 Mmt of ore containing 7 g/mt of gold. The deposit is reportedly 500 m long and 18 m thick. Preliminary studies reportedly indicated that the ore was almost free-milling and of low arsenic content.

Nickel.—Because of a low head-grade (0.7%), the Hitura nickel mine was closed twice during the 1980's. Operations restarted in 1988 with an output of 0.5 Mmt, first by open pit and later by underground mining. Operations will reportedly continue until 1996, even though only 60% of the deposit is minable. Because of a high magnesia content (11% Mg, 6.5% Ni, and 1.4% Cu), the concentrate is not smelted but instead is used by OMG's nearby Kokkola plant for the manufacture of nickel chemicals.

The nickel concentrates from two other mines, Enonkoski and Vammala, are either smelted at Outokumpu's Harjavalta smelter or used in the manufacture of stainless steel at the Tornio plant. The Enonkoski underground nickel-copper mine at Laukunkangas in southern Finland has reserves of about 1 Mmt and an average production of about 0.8 Mmt/a, grading 1% Ni, 0.3% Cu, and 0.06% Co. Locally produced concentrate (40,000 mt/a to 60,000 mt/a of 10% Ni and 25% Cu) is trucked to the Harjavalta smelter, 400 km away. Production at the

Vammala underground mine, 170 km north of Helsinki, has been steadily declining, and in 1992 was less than 2,000 tons of contained nickel in concentrate. Because both mines will reportedly be depleted in the next few years, arrangements are being made to obtain nickel concentrates from Australia. Nickel concentrate for the Harjavalta smelter will reportedly be supplied by the wholly owned Forretania mine and through a long-term purchase agreement with Western Mining Corp.'s Mount Keith Mine.

Steel.—Since the last iron ore mine, the Rautuvaara Mine, closed in 1988, the Finnish steel industry has relied on imported ore.

The 1992 production of 2.1 Mmt of raw steel by Rautaruukki was about 2% higher than that of the previous year. Rautaruukki owns and operates Raahe Steel Works and a number of downstream plants and related subsidiaries. In 1992 the coking plant at the Raahe Steel Works was completed, making the facility self-sufficient in metallurgical coke. The reportedly almost sulfur-free coke will reportedly reduce the steelworks' sulfur emissions by 40%.

Outokumpu's Stainless Steel segment is the youngest in the group, employs the fewest people, and is the most profitable. It was built next to the ferrochrome plant in Tornio in 1973. After a number of expansion projects in the 1980's, annual production capacity increased to 250,000 tons of cold-rolled stainless steel and 100,000 tons of hot-rolled products.

Zinc.—In May 1992, the Vihanti Mine was closed, leaving Finland with only one source of zinc concentrate, Outokumpu's Pyhasalmi Mine, 380 km north of Helsinki. The sulfide ore is composed primarily of coarse-grained pyrite, plus sphalerite, chalcopyrite, and barite. The estimated 11 Mmt deposit reportedly has a metal content of 2.2% zinc, plus copper, gold, pyrite, and silver. Average production is about 20,000 mt/a of contained zinc and 8,000 mt/a of contained copper. The copper concentrate is railed to Harjavalta and the zinc concentrate to the Kokkola smelter. Because of diminishing reserves in Finland, Outokumpu relies on its Tara Mine in Ireland for a significant part of its zinc ore. Together with the Pyhasalmi Mine, the Tara Mine supplies about 80% of the feed for the Kokkola smelter.

The Kokkola zinc smelter came on-stream in 1969, producing at the rate of 90,000 mt/a. In 1992, production was 170,500 tons of zinc, plus 590 tons of cadmium, 85 tons of mercury, and 30,000 tons of selenium. The smelter is close to the sea, an important asset when 85% to 90% of output is exported.

Industrial Minerals

Cement.—In June 1992, a letter of intent was signed between two leading Finnish construction companies, the Partek Corp. and the Metra Corp. Partek and Metra are the only cement producers in the country. According to the agreement, which became effective on August 31, the companies' cement operations would be merged, making the joint venture Finland's sole producer of cement with a total capacity of about 1.6 Mmt/a at three plants: Lappeenranta, Pargas, and Virkkala.

Mica.—The only producer of mica in Finland is reportedly Kemira Oy. At Kemira Oy's Siilinjarvi apatite mine, mica is extracted during the wet beneficiation of apatite from crude ore. The ore contains approximately 10% apatite, 16% calcite, 3% dolomite, 65% different micas, and 6% other silicates. Production of mica began in 1986 and reached full capacity of 15,000 mt/a in 1987. After separation from crude ore, mica is wet-ground and fractionated to specified particle sizes. Production amounts to about 10,000 mt/a of coarse-grade mica and about 5,000 mt/a of fine-ground, mostly muscovite mica. The fine-ground mica is used for manufacture of pearl lustre pigment at the new 12,000-mt/a-capacity plant built near Kemira's titanium dioxide facility in Pori.

Mineral Fuels

After a dismal year, the 1992 peat production more than doubled. With a production of 5.4 Mmt in 1992, Finland became the third largest producer of peat in the world. About 5.1 Mmt was used for fuel, while the rest was used in agriculture. About 85% of production is milled peat and 15% sod peat. Because peat production is highly dependent on weather, peat technology and research, conducted by the Technical Research Center of Finland, is aimed at development of weather-independent production methods. The most significant achievement of the past few years of research was the startup of the world's first peat-fired ammonia plant in Oulu. The production of ammonia is about 80,000 mt/a using synthetic gas produced from sod peat.

Reserves

Several metalliferous mines have closed in the past few years, and the remaining mines are nearly depleted. Only the Pyhasalmi and Kemi Mines have enough reserves to last past the end of the century. Reserves of industrial minerals, mainly apatite, peat, and phosphate rock, are abundant. *(See table 5.)*

INFRASTRUCTURE

Finland has a total of 5,924 km of railroads, of which 1,445 km is electrified and 480 km is multiple track. Nearly 99% are state-owned and operated by the Finnish State Railways. Most of the 103,000 km of highways are in the more densely populated southern part of the country. Out of the total 6,675 km inland waterways, about 3,700 km is suitable for steamers. The merchant marine consists of 80 ships, including 26 roll-on/roll-off, 17 cargo, 18 tanker, and 7 bulk ships. There are five major ports (Helsinki, Oulu, Pori, Rauma, and Turku), six secondary ports, and numerous minor ports.

OUTLOOK

The decision by the Finnish Government in early 1992 to apply for full membership in the EC may mean accession in 1995. Future membership necessitated revision of the Mining Law that kept foreign mining companies out. The revised version of the Mining Law will confer on foreign companies the same rights that Finnish companies enjoy.

Of the existing mines, only three (Kemi, Pyhasalmi, and Siilinjarvi) are forecast to survive into the next century. As a result, domestic exploration has reportedly been intensified, and expansion of Finnish mineral activities in foreign countries is ongoing. On the domestic front, an important metal deposit has reportedly been made by the Geological Survey of Finland. It is in the Sodankyla district of Lapland, north of the Arctic Circle. Mineralization has reportedly been found to a depth of 500 m, the deepest hole drilled. Preliminary examination reportedly indicated the presence of copper and nickel, as well as cobalt, gold, platinum, and silver. To secure concentrate supplies for its Finnish smelters, Outokumpu Oy expanded its mining operations into Australia, Chile, and other countries.

OTHER SOURCES OF INFORMATION

Agencies

Central Statistical Office of Finland
SF-00101 Helsinki, Finland
Geological Survey of Finland
SF-02150 Espoo, Finland
Helsinki University of Technology
Laboratory of Rock Engineering
SF-02150 Espoo, Finland
Ministry of Commerce and Industry
SF-00101 Helsinki, Finland

Publications

Bulletin of Statistics Central Statistics Office.
Outokumpu News, Jan. 1993. V. 30.
Outokumpu, Annual Report, 1992.
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Rautaruukki, Annual Report, 1992, monthly.

TABLE 1

FINLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
METALS						
Aluminum metal, secondary		29,900	27,989	23,900	22,100	e22,100
Cadmium metal, refined		703	612	569	593	590
Chromite:						
Gross weight:						
Lump ore[e]	thousand tons	450	353	347	320	250
Concentrate	do.	235	140	137	e133	e229
Foundry sand[e]	do.	15	r20	r20	r20	20
Total	do.	700	r513	r504	r473	499
Cr_2O_3 content:						
Lump ore[e]	do.	95	92	90	90	83
Concentrate	do.	85	65	64	e60	e96
Foundry sand[e]	do.	10	r15	r15	r15	15
Total	do.	190	r172	r169	e165	e194
Cobalt, metal, powder, and salts		1,132	1,295	e1,300	e1,503	e2,100
Copper:						
Mine output, Cu content		20,200	14,459	r12,611	r11,732	10,246
Metal:						
Smelter		79,000	79,470	r90,180	r90,055	110,502
Refined		53,900	55,689	65,103	r64,455	70,948
Gold metal	kilograms	2,035	2,510	2,813	2,200	1,600
Iron and steel:						
Iron ore, marketable, all types:[2]						
Gross weight	thousand tons	556	—	—	—	—
Fe content	do.	360	—	—	—	—
Metal:						
Pig iron	do.	2,174	2,284	2,283	2,331	2,452
Ferroalloys, ferrochromium	do.	156	169	r157	190	187
Steel, crude	do.	2,798	2,921	2,861	2,890	3,077
Semimanufactures, rolled	do.	2,300	2,452	2,486	r2,478	e2,300
Lead: Mine output, Pb content		1,900	2,567	e1,700	r e1,300	e400
Mercury		130	159	141	74	85
Nickel:						
Mine output, Ni content		e11,699	10,480	11,524	9,900	9,171
Metal, electrolytic		15,721	13,355	16,882	r13,850	14,781
Platinum-group metals:[e]						
Palladium	kilograms	[3]106	100	100	100	100
Platinum	do.	[3]54	60	60	60	60
Selenium metal	do.	25,073	27,969	31,160	35,000	30,000
Silver metal	do.	31,411	31,127	28,508	30,000	27,000
Zinc:						
Mine output, Zn content		63,900	58,430	e51,700	55,500	30,800
Metal		156,076	162,508	174,923	170,400	170,500
INDUSTRIAL MINERALS						
Barite		10,993	1,614	—	—	—
Cement, hydraulic	thousand tons	1,504	1,596	1,666	1,324	1,129
Feldspar		56,200	54,581	52,630	53,000	47,000

See footnotes at end of table.

TABLE 1—Continued

FINLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
INDUSTRIAL MINERALS—Continued						
Lime	thousand tons	260	224	e225	e225	e225
Mica[e]		15,000	15,000	15,000	15,000	15,000
Nitrogen: N content of ammonia		42,630	41,600	r23,300	r23,600	e10,000
Phosphate rock, apatite concentrate:						
Gross weight	thousand tons	584	580	546	472	555
P_2O_5 content	do.	215	214	201	e170	e200
Pyrite, gross weight	do.	615	730	r672	724	653
Sodium sulfate[e]	do.	35	33	33	33	30
Stone, crushed:						
Limestone and dolomite:						
For cement manufacture	do.	2,150	2,107	2,397	r e2,000	e1,800
For agriculture	do.	1,072	1,188	1,269	r e950	e700
For lime manufacture	do.	418	464	439	e400	e250
Fine powders	do.	455	579	648	r e510	e430
Metallurgical	do.	123	25	1	e4	e11
Total	do.	4,218	4,363	4,754	r3,864	3,191
Quartz silica sand	do.	272	274	276	201	169
Sulfur:						
S content of pyrite	do.	313	306	357	369	e330
Byproduct:						
Of metallurgy	do.	240	180	237	227	225
Of petroleum	do.	47	41	e42	e40	e40
Total	do.	600	527	636	636	e595
Sulfuric acid	do.	1,095	1,392	e1,325	e1,300	e1,300
Talc	do.	379	398	385	361	371
Wollastonite		19,165	21,634	29,844	28,000	e28,000
MINERAL FUELS AND RELATED MATERIALS						
Peat:						
For fuel use	thousand tons	r3,749	r4,590	r4,500	r2,308	5,103
For agriculture and other uses	do.	325	451	r330	r220	355
Petroleum refinery products	thousand 42-gallon barrels	72,000	74,000	e72,500	e73,000	e73,000

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Table includes data available through June 1993.

[2]Includes approximately 30% of unused roasted pyrite (purple ore) from the Kokkola Works.

[3]Reported figure.

TABLE 2

FINLAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals: Alkali metals	—	20	—	All to Netherlands.
Aluminum:				
Oxides and hydroxides	1	—		
Metal including alloys:				
Scrap	1,246	1,654	—	Germany 428; Sweden 427; unspecified 585.
Unwrought	23,285	20,430	—	Japan 11,550; Sweden 4,466; Germany 1,682.
Semimanufactures	12,399	9,202	2	Sweden 1,586; Belgium-Luxembourg 1,448; Germany 908.
Cadmium: Metal including alloys, unwrought including waste and scrap	591	407	—	Netherlands 272; Sweden 73; United Kingdom 47.
Chromium:				
Ore and concentrate	9,106	2,008	—	Sweden 1,064; Poland 600; Denmark 216.
Oxides	—	2	—	All to U.S.S.R.
Metal including alloys, all forms value, thousands	$2	$2	—	Do.
Cobalt:				
Oxides and hydroxides	1,112	1,065	121	Netherlands 441; Italy 121; Germany 119.
Metal including alloys, unwrought including waste and scrap	318	396	90	Sweden 100; United Kingdom 51; Japan 41.
Columbium and tantalum: Metal including alloys, all forms, tantalum value, thousands	$8	—		
Copper:				
Ore and concentrate	12,432	18,071	—	Sweden 9,702; Germany 8,573.
Matte and speiss including cement copper	363	244	41	Germany 203.
Metal including alloys:				
Scrap	3,289	6,553	—	Malaysia 903; Belgium-Luxembourg 893; Germany 807.
Unwrought	48,014	45,928	50	Sweden 17,556; Belgium-Luxembourg 13,507; United Kingdom 8,779.
Semimanufactures	67,340	65,262	4,322	Italy 13,841; Germany 13,650; United Kingdom 8,441.
Gold:				
Waste and sweepings value, thousands	$73	$73	—	United Kingdom $38; Sweden $23; Norway $12.
Metal including alloys, unwrought and partly wrought kilograms	1,914	1,943	—	Germany 859; Switzerland 775; United Kingdom 226.
Iron and steel: Metal:				
Scrap	1,765	57,090	—	Italy 14,461; Sweden 11,353; Switzerland 7,038.
Pig iron, cast iron, related materials	114	39	—	All to Sweden.
Ferroalloys:				
Ferrochromium	105,199	118,172	31,717	France 20,364; Sweden 18,331; Germany 15,556.
Ferronickel	5	—		
Ferrosilicon	9	—		
Silicon metal[2]	—	28	—	All to U.S.S.R.
Unspecified value, thousands	$11	—		
Steel, primary forms	117,488	110,225	34,420	Sweden 29,850; United Kingdom 19,228; Morocco 14,881.

See footnotes at end of table.

TABLE 2—Continued

FINLAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel:—Continued:					
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated	value, thousands	$328,083	$347,874	$36,500	Germany $80,849; Denmark $50,140; Italy $21,742.
Clad, plated, coated	do.	$80,949	$108,926	$11,353	Germany $16,314; Sweden $12,737; unspecified $10,301.
Of alloy steel		229,419	322,345	9,590	Germany 41,562; India 40,470; unspecified 60,057.
Bars, rods, angles, shapes, sections		246,059	251,736	1,177	Sweden 87,337; Germany 65,682; Norway 26,812.
Rails and accessories		443	295	(3)	Sweden 225; United Arab Emirates 64; United Kingdom 3.
Wire		9,332	7,187	1	Sweden 3,921; Denmark 1,643; Norway 737.
Tubes, pipes, fittings	value, thousands	$172,379	$146,256	$5	Sweden $43,363; Germany $22,969; United Kingdom $18,400.
Lead:					
Ore and concentrate		2,629	4,632	—	All to Germany.
Metal including alloys:					
Scrap		13,934	10,977	—	Sweden 6,197; France 3,238; United Kingdom 1,403.
Unwrought		183	47	—	Sweden 21; Germany 19.
Semimanufactures		63	14	—	Sweden 7; U.S.S.R. 7.
Magnesium: Metal including alloys:					
Scrap		123	44	—	Germany 22; Japan 21.
Unwrought		—	3	—	All to United Kingdom.
Manganese: Oxides		—	8	—	All to Sweden.
Mercury		103	110	—	Netherlands 107; Denmark 3.
Molybdenum: Metal including alloys, unwrought including waste and scrap		1	—		
Nickel:					
Ore and concentrate		26,292	1,266	—	All to Canada.
Metal including alloys:					
Scrap		28	90	—	Germany 35; United Kingdom 22; Japan 17.
Unwrought		10,515	6,791	340	Italy 921; United Kingdom 832; Japan 819.
Semimanufactures		45	18	—	Germany 13; Sweden 4.
Platinum-group metals:					
Waste and scrap	value, thousands	$19	$24	—	All to Sweden.
Metals including alloys, unwrought and partly wrought:					
Platinum	do.	$1	$9	—	All to Norway.
Unspecified	do.	$237	$16	—	All to United Kingdom.
Silver:					
Ore and concentrate[4]	do.	$2,073	$6,391	—	United Kingdom $4,871; Germany $1,519; U.S.S.R. $1.
Waste and sweepings[4]	do.	$1,431	$825	—	Germany $337; Austria $169; Sweden $166.
Metal including alloys, unwrought and partly wrought	do.	$4,036	$3,310	—	Germany $2,111; U.S.S.R. $500; Sweden $445.
Tin: Metal including alloys:					
Scrap		185	224	—	Germany 83; United Kingdom 62; Belgium-Luxembourg 24.

See footnotes at end of table.

TABLE 2—Continued

FINLAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Tin: Metal including alloys—Continued:					
Unwrought		8	7	(2)	Mainly to Netherlands.
Semimanufactures	value, thousands	$63	$4	—	Germany $3.
Titanium:					
Ore and concentrate		1	—		
Oxides	value, thousands	$1,886	$2,937	NA	NA.
Metal including alloys:					
Unwrought including waste and scrap		41	—		
Semimanufactures		30	15	—	Germany 7; Netherlands 4; Sweden 4.
Tungsten: Metal including alloys:					
Unwrought including waste and scrap		10	6	—	All to Belgium-Luxembourg.
Semimanufactures		9	11	—	Sweden 9; Norway 1; United Kingdom 1.
Zinc:					
Ore and concentrate		9	—		
Blue powder		23	—		
Metal including alloys:					
Scrap		5,172	6,795	—	Norway 313; India 208; unspecified 6,095.
Unwrought		140,098	153,377	13,996	Netherlands 79,767; United Kingdom 28,310; Sweden 14,264.
Semimanufactures		55	52	—	Czechoslovakia 12; United Kingdom 12; Sweden 10.
Zirconium: Metal including alloys, semimanufactures	value, thousands	$1	$1	—	All to United Kingdom.
Other:					
Ores and concentrates		34	—		
Oxides and hydroxides		2,393	1,917	791	Israel 449; United Kingdom 219; Netherlands 124.
Ashes and residues		4,016	25,060	28	Germany 22,179; Netherlands 895; United Kingdom 810.
Metalloids[5]		28	38	13	United Kingdom 23.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.	value, thousands	$2	$2	—	All to U.S.S.R.
Artificial: Corundum		11	—		
Grinding and polishing wheels and stones		188	115	3	Sweden 37; Norway 18; U.S.S.R. 18.
Boron materials:					
Crude natural borates		684	174	—	All to Sweden.
Oxides and acids		19	30	—	Do.
Cement		3,363	293	—	Norway 121; U.S.S.R. 116; Sweden 51.
Chalk		—	1,181	—	Germany 1,178.
Clays, crude:					
Bentonite		280	246	—	Sweden 206; China 18; France 18.
Kaolin		32	90	—	China 22; Netherlands 21; Germany 14.
Unspecified		14	—		
Diamond, natural:					
Gem, not set or strung	value, thousands	$34	$71	—	U.S.S.R. $31; Norway $24; Belgium-Luxembourg $17.
Industrial stones	do.	$5	$51	—	Belgium-Luxembourg $48; Austria $1; Italy $1.

See footnotes at end of table.

TABLE 2—Continued

FINLAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Diatomite and other infusorial earth		5	10	—	Mainly to U.S.S.R.
Feldspar		32,770	31,401	—	Germany 14,066; United Kingdom 13,511; Poland 1,853.
Fertilizer materials:					
Crude, n.e.s.		24	4	—	Germany 2; Sweden 2.
Manufactured:					
Ammonia	value, thousands	—	$1	—	All to Sri Lanka.
Nitrogenous		33	9,052	—	Netherlands 5,600; Spain 3,327; Sweden 121.
Phosphatic		5	—		
Potassic	value, thousands	$2,655	$12,021	—	Belgium-Luxembourg $4,594; Saudi Arabia $1,928; Italy $1,646.
Unspecified and mixed	do.	$72,898	$87,385	—	China $53,038; Thailand $5,762; United Kingdom $5,104.
Graphite, natural		—	49	—	Norway 29; Sweden 20.
Gypsum and plaster		90	81	—	Sweden 48; Republic of Korea 16; U.S.S.R. 16.
Lime		4,392	6,763	—	Sweden 6,076; Germany 480; Belgium-Luxembourg 100.
Magnesium compounds: Oxides and hydroxides		519	22	—	Sweden 21; U.S.S.R. 1.
Mica:					
Crude including splittings and waste		3,743	4,133	—	Japan 3,153; Germany 590; Republic of Korea 151.
Worked including agglomerated splittings	value, thousands	—	$12	—	Norway $6; France $4; Australia $2.
Nitrates, crude		—	1	—	All to U.S.S.R.
Phosphates, crude		22,545	—		
Pigments, mineral: Iron oxides and hydroxides, processed		2,349	2,491	—	United Kingdom 2,477; Sweden 10; U.S.S.R. 4.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$41	$76	$27	Germany $29; Hong Kong $12; Canada $3.
Synthetic	do.	$1	—		
Pyrite, unroasted	do.	$10,626	$8,701	NA	NA.
Salt and brine		21	21	—	All to U.S.S.R.
Sodium compounds, n.e.s.: Sulfate, manufactured		12,053	18,269	20	Netherlands 4,293; Greece 3,300; United Kingdom 3,050.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		260,771	264,049	502	Italy 109,762; Japan 36,750; Spain 31,642.
Worked		4,347	7,708	45	Germany 2,304; Sweden 1,880; Switzerland 1,058.
Dolomite, chiefly refractory-grade		—	35	—	All to U.S.S.R.
Gravel and crushed rock		50,800	91,504	—	Sweden 59,096; Germany 31,144; Norway 1,113.
Limestone other than dimension		2,702	3,452	—	Sweden 3,434; U.S.S.R. 18.
Quartz and quartzite		7,162	9,835		Netherlands 6,205; Belgium-Luxembourg 1,700; Sweden 1,281.
Sand other than metal-bearing		9,898	184	—	U.S.S.R. 176; Sweden 8.
Sulfur:					
Elemental:					
Crude including native and byproduct		231	34	—	U.S.S.R. 32.
Colloidal, precipitated, sublimed		—	9,715	—	All to Israel.

See footnotes at end of table.

TABLE 2—Continued

FINLAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur—Continued:					
Dioxide	value, thousands	—	$1	$1	
Sulfuric acid	do.	$2,668	$1,295	—	Netherlands $759; Spain $171; Switzerland $159.
Talc, steatite, soapstone, pyrophyllite		105,781	20,960	NA	NA.
Vermiculite, perlite, chlorite		488	—		
Other:					
Crude		22,847	20,426	—	Germany 7,898; Italy 4,223; Spain 2,309.
Slag and dross, not metal-bearing		62,774	47,242	—	Sweden 25,471; Norway 21,734; Italy 25.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		78	502	—	Mainly to U.S.S.R.
Carbon black		24	39	—	Germany 37; Sweden 2.
Coal: Bituminous		28	—		
Coke and semicoke		631	489	—	All to Sweden.
Peat including briquets and litter		85,426	103,072	—	Netherlands 46,497; Sweden 24,180; Belgium-Luxembourg 13,953.
Petroleum refinery products:					
Liquefied petroleum gas	thousand 42-gallon barrels	2	105	—	Mainly to Sweden.
Gasoline	do.	5,908	11,782	—	Sweden 6,975; Poland 2,479; Germany 1,036.
Mineral jelly and wax	do.	1	11	(3)	Mainly to Norway.
Kerosene and jet fuel	do.	365	706	—	Mainly to Sweden.
Distillate fuel oil	do.	3,228	8,711	—	Sweden 4,802; Poland 1,615; Germany 1,515.
Lubricants	do.	246	1,118	(3)	United Kingdom 346; Netherlands 231; U.S.S.R. 231.
Residual fuel oil	do.	2,385	746	—	Italy 380; Netherlands 227; United Kingdom 140.
Bitumen and other residues	do.	415	378	—	Sweden 189; Denmark 109; Italy 72.
Bituminous mixtures	42-gallon barrels	558	255	—	Sweden 164; U.S.S.R. 85.

NA Not available.
[1]Table prepared by Douglas Rhoten, International Data Section.
[2]May include high-purity silicon.
[3]Less than 1/2 unit.
[4]May include other precious metals.
[5]Reported under SITC item number as "selenium, phosphorus, etc."

TABLE 3

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals:					
Alkali metals	value, thousands	$1,583	$1,699	—	France $1,695; Germany $2; United Kingdom $2.
Alkaline-earth metals		7	14	1	United Kingdom 7; Denmark 5; China 1.

See footnotes at end of table.

TABLE 3—Continued

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Aluminum:					
Ore and concentrate		7,070	8,037	—	Australia 4,511; Greece 3,254; Sweden 184.
Oxides and hydroxides		24,830	28,300	67	Spain 20,700; Germany 6,748; United Kingdom 626.
Metal including alloys:					
Scrap		27,004	37,758	15,442	Sweden 7,657; U.S.S.R. 6,361; United Kingdom 3,612.
Unwrought		26,136	19,446	(2)	Canada 7,190; U.S.S.R. 5,782; Norway 1,262.
Semimanufactures		37,597	27,079	133	Germany 6,950; Norway 3,428; Sweden 2,770.
Antimony: Metal including alloys, all forms	value, thousands	$46	$24	—	Japan $10; China $9; Belgium-Luxembourg $2.
Beryllium: Metal including alloys, semimanufactures	do.	—	$72	$63	United Kingdom $5; Switzerland $2; Germany $1.
Bismuth: Metal including alloys, all forms	do.	$28	$54	—	Germany $27; United Kingdom $27.
Cadmium: Metal including alloys:					
Unwrought including waste and scrap	do.	$1	$1	—	All from Germany.
Semimanufactures	do.	$1	$1	—	Do.
Chromium:					
Ore and concentrate		85	5	—	All from Netherlands.
Oxides and hydroxides		1,033	1,190	(2)	U.S.S.R. 515; Poland 322; United Kingdom 229.
Metal including alloys, all forms	value, thousands	$32	$18	$4	France $4; Netherlands $3; United Kingdom $2.
Cobalt:					
Oxides and hydroxides	do.	$21	$96	$3	Netherlands $59; Germany $32; United Kingdom $1.
Metal including alloys:					
Unwrought including waste and scrap	do.	$614	$171	$85	Sweden $38; Germany $31; United Kingdom $10.
Semimanufactures		13	10	1	Sweden 6; Germany 2.
Columbium and tantalum: Metal including alloys, all forms, tantalum	value, thousands	$43	$32	—	Austria $12; Netherlands $7; United Kingdom $7.
Copper:					
Ore and concentrate		279,755	304,188	6,708	Portugal 128,055; Norway 63,979; Sweden 58,277.
Metal including alloys:					
Scrap		988	6,379	17	U.S.S.R. 4,743; Netherlands 385; Sweden 371.
Unwrought		29,250	20,123	—	Sweden 12,592; Poland 4,601; Spain 1,000.
Semimanufactures		30,955	24,187	36	Sweden 9,457; Germany 6,397; U.S.S.R. 3,858.
Gold:					
Waste and sweepings	value, thousands	$124	$167	—	Sweden $164; Czechoslovakia $3.
Metal including alloys, unwrought and partly wrought	kilograms	989	950	1	Sweden 393; Switzerland 127; Netherlands 124.
Iron and steel:					
Iron ore and concentrate, excluding roasted pyrite	thousand tons	3,058	3,085	—	Sweden 1,616; U.S.S.R. 1,469.
Metal:					
Scrap		45,774	45,641	—	U.S.S.R. 38,282; United Kingdom 3,824; Germany 3,066.
Pig iron, cast iron, related materials		56,561	12,138	(2)	U.S.S.R. 4,159; Germany 3,249; United Kingdom 2,660.
Ferroalloys:					
Ferrochromium		2,141	2,013	7	Sweden 461; U.S.S.R. 458; Zimbabwe 407.

See footnotes at end of table.

TABLE 3—Continued

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Ferroalloys—Continued:				
Ferromanganese	10,802	8,827	—	Norway 8,787; Germany 33; Sweden 6.
Ferronickel	30,718	29,154	—	Greece 11,631; Colombia 7,822; Dominican Republic 5,104.
Ferrosilicochromium	22	—		
Ferrosilicomanganese	20,023	15,000	—	Norway 6,801; U.S.S.R. 6,628; Spain 1,100.
Ferrosilicon	13,124	11,612	—	Norway 6,607; U.S.S.R. 4,290; Sweden 451.
Silicon metal[3]	1,369	1,075	—	China 530; Norway 510; Japan 27.
Unspecified	2,576	2,169	112	United Kingdom 540; Norway 291; Belgium-Luxembourg 178.
Steel, primary forms	150,929	129,438	1	Sweden 44,569; India 40,719; unspecified 28,897.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	77,783	60,789	2	Sweden 24,543; Germany 11,880; Czechoslovakia 6,276.
Clad, plated, coated	82,297	78,811	2	Sweden 22,466; Germany 13,871; United Kingdom 12,664.
Of alloy steel	74,061	64,924	13	Sweden 29,734; Germany 18,019; Belgium-Luxembourg 6,375.
Bars, rods, angles, shapes, sections	293,946	172,755	480	Sweden 36,280; Germany 34,315; France 19,065.
Rails and accessories	8,197	24,556	2	Sweden 8,171; Austria 1,826; Belgium-Luxembourg 1,180.
Wire	19,769	12,092	85	Sweden 5,341; Belgium-Luxembourg 2,093; United Kingdom 1,716.
Tubes, pipes, fittings	136,151	96,787	398	Germany 23,343; Sweden 12,540; United Kingdom 11,133.
Lead:				
Oxides	475	412	—	Germany 406; United Kingdom 4; Denmark 2.
Metal including alloys:				
Scrap	—	320	—	All from U.S.S.R.
Unwrought	13,802	12,315	—	Sweden 8,177; U.S.S.R. 3,069; United Kingdom 681.
Semimanufactures	556	441	1	Germany 299; Sweden 131; Belgium-Luxembourg 8.
Magnesium: Metal including alloys:				
Unwrought	107	47	10	Norway 31; Spain 6.
Semimanufactures	69	19	3	Germany 8; Italy 7; Sweden 1.
Manganese:				
Ore and concentrate, metallurgical-grade	17,830	8,466	—	Ghana 7,446; Netherlands 1,006; United Kingdom 14.
Oxides	353	288	—	Belgium-Luxembourg 131; Netherlands 63; Germany 38.
Metal including alloys, all forms	3	51	—	France 40; Germany 8; United Kingdom 2.
Mercury value, thousands	$13	$10	—	China $5; United Kingdom $3; Germany $1.
Molybdenum:				
Ore and concentrate, roasted	1,792	1,306	320	Chile 539; Belgium-Luxembourg 360; United Kingdom 47.
Metal including alloys:				
Unwrought including waste and scrap value, thousands	$26	$24	$4	Germany $17; United Kingdom $3.
Semimanufactures do.	$306	$153	$6	France $87; Belgium-Luxembourg $32; Austria $14.
Nickel:				
Ore and concentrate	26,917	20,094	—	Norway 20,075; Canada 18.
Matte and speiss	6,040	5,538	—	Australia 5,475; Albania 63.

See footnotes at end of table.

TABLE 3—Continued

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Nickel—Continued:					
Metal including alloys:					
Scrap		4,754	4,882	—	Netherlands 4,556; U.S.S.R. 213; United Kingdom 113.
Unwrought		3,060	5,495	1	U.S.S.R. 2,491; Canada 2,398; Brazil 229.
Semimanufactures		55	153	82	Germany 51; U.S.S.R. 8; Italy 5.
Platinum-group metals:					
Waste and sweepings	value, thousands	$4	—		
Metals including alloys, unwrought and partly wrought:					
Platinum	do.	$64	$92	$1	Germany $45; Switzerland $36; United Kingdom $10.
Unspecified	do.	$1,617	$1,101	$11	Germany $549; United Kingdom $186; Switzerland $106.
Silver:					
Waste and sweepings[4]	do.	$4	$9	—	All from Germany.
Metal including alloys, unwrought and partly wrought	do.	$9,395	$4,785	$6	Germany $2,599; Sweden $701; Switzerland $499.
Tin: Metal including alloys:					
Scrap		—	4	—	All from U.S.S.R.
Unwrought		64	42	(2)	United Kingdom 18; Sweden 13; Brazil 8.
Semimanufactures		229	168	(2)	United Kingdom 79; Germany 41; Sweden 30.
Titanium:					
Ore and concentrate	value, thousands	$18,958	$15,133	—	Norway 9,111; Australia 6,022.
Oxides	do.	$3,753	$4,037	$692	United Kingdom $1,410; Poland $955; Czechoslovakia $434.
Metal including alloys:					
Unwrought including waste and scrap		23	15	6	Mainly from U.S.S.R.
Semimanufactures		77	59	11	Germany 13; France 9; Sweden 8.
Tungsten: Metal including alloys:					
Unwrought including waste and scrap		18	6	1	Mainly from Germany.
Semimanufactures	value, thousands	$448	$167	$15	United Kingdom $69; Sweden $24; Germany $20.
Uranium and thorium: Metal including alloys, all forms, uranium	do.	$1	$1	—	All from Austria.
Vanadium: Metal including alloys, all forms	do.	$1	—		
Zinc:					
Ore and concentrate		266,689	236,902	7,886	Sweden 60,975; Ireland 47,939; Spain 36,256.
Oxides		475	91	—	Germany 72; United Kingdom 18; Sweden 1.
Blue powder		410	455	(2)	Norway 281; United Kingdom 112; Germany 63.
Metal including alloys:					
Scrap		66	53	—	All from U.S.S.R.
Unwrought		111	573	(2)	U.S.S.R. 541; Norway 30; Netherlands 2.
Semimanufactures		266	502	—	Sweden 228; Germany 61; Denmark 49.
Zirconium:					
Ore and concentrate		1,003	1,721	2	All from Australia.
Metal including alloys:					
Unwrought including waste and scrap		7	6	—	Australia 3; Belgium-Luxembourg 2; Norway 1.
Semimanufactures		16	9	6	France 2; Belgium-Luxembourg 1.

See footnotes at end of table.

TABLE 3—Continued

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Other:					
Ores and concentrates	value, thousands	$14	$1	$1	
Oxides and hydroxides		1,021	834	140	Australia 220; Sweden 215; China 70.
Ashes and residues		42,188	13,539	4,463	Australia 2,562; Sweden 2,032; United Kingdom 1,079.
Base metals including alloys, all forms	value, thousands	$187	$86	$25	Germany $26; Japan $25; France $4.
Metalloids[5]	do.	$757	$49	$14	Germany $24; Japan $4; United Kingdom $4.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		412	200	(e)	Germany 64; Turkey 62; Greece 42.
Artificial: Corundum		1,708	1,291	8	Austria 760; Italy 238; Germany 110.
Dust and powder of precious and semi-precious stones including diamond	value, thousands	$20	$34	$4	France $21; United Kingdom $6; Brazil $1.
Grinding and polishing wheels and stones		2,489	1,803	8	Austria 335; Germany 306; Italy 221.
Barite and witherite		1,864	1,407	—	Germany 814; United Kingdom 425; China 144.
Boron materials:					
Crude natural borates		10,805	7,642	42	All from Turkey.
Oxides and acids		2,988	1,510	211	Turkey 550; Italy 511; China 126.
Cement		268,519	170,769	(e)	U.S.S.R. 77,398; Poland 63,754; Denmark 16,017.
Chalk		264,501	242,645	299	Denmark 208,627; United Kingdom 13,557; Norway 12,918.
Clays, crude:					
Bentonite		7,841	7,583	1,784	Greece 3,652; Denmark 990; Germany 489.
Kaolin		967,917	937,236	244,074	United Kingdom 654,991; Australia 7,885; France 2,284.
Unspecified		41,521	48,709	1,180	United Kingdom 29,611; Germany 14,633; Netherlands 1,391.
Cryolite and chiolite		61	22	—	Denmark 20; France 1.
Diamond, natural:					
Gem, not set or strung	value, thousands	$6,907	$5,054	$15	Belgium-Luxembourg $3,278; Switzerland $755; India $443.
Industrial stones	do.	$718	$472	$304	Switzerland $43; Israel $40; France $28.
Diatomite and other infusorial earth		3,610	2,913	755	Iceland 1,300; Denmark 239; Spain 210.
Feldspar		26	47	—	Norway 26; Sweden 20.
Fertilizer materials:					
Crude, n.e.s.		360	158	—	Germany 139; United Kingdom 18; France 1.
Manufactured:					
Ammonia	value, thousands	$49,979	$40,534	—	U.S.S.R. $30,710; United Kingdom $6,461; Netherlands $3,321.
Nitrogenous		71,447	61,298	(e)	Netherlands 20,905; Germany 12,953; Norway 12,035.
Phosphatic		8,440	2,206	—	U.S.S.R. 2,197; India 4; Netherlands 3.
Potassic	value, thousands	$35,953	$25,628	—	U.S.S.R. $16,919; Germany $6,337; United Kingdom $2,357.
Unspecified and mixed		8,056	19,300	(e)	Netherlands 11,388; U.S.S.R. 6,144; Germany 557.
Fluorspar		8,655	6,709	—	China 4,574; Mexico 1,417; Netherlands 620.
Graphite, natural		188	100	—	Sweden 89; China 5; Norway 3.
Gypsum and plaster		249,324	193,602	3	Spain 157,537; Poland 16,531; Germany 6,912.
Lime		25,163	22,613	—	Sweden 20,735; Brazil 1,582; U.S.S.R. 154.

See footnotes at end of table.

TABLE 3—Continued

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Magnesium compounds:					
Magnesite, crude		956	1,520	—	Spain 1,322; Austria 125; Germany 57.
Oxides and hydroxides		6,192	5,053	—	North Korea 2,003; Spain 1,932; Netherlands 650.
Mica:					
Crude including splittings and waste		346	292	32	United Kingdom 93; India 76; Germany 50.
Worked including agglomerated splittings		49	34	1	Switzerland 17; Austria 6; United Kingdom 6.
Nitrates, crude		363	259	—	Chile 220; Poland 17.
Phosphates, crude	value, thousands	$5,638	$2,403	—	U.S.S.R. $2,021; Sweden $357; Denmark $23.
Pigments, mineral: Iron oxides and hydroxides, processed		3,036	2,189	33	Germany 1,717; United Kingdom 299; Spain 41.
Potassium salts, crude		10	—		
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$1,103	$1,073	$29	Germany $348; Thailand $181; Netherlands $156.
Synthetic	do.	$285	$260	$6	Germany $147; Austria $57; Switzerland $26.
Pyrite, unroasted	do.	$8	$6	—	Germany $5; Italy $1.
Quartz crystal, piezoelectric	do.	$4	$1	$1	
Salt and brine		686,355	477,639	(e)	Netherlands 205,125; Germany 150,161; Poland 89,748.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		55,669	51,452	7,834	Poland 17,484; Germany 15,220; Netherlands 7,741.
Sulfate, manufactured		435	314	9	Belgium-Luxembourg 152; Germany 47; United Kingdom 38.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		5,080	4,456	3	Norway 2,767; Sweden 1,054; U.S.S.R. 452.
Worked		5,619	6,557	453	Italy 2,677; Portugal 1,457; U.S.S.R. 1,180.
Dolomite, chiefly refractory-grade		28,862	28,373	17	Norway 8,931; Sweden 8,670; Belgium-Luxembourg 5,230.
Gravel and crushed rock		124,513	108,730	3	Norway 72,351; Sweden 24,728; U.S.S.R. 9,830.
Limestone other than dimension		919,369	889,525	1	Sweden 842,175; Norway 35,094; U.S.S.R. 4,102.
Quartz and quartzite		928	4,041	103	Germany 3,328; Norway 267; Sweden 250.
Sand other than metal-bearing		84,271	59,348	48	Belgium-Luxembourg 31,174; Sweden 9,983; Denmark 5,491.
Sulfur:					
Elemental:					
Crude including native and byproduct		21,197	7,395	—	Germany 6,451; Sweden 864; Poland 20.
Colloidal, precipitated, sublimed		15	2	—	Germany 1; Netherlands 1.
Dioxide		21,631	24,459	(e)	Sweden 21,512; U.S.S.R. 2,947.
Sulfuric acid		114	86	—	Netherlands 53; Germany 32; United Kingdom 1.
Talc, steatite, soapstone, pyrophyllite	value, thousands	$280	$231	—	Belgium-Luxembourg $113; Germany $41; United Kingdom $25.
Vermiculite including perlite		1,422	643	—	U.S.S.R. 521; United Kingdom 62; Denmark 44.
Other:					
Crude		4,745	3,153	21	Germany 2,144; Spain 842; Sweden 64.
Slag and dross, not metal-bearing		14,686	11,689	586	Sweden 4,860; Poland 4,620; Netherlands 1,500.

See footnotes at end of table.

TABLE 3—Continued

FINLAND: IMPORTS OF MINERAL COMMODITIES FOR 1991[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		2,450	219	89	Netherlands 48; Hungary 45; United Kingdom 19.
Carbon black		10,305	6,777	787	Sweden 2,281; Germany 2,227; Netherlands 1,044.
Coal:					
Anthracite		17,246	13,070	—	U.S.S.R. 11,512; China 1,537; Germany 21.
Bituminous	thousand tons	6,084	5,160	494	Poland 2,601; U.S.S.R. 938; Colombia 619.
Briquets of anthracite and bituminous coal		—	1,419	—	All from Spain.
Lignite including briquets		2,936	—		
Coke and semicoke		786,047	704,508	—	Poland 240,547; Netherlands 177,428; U.S.S.R. 105,679.
Gas, natural: Gaseous	value, thousands	$217,710	$224,817	—	All from U.S.S.R.
Peat including briquets and litter		1,193	3,573	—	Do.
Petroleum:					
Crude	thousand 42-gallon barrels	66,240	73,576	—	U.S.S.R. 24,858; Norway 18,178; United Kingdom 12,218.
Refinery products:					
Liquefied petroleum gas	do.	3,572	4,022	(2)	U.S.S.R. 3,754; Netherlands 109; Norway 87.
Gasoline	do.	1,415	3,040	(2)	U.S.S.R. 1,435; Belgium-Luxembourg 909; Netherlands 450.
Mineral jelly and wax	do.	110	78	1	Germany 35; U.S.S.R. 26; United Kingdom 5.
Kerosene and jet fuel	do.	281	355	(2)	U.S.S.R. 342; Netherlands 12.
Distillate fuel oil	do.	8,190	5,475	(2)	U.S.S.R. 4,868; Belgium-Luxembourg 381; Norway 151.
Lubricants	do.	3,289	5,107	17	U.S.S.R. 4,457; Netherlands 218; Poland 125.
Residual fuel oil	do.	7,810	5,883	—	All from U.S.S.R.
Bitumen and other residues	do.	362	327	—	Sweden 300; France 24; Netherlands 2.
Bituminous mixtures	do.	10	11	1	Germany 3; Sweden 3; Denmark 2.
Petroleum coke	do.	422	388	369	Mainly from U.S.S.R.

NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]Less than 1/2 unit.

[3]May include high-purity silicon.

[4]May include other precious metals.

[5]Reported under SITC item number as "selenium, phosphorus, etc."

TABLE 4

FINLAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Ammonia	Kemira Oy (Government, 100%)	Plant at Oulu	150
Cement	Partek Cement Oy (Partek Corp. 50% and Metra Corp. 50%)	Plants at Lappeenranta, Pargas, and Virkkala	1,600
Chromite	Outokumpu Oy (Government, 100%)	Mine at Kemi	400
Cobalt, powder and salt	Outokumpu-Mooney Group (Outokumpu, 96%)	Smelter at Kokkola	3
Copper, ore (Cu content)	Outokumpu Oy (Government, 100%)	Mines at Pyhasalmi and Saattopora	11
Copper, metal	do.	Smelter at Harjavalta and Pori	160
Do.	do.	Refinery at Pori	75
Feldspar	Lohja Oy (Metra Corp.)	Mine and plant at Haapaluoma, Kemio, and Peraseinajok	100

See footnotes at end of table.

TABLE 4—Continued

FINLAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Ferrochrome		Outokumpu Oy (Government, 100%)	Smelter at Tornio	230
Gold (Au content)	tons	do.	Mine at Saattopora	1
Limestone		Partek Minerals Oy (Partek Corp.)	Mines at Kolari, Lappeenranta, and Pargas	1,900
Do.		Lohja Oy (Metra Corp.)	Mines at Mustio and Sipoo	1,650
Do.		Rauma-Repola Oy	Mine at Turnio	300
Mercury	tons	Outokumpu Oy (Government, 100%)	Smelter at Kokkola	150
Mica		Kemira Oy (Government, 100%)	Mine at Siilinjarvi	15
Nickel, ore (Ni content)		do.	Mines at Enonkoski, Hitura, and Vammala	10
Nickel, metal		do.	Smelter at Harjavalta	20
Phosphate, apatite		Kemira Oy (Government, 100%)	Mine at Siilinjarvi	600
Pyrite		Outokumpu Oy (Government, 100%)	Mine at Pyhasalami	500
Qartz and quarzite		Lohja Oy (Metra Corp.)	Mines at Kemio and Nilsia	250
Selenium	tons	Outokumpu Oy (Government, 100%)	Smelter at Pori	35
Silver	do.	do.	do.	30
Steel		Rautaruukki Oy (Government, 100%)	Plant at Raahe	2,100
Do.		Fundia AB (Norsk Jenverk AS of Norway, 50%; and Rautaruukki, 50%)	Plants at Aminnefors, Dalsbruk, and Koverhar	850
Do.		Ovako Oy (SKF, 50%; Wartsila, 25%; and Fiskas, 20%)	Plant at Imatra	600
Talc		Finnminerals Oy (Lohja, 50%; Yhtyneet Paperitehtaat, 50%)	Mines at Lahnaslampi, Lipsavaara, Luikanlahti, and Polvijari	400
Wollastonite		Partek Minerals Oy (Partek Corp.)	Mine at Lappeenranta	30
Zinc (Zn content)		Outokumpu Oy (Government, 100%)	Mine at Pyhasalami	35

TABLE 5

FINLAND: RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

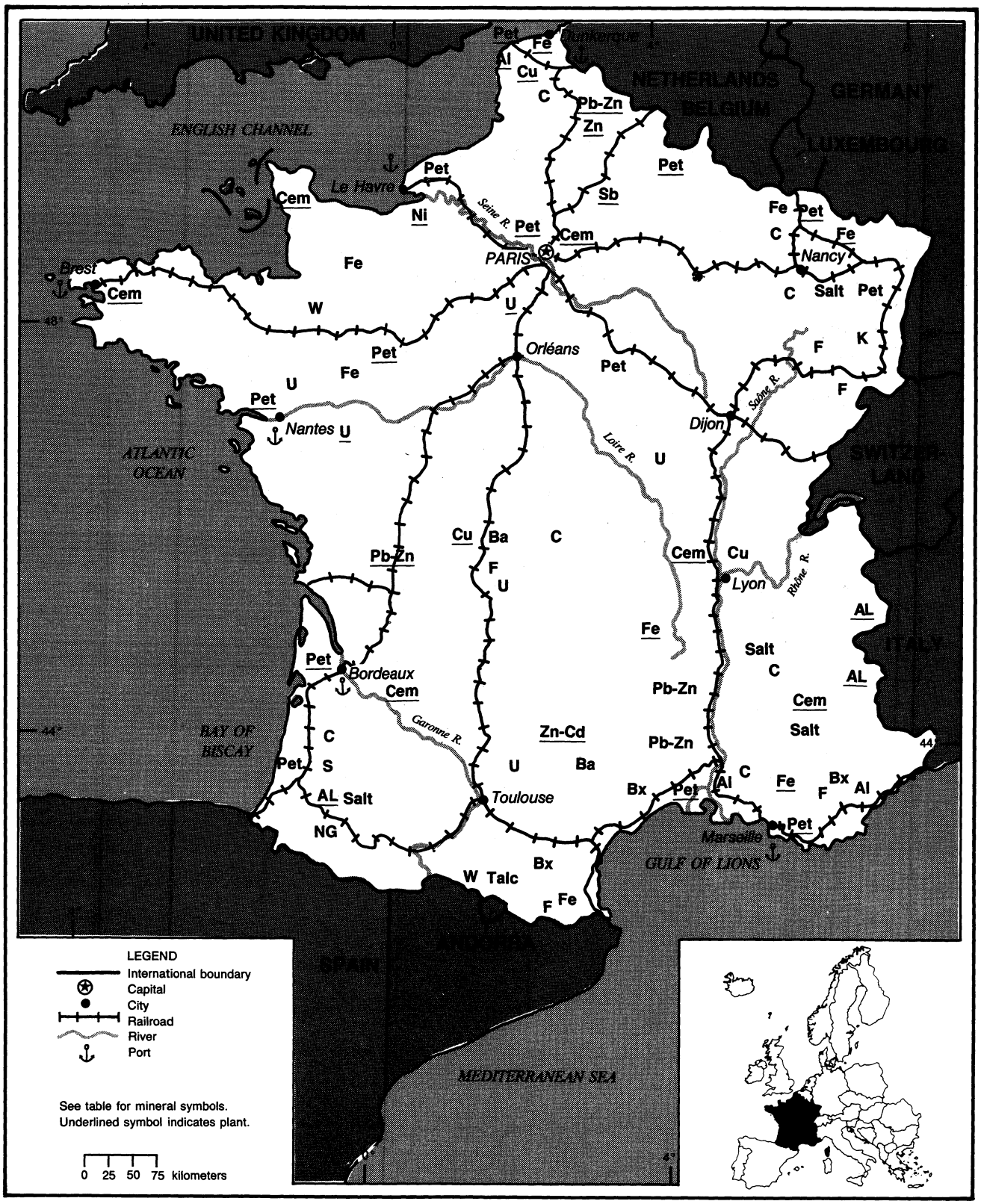
(Million metric tons unless otherwise specified)

Commodity		Reserves
Apatite		350
Chromium		140
Cobalt	thousand tons	15
Copper		10
Gold	tons	2
Nickel		12
Peat		e350
Phosphate rock		100
Talc		40
Wollastonite		24
Zinc		6

eEstimated.

FRANCE

AREA 547,000 km² **POPULATION 57.3 million**



THE MINERAL INDUSTRY OF

FRANCE

By Harold R. Newman

France is one of the major European mineral producers. The traditional mineral industries in France have been in a state of transition over the past several years. Changing economic conditions such as rising energy costs, increasing supplies of raw materials from other countries, lower prices owing to increased competition, and depletion of reserves have necessitated the rationalization of many traditionally strong mineral industries such as bauxite, coal, iron ore, and steel.

Industries have had to adjust to a change in the state's economic policies. In the past, the heavy involvement of the state, both economic and political, was one of the main elements of French mineral policy. Reduction of Government subsidies supporting uneconomic mineral operations and the depletion of mineral reserves have had a significant impact on a number of extractive operations in the French mineral industry.

The gross domestic product (GDP) increased by 1.9% and industrial output by 1.5% over those of 1991. Real GDP growth has matched the average for Organization for Economic Cooperation and Development (OECD) countries for the past 5 years. Reportedly, France has posted average annual productivity gains of 2.9% from 1979 to 1990. This is higher than anywhere else except Japan.

The French economy has performed well relative to its European neighbors. The country does face a serious problem with its unemployment rate, which was 10.3% of the work force at yearend.

GOVERNMENT POLICIES AND PROGRAMS

The French Government was continuing to reduce the budget deficit with policies that were not only affecting the mineral industry, but other industries as well. At the same time, other economic policies were driven by the desire to reduce unemployment and improve French competitiveness, particularly as the advent of the unified European internal market approaches. Efforts have been made to promote the private sector and to reduce the dependence of state-owned companies on subsidies, although significant industrial capacity remains in the public domain. Some exchange controls have been eliminated and the value added tax (VAT) rate has been reduced to bring this tax in line with the EC norm. The top VAT rate of 33% has been reduced to 22%, with a further cut to the standard EC rate of 18.6% effective January 1993. Many state-controlled industries have made significant strides in preparing themselves for the unified European internal market.

PRODUCTION

Mineral and metal industries generally maintained their production and other activities at about the same rate or decreased somewhat from those of the previous year. Gold production decreased owing to the closure of a mine. Lead, silver, and zinc production was about the same level. Several industries, such as bauxite, coal, iron ore, and uranium, have steadily undergone changes over the past few years.

The coal and iron ore industries were affected by cheaper foreign sources and the depletion of domestic resources. The continued decline in coal production was accentuated by the closure of mines in the Bassin du Nord and the Pas-de-Calais.

Coal mining is in the hands of Charbonnages de France (CdF), a state-owned company. As a result of the high cost of underground production in comparison to cheaper imported coal, CdF was maintaining its policy of investing in high productivity mines and closing uneconomic operations.

Bauxite reserves were depleted, which resulted in the closure of mining operations. Bauxite mining had ceased altogether by yearend. Other domestic companies were facing increased foreign competition.

The uranium industry reduced its operations by closing a number of mines and processing plants owing to low market prices and depletion of certain deposits.

Another factor in the drop of uranium demand was the reduced cost for petroleum and the increased accessibility of natural gas from the North Sea and the former U.S.S.R. Lower petroleum prices meant that fewer new nuclear plants were considered for construction, some older plants were being closed, and the export market decreased. *(See table 1.)*

TRADE

The Government's efforts to refocus the country's trading patterns toward OECD countries were continuing. The percentage of France's trade with its EC partners increased while the trade deficit with the EC decreased. There were also strong commercial relations between France and the United States.

Table 2 shows the impact of selected classes of mineral commodities on France's balance of payments position in relation to the EC and the world. *(See tables 2, 3, and 4.)*

STRUCTURE OF THE MINERAL INDUSTRY

Government and private companies produce minerals and mineral products, conduct research, and explore domestically and internationally for new resources. Since 1981, when some of the major companies were nationalized, the Government has restructured some of these industries, notably steel and coal.

Adjustments to the forthcoming single European market resulted in numerous mergers, closures of operations, and cooperative ventures as companies sought ways to obtain competitive advantages. Some industries that have benefited greatly from Government assistance in the past were experiencing a Government determined to reduce assistance for nonprofitable operations. Others were expanding as the previous Government programs resulted in exploitable opportunities, such as the availability of abundant and inexpensive electrical power.

The Government held significant financial interests in most of the mining, metallurgical, and energy companies in France. These included Societe Nationale Elf Aquitaine (SNEA); Usinor-Sacilor S.A.; Imetal S.A.; Pechiney; CdF; Compagnie Generale des Matieres Nucleaires (Cogema); and Bureau de Recherches Geologiques et Minieres (BRGM) and its subsidiary, Compagnie Francaise des Mines S.A. *(See table 5.)*

COMMODITY REVIEW

Metals

Alumina and Bauxite.—French bauxite production continued to decline and had ceased altogether by the beginning of 1992. In comparison, the bauxite output in 1980 was more than 1.9 Mmt. The depletion of ores and competition from cheaper foreign sources of raw and partially processed bauxite forced the reduction and subsequent cessation of production. Closed mines were operated by Pechiney at Var and Herault and the mine owned by SA des Bauxites et Alumines de Provence at Var.

The closures of alumina refineries followed the pattern of the bauxite operations. The Gardenne plant, which was opened by Charles Bayer in 1893, remained the only operating alumina refinery in France. Bauxite feedstock was purchased on the open market, as well as from Aluminium Pechiney's Les Baux operations.

Aluminum.—Pechiney closed the Nogueres and Riouperoux primary smelters at yearend 1991. The 38,000-mt/a Nogueres smelter, built in the early 1960's, was one of Pechiney's older plants and would have required substantial funds to modernize and implement environmental safeguards. The same situation existed with the 14,000-mt/a Riouperoux smelter.

Pechiney planned on replacing the aforementioned lost capacity with the 215,000-mt/a smelter under construction at Graves-sur-loon Plage near Dunkirk. The new smelter was expected to become operational by 1993 at an estimated cost of $850 million.[1] When the smelter does become operational, almost one-half of Pechiney's 10-Mmt/a primary aluminum capacity will be in France. At a reported average cost of $1.27/kilogram, France was considered the lowest cost aluminum-producing country in Europe. The main reasons were lower energy costs and advanced technology. Pechiney continued with plans to build two specialized foundries for aluminum beverage can recycling. One would be built at Nogueres at the site of the existing primary aluminum smelter. The foundry was scheduled to be operational in 1992 with a capacity to process 20,000 mt/a of cans. Cost of the project was estimated to be $710,000.

The second foundry was to be built at Nuef Brisach near Strasbourg. The foundry also was scheduled to be operational in 1992 with the same capacity as Nogueres. Cost of the second foundry was estimated at $1.1 million.

Antimony.—The Gagneraud Mine at Brouzils, Vendee, started production in early 1991. BRGM, owner of the project, was continuing with a testing program to determine whether to go into full production of 200 mt/month of contained antimony. The ore, with a grade of about 7% antimony, was thought to be comparable in quality with Bolivian ore. Most of the production was expected to be shipped to Compagnie Lucette, a BRGM subsidiary that produces antimony trioxide.

Other domestic sources of the metal were from the Societe Metaleurope refining of lead-zinc at Noyelles-Godault, la Societe des Mines de la Lucette works at Genest, and la Societe Industrielle et Chimique de l'Aisne at Chauny. France was importing most of its 4,500 mt/a of antimony metal requirements from Bolivia and China.

Ferroalloys.—Societe Europeenne d'Alliages pour la Siderurgie's (SEAS) new 110,000-mt/a high-carbon ferromanganese and silicomanganese plant was in operation in 1992. The plant, on a 23-hectare site in Dunkirk, is employing modern submerged-arc-furnace technology and utilizing relatively low-cost power from the nearby Graveslines nuclear power station. Most of the smelter's output was expected to be used internally in Usinor's steelmaking operations.

A long-term contract with Brazilian manganese producer Compania Vale Rio Doce (CVRD) was signed to supply approximately two-thirds of the plant's manganese ore requirements.

Gold.—Gold mining in France was mostly concentrated in Societe des Mines du Bourneix's operations in the Saint-Yrieix district south of Limoges. Gold mineralization at Bourneix's mines is associated with galena, arsenopyrite, and pyrite within broad quartzitic lenses covering an area 15 to 20 km in length. Of the operating mines, the underground operations at Bourneix and Laurieras produce the greatest tonnage of gold ore and the highest gold content.

Three smaller surface mines, Les Renartieres, Cros-Gallet Sud, and Les

Fouilloux, truck their ores to the Bourneix concentrator for processing. The original 60,000-mt/a concentrator batch processes the ores depending on the source and gold content of the ore.

Bourneix constructed a 35-mt/h concentrator that was expected to raise the annual contained gold output to 1,600 kg. There were plans, pending environmental approval, for leaching and smelter facilities.

The other operation, Mines et Produits Chimiques de Salsigne's (MPCS) mine near Carcassonne, closed at the end of 1991. MPCS reported total liabilities of $44 million and a net debt of more than $6 million. The company was liquidated in early 1992. Coframines S.A., a subsidiary of BRGM, was the main stockholder and was seeking parties interested in developing the project.

The Salsigne Mine has estimated reserves for between 6 and 10 years of operation and was thought capable of producing 18,000 kg/a.

Iron Ore.—The famous iron ore basin of northern France stretches from Lorraine, France, northward into Belgium. However, for many years the high phosphorus and relatively low iron content of the ores has limited their desirability. The iron content of the ore varies from 30% to 32%. Consequently, production in Lorraine has been declining for several years. Iron ore production has decreased more than 50% in the past 10 years.

France's domestic producers were having a difficult time competing against foreign iron ore sources, which have higher grade ores and lower production costs. In the past, increased use of highly mechanized equipment and the use of Government subsidies have kept many mines in operation. In recent years, the uneconomic mines were closed, and others are to be closed as deposits are depleted.

Lormines S.A. announced a further rationalization that would reduce its work force and set production at 5 Mmt for 1992 from the company's four open pit mines.

Production from the other two French iron ore-producing basins, Normandy and Anjou, were following a similar trend in dropping to small fractions of previous production levels.

Iron and Steel.—As a result of a consolidation of the French steel industry and of purchases of additional production facilities outside of France, Usinor Sacilor S.A., the state steel group, ranked second in world steel production behind Nippon Steel of Japan. Usinor Sacilor was continuing to strengthen the company's market position both in Europe and in the United States. The company was producing about 75% of its steel in France, 20% in Germany, and 5% in the United States.

In Europe, Usinor Sacilor and Arbed SA of Luxembourg entered into a 50-50 joint venture and formed a new company, Europrofil, to market certain products that both companies produce and to share the export trading company, Le Materiel de Voie. The products produced include beams, joists, and special sections, including mine shaft supports.

The two companies were reported to also be discussing the possibility of co-operation in the production of wire rod. An agreement between the companies was seen as a method of rationalization of production in the wire rod market utilizing the combined resources of two of the largest producers in Europe. A new company, TrefilEurope, would oversee the merging of wire rod production of Usinor Sacilor's subsidiaries, Trefilunion and Saarstahl, and Arbed's Bissen works.

The EC approved an investment of $463 million by Credit Lyonnais SA of France into Usinor Sacilor. The investment was expected to be in the form of capital and stock purchases and would give the 51% Government-controlled bank a 20% stake in Usinor Sacilor.

Compagnie Francaise des Ferrailles (CFF), the largest independent scrap metal processor in Europe, continued with investments in shredders and joint ventures. CFF has investments in 22 shredder operations, including 1 each in Spain and Belgium and 2 in the United States. Construction of four new sites was proceeding in 1992; three are in France and one is in Spain. CFF supplies about 4 Mmt/a of ferrous scrap, which is about 40% of the total French market.

Lithium.—The use of lithium in alloying with aluminum has been undergoing extensive research in the aerospace and automobile industries. In France, the granites of Beauvoir contain high concentrates of barium, lithium, niobium, tantalum, and tin. Owing to the low grades of lithium in ores and the physical problems of separating the metal from the silica minerals, lithium metal recovery has been difficult. Also, a concentration of approximately 7 kg of LiO_2 per ton of rock makes economic exploitation of the deposit difficult. The ores that are exploited are processed at the Pombliere Saint Marcel refinery facility operated by Metaux Speciaux, which produces lithium and other chemical compounds.

Polymetallics.—BRGM was proceeding with exploration and development of the Chessy polymetallic deposit. Aztec Mining Ltd., the Australian subsidiary of AMAX Inc. of the United States, has a 24% interest in the project.

Exploration drilling has defined estimated geological reserves of 5.4 Mmt of ore. Minable reserves were estimated to be 4.1 Mmt of ore at average grades of 2.5% copper, 7.8% zinc, and 21% barite. The company expects to produce about 30,000 mt/a of 28% to 30% metal content copper concentrate, 40,000 mt/a of 55% to 60% metal content zinc concentrate with a byproduct production of 100,000 mt/a of 52% sulfur content pyrite, and 60,000 mt/a of chemical-grade barite.

Permits to allow construction of the plant and underground mine work to commence were obtained by yearend 1992. A production rate of 300,000 mt/a was planned by BRGM. Production was scheduled to begin in early 1994 with an estimated mine life of 14 years.

Metaleurop S.A. operated two lead-zinc mines, one at Les Malines and the other at Noailhac-Saint Salvy. The company increased production at Les

Malines to offset the lower metal content of the ore and increased efficiency to reduce operating expenses. At the Saint Salvy Mine, Metaleurop, in collaboration with BRGM, was continuing exploration of the western extension of the main vein of the Saint Salvy deposit.

Uranium.—Cogema, the state-owned uranium mining company, was the major producer of uranium in France. In recent years, the pace of exploration has decreased and projected future ore requirements have leveled off. In fact, many projects worldwide have been halted or canceled.

The Division Miniere Vendee (DMV), a division of Cogema, is based in the Loire-Atlantique region of western France. There were four mines and a 450,000-mt/a processing plant, which produced about 650 mt/a metal content of uranium. Two of the mines, Ecarpiere and Piriac, were closed in mid-1990 with the remaining two mines, Le Chardon and La Commanderie, scheduled to close at yearend 1992. The processing plant at Ecarpiere would also be shut down. Cogema cited the low grade of ore mined by DMV as the reason for the closure of the division. Cogema has two other mining divisions in France, La Crouzille, near Limoges, and Herault, in southwest France, that were continuing operations.

France has 56 nuclear reactors that produce 55,778 MW of electricity. Six more reactors were under construction and, when completed, would furnish an additional 8,305 MW of electricity. Nuclear power reactors provide almost 75% of electricity generated in France. About 12% of production was exported to neighboring countries.

Zinc.—Two companies operated primary zinc plants in France. The company Societe des Mines et Fonderies de Zinc de la Vieille-Montagne (VM), of Belgium, operated a zinc refinery at Auby-les-Douai with an annual capacity of 210,000 mt/a of zinc. This electrolytic plant is the newest and most modern in Europe and was built at a cost of $70 million in 1987. The other company, Metaleurop S.A., operated a 110,000-mt/a primary smelter and a 15,000-mt/a secondary smelter at Noyelles-Godualt.

Industrial Minerals

Andalusite.—Denain-Anzin Mineraux Refractaire Ceramique (DAMREC), a subsidiary of the Imetal Group, was the only producer of andalusite in Europe. DAMREC's mining operation is at Glomel, Brittany, and was producing about 75,000 mt/a. This placed France second only to the Republic of South Africa in terms of world output of andalusite. The company produced three grades of andalusite that were distinguished by different alumina and iron oxide content. These products were sold to the refractory and ceramic industries.

Barite.—The main primary barite-producing area in France is at Chaillac in central France near Limoges. Barytine de Chaillac, a subsidiary of Solvay Barium Strontium GmbH of Germany, is the major producer with an open pit mine and plant at Chaillac. Barytine produces about 90,000 mt/a of flotation-grade barite averaging 98% barium sulfate, which is suitable for chemicals production. Most of the output is exported to Solvay for further processing.

Byproduct barite is produced by Ste. Industrielle du Centre from its underground fluorspar mining operations at Chaillac. The company produces about 3,000 mt/a, mainly for the domestic market.

Calcium Carbonate.—Blancs Mineraux de Paris's (BMP) new calcium carbonate plant at Saint-Croix-de-Mareui became fully operational in 1991. The plant, which cost about $8 million, has an annual production capacity of 70,000 tons of calcium carbonate slurry. This production consists of wet-processed ultrafine ground calcium carbonate for the paper industry.

Pfizer Inc. of the United States announced it would construct the company's first European precipitated calcium carbonate (PCC) plant at Saillat-sur-Vienne. The plant will be set up at French paper manufacturer Aussedat Rey's paper mill. The PCC slurry would be piped directly to the paper mill. PCC imparts high brightness and high opacity to paper. Conversion from the acid process of papermaking to the alkaline process has increased the use of both PCC and natural ground calcium carbonate in carbonate filters. This has reduced kaolin's market share of the paper market.

Cement.—Lafarge Coppee SA and Societe Des Ciments Francais are the two largest cement producers in France. During the past several years, these two companies have been acquiring a number of companies within France as well as internationally. Each company has gained control of approximately one-third of the domestic market, leaving fewer than eight other companies with the final one-third.

In mid-1992 Italcementi Fabbriche Riunite Cemento, an Italian company, purchased a 30% share of Ciments Francaise from Paribas, a French banking group. Italcementi stated the reason for the purchase was to increase its presence internationally.

Both companies control about 33% of their respective national markets, and it was anticipated that the new venture would enable the companies to operate more effectively in the wider European market.

The economic slowdown, particularly in construction, was noticeable in the cement sector where French production dropped an estimated 5% as compared with that in 1991.

Feldspar.—French feldspar production was from five companies. Ets. Baux, at Saint Paul de Fenouillet, operated three open pit mines and a plant with a production capacity of 180,000 mt/a. Most of the material produced was sold to the glass industry with the remainder going to the ceramic industry.

Other producers were Ste. des Feldspaths du Midi and Ste. des Feldspaths du Morvan. They produce feldspar for the ceramics industry and have annual capacities of 80,000 mt/a and 50,000 mt/a, respectively.

Societe d'Exploitation de Sables et Mineraux S.A. (Samin) has an open pit mine at Roche en Regnier with a production capacity of 70,000 mt/a. Samin produced phonolite, which is a fine-grained equivalent of nepheline syenite. This can be substituted for feldspar in most glassmaking and ceramic applications.

Fluorspar.—Societe Generale de Rechereches et d'Exploitations Minieres (Sogerem), a Pechiney subsidiary, controlled more than 60% of fluorspar production. The fluorspar vein deposits are found in Hercynian massifs, Massif Central, the Vosges, the axial zone of the Pyrenees, and the outer Alps.

Sogerem's mining operations supply Comifluor S.A., another Pechiney subsidiary, which operates a plant at Olette. This plant produces acid-grade fluorspar (97% CaF_2) and electrical-grade fluorspar. Total production of both grades is approximately 45,000 mt/a. The Escardo Mine, owned by Denain-Anzin Mineraux, also ships approximately 90,000 mt/a from its surface operation to the Olette plant.

The other main producer is Societe Industrielle du Centre's Rossignol Mine in Chaillac. The mining operation extracts ore from a 1,000-m-long vein. The facility reportedly has the capacity to process 50,000 mt/a of crude ore to produce both metallurgical-grade and acid-grade feldspar.

Gypsum.—France was one of Europe's largest producers of gypsum. Two-thirds of the production was from the Paris Basin. Four companies produce approximately 95% of the output. In recent years, France has reported increased sales of gypsum products to other European countries. SA de Materiel de Construction is the largest company and accounts for almost one-half of the total 5.8 Mmt/a produced. The largest operation was the 1.3-Mmt/a underground mine at Taverny.

Kaolin.—Kaolin deposits derived from the granite massifs in Brittany are the ones most actively mined in France. The largest mine, operated by Societe Kaoliniere Armoricaine, was at Quessoy. The mine has a capacity of 120,000 mt/a. Another deposit in this northern area of Brittany is Plemet. In the southern part of the peninsula, at Ploemeur, are the two operations of Societe des Kaolin d'Arvor and Societe Nouvelle d'Exploitation de Morbinan. Reportedly, these operations each have a capacity to produce 75,000-mt/a. The 50,000-mt/a capacity operation in the northwest at Berrien is owned by Societe des Kaolins du Finistere and is used mostly in the paper and ceramics industries. Ball and refractory clays are mined in the Charante Basin to the southwest, producing more than 1 Mmt/a of crude clay.

Mica.—The country's three largest producers of mica have operations in Brittany. The mica produced was a byproduct of kaolin operations. The largest producer, Micarec SA, partially owned by Societe Nouvelle d'Exploitation des Kaolins du Morbihan, operated the kaolin deposit at Ploemuer, as does Kaolins d'Arvor SA, the second largest producer. Kaolins du Finisterre uses flotation at its Berrien deposit to process the byproduct mica.

Potash.—Mines de Potasse d'Alsace (MDPA) was the principal producer of potash with two mines, Marie-Louise and Amelie, near Mulhouse, Alsace. MDPA is the world's fifth largest supplier of potash salts. The main products are about 10 Mmt/a of 15.52% potash ore, which is concentrated to 62% potassium oxide material, bromine and industrial products, and rock salt for snow clearing. About 90% of the potash production is used by agriculture for fertilizer and 10% is purified and treated for use in other industries.

The Alsace deposits in the Upper Rhine Valley are in the Mulhouse area where a graben of Late Eocene geologic age was filled with two influxes of seawater. The latter surge of seawater in Early Oligocene time resulted in the deposition of two potash-rich beds. The strata were subsequently folded in Pliocene time into three different basins, the Wittelsheim and Munchausen in France and the Buggingen in Germany.

Based on estimated reserves, the French deposit will last into the next century. However, future development will be constrained to the east, west, and south by the boundaries of the tilted potash beds and to the north by the depth of the deposit.

Rare Earths.—Rhône-Poulenc S.A. is one of the world's leading processors of rare earths. In recent years, there has been growth in the rare-earth market for yttrium, neodymium, samarium, and cerium. This growth is due to developments and applications in permanent magnets, electronics, and superconductivity products.

Salt.—France is a significant European producer of salt. The country produces rock, solar, and vacuum salt as well as brine. Mining of rock salt is from two areas, Varangeville and Nancy, in northeastern France. One company, Cie Industrielle et Miniere, operates an 850,000-mt/a facility at Nancy and a 500,000-mt/a facility at Hautrives. Rock salt's share of crystallized salt production is about 7%.

Solar salt production is concentrated along the Mediterranean coast and on the Island of Corsica. This production accounts for 59% of the 4.7-Mmt/a crystallized salt capacity. Vacuum salt is produced at seven locations representing a capacity of 1.45-Mmt/a. This method of production accounts for the remaining crystallized salt capacity. The largest operation is the 600,000-mt/a facility operated by Cie. des Salins du Midi et des Salins de l'Est (CSME) at Varangeville in northeastern France.

Talc.—Talc de Luzenac S.A. is not only significant to the domestic market, it is also Europe's largest corporate talc producer. The company acquired several talc mining interests worldwide in 1990. Borax Francais S.A., a subsidiary of RTZ Corp., subsequently purchased 92% of Talc de Luzenac S.A. As a result of this, in 1991, RTZ Corp. became one of the major talc producers in the world.

Talc de Luzenac's open pit mine near Aix-les-Themes, where the company has

been mining since 1905, is the largest operation. Production was about 300,000 mt/a of ore from which more than 40 different grades of talc are derived. In terms of estimated reserves, the deposit, considered one of the largest in the world, could probably support the current output for another 100 years.

Mineral Fuels

Coal.—All underground coal mines were closed in the Midi-Pyrenees region in southern France and in the Nord Pas-de-Calais basin. In the northeast producing regions, CdF was proceeding with further rationalizations, which resulted in reduced production. The Lorraine basin produced 8.4 Mmt of coal and the Centre-Midi basin 1.6 Mmt of coal. The Provence basin accounted for 1.9 Mmt of lignite. CdF was planning to stabilize production at 10 to 12 Mmt/a of coal and 2 to 2.5 Mmt/a of lignite.

CdF and EdF were continuing with plans to add a number of coal-fired generating plants to the electrical utility grid, which was composed mostly of nuclear plants. The objective was to develop a large, pollution-free, coal-fired electric generating plant utilizing the technology present in smaller plants. Initially, a 250-MW plant was planned, which could be upscaled to 600 MW in the future.

Nuclear Power.—EdF signed agreements with agencies of the former U.S.S.R. for cooperation in various nuclear fields. Areas of possible co-operation were operational safety; accident recovery; design, construction, and decommissioning of nuclear facilities; and enrichment of reprocessed uranium.

Petroleum and Natural Gas.—Elf Aquitaine, the 53.9% state-owned oil company, was continuing negotiations with various Republics of the former U.S.S.R. to begin a 5-year petroleum exploration program starting in the early 1990's. The company would explore 6,400 ha of territory in the west of Kazakhstan and in Russia. Elf was also planning to eventually develop refinery distribution and petrochemical operations.

In 1992, onshore petroleum production was mainly from the Paris Basin, which produced an estimated 13 Mbbl, and the Aquitaine Basin, which produced an estimated 7 Mbbl. Because production has started to decline in these areas, the Government was planning to initiate a program to encourage exploration for new deposits in other areas thought to have good potential. The Jura Basin was one area under consideration.

There were five companies that operated refineries in France: SNEA, Total CFP, Royal Dutch/Shell Group, British Petroleum Co. PLC, and Mobil Corp. The structure of the industry is geared to gasoline production. Refining is mainly focused on high-octane unleaded gas because a majority of the vehicles in France can use this without engine modifications.

There are no refining units capable of processing heavy fuels nor is there available hydrocracked feedstocks for the production of gas oil. This leaves the process stream short on middle distillates and naphtha. France is a net petroleum products importer. *(See table 6.)*

INFRASTRUCTURE

France has a very modern and well-developed infrastructure. The French National Railways (SNCF) operates 34,568 km of 1.435-m standard gauge, of which 11,674 km was electrified. The system incorporates the use of superfast trains on selected tracks. Similarly, the highways are extensive and modern for the transport of goods and services. The inland waterways are increasingly used to transport more goods; however, they always have been significant avenues of commerce with 6,969 km of the 14,932-km-long waterway heavily used. The major sea ports are as follows: Bordeaux, Boulogne, Brest, Cherbourg, Dunkerque, Fos-Sur-Mer, Le Havre, Marseille, Nantes, Rouen, Sete, and Toulon.

One of the most significant infrastructure developments in recent times has been the Channel Tunnel Project. Transportation, not only in France but also in the whole of Europe, will change significantly with the completion of the Channel Tunnel. The tunnel, being constructed underneath the English Channel, will connect Coquelles, near Calais, France, and Folkestone, England. From these terminals, people will drive their cars and trucks onto trains that will transport them 49 km to each respective side in about one-half hour.

Completion of the project was scheduled for June 1993, at which time service between Coquelles and Folkestone would commence. The Channel Tunnel connecting the two countries will be a vital infrastructure component when the EC becomes a single marketplace of 320 million people.

OUTLOOK

One of the world's most developed economies, France was an advocate for the EC and the European single market. The country has had to make considerable changes in the structure of the industries within the country, particularly those controlled by the state. Several state-owned companies have taken the initiative to become leaders in their respective industries. Others have had to make additional adjustments under rationalization schemes proposed by the EC or the French Government. The depletion of natural resources and/or the cessation of subsidies for uneconomic operations will have impacts on local communities and their economies. France will have the advantage of plentiful electrical power to attract industrial facilities requiring a good work force and access to the significant markets in Europe.

[1]Where necessary, values have been converted from French francs (f) to U.S. dollars ($) at the rate of f5.72=US$1.00, the average rate in 1992.

OTHER SOURCES OF INFORMATION

Agencies

Ministere de la Recherche et de l'Industrie
(Ministry of Research and Industry)
68 rue de Bellechasse
75353 Paris, cedex 07
France

Bureau de Recherches Geologique et Minieres
(Bureau of Geological and Mining Research)

Avenue de Concyr - BP 6009
45060 Orleans cedex 2
France

Publications

Annales des Mines.
Annuaire de Statistique Industrielle.
Annual Reports: BRGM, CdF, Imetal, Entreprise Miniere et Chimique, SNEA, Total, Usinor Sacilor.
Chronique de la Recherche Miniere.
Matieres Premieres Minerales.

TABLE 1

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992
METALS						
Aluminum:						
Bauxite, gross weight	thousand tons	878	550	490	r180	100
Alumina:						
Crude	do.	720	624	606	e500	400
Calcined	do.	551	479	467	r403	300
Metal:						
Primary	do.	327	334	325	286	3418
Secondary	do.	211	225	208	217	3227
Antimony metal including regulus		6,093	6,910	6,520	r760	600
Arsenic, white[e]		10,000	10,000	36,480	—	—
Bismuth metal		90	100	70	e50	40
Cadmium metal		355	170	187	271	250
Cobalt metal including powder		176	165	150	e150	150
Copper:						
Mine output, Cu content		246	300	480	e400	300
Metal:						
Blister, secondary[e]		38,500	r8,400	r6,600	r5,800	6,000
Refined:						
Primary		7,239	16,363	18,034	e19,600	30,100
Secondary[e]		36,000	26,800	26,000	r30,000	29,000
Total		43,239	43,163	44,034	r e49,600	59,100
Gold, mine output, Au content	kilograms	2,525	3,303	4,236	r e3,700	4,000
Iron and steel:						
Iron ore and concentrates:						
Gross weight	thousand tons	9,983	9,368	8,729	7,472	5,700
Fe content	do.	2,994	2,810	2,793	e2,316	1,700
Metal:						
Pig iron	do.	14,786	15,071	14,415	13,646	313,051
Ferroalloys:						
Blast furnace: Spiegeleisen and ferromanganese	do.	324	325	324	e320	300
Electric furnace:						
Ferrochrome[e]	do.	10	r10	25	20	15
Ferromanganese	do.	27	e27	36	e30	30
Ferrosilicon	do.	131	e130	117	e115	100
Silicon metal	do.	70	e72	64	e70	60
Other[e]	do.	359	79	50	50	50
Total[e]	do.	621	r643	616	605	555
Steel ingots and castings	do.	19,122	19,335	19,015	18,434	317,961
Semimanufactures	do.	17,465	17,691	16,774	16,678	316,172
Lead:						
Mine output, Pb content		1,966	1,122	1,187	1,725	—
Smelter:						
Primary		146,500	149,300	136,800	e140,000	130,000
Secondary[e]		15,000	20,000	20,000	30,000	25,000
Total[e]		161,500	169,300	156,800	170,000	155,000

See footnotes at end of table.

TABLE 1—Continued

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS—Continued						
Lead—Continued:						
Refined:						
Primary: Soft lead		146,511	149,300	162,260	154,500	160,500
Secondary:						
Soft lead		37,400	52,100	47,612	e57,500	49,400
Pb content of antimonial lead		71,791	76,910	60,598	e71,500	74,160
Total		255,702	278,310	270,470	e283,500	284,060
Magnesium metal including secondary		13,800	14,600	e14,000	e14,000	12,000
Nickel metal		10,400	8,632	9,800	8,607	10,200
Silver:[e]						
Mine output, Ag content:						
Lead and zinc concentrates	kilograms	3 24,074	r 19,200	r 20,500	r 23,600	22,000
Mixed copper, gold, silver concentrates	do.	3 6,220	5,000	5,000	5,000	4,000
Total	do.	3 30,294	r 24,200	r 25,500	r 28,600	26,000
Metal, Ag content of final smelter products[e]	do.	3 24,882	25,000	22,200	20,000	20,000
Tin, smelter output of solder and other alloys, secondary		2,635	2,670	e2,560	e2,400	2,000
Uranium:						
Mine output, U content		3,385	3,219	2,820	e2,300	2,000
Chemical concentrate, U_3O_8 equivalent		3,669	3,763	3,323	2,530	2,400
Zinc:						
Mine output, Zn content		31,139	26,706	23,851	27,109	16,500
Metal including secondary:						
Slab		274,100	265,800	263,136	299,600	304,700
Dust[e]		9,000	9,000	8,600	9,000	8,000
INDUSTRIAL MINERALS						
Barite		104,400	111,800	92,500	r e90,000	80,000
Bromine, elemental[e]		20,000	18,000	3,100	3,000	2,500
Cement, hydraulic	thousand tons	25,300	26,835	26,388	26,507	25,000
Clays:						
Bentonite[e 4]		5,000	5,000	r10,000	r10,000	10,000
Kaolin and kaolinitic clay (marketable)	thousand tons	338	346	r e367	e360	350
Refractory clay, unspecified[e]	do.	50	3 15	16	15	15
Diamonds: Synthetic, industrial[e]	thousand carats	4,000	4,000	5,000	4,000	3,500
Diatomite[e]	thousand tons	250	250	250	250	250
Feldspar, crude[e]	do.	3 322	360	420	400	400
Fluorspar:						
Crude	do.	313	449	515	e400	400
Marketable:						
Acid and ceramic-grade	do.	133	158	e145	e150	140
Metallurgical-grade	do.	52	62	e113	e50	60
Total	do.	185	220	258	e200	200
Gypsum and anhydrite, crude	do.	5,628	5,684	5,796	r e5,600	5,700
Kyanite, andalusite, related materials[e]	do.	50	50	r50	r50	50
Lime: Quicklime, hydrated lime, dead-burned dolomite	do.	3,089	3,084	e3,000	e3,000	3,000
Mica[e]		11,000	8,000	7,000	6,000	5,000
Nitrogen: N content of ammonia	thousand tons	1,832	1,476	1,586	1,604	3 1,407

See footnotes at end of table.

TABLE 1—Continued

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued						
Pigments, mineral, natural: Iron oxides e		15,000	15,000	15,000	14,000	12,000
Phosphates: Thomas slag	thousand tons	775	701	488	538	500
Potash:						
Gross weight (run-of-mine)	do.	10,392	8,791	9,468	e9,500	9,500
K_2O equivalent (run-of-mine) e	do.	3 1,502	1,400	1,400	1,400	1,400
K_2O equivalent (marketable)	do.	1,385	1,195	1,292	r1,129	1,130
Pozzolan and lapilli e	do.	400	400	336	400	400
Salt:						
Rock salt e	do.	r 3 1,145	r910	r790	r800	700
Brine salt (refined)	do.	1,133	1,138	1,155	e1,000	1,100
Marine salt	do.	1,437	1,914	r1,298	r e1,200	1,200
Salt in solution	do.	3,973	4,305	r3,362	r e3,500	3,600
Total e	do.	r 3 7,688	r8,267	r6,605	r6,500	6,600
Sodium compounds: e						
Soda ash	do.	780	780	1,180	1,000	1,000
Sodium sulfate	do.	120	120	120	120	120
Stone, sand and gravel:						
Limestone, agricultural and industrial e	do.	7,000	7,000	7,000	6,000	6,000
Slate, roof e	do.	60	60	40	50	50
Sand and gravel:						
Industrial sands, total e	do.	7,500	r7,500	3,500	r3,500	3,500
Other sand and gravel, alluvial	do.	208,000	e210,000	e208,500	219,240	220,000
Sulfur, byproduct:						
Of natural gas	do.	725	647	666	e794	750
Of petroleum	do.	225	239	233	e225	225
Of unspecified sources e	do.	150	150	150	180	150
Total e	do.	1,100	1,036	1,049	1,199	1,125
Talc:						
Crude		320,000	329,960	328,100	e310,000	300,000
Powder e		270,000	270,000	287,000	280,000	260,000
MINERAL FUELS AND RELATED MATERIALS						
Asphaltic material e		44,200	43,000	44,500	45,000	40,000
Carbon black e		180,000	180,000	252,000	250,000	200,000
Coal, including briquets:						
Anthracite and bituminous coal	thousand tons	12,139	11,471	10,488	10,128	10,000
Lignite	do.	1,653	2,168	2,256	r1,963	1,900
Total	do.	13,792	13,639	12,744	r12,091	11,900
Briquets e	do.	3 804	825	540	500	500
Coke, metallurgical	do.	5,288	5,340	5,208	5,053	5,000
Gas, natural:						
Gross	million cubic meters	4,644	4,406	4,334	4,097	4,100
Marketed	do.	3,207	3,073	3,031	2,845	2,900
Natural gas liquids	thousand 42-gallon barrels	3,882	3,983	e4,000	e3,600	3,800
Peat e	thousand tons	200	200	200	200	200

See footnotes at end of table.

TABLE 1—Continued

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	24,776	23,639	22,036	21,240	22,000
Refinery products:						
Liquefied petroleum gas	do.	e24,000	30,102	32,492	e30,000	30,000
Gasoline, all kinds	do.	e127,140	129,515	r140,820	e145,000	145,000
Jet fuel	do.	e30,600	e30,000	39,976	e40,000	40,000
Kerosene	do.	e400	372	462	e500	500
Distillate fuel oil	do.	200,150	208,768	210,372	e210,000	200,000
Heavy fuel oil	do.	e77,000	76,732	76,510	e75,000	76,000
Other products	do.	e45,000	40,041	42,000	e40,000	40,000
Refinery fuel and losses	do.	e28,000	26,537	20,286	e20,000	20,000
Total e	do.	532,290	542,067	r 3562,918	560,500	551,500

eEstimated. rRevised.

[1]Table includes data available through May 1993.

[2]In addition to the commodities listed, France also produces germanium from domestic ores and has been described as the world's leading producer of this commodity in French sources. Output was reported as being all from the Saint-Salvy Mine. Unfortunately, actual output is not regularly reported, and the ore from this mine is not sufficiently uniform in grade to permit estimates of output based on reported concentrate production. In addition, France produces large quantities of stone, but statistics on output are not available.

[3]Reported figure.

[4]Includes smectic clay.

TABLE 2

FRANCE: 1991 BALANCE OF PAYMENTS, SELECTED MINERAL COMMODITIES[1]

(Thousand dollars)

Mineral commodity	Exports to EC	Imports from EC	Net gain or (loss)	Exports to the world	Imports from the world	Net gain or (loss)
Crude industrial minerals:						
Feldspar	$7,582	$2,436	$5,146	$8,587	$6,663	$1,924
Magnesite	9	373	(364)	13	560	(547)
Slate	1,826	449	1,377	2,191	484	1,707
Other	440,134	402,479	37,655	596,466	851,600	(255,134)
Total	449,551	405,737	43,814	607,257	859,307	(252,050)
Metalliferous ores:						
Copper	357	280	77	357	1,446	(1,089)
Lead	4	7,380	(7,376)	6	52,216	(52,210)
Tin		12	(12)		19	(19)
Zinc	4,135	34,618	(30,483)	4,164	193,248	(189,084)
Other (including waste and scrap)	953,355	549,294	404,061	1,065,534	1,486,759	(421,225)
Total	957,851	591,584	366,267	1,070,061	1,733,688	(663,627)
Nonmetallic mineral manufactures	268,718	512,622	(243,904)	576,656	819,228	(242,572)
Metals:						
Iron and steel	5,757,902	5,792,854	(34,952)	8,434,848	6,833,633	1,601,215
Mercury	196	81	115	422	444	(22)
Other nonferrous metals	2,680,117	3,065,139	(385,022)	3,629,770	5,343,748	(1,713,978)
Total	8,438,215	8,858,074	(419,859)	12,065,040	12,177,825	(112,785)
Mineral fuels	3,462,972	5,068,997	(1,606,025)	5,392,173	22,346,703	(16,954,530)

[1]Table prepared by Harold Willis, Section of International Data.

TABLE 3

FRANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	15	8	(2)	Italy 3; United Kingdom 3; Germany 1.
Alkaline-earth metals	42	24	6	Algeria 7; Netherlands 7; Israel 2.
Aluminum:				
Ore and concentrate	13,142	17,450	—	Italy 8,592; United Kingdom 5,862; Morocco 2,000.
Oxides and hydroxides	227,878	178,481	7,076	Italy 77,142; Germany 21,972; Spain 20,428.
Ash and residue containing aluminum	17,237	NA	NA	NA.
Metal including alloys:				
Scrap	150,055	141,033	3,370	Italy 51,836; Belgium-Luxembourg 42,637; Germany 18,726.
Unwrought	135,834	127,481	136	Italy 36,938; Germany 34,646; Belgium-Luxembourg 11,011.
Semimanufactures	399,857	423,814	17,658	Germany 123,461; United Kingdom 75,975; Italy 37,932.
Antimony:				
Ore and concentrate	27	NA	NA	NA.
Oxides	5,080	NA	NA	NA.
Ash and residue containing antimony	18	NA	NA	NA.
Metal including alloys, all forms	72	206	50	Belgium-Luxembourg 103; Netherlands 20; Japan 19.
Arsenic: Metal including alloys, all forms	784	NA	NA	NA.
Beryllium: Metal including alloys, all forms	96	71		Mainly to Germany.
Bismuth: Metal including alloys, all forms	78	18	—	Germany 10; United Kingdom 3; Spain 2.
Cadmium: Metal including alloys, all forms	377	720	111	Belgium-Luxembourg 451; Netherlands 71; Germany 63.
Chromium:				
Ore and concentrate	2,395	4,089	(2)	Italy 2,396; Germany 1,148; Spain 454.
Oxides and hydroxides	330	1,087	—	United Kingdom 408; Netherlands 338; Germany 168.
Metal including alloys, all forms	3,899	2,674	1,379	Germany 562; Japan 178; United Kingdom 148.
Cobalt:				
Ore and concentrate	2	18	—	All to Morocco.
Oxides and hydroxides	32	22	5	Germany 5; Netherlands 5; United Kingdom 4.
Ash and residue containing cobalt	274	NA	NA	NA.
Metal including alloys, all forms	617	669	83	United Kingdom 156; Belgium-Luxembourg 94; Germany 78.
Columbium and tantalum: Tantalum metal including alloys, all forms	26	33	15	Italy 13; Germany 3; United Kingdom 2.
Copper:				
Ore and concentrate	1,060	683	—	All to Germany.
Matte and speiss including cement copper	77	61	—	Belgium-Luxembourg 27; Italy 19; Spain 10.
Oxides and hydroxides	23	NA	NA	NA.
Sulfate	300	NA	NA	NA.
Ash and residue containing copper	16,183	NA	NA	NA.
Metal including alloys:				
Scrap	161,172	169,115	273	Germany 49,295; Italy 48,881; Belgium-Luxembourg 44,035.
Unwrought	27,616	29,450	(2)	Spain 17,304; Belgium-Luxembourg 5,228; Italy 3,178.
Semimanufactures	344,640	359,308	5,298	Germany 98,924; Italy 71,075; Spain 43,293.
Germanium: Metal including alloys, all forms	21	3	2	Mainly to Germany.
Gold:				
Waste and sweepings value, thousands	$11,210	$10,749	$19	Switzerland $5,392; Canada $2,548; Portugal $1,010.
Metal including alloys, unwrought and partly wrought kilograms	40,919	179,200	(2)	Switzerland 65,400; Italy 49,400; Israel 28,300.

See footnotes at end of table.

TABLE 3—Continued

FRANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Hafnium: Metal including alloys, all forms	9	NA	NA	NA.
Iron and steel:				
Iron ore and concentrate: Excluding roasted pyrite thousand tons	3,280	3,153	—	Mainly to Belgium-Luxembourg.
Metal:				
Scrap do.	3,675	3,425	(2)	Spain 1,259; Italy 1,192; Belgium-Luxembourg 529.
Pig iron, cast iron, related materials	552,914	408,208	79,909	Italy 101,418; Germany 51,100; Belgium-Luxembourg 48,826.
Ferroalloys:				
Ferrochromium	21,657	22,780	812	Germany 9,386; United Kingdom 6,844; Belgium-Luxembourg 2,996.
Ferromanganese	25,657	57,673	18,909	Germany 13,280; Italy 9,779; Iran 2,835.
Ferromolybdenum	3,272	NA	NA	NA.
Ferronickel	3,240	1,801	—	Italy 762; Germany 550; Spain 469.
Ferroniobium	61	NA	NA	NA.
Ferrosilicochromium	136	NA	NA	NA.
Ferrosilicomagnesium	52,316	NA	NA	NA.
Ferrosilicomanganese	51,138	56,408	8,783	Germany 12,176; Italy 11,716; Spain 8,028.
Ferrosilicon	29,007	40,019	321	Germany 14,762; Japan 8,024; Italy 7,252.
Unspecified	31,105	29,435	3,029	Italy 4,145; Germany 3,763; Japan 3,229.
Steel, primary forms thousand tons	1,072	1,255	86	Belgium-Luxembourg 815; Germany 116; Norway 93.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel				
Not clad, plated, coated do.	4,271	4,449	384	Italy 1,253; Germany 719; Spain 483.
Clad, plated, coated do.	1,594	1,844	92	Italy 226; United Kingdom 218; Belgium-Luxembourg 140.
Of alloy steel do.	534	568	30	Germany 144; Italy 98; United Kingdom 48.
Bars, rods, angles, shapes, sections do.	2,596	2,599	120	Germany 916; Belgium-Luxembourg 291; Italy 289.
Rails and accessories do.	124	104	2	India 17; Italy 17; Iran 16.
Wire do.	171	149	25	Germany 47; Spain 9; United Kingdom 9.
Tubes, pipes, fittings do.	1,357	1,344	57	United Kingdom 180; Germany 165; Netherlands 111.
Lead:				
Ore and concentrate	34	3	—	Spain 2; Israel 1.
Oxides	16,134	13,724	—	Japan 5,190; Belgium-Luxembourg 3,683; Germany 1,918.
Ash and residue containing lead	2,443	NA	NA	NA.
Metal including alloys:				
Scrap	9,389	4,028	—	Spain 1,157; Germany 1,105; Ireland 524.
Unwrought	62,399	72,213	50	Belgium-Luxembourg 14,682; Italy 12,885; Netherlands 9,246.
Semimanufactures	2,833	3,771	(2)	United Kingdom 1,368; Germany 1,003; Netherlands 465.
Lithium: Oxides and hydroxides	1	NA	NA	NA.
Magnesium: Metal including alloys:				
Scrap	242	221	92	Netherlands 85; Germany 30; Spain 14.
Semimanufactures	120	202	—	Germany 95; Netherlands 63; Yugoslavia 25.
Manganese:				
Ore and concentrate, metallurgical-grade	52,873	87,341	—	Norway 46,200; Italy 16,009; Belgium-Luxembourg 10,070.

See footnotes at end of table.

TABLE 3—Continued

FRANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Manganese—Continued:					
Oxides		3,588	2,651	—	Italy 1,836; Norway 308; Belgium-Luxembourg 102.
Metal including alloys, all forms		4,825	3,961	119	Germany 1,032; United Kingdom 918; Italy 562.
Mercury		38	112	18	Belgium-Luxembourg 32; United Kingdom 24; Netherlands 15.
Molybdenum:					
Ore and concentrate		693	235	—	Netherlands 120; Belgium-Luxembourg 58; United Kingdom 30.
Ash and residue containing molybdenum		509	NA	NA	NA.
Metal including alloys:					
Unwrought including waste and scrap		188	197	—	Germany 62; Italy 55; Austria 51.
Semimanufactures		83	58	(2)	Germany 17; Japan 15; United Kingdom 7.
Nickel:					
Ore and concentrate		23	67	—	Italy 52; Netherlands 14; Reunion 1.
Matte and speiss	value, thousands	$2,955	$2,172	—	Belgium-Luxembourg $1,767; Canada $324; Cote d'Ivoire $47.
Oxides and hydroxides		9	NA	NA	NA.
Ash and residue containing nickel		1,361	NA	NA	NA.
Metal including alloys:					
Scrap		4,118	4,615	545	Germany 1,789; Netherlands 979; United Kingdom 507.
Unwrought		8,036	4,891	1,429	Germany 1,853; Sweden 434; Japan 400.
Semimanufactures		6,722	6,660	870	Germany 3,968; United Kingdom 619; Sweden 161.
Platinum-group metals:					
Waste and sweepings	value, thousands	$25,761	$17,905	$2,907	Italy $5,616; United Kingdom $3,775; Belgium-Luxembourg $3,750.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	6,118	NA	NA	NA.
Platinum	value, thousands	$82,540	$64,933	$53	Netherlands $29,677; Switzerland $13,559; United Kingdom $11,912.
Rhodium	kilograms	672	NA	NA	NA.
Iridium, osmium, ruthenium	do.	(2)	NA	NA	NA.
Unspecified	value, thousands	—	$74,513	$927	Netherlands $42,853; Germany $9,491; United Kingdom $9,362.
Rare-earth metals including alloys, all forms		16	NA	NA	NA.
Selenium, elemental		6	NA	NA	NA.
Silicon, high-purity		35	344	3	Japan 27; Germany 12; United Kingdom 2.
Silver:					
Ore and concentrate		14	—		
Waste and sweepings[4]	value, thousands	$18,289	$37,622	$27	Germany $18,110; United Kingdom $11,202; Switzerland $3,420.
Metal including alloys, unwrought and partly wrought	do.	$153,929	$143,380	$1,488	Spain $79,512; United Kingdom $22,998; Germany $13,708.
Tellurium, elemental		34	NA	NA	NA.
Tin:					
Oxides		6	NA	NA	NA.

See footnotes at end of table.

TABLE 3—Continued

RANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Tin—Continued:				
Ash and residue containing tin	102	NA	NA	NA.
Metal including alloys:				
Scrap	258	324	—	Germany 184; Belgium-Luxembourg 100; Malaysia 12.
Unwrought	159	99	—	Spain 24; Belgium-Luxembourg 15; Italy 11.
Semimanufactures	404	303	(2)	Spain 211; Tunisia 21; Algeria 16.
Titanium:				
Ore and concentrate	38	867	19	Sierra Leone 822; Canada 16; Spain 10.
Oxides	17,676	18,847	4,874	Germany 4,595; United Kingdom 1,307; Malaysia 1,040.
Metal including alloys:				
Unwrought including waste and scrap	1,277	956	264	United Kingdom 339; Spain 128; Italy 107.
Semimanufactures	1,448	984	86	United Kingdom 286; Germany 167; Indonesia 128.
Tungsten:				
Ore and concentrate	7	4	—	Italy 2; Germany 1.
Oxides and hydroxides	49	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	146	186	23	Germany 59; United Kingdom 32; Belgium-Luxembourg 20.
Semimanufactures	130	113	2	Germany 27; Republic of South Africa 17; Spain 17.
Uranium and thorium:				
Oxides and other compounds value, thousands	$1,353,112	$1,433,375	$104,983	Belgium-Luxembourg $627,361; United Kingdom $303,874; Japan $228,008.
Metal including alloys, all forms, uranium do.	$187,496	$193,733	$80,106	Netherlands $41,133; Germany $27,808; Japan $26,534.
Vanadium:				
Ore and concentrate	24	NA	NA	NA.
Oxides and hydroxides	35	NA	NA	NA.
Ash and residue containing vanadium	132	NA	NA	NA.
Metal including alloys, all forms	4	29	1	Germany 28.
Zinc:				
Ore and concentrate	24,635	12,208	—	Italy 7,368; Belgium-Luxembourg 3,942; Spain 777.
Oxides	24,441	23,655	2	Germany 3,894; Spain 3,741; Italy 3,713.
Blue powder	1,734	NA	NA	NA.
Ash and residue containing zinc	28,274	NA	NA	NA.
Metal including alloys:				
Scrap	19,411	21,098	86	Belgium-Luxembourg 4,880; Italy 3,423; unspecified 7,292.
Unwrought	83,236	86,452	—	Germany 30,678; Belgium-Luxembourg 27,574; Italy 9,250.
Semimanufactures	41,084	[3]43,985	44	Belgium-Luxembourg 17,678; Germany 15,165; Italy 1,957.
Zirconium:				
Ore and concentrate	857	816	(2)	Italy 326; Germany 207; Belgium-Luxembourg 171.
Ash and residue containing zirconium	3	NA	NA	NA.
Metal including alloys, all forms	10,456	9,527	488	Germany 4,356; Italy 1,142; Spain 464.
Other:				
Ores and concentrates:				
Of base metals	1,057	104	—	United Kingdom 80; Portugal 24.
Of precious metals value, thousands	$14	$19	—	United Kingdom $18; Belgium-Luxembourg $1.
Oxides and hydroxides	3,648	7,154	305	Germany 2,976; Italy 798; Netherlands 789.
Ashes and residues	25,306	110,816	136	Belgium-Luxembourg 37,105; Italy 24,981; Germany 17,310.

See footnotes at end of table.

TABLE 3—Continued

FRANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Other—Continued:					
Base metals including alloys, all forms		79	81	13	Japan 31; Switzerland 18; Germany 8.
Metalloids		823	1,643	312	Canada 492; Japan 171; Republic of South Africa 139.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		2,519	1,641	1	Spain 702; Germany 214; Belgium-Luxembourg 148.
Artificial: Corundum		23,591	16,854	426	Spain 3,352; Germany 1,938; Belgium-Luxembourg 1,864.
Grinding and polishing wheels and stones		11,379	10,126	253	Italy 2,458; Belgium-Luxembourg 1,600; United Kingdom 1,502.
Dust and powder of precious and semi-precious stones including diamond	value, thousands	$1,331	$1,652	$23	Italy $563; Switzerland $324; Germany $199.
Asbestos, crude		101	386	—	Austria 192; Italy 96; Tunisia 43.
Barite and witherite	thousand tons	78	1,630	(2)	Belgium-Luxembourg 1,444; Germany 141; Switzerland 30.
Boron materials: Crude natural borates		4,563	3,464	—	Spain 2,207; Belgium-Luxembourg 1,157; Italy 85.
Cement	thousand tons	2,124	2,298	466	Germany 410; United Kingdom 238; Reunion 159.
Chalk		629,570	687,192	525	Germany 305,801; Belgium-Luxembourg 128,507; Switzerland 79,912.
Clays, crude:					
Bentonite		23,045	20,517	—	Spain 7,875; Germany 4,468; Portugal 3,291.
Chamotte earth or dinas earth		135,547	NA	NA	NA.
Fuller's earth		5,425	NA	NA	NA.
Fire clay		123,853	NA	NA	NA.
Kaolin		267,939	247,032	4	Italy 77,707; Germany 59,380; Belgium-Luxembourg 35,385.
Unspecified		93,918	369,033	9	Italy 163,983; Germany 69,566; United Kingdom 46,563.
Cryolite and chiolite		215	2,040	—	Spain 1,396; Hungary 271; United Kingdom 88.
Diamond, natural:					
Gem, not set or strung	value, thousands	$102,092	$71,026	$9,030	Switzerland $39,607; Belgium-Luxembourg $9,391; Hong Kong $4,723.
Industrial	do.	$1,202	$1,288	$279	Belgium-Luxembourg $619; Germany $134; Switzerland $119.
Diatomite and other infusorial earth		41,661	35,767	—	Germany 14,830; Italy 6,051; Austria 2,135.
Feldspar, fluorspar, related materials:					
Feldspar		123,367	110,868	—	Spain 64,496; Germany 24,945; Belgium-Luxembourg 13,926.
Fluorspar		40,204	32,045	54	Italy 17,895; Germany 7,438; Belgium-Luxembourg 3,963.
Unspecified		50	NA	NA	NA.
Fertilizer materials:					
Crude, n.e.s.		54,418	48,346	80	Germany 20,098; Switzerland 7,115; United Kingdom 6,660.
Manufactured:					
Ammonia		25,281	57,504	—	Spain 30,954; Norway 10,260; Israel 8,700.
Nitrogenous		670,104	771,997	16,269	Germany 171,275; Spain 142,108; United Kingdom 95,752.
Phosphatic		258,936	148,069	—	Germany 70,962; Switzerland 35,975; Italy 18,110.
Potassic		325,753	342,352	286	Belgium-Luxembourg 101,579; Netherlands 64,749; Switzerland 43,061.

See footnotes at end of table.

TABLE 3—Continued

FRANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Fertilizer materials—Continued:				
Manufactured—Continued:				
Unspecified and mixed	707,697	776,835	29	Spain 197,379; Germany 104,212; United Kingdom 77,882.
Graphite, natural	562	473	67	United Kingdom 102; Belgium-Luxembourg 90; Germany 72.
Gypsum and plaster thousand tons	1,015	1,072	(2)	Germany 456; Belgium-Luxembourg 434; Netherlands 95.
Iodine	38	NA	NA	NA.
Kyanite and related materials	47,655	NA	NA	NA.
Lime	447,006	435,088	—	Germany 285,994; Belgium-Luxembourg 101,003; Guinea 14,047.
Magnesium compounds:				
Magnesite, crude	81	45	—	Martinique 21; Norway 17; Italy 5.
Oxides and hydroxides	19,520	25,386	18	Belgium-Luxembourg 9,180; Germany 6,765; Austria 1,894.
Sulfate	942	NA	NA	NA.
Mica:				
Crude including splittings and waste	8,371	7,828	30	Germany 4,070; United Kingdom 1,288; Spain 621.
Worked including agglomerated splittings	2,128	1,196	9	Switzerland 401; Italy 193; Hong Kong 159.
Nitrates, crude	1	57	—	Italy 26; Switzerland 24; Belgium-Luxembourg 5.
Phosphates, crude	2,660	1,511	—	United Kingdom 1,127; Belgium-Luxembourg 96; Spain 60.
Pigments, mineral:				
Natural, crude	1,956	NA	NA	NA.
Iron oxides and hydroxides, processed	17,083	12,599	919	Italy 5,281; Germany 1,513; Republic of Korea 1,250.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$77,244	$76,692	$6,356	Switzerland $58,097; United Kingdom $3,344; Hong Kong $2,583.
Synthetic do.	$24,295	$22,166	$1,829	Switzerland $14,862; Germany $795; Italy $782.
Pyrite, unroasted	123	75	—	Italy 53; Belgium-Luxembourg 8; Turkey 7.
Quartz crystal, piezoelectric value, thousands	$150	$106	$27	Sweden $66; Belgium-Luxembourg $6; Switzerland $3.
Salt and brine	936,061	797,890	414	Italy 263,998; Germany 146,390; Spain 64,276.
Sodium compounds, n.e.s.:				
Sulfate, manufactured	r30,502	39,100	—	Italy 14,194; Germany 6,369; Belgium-Luxembourg 5,724.
Sulfate, natural	r—	—		
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	211,860	281,080	1,436	Belgium-Luxembourg 185,138; Germany 34,899; Switzerland 21,065.
Worked	105,261	104,739	8,955	Belgium-Luxembourg 35,370; Germany 21,153; Switzerland 9,001.
Dolomite, chiefly refractory-grade	101,167	158,441	44	Belgium-Luxembourg 65,145; Denmark 47,516; Netherlands 10,810.
Gravel and crushed rock thousand tons	11,427	11,433	5	Germany 4,433; Switzerland 3,453; Belgium-Luxembourg 1,294.
Limestone other than dimension	313,508	257,019	1	Norway 110,856; Germany 104,294; Belgium-Luxembourg 37,951.
Quartz and quartzite	10,915	3,074	6	Germany 978; Belgium-Luxembourg 836; Spain 775.
Sand other than metal-bearing thousand tons	4,884	4,821	(2)	Germany 2,414; Switzerland 908; Italy 868.

See footnotes at end of table.

TABLE 3—Continued

FRANCE: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur:					
Elemental:					
Crude including native and byproduct		509,127	370,644	228	Tunisia 117,641; United Kingdom 70,017; Algeria 40,650.
Colloidal, precipitated, sublimed		431	588	—	Spain 144; Germany 101; Belgium-Luxembourg 55.
Dioxide		852	2,175	—	Belgium-Luxembourg 886; Germany 593; Netherlands 590.
Sulfuric acid		271,923	253,946	5,714	Belgium-Luxembourg 172,070; United Kingdom 32,625; Ireland 22,854.
Talc, steatite, soapstone, pyrophyllite		147,109	156,799	5,454	Germany 43,985; Spain 30,348; Netherlands 25,896.
Vermiculite[6]		1,168	1,608	—	Belgium-Luxembourg 390; Algeria 264; Denmark 170.
Other:					
Crude	thousand tons	1,761	7	(2)	Switzerland 4; Germany 1; Spain 1.
Slag and dross, not metal-bearing	do.	1,373	1,476	(2)	Germany 423; Israel 329; Italy 297.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		r7,814	33,490	—	Spain 24,297; Belgium-Luxembourg 4,526; Switzerland 2,076.
Carbon black		109,899	85,065	5	Spain 25,677; Germany 23,336; Italy 12,824.
Coal:					
Anthracite		36,794	32,511	—	Germany 11,931; Italy 7,551; Belgium-Luxembourg 6,359.
Bituminous		606,512	651,922	—	Germany 391,336; Netherlands 144,594; Italy 34,621.
Briquets of anthracite and bituminous coal		27,051	48,935	—	Belgium-Luxembourg 16,132; Germany 14,596; Italy 6,422.
Lignite including briquets		667	962	—	Spain 833; Belgium-Luxembourg 129.
Coke and semicoke		397,706	393,885	—	Germany 83,475; Norway 49,369; Netherlands 49,111.
Gas, natural:					
Gaseous	thousand cubic meters	r70,753	171,832	—	Germany 104,289; Belgium-Luxembourg 36,703; Switzerland 30,793.
Liquefied	do.	r654	92	—	Germany 63; Switzerland 20; Republic of Korea 3.
Peat including briquets and litter		3,536	5,356	—	Italy 2,335; Belgium-Luxembourg 687; Germany 466.
Petroleum:					
Crude	thousand 42-gallon barrels	149	219	—	Netherlands 205; Germany 13.
Refinery products:					
Liquefied petroleum gas	do.	9,393	11,013	318	Italy 4,729; United Kingdom 1,067; Germany 898.
Gasoline, motor	do.	34,587	NA	NA	NA.
Mineral jelly and wax	do.	794	775	(2)	Germany 451; Netherlands 135; Belgium-Luxembourg 64.
Kerosene and jet fuel	do.	6,634	NA	NA	NA.
Distillate fuel oil	do.	15,890	NA	NA	NA.
Lubricants	do.	6,914	NA	NA	NA.
Residual fuel oil	do.	23,955	NA	NA	NA.
Bitumen and other residues	do.	2,196	2,585	—	Spain 753; United Kingdom 552; Germany 234.
Bituminous mixtures	do.	184	222	3	Algeria 55; Belgium-Luxembourg 34; Germany 18.
Petroleum coke	do.	40	14	2	Germany 3; Greece 3; Japan 1.

rRevised. NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]Less than 1/2 unit.

[3]May include silicon metal.

[4]May include other precious metals.

[5]Includes zinc dust, powder, and flakes.

[6]Includes perlite and chlorite.

TABLE 4

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	4,048	476	4	United Kingdom 155; Belgium-Luxembourg 127; Germany 101.
Alkaline-earth metals	2,626	3,306	57	Morocco 2,511; U.S.S.R. 350; China 142.
Aluminum:				
Ore and concentrate thousand tons	1,388	1,239	(2)	Guinea 853; Greece 183; China 110.
Oxides and hydroxides	446,591	391,819	1,030	Greece 263,851; Suriname 41,462; Guinea 33,136.
Ash and residue containing aluminum	11,470	NA	NA	NA.
Metal including alloys:				
Scrap	137,532	203,559	7,238	Germany 106,956; Belgium-Luxembourg 31,742; Netherlands 25,135.
Unwrought	541,099	551,549	16,991	Norway 119,231; Netherlands 94,653; U.S.S.R. 62,108.
Semimanufactures	376,022	374,514	6,315	Germany 101,957; Belgium-Luxembourg 76,070; Italy 33,407.
Antimony:				
Ore and concentrate	9,620	NA	NA	NA.
Oxides	1,080	NA	NA	NA.
Ash and residue containing antimony	422	NA	NA	NA.
Metal including alloys, all forms	2,977	3,768	—	China 1,597; U.S.S.R. 1,569; Germany 205.
Arsenic: Metal including alloys, all forms	260	NA	NA	NA.
Beryllium: Metal including alloys, all forms	3	16	4	Mainly from United Kingdom.
Bismuth: Metal including alloys, all forms	199	311	(2)	Belgium-Luxembourg 107; United Kingdom 103; Peru 74.
Cadmium: Metal including alloys, all forms	1,731	1,547	42	Germany 395; United Kingdom 196; Belgium-Luxembourg 179.
Chromium:				
Ore and concentrate	88,181	77,152	—	Turkey 31,279; Albania 20,064; Republic of South Africa 12,552.
Oxides and hydroxides	8,131	7,659	5	United Kingdom 3,646; Germany 2,620; Italy 1,052.
Metal including alloys, all forms	1,047	1,558	24	U.S.S.R. 1,157; United Kingdom 148; Germany 93.
Cobalt:				
Ore and concentrate	1	—		
Oxides and hydroxides	290	405	1	Finland 133; United Kingdom 96; Germany 62.
Ash and residue containing cobalt	529	NA	NA	NA.
Metal including alloys, all forms	1,632	1,339	174	Zambia 339; United Kingdom 257; Norway 171.
Columbium and tantalum:				
Ash and residue containing columbium and tantalum	26	NA	NA	NA.
Metal including alloys, all forms:				
Columbium[3]	43	NA	NA	NA.
Tantalum	33	36	26	Italy 3; Austria 2; Germany 2.
Copper:				
Ore and concentrate	50	4,455	—	Philippines 4,444; Germany 10.
Matte and speiss including cement copper	322	369	64	Belgium-Luxembourg 278; Italy 22.
Oxides and hydroxides	801	NA	NA	NA.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Copper—Continued:				
Sulfate	4,982	NA	NA	NA.
Ash and residue containing copper	2,843	NA	NA	NA.
Metal including alloys:				
Scrap	58,382	69,198	105	Germany 16,266; Spain 9,592; United Kingdom 8,500.
Unwrought	460,109	457,230	4,197	Chile 170,425; Belgium-Luxembourg 111,472; Zambia 54,262.
Semimanufactures	278,089	265,579	1,921	Belgium-Luxembourg 82,696; Germany 73,731; Italy 51,480.
Gallium, indium, thallium: Metal including alloys, all forms	16	NA	NA	NA.
Germanium:				
Oxides	1	NA	NA	NA.
Metal including alloys, all forms	6	3	(2)	Belgium-Luxembourg 2.
Gold:				
Waste and sweepings value, thousands	$7,002	$3,468	$1	Spain $796; United Kingdom $468; unspecified $556.
Metal including alloys, unwrought and partly wrought kilograms	266,300	139,100	96,800	Canada 14,700; Germany 9,100; Switzerland 5,500.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite thousand tons	18,801	18,206	—	Brazil 5,792; Australia 4,151; Canada 1,919.
Pyrite, roasted	103,193	72,033	—	Italy 35,596; Belgium-Luxembourg 16,908; Spain 16,066.
Metal:				
Scrap	999,082	1,115,157	192	Germany 562,413; Belgium-Luxembourg 377,707; United Kingdom 68,227.
Pig iron, cast iron, related materials	363,849	393,940	236	Germany 275,081; Canada 30,590; United Kingdom 28,431.
Ferroalloys:				
Ferrochromium	210,926	191,799	179	Republic of South Africa 120,221; Finland 18,112; U.S.S.R. 13,101.
Ferromanganese	83,504	78,707	74	Norway 22,385; Belgium-Luxembourg 14,525; Republic of South Africa 12,072.
Ferromolybdenum	2,704	NA	NA	NA.
Ferronickel	46,933	38,403	(2)	New Caledonia 23,547; Greece 5,894; Dominican Republic 3,812.
Ferroniobium	1,025	NA	NA	NA.
Ferrophosphorus	3,245	NA	NA	NA.
Ferrosilicochromium	205	196	—	Zimbabwe 102; Italy 64; Germany 20.
Ferrosilicomanganese	43,708	60,286	—	Norway 30,233; Italy 18,342; U.S.S.R. 3,365.
Ferrosilicon	70,179	69,862	226	Norway 27,274; Germany 12,896; Iceland 6,547.
Ferrotitanium and ferrosilicotitanium	3,554	NA	NA	NA.
Ferrotungsten and ferrosilicotungsten	336	NA	NA	NA.
Ferrovanadium	725	NA	NA	NA.
Silicon metal	13,243	4 13,825	7	Brazil 6,736; Norway 4,289; Germany 583.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Ferroalloys—Continued:				
Unspecified	11,364	20,090	1,626	United Kingdom 4,390; Germany 4,357; U.S.S.R. 2,465.
Steel, primary forms	469,240	521,445	249	Germany 276,330; Belgium-Luxembourg 150,307; United Kingdom 42,923.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel				
Not clad, plated, coated thousand tons	4,333	4,259	(2)	Belgium-Luxembourg 2,446; Germany 776; Italy 339.
Clad, plated, coated do.	1,037	1,088	3	Belgium-Luxembourg 452; Germany 230; United Kingdom 91.
Of alloy steel do.	482	491	23	Belgium-Luxembourg 204; Germany 127; Italy 45.
Bars, rods, angles, shapes, sections do.	2,977	2,741	2	Germany 734; Belgium-Luxembourg 667; Italy 583.
Rails and accessories do.	53	51	(2)	Belgium-Luxembourg 28; Germany 18; U.S.S.R. 3.
Wire do.	355	351	(2)	Belgium-Luxembourg 97; Germany 92; Italy 79.
Tubes, pipes, fittings do.	904	850	6	Italy 289; Germany 223; Belgium-Luxembourg 83.
Lead:				
Ore and concentrate	175,294	182,733	13,697	Republic of South Africa 51,838; Sweden 20,782; Ireland 19,119.
Oxides	3,781	5,393	6	Germany 4,981; United Kingdom 295; Italy 44.
Ash and residue containing lead	14,274	NA	NA	NA.
Metal including alloys:				
Scrap	40,018	69,056	—	Belgium-Luxembourg 18,638; Netherlands 12,450; United Kingdom 11,097.
Unwrought	54,457	42,799	1	United Kingdom 16,361; Germany 8,153; Belgium-Luxembourg 7,968.
Semimanufactures	7,412	6,387	10	Belgium-Luxembourg 3,607; Germany 1,500; Netherlands 493.
Lithium: Oxides and hydroxides	371	NA	NA	NA.
Magnesium: Metal including alloys:				
Scrap	95	115	10	Germany 48; Yugoslavia 40; Netherlands 9.
Unwrought	4,783	4,685	1,072	Norway 3,250; Netherlands 115; Yugoslavia 64.
Semimanufactures	741	852	48	Germany 282; Switzerland 146; United Kingdom 107.
Manganese:				
Ore and concentrate, metallurgical-grade	754,716	720,057	2	Gabon 499,009; Brazil 82,341; Republic of South Africa 62,760.
Oxides	11,088	8,603	15	Greece 3,975; Belgium-Luxembourg 2,238; Netherlands 1,247.
Metal including alloys, all forms	3,298	3,220	278	Netherlands 876; Belgium-Luxembourg 840; Republic of South Africa 685.
Mercury	107	110	(2)	Spain 57; China 14; Netherlands 11.
Molybdenum:				
Ore and concentrate	9,994	8,451	6,278	Belgium-Luxembourg 1,228; Netherlands 313; Chile 281.
Oxides and hydroxides	126	NA	NA	NA.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Molybdenum—Continued					
Ash and residue containing molybdenum		426	NA	NA	NA.
Metal including alloys:					
Unwrought including waste and scrap		363	247	78	Austria 86; Germany 58; Belgium-Luxembourg 19.
Semimanufactures		148	166	46	Austria 83; Netherlands 25; Germany 7.
Nickel:					
Ore and concentrate		9	27	—	Germany 21; Republic of South Africa 6.
Matte and speiss		13,406	11,690	—	New Caledonia 11,287; Canada 360; Norway 10.
Oxides and hydroxides		286	NA	NA	NA.
Ash and residue containing nickel		159	NA	NA	NA.
Metal including alloys:					
Scrap		2,042	2,838	396	Germany 1,095; United Kingdom 504; Czechoslovakia 192.
Unwrought		31,877	26,304	783	U.S.S.R. 8,097; Germany 4,079; Republic of South Africa 3,380.
Semimanufactures		6,952	7,169	2,971	United Kingdom 2,179; Germany 1,360; Italy 149.
Platinum-group metals:					
Waste and sweepings	value, thousands	$25,578	$23,123	—	Netherlands $7,501; Spain $5,418; Germany $2,788.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	6,257	NA	NA	NA.
Platinum	value, thousands	$109,380	$87,506	$7,915	United Kingdom $42,544; Republic of South Africa $16,111; Germany $8,779.
Rhodium	kilograms	824	NA	NA	NA.
Iridium, osmium, ruthenium	do.	68	NA	NA	NA.
Unspecified	value, thousands	—	$123,235	$4,940	Republic of South Africa $35,229; United Kingdom $30,014; U.S.S.R. $17,993.
Rare-earth metals including alloys, all forms		302	NA	NA	NA.
Selenium, elemental		61	NA	NA	NA.
Silicon, high-purity		376	NA	NA	NA.
Silver:					
Ore and concentrate	kilograms	20,700	28,000	—	Netherlands 25,700; Belgium-Luxembourg 2,200; Spain 100.
Waste and sweepings[5]	value, thousands	$66,403	$45,301	—	Spain $30,693; Netherlands $4,530; United Kingdom $2,944.
Metal including alloys, unwrought and partly wrought	do.	$140,842	$101,891	$15,036	United Kingdom $42,027; Belgium-Luxembourg $11,602; Morocco $11,263.
Tellurium, elemental		50	NA	NA	NA.
Tin:					
Ore and concentrate		900	17	—	United Kingdom 11; Malaysia 6.
Oxides		109	NA	NA	NA.
Ash and residue containing tin		8	NA	NA	NA.
Metal including alloys:					
Scrap		12	10	—	Germany 7; Spain 2; United Kingdom 1.
Unwrought		8,780	8,576	(2)	Brazil 2,869; Indonesia 1,530; Malaysia 1,458.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Tin—Continued:				
Metal including alloys—Continued:				
Semimanufactures	535	501	1	Germany 186; Netherlands 158; Switzerland 72.
Titanium:				
Ore and concentrate	198,343	115,316	(2)	Canada 69,100; Australia 29,434; Malaysia 10,142.
Oxides	7,860	15,032	653	Belgium-Luxembourg 7,094; Germany 2,401; United Kingdom 1,573.
Metal including alloys:				
Unwrought including waste and scrap	1,808	1,180	119	Japan 617; U.S.S.R. 138; Germany 75.
Semimanufactures	3,478	2,386	912	Japan 728; United Kingdom 386; Sweden 154.
Tungsten:				
Ore and concentrate	8	4	—	All from Austria.
Oxides and hydroxides	9	NA	NA	NA.
Ash and residue containing tungsten	1	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	155	188	25	Austria 69; Germany 55; Netherlands 10.
Semimanufactures	107	282	6	Germany 241; Switzerland 11; Austria 8.
Uranium and thorium:				
Ore and concentrate (monazite) value, thousands	$13,299	$3,158	$209	Australia $2,570; Republic of South Africa $243; Malaysia $73.
Oxides and other compounds do.	$132,944	$310,694	$22,674	U.S.S.R. $103,212; China $55,808; United Kingdom $32,342.
Metal including alloys, all forms:				
Uranium do.	$592,813	$434,483	$1	Niger $161,403; Republic of South Africa $76,359; unspecified $81,056.
Thorium	9	NA	NA	NA.
Vanadium:				
Ore and concentrate	3	NA	NA	NA.
Oxides and hydroxides	282	NA	NA	NA.
Ash and residue containing vanadium	217	NA	NA	NA.
Metal including alloys, all forms	85	14	(2)	Mainly from Germany.
Zinc:				
Ore and concentrate	596,063	631,485	11,239	Bolivia 100,702; Canada 100,153; Peru 80,592.
Oxides	12,371	15,161	20	Germany 3,915; Netherlands 3,909; Belgium-Luxembourg 2,531.
Blue powder	8,852	NA	NA	NA.
Ash and residue containing zinc	57,377	NA	NA	NA.
Metal including alloys:				
Scrap	9,753	5,972	9	Belgium-Luxembourg 2,605; Netherlands 1,439; Germany 785.
Unwrought	110,473	104,238	26	Germany 32,287; Netherlands 22,660; Belgium-Luxembourg 21,721.
Semimanufactures	11,885	[6]23,203	146	Belgium-Luxembourg 11,747; Germany 7,182; Netherlands 1,210.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Zirconium:				
Ore and concentrate	49,714	46,167	979	Australia 37,080; Republic of South Africa 7,053; Italy 491.
Oxides	264	NA	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	215	95	42	Belgium-Luxembourg 19; Japan 18; Germany 12.
Semimanufactures	81	112	74	Japan 7; Italy 6; Republic of South Africa 6.
Other:				
Ores and concentrates:				
Of base metals	9,620	7,725	185	China 3,276; Bolivia 1,722; Belgium-Luxembourg 1,059.
Of precious metals	235	51	17	Turkey 20; Spain 12; U.S.S.R. 1.
Ashes and residues	25,794	118,938	6,396	Belgium-Luxembourg 35,336; Germany 28,257; Spain 16,212.
Base metals including alloys, all forms	68	83	8	Germany 33; Belgium-Luxembourg 31; United Kingdom 5.
Metalloids	1,054	638	30	Italy 210; China 112; Australia 80.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	25,488	16,303	552	Turkey 10,563; Italy 1,270; Netherlands 1,123.
Artificial:				
Corundum	16,615	14,287	441	Germany 4,162; Austria 3,019; Belgium-Luxembourg 2,243.
Silicon carbide	26,637	NA	NA	NA.
Dust and powder of precious and semi-precious stones including diamond value, thousands	$11,144	$10,017	$4,048	Ireland $3,425; Germany $1,125; Switzerland $571.
Grinding and polishing wheels and stones	15,741	13,417	160	Italy 3,630; Germany 2,423; Belgium-Luxembourg 1,784.
Asbestos, crude	63,672	67,373	75	Canada 39,515; U.S.S.R. 13,590; Republic of South Africa 11,971.
Barite and witherite	42,058	53,855	—	China 23,252; Germany 14,250; Belgium-Luxembourg 9,811.
Boron materials:				
Crude natural borates	44,034	84,620	73	Turkey 82,726; United Kingdom 1,192; Belgium-Luxembourg 500.
Elemental	16	NA	NA	NA.
Oxides and acids	2,903	3,454	385	Italy 1,210; China 670; Argentina 257.
Bromine	7,514	NA	NA	NA.
Cement	681,282	798,578	287	Belgium-Luxembourg 548,806; Germany 107,283; Greece 66,809.
Chalk	22,136	36,278	—	Germany 25,850; Belgium-Luxembourg 7,487; Spain 1,567.
Clays, crude:				
Bentonite	127,279	117,588	8,910	Italy 48,816; Greece 30,258; Germany 15,460.
Chamotte earth	30,124	NA	NA	NA.
Fire clay	6,814	NA	NA	NA.
Fuller's earth	5,967	NA	NA	NA.
Kaolin	405,005	418,671	73,890	United Kingdom 239,034; Brazil 28,733; Germany 24,481.
Unspecified	385,117	362,399	7,008	Germany 256,208; Senegal 50,581; Spain 24,851.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Cryolite and chiolite		831	393	102	Denmark 286; Brazil 102.
Diamond, natural:					
Gem, not set or strung	value, thousands	$298,833	$219,555	$16,100	Belgium-Luxembourg $73,920; Switzerland $48,558; Israel $24,601.
Industrial stones	do.	$3,467	$3,762	$1,087	Belgium-Luxembourg $1,196; Central African Republic $284; U.S.S.R. $238.
Diatomite and other infusorial earth		20,160	17,458	11,270	Germany 3,206; Denmark 1,896; Spain 332.
Feldspar, fluorspar, related materials:					
Feldspar		32,340	r74,212	179	Norway 26,048; Germany 24,050; Canada 8,518.
Fluorspar		18,441	28,571	—	China 18,807; Germany 7,959; Republic of South Africa 986.
Leucite, nepheline, nepheline syenite		34,595	NA	NA	NA.
Fertilizer materials:					
Crude, n.e.s.		112,272	110,179	—	Belgium-Luxembourg 42,194; Netherlands 35,432; Germany 14,736.
Manufactured:					
Ammonia	thousand tons	566	470	—	Netherlands 162; Trinidad and Tobago 95; Germany 61.
Nitrogenous	do.	4,252	3,501	383	Netherlands 963; Belgium-Luxembourg 715; Poland 323.
Phosphatic	do.	1,100	809	7	Belgium-Luxembourg 321; Morocco 109; Netherlands 88.
Potassic	do.	1,246	1,425	10	Canada 240; U.S.S.R. 218; Spain 191.
Unspecified and mixed	do.	2,220	1,558	49	Belgium-Luxembourg 637; Netherlands 283; Morocco 252.
Graphite, natural		5,203	4,374	36	China 1,501; Germany 737; Austria 580.
Gypsum and plaster		147,935	185,250	879	Germany 106,025; Spain 47,159; Belgium-Luxembourg 14,295.
Iodine		881	NA	NA	NA.
Kyanite and related materials:					
Mullite		2,675	NA	NA	NA.
Unspecified		5,402	NA	NA	NA.
Lime		175,182	215,459	—	Belgium-Luxembourg 106; Germany 85; Spain 15.
Magnesium compounds:					
Magnesite, crude		1,368	746	17	Italy 326; Germany 127; Austria 97.
Oxides and hydroxides		206,667	209,544	2,285	Spain 52,481; China 38,831; Greece 36,768.
Sulfate		209,215	NA	NA	NA.
Mica:					
Crude including splittings and waste		4,654	4,934	90	India 1,569; Morocco 952; Brazil 681.
Worked including agglomerated splittings		300	342	(2)	Belgium-Luxembourg 152; Switzerland 106; Germany 27.
Nitrates, crude		18,326	18,683	—	Chile 13,454; Germany 3,529; Poland 1,274.
Phosphates, crude	thousand tons	3,271	3,085	642	Israel 798; Morocco 544; Syria 328.
Phosphorus, elemental		663	NA	NA	NA.
Pigments, mineral:					
Natural, crude		8,591	NA	NA	NA.
Iron oxides and hydroxides, processed		40,141	37,284	426	Germany 25,429; Belgium-Luxembourg 3,491; United Kingdom 1,606.
Potassium salts, crude		85,922	79,038	—	Israel 33,980; U.S.S.R. 29,505; Jordan 8,000.

See footnotes at end of table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$153,643	$121,177	$5,381	Switzerland $59,541; Thailand $21,620; United Kingdom $6,490.
Synthetic	do.	$10,408	$11,111	$1,958	Mauritius $3,605; Switzerland $1,677; unspecified $2,036.
Pyrite, unroasted		2,865	840	13	Italy 652; Germany 131; Belgium-Luxembourg 26.
Quartz crystal, piezoelectric	value, thousands	$385	$397	$91	Japan $275; Germany $22; Switzerland $4.
Salt and brine		182,412	198,151	143	Netherlands 56,209; Germany 54,538; Belgium-Luxembourg 45,208.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		136,613	206,218	62,139	Belgium-Luxembourg 58,648; Germany 45,089; Poland 24,422.
Sulfate, manufactured		91,877	78,859	5	Belgium-Luxembourg 36,779; Spain 31,054; Germany 3,105.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		294,037	281,113	756	Republic of South Africa 46,218; Germany 43,282; Italy 37,065.
Worked		472,334	492,718	115	Spain 222,354; Italy 141,397; Portugal 68,687.
Dolomite, chiefly refractory-grade		281,731	262,391	—	Belgium-Luxembourg 235,340; Italy 17,701; Norway 2,333.
Gravel and crushed rock	thousand tons	7,417	8,811	(e)	Belgium-Luxembourg 7,312; United Kingdom 612; Germany 570.
Limestone other than dimension		186,479	220,172	—	Belgium-Luxembourg 214,837; Germany 5,270.
Quartz and quartzite		334,374	306,525	344	Belgium-Luxembourg 295,040; Italy 5,014; Spain 2,635.
Sand other than metal-bearing	thousand tons	2,134	2,198	(e)	Belgium-Luxembourg 1,455; United Kingdom 530; Germany 57.
Sulfur:					
Elemental:					
Crude including native and byproduct		661,815	559,530	25,071	Poland 232,002; Germany 127,733; Canada 107,681.
Colloidal, precipitated, sublimed		353	348	(e)	United Kingdom 165; Spain 110; Netherlands 24.
Dioxide		1,140	1,032	—	Belgium-Luxembourg 920; Germany 92; unspecified 19.
Sulfuric acid		166,078	153,995	335	Belgium-Luxembourg 52,749; Spain 43,354; Germany 25,009.
Talc, steatite, soapstone, pyrophyllite		25,368	24,507	804	Belgium-Luxembourg 9,123; China 5,689; Italy 2,613.
Vermiculite[8]		96,852	76,962	84	Republic of South Africa 23,011; Italy 19,380; Greece 13,380.
Other:					
Crude	thousand tons	2,877	2,223	2	Switzerland 1,372; Germany 261; Spain 202.
Slag and dross, not metal-bearing	do.	2,766	2,780	2	Germany 1,618; Netherlands 155; Canada 117.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		17,940	22,993	2,353	Belgium-Luxembourg 20,256; Canada 88; unspecified 165.
Carbon black		108,543	108,023	2,302	Netherlands 35,756; Germany 33,290; Spain 10,624.
Coal:					
Anthracite	thousand tons	1,980	2,682	131	Republic of South Africa 853; China 792; United Kingdom 358.

See footnotes at end table.

TABLE 4—Continued

FRANCE: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal—Continued:					
Bituminous	thousand tons	17,132	18,850	8,547	Australia 4,292; Colombia 1,969; China 957.
Briquets of anthracite and bituminous coal	do.	107	123	—	Mainly from Germany.
Lignite including briquets	do.	138	144	—	Do.
Coke and semicoke		1,042,953	689,506	26	Netherlands 211,605; Germany 168,595; Belgium-Luxembourg 129,582.
Gas, natural:					
Gaseous	million cubic meters	19,117	14,766	—	U.S.S.R. 7,548; Norway 3,784; Netherlands 3,434.
Liquefied	do.	9,753	9,709	—	Mainly from Algeria.
Peat including briquets and litter		554,974	538,329	208	Germany 200,966; Netherlands 132,964; Belgium-Luxembourg 92,820.
Petroleum:					
Crude	thousand 42-gallon barrels	491,344	394,908	—	Iran 65,561; Norway 44,488; United Kingdom 35,572.
Refinery products:					
Liquefied petroleum gas	do.	20,768	26,782	1,124	Algeria 10,012; Saudi Arabia 6,329; United Kingdom 5,270.
Gasoline	do.	65,658	NA	NA	NA.
Mineral jelly and wax	do.	951	658	157	Germany 156; Netherlands 131; unspecified 144.
Kerosene and jet fuel	do.	7,825	NA	NA	NA.
Distillate fuel oil	do.	71,869	NA	NA	NA.
Lubricants	do.	1,915	NA	NA	NA.
Residual fuel oil	do.	34,232	NA	NA	NA.
Bitumen and other residues	do.	2,828	2,604	—	Belgium-Luxembourg 1,178; Spain 726; Germany 582.
Bituminous mixtures	do.	62	64	(2)	Belgium-Luxembourg 30; Germany 14; Switzerland 10.
Petroleum coke	do.	7,815	7,418	6,044	Germany 836; United Kingdom 321; Belgium-Luxembourg 126.

NA Not available

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]Less than 1/2 unit.

[3]May contain rhenium.

[4]May include high-purity silicon.

[5]May include other precious metals.

[6]Includes zinc dust, powder, and flakes.

[7]Includes leucite, nepheline, and nepheline syenite.

[8]Includes perlite and chlorite.

TABLE 5

FRANCE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Aluminium Pechiney (Government)	Plant at Gardanne, Bouches-du-Rhone Province	700.
Aluminum	do.	Aluminum smelters at— Saint-Jean-de-Maurienne, Savoie Province	120.
Do.	do.	Nogueres, Pyrenees Atlantiques Province	115.
Do.	do.	Lannemezan, Hautes-Pyrenees Province	63.
Do.	do.	Auzat, Ariege Province	44.
Antimony, metal	Societe Nouvelle des Mines de la Lucette	Plant at Le Genest, Mayeene Province	10.
Barite	Barytine de Chaillac	Mine and plant at Chaillac, Indre Province	150.
Do.	Societe Industrielle du Centre	Mine at Rossignol, Chaillac, Indre Province	100.
Bauxite	Aluminium Pechiney (Government)	Mines in Herault and Var Provinces	900.
Do.	Societe Anonyme des Bauxites et Alumines de Provence (S.A.B.A.P.)	Mine at Combecave, Var Province	400.
Cadmium metric tons	Compagnie Royale Asturienne des Mines	Plant at D'Auby-les-Douai, Nord Province	300.
Cement	Eight companies, of which the largest are—	80 plants, including—	23,233 including—
Do.	Ciments La Farge France	15 plants largest at St. Pierre-la-Cour	(7,815). (1,160).
Do.	Societe des Ciments Français	13 plants largest at Gargenville	(6,190). (1,100).
Coal	Charbonnages de France:		15,000 including—
Do.	Basin de Paris	Mines and washeries	4,500.
Do.	Bassin Nord-Pas-de-Calais	Mines and washeries in northern France	(1,500).
Do.	Bassin de Lorraine	Mines and washeries in eastern France	(10,000).
Cobalt, metal metric tons	Societe Metallurgique Le Nickel (SLN)	Plant at Sandouville, near Le Havre (treats New Caledonian nickel-cobalt ores)	600.
Copper, metal	Compagnie General d'Electrolyse du Palais	Electrolytic plant: Palais-sur-Vienne, Haute Vienne Province	45.
Do.	Societe Française d' Affinage du Cuivre (Afficuivre)	Smelter at Poissy, Yvelines Province	11.
Do.	Affinerie Sud-Ouest	Fire refinery at Toulouse	2.
Feldspar	Denain-Anzin Minéraux S.A.	Mine and plant at St. Chely d'Apcher, south of Clermont-Ferrand	55.
Ferroalloys	Societe du Ferromanganese de Paris, Outreau	Plant at Boulogne-sur-Mer	420.
Do.	Pechiney Electrometallurgie (Pechiney, Government)	12 plants at Bellegarde 27 furnaces	387.
Do.	Chromeurope SA	Plant at Dunkerque	25.
Fluorspar	Societe d'Enterprises, Carrieres et Mines, de l'Esterel (SECME)	Fonsante Mine near Adrets d'Esterel, Var Province	150.
Do.	Denain-Anzin Mineŕaux	Mine and plant at Escaro, Pyrenees-Orientales Province	120.
Do.	Societe Generale de Recherches et d'Exploitation Miniere (SOGEREM)	Opencast mine at Montroc, Tar Province	100.
Do.	Comifluor S.A.	Plant at Bastide-a-Olette, Pyrenees-Orientales Province	80 concentrate.
Do.	Compagnie Miniere Dong Trieu	Mine at Lussac-les-Eglises	NA.
Do.	Compagnie Française des Minerais d'Uranium (CFMU)	Mine at Autun in Saone-et-Loire	50.
Gold, ore	Societe des Mines du Bourneix (Government)	Mines in the district of Saint Yrieix la Perche, Limoges	1,700 kg concentrate.
Iron and steel:			
Iron ore	Bassin de Lorraine Acieres Reunies de Burbach-Eich-Dudelange (ARBED) and Usinor-Sacilor	Mines in eastern France	10,000.

See footnote at end of table.

TABLE 5—Continued

FRANCE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel—Continued:			
Iron ore—Continued:	Bassin l de l' Ouest: Societe Metallurgique de Normandie (SMN)	Mines in Normandy	500.
Steel	Usinor-Sacilor (Government, 72%)	Dunkerque	7,500.
Do.	do.	Fos-sur-Mer	4,200.
Do.	do.	Seramange	3,000.
Do.	Unimetal, Unsinor-Sacilor (100%)	Gadrange, Neuves Maisons, Thonville, Montereau, Garcenville, Trith-St.-Leper	8,432.
Do.	Asocmetal, Unsinor-Sacilor (100%)	Dunkerque, Fos-Sur-Mer, Hagondange, St. Etienne	1,355.
Lead, metal	Societe Miniere et Metallurgique de Penarroya	Imperial Smelter, Noyelles Godault	150.
Lead-zinc, ores	Societe Miniere et Metallurgique de Penarroya SA	Mines and plants at Les Mailines, near Granges, Gard Province	50 (Pb).
Do.	do.	Saint-Salvy, Tarn Province	100 (Zn).
Magnesium metal	Societe Française d'Electro-Metallurgie, Pechiney (100%)	Plant at Marignac, Haute Garonne	14.
Natural gas million cubic feet	Elf Aquitaine	Gasfield and plant at Lacq	700,000.
Nickel	Societe Metallurgique le Nickel (SLN)	Sandouville plant, near le Havre (treats nickel mattes from New Caledonia)	16.
Petroleum:			
Crude	Elf Aquitaine	Oilfields in Paris Basin	1,000.
Refined barrels per day	Compagnie Française de Raffinage (Total)	Refineries at Gonfreville, Seine-Maritime Province, and La Mede, Bouches-du Rhone Province	446,000.
Do.	Shell-Française	Refineries at Petite Couronne, in Siene-Maritime Province	285,300.
Do.	do.	Berre, Bouches-du-Rhone Province	270,000.
Do.	Elf-France	Refineries at Feyzin, Rhone Province	119,000.
Do.	do.	Donges, Loire-Atlantique Province	199,000.
Do.	do.	Grandpuits, Seine-et-Marne Province	96,000.
Do.	Societe Française British Petroleum (S.F.B.P.)	Refineries at Lavera, Bouches-du Rhone Province	175,000.
Do.	Esso S.A.F.	Refineries at Fos-sur-Mer, Bouches-du Rhone Province	237,000.
Do.	Mobil Oil Française	Refineries at Gravenchon	62,000.
Do.	Cie. Rhenane de Raffinage (CRR)	Refinery at Reichstett, Bas-Rhin	80,000.
Potash	Mines de Potasse d'Alsace S.A. (MDPA)	Mines at Amelie, Marie-Louise, and Theodore in Alsace	1,750 (K_2O).
Salt, rock	Compagnie des Salins du Midi et des Salines de l'Est (C.S.M.S.E.)	Varangeville mine at Saint-Nicolas-de-Port in Neurthe-et-Moselle Province	9,000.
Sulfur	Societe Nationale Elf Aquitaine (SNEA)	Byproduct from natural gas desulfurization at Lacq, Aquitaine	3,000.
Talc	Talcs de Luzenac	Trumouns, near Ariege	400.
Uranium metric tons	Cogema, Compagnie Generale des Matieres Nucleaires (Government)	Mines at Limousin	1,013 (U_3O_8).
Do. do.	do.	Vendee	500 (U_3O_8).
Do. do.	do.	Herault	377 (U_3O_8).
Zinc metal	Compagnie Royale Asturienne des Mines (Belgium)	Electrolytic plant at Auby-les-Douai, Nord	115.
Do.	Societe des Mines et Fonderies de Zinc de la Vieille Montagne (SGB, Belgium)	Electrolytic plant at Viviez, Aveyron	110.

NA Not available.

TABLE 6

FRANCE: RESERVES OF MAJOR MINERAL COMMODITIES IN 1992

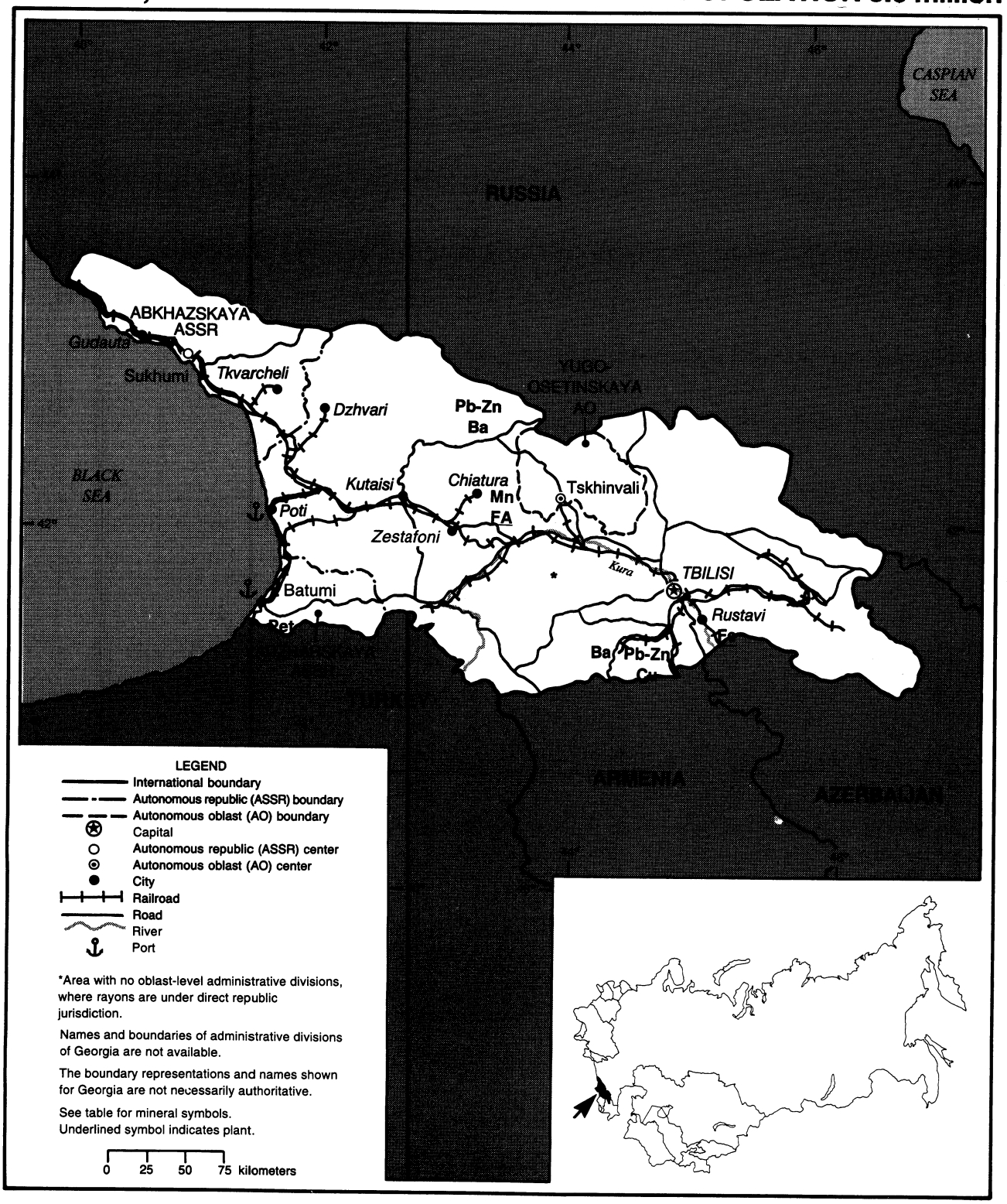
(Million metric tons unless otherwise specified)

Commodity	Reserve[e]
Barite	2
Bauxite	5
Bromine million kilograms	1.6
Coal	284
Copper/zinc ore	27
Fluorspar	10
Iron ore	935
Potash	20
Sulfur	10

[e]Estimated.

GEORGIA

AREA 69,700 km² **POPULATION 5.6 million**



THE MINERAL INDUSTRY OF

GEORGIA

By Richard M. Levine

In 1992 the Georgian economy and mineral industry were beset not only by the problems resulting from the breakdown in the centrally planned economic system of the former U.S.S.R., but also by political and ethnic conflicts. These conflicts impeded both Georgia's economic growth and its transition to a market economy.

GOVERNMENT POLICIES AND PROGRAMS

Before the breakup of the U.S.S.R., Georgia had been supplying processing plants outside of Georgia in Armenia, Russia, Kazakhstan, and other republics with copper, barite, gold, lead, silver, and zinc in ores and concentrates. Georgia has decided to develop metallurgical processing to achieve more value added from its minerals and also to supply itself with needed minerals. The Georgian Government is interested in developing its mineral resources and has been seeking foreign investment. In 1990, the Georgian Department of Geology, Geodesy, and Cartography was given exclusive rights to issue licenses for mineral development. Previously this right also had been held by the Ministry of the Environment and the State Technical Inspectorate. This department will review applications from both legal entities and private individuals. The largest and most valuable sites, it was declared, will be auctioned.

PRODUCTION

Georgia has a diverse mineral industry, producing fuels, ferrous and nonferrous metals, ferroalloys, and industrial minerals. Georgia is a major producer of manganese from the Chiatura deposit, although reserves of high-grade ore are almost depleted. The manganese is used in Georgia for ferroalloy production at the Zestafoni ferroalloys plant. A small amount of iron ore also is mined. At the Madneuli complex in Georgia, a copper-barite polymetallic ore deposit is exploited for copper, barite, and a range of byproduct minerals, including gold and silver. Production of lead and zinc occurs at the Kvaisi lead-zinc deposit, and arsenic is mined from the Lukhumi and Tsana deposits. Georgia also produces a range of industrial minerals, including bentonite, diatomite, talc, and zeolites and semiprecious stones. Georgia also produces some coal, gas, and oil. In 1992 Georgia reportedly stabilized mineral production with some reported increases in production. The few reported statistics state that copper production remained at its 1991 level of 6,000 tons while manganese concentrate production increased by 373,000 tons. However, coal production fell from 300,000 tons in 1991 to 181,000 tons in 1992. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992 the major mineral-producing enterprises in Georgia were state owned, although as with all former Soviet Republics, plans were being formulated and enacted for some form of privatization. *(See table 2.)*

COMMODITY REVIEW

Indusrrial Minerals

Georgia was seeking to develop its arsenic industry. Arsenic mining occurs at the Lukhumi deposit in western Georgia with reported industrial reserves of 112,000 tons and containing 8,600 tons of arsenic. Underground mining methods are used at Lukhumi. Other deposits under exploitation include the Tsana quartz-arsenopyrite deposit on the south slope of the Caucasus range about 165 kilometers from Kutaisi with 167,000 tons of industrial reserves containing 30,000 tons of metallic arsenic. Metallic arsenic and arsenic compounds are produced at the Racha and Tsana mining and chemical plants, but both plants are old and are not considered economically, technologically, or environmentally viable. Plant output, reportedly, does not meet world standards. Given the quality of the ore, the Georgian Government considers it possible to produce high-quality products if investment is made in modern equipment and technology. Foreign investment was being sought for this purpose.

Metals

Copper.—At the Madneuli polymetallic ore mining and beneficiation complex, the beneficiation plant was processing approximately 700,000 to 800,000 tons per year of copper-pyrite ore. The Georgian Government had a contract with the Swiss company Marc Rich for selling 10,000 tons of copper concentrate. However, in 1993 Georgia canceled this contract. The director of the Madneuli complex stated that the contract did not stipulate repatriating the gold extracted from the concentrate while Russian enterprises being supplied concentrate both offered better terms and returned to Georgia about 330 kilograms of gold extracted from the concentrate. Plans call for developing smelting and refining

facilities, and the possibility of attracting foreign capital was being studied.

Gold.—Georgia produces a small amount of gold as a byproduct of its nonferrous metals mining industry. Total gold resources in Georgia were reported to be about 300 tons. Georgia is attempting to increase its copper production and in the process also will be producing more gold. Total gold production in Georgia is projected to reach 3 tons. Gold production in Georgia in 1992 was about 1 ton from the Madneuli polymetallic mining complex.

Other potential regions for gold mining include the Bolnisi region with an estimated 160 tons of reserves, the Racha region with 80 tons of reserves, and the Adjaria region with 25 tons.

Mineral Fuels

In 1992 Georgia extracted 125,000 tons of crude oil, which was 56,000 tons below the 1991 level. The Batumi oil refinery, the only one in Georgia, in 1992 processed 500,000 tons of crude oil compared with 1.84 million tons in 1991. The plant has a 2-million-ton-per-year throughput capacity.

Reserves

Georgia has a diverse range of mineral resources, many of which have not yet been exploited. Mineral resources in Georgia include antimony, arsenic, barite, bentonite, copper, diatomite, dimension stone, hard and brown coal, iron, lead, manganese, mercury, peat, petroleum, precious and semiprecious stones, talc, zeolites, and zinc. Reserve figures for most metals are still not available. For the few metals for which data have been located, reportedly Georgia has manganese reserves of 240 million tons grading 17% to 25% Mn at the Chiatura deposit gold reserves of 260 tons in the Madneuli and Bolnisi regions, and silver reserves of 1,500 tons. Table 3 lists the available reserve figures, which are mostly for industrial minerals.

Reserves in Georgia were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The criteria used in this system were designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

INFRASTRUCTURE

Georgia, which has its western border on the Black Sea, is bordered to the north by Russia, to the east by Azerbaijan, and to the south by Armenia and Turkey. The Caucasus mountains form the major part of the terrain. Through its ports of Batumi, Poti, and Sukhumi on the Black Sea, Georgia is able to ship its output to world markets. The port at Batumi is a major shipment center for refinery products. Georgia had, as of 1990, not including industrial railroads, 1,570 kilometers of railroads that is all electrified and 33,900 kilometers of highways, of which 29,500 was hard surfaced. One special means of transport employed in Georgia is aerial cables, of which there are about 100 in operation, with a number used at mineral production sites.

OUTLOOK

Georgia has significant mineral deposits, but the future of its mineral industry first will depend on the country establishing political and economic stability to permit a more secure investment climate. If this stability is established, Georgia's favorable location on the Black Sea should enable it to reach world markets at reasonable cost while its already existing supply routes to the countries of the former U.S.S.R. will enable Georgia to maintain markets in these countries that prove economically advantageous. Georgia currently produces manganese and ferromanganese that could be sold on world markets and also either produces or has reserves of a number of metals and nonmetallic minerals that could possibly compete on world markets. It will be necessary to assess Georgia's mineral production and reserves in terms of production costs and available markets to determine the viability of Georgia's mineral industry as Georgia makes the transition to a market economy.

TABLE 1
GEORGIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity		1992
Arsenic		1,500
Barite		40,000
Bentonite		150,000
Cement		1,000,000
Coal		181,000
Copper, Cu content of ore		6,000
Diatomite		75,000
Gold	kilograms	1,000
Iron and steel:		
Steel, crude		700,000
Pig iron		500,000
Lead, Pb content of ore		800
Manganese ore:		1,200,000
Mn content of ore		350,000
Petroleum		150,000
Zinc, Zn content of ore		2,000

TABLE 2
GEORGIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Barite	Chordskoye deposit	Onskiy rayon	70,000.
Bentonite	Gumbrskoye and Askanskoye deposits	Gumbra, Askana regions	200,000.
Cement	Rustavi cement plant	Rustavi	1,500,000.
Coal	Tkibuli-Shaorskoye, Tkvarchelskoye, Akhaltsikhskoye deposits	Tkibuli, Tkvarcheli, Akhaltsikhe regions	500,000.
Copper (copper content of ore)	Madneuli complex	Madneuli region	8,000.
Diatomite	Kisatibskoye deposit	Kisatibi region	150,000.
Ferroalloys	Zestafoni plant	Zestafoni	100,000 (ferromanganese).
Do.	do.	do.	250,000 (silicomanganese).
Do.	do.	do.	250,000 (manganese sintor).
Gold	Madneuli complex	Madneuli region	1.5.
Lead-zinc	Kvaisi deposit	Kvaisi region	1,200 (lead).
Do.	do.	do.	2,500 (zinc).
Manganese, ore	Chiatura complex	Chiatura region	2,000,000.
Petroleum, crude	About 60 wells accounting for 98% of output	Mirzaani, Teleti, Supsa regions	200,000.
Steel, crude	Rustavi steel mill	Rustavi	1,500,000.

TABLE 3
GEORGIA: RESERVES OF MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
Barite ore	22,000
Bentonite	17,000
Coal:	
Hard	335,000
Brown	70,000
Diatomite	10,000
Gold	.26
Lead, ore, 1.6% Pb	2,600
Manganese ore, 17% to 25% Mn	249,000
Silver	1.5
Talc	2,000
Zeolites	33,000
Zinc, ore, 3.8% Zn	2,600

GERMANY

AREA 356,900 km² **POPULATION 80.4 million**

LEGEND

- International boundary
- State (land) boundary
- National capital
- City
- Railroad
- River
- Canal
- Port

See table for mineral symbols.
Underlined symbol indicates plant.

0 50 100 kilometers

THE MINERAL INDUSTRY OF

GERMANY

By William L. Zajac

Reunification and recession affected Germany in 1992 in all aspects of the economic environment, including that of the minerals industry. Considering the unique situation in Germany, comparisons to years before 1991 are not appropriate owing to the very different economic and social systems in place before that year. The recession in 1992 caused reconstruction to slow down and accentuated the deep-rooted structural problems in the Eastern states. Every interruption in investment in the Eastern states increases the gap between production and income and causes more social friction. Despite the fact that transfers of money from the Western states to the Eastern states in 1992 were the equivalent of $100[1] billion ($80 billion in 1991), the world recession slowed the expected growth and strengthening of industry. The overall GDP for Germany grew by 2.0% in 1992, a larger percentage than in 1991 (+0.6%), but this growth does not reflect the actual circumstances in the country. The GDP in the Western states, which generate 92% of the total GDP, grew by 1.5% while the GDP in the Eastern states grew by 6.8% and much of the growth in the Western states was in support of the growth in the Eastern states. The construction industry, both in the production of construction materials and actual building, provided the base for the growth because most other industries showed a decline in production. Overall unemployment rose in 1992 to almost 3 million persons, an increase of 14.5% compared with that of 1991, with the Eastern states showing an increase of 28.1% in unemployed persons and the Western states showing a 7.0% increase. In 1992, the Federal Government took in the equivalent of $918.0 billion and paid out the equivalent of $971.4 billion, leaving a deficit of $53.4 billion. In comparison, in 1991, the Federal Government took in $786.1 billion and paid out $839.8 billion, for a deficit of $53.7 billion.

GOVERNMENT POLICIES AND PROGRAMS

The privatization and restructuring of industry in the Eastern states continued to have top priority for the German Federal Government. Initially, the Treuhandanstalt, the federal agency with the task of privatizing or restructuring the industry in the former centrally planned economy of the Eastern states, had control of 12,000 enterprises. By early 1993, almost 10,000 enterprises had been dealt with. Of these, 5,700 went to new investors, 1,270 were reprivatized, 300 were turned over to local municipalities, and 2,500 were closed or liquidated. At its inception at the time of the social, economic, and currency union, the Treuhandanstalt was responsible for about 40% of all workers in the Eastern states. Early in 1993, this amount was down to about 6%, and three-fifths, or about 271,000 persons, were in industrial enterprises. Thus, although the actual number of persons under the aegis of the Treuhandanstalt has dropped significantly, the agency has remained very important to the economy of the Eastern states. Of the total persons working under the umbrella of the Treuhandanstalt, 90,000 were employed in mining and the energy industries, 25,000 were in the services sectors, 18,000 were in news agencies, 16,000 were in construction, and 10,000 were in agriculture and forestry. Of the enterprises sold, the majority have been in the steel and light metals industries, stone quarrying, clay mining, fine ceramics, and the glass industry, or in industry branches that deal directly with construction and that benefit the customer by being in proximity, thus lowering transportation costs. The worst results in sales have been in the leather, textiles, and clothing sectors. The economic situation of enterprises remaining to be privatized is considered critical, for these enterprises cause deficits in all branches of German industry. In 1992, enterprises under the control of the Treuhandanstalt were responsible for an average of 30% of the deficit. In 1992, the Treuhandanstalt paid out the equivalent of about $10 billion to maintain jobs and to ensure privatization, about the same as in 1991 and what is expected for 1993. Investments are deemed to be the savior of industry in the Eastern states. In 1992, the equivalent of $70 billion was invested in industry in the Eastern states, of which about $40 billion was for construction and $30 billion was for equipment. Investments in plants were about 25% of the total, and the Federal Government was responsible for a great deal of that investment. Investments by private enterprises also have been high and for 1993 are expected to be double per worker that of the Treuhandanstalt. In 1992, 60% of investments in manufacturing was from enterprises in the West, 66% of investments in plants of the processing industry was from enterprises in the Western states of Germany, and about 55% of investments in construction, excluding domiciles, was from investors in the Western states of Germany. Although many of the enterprises in the Eastern states are small in comparison to Western standards, their problems are large. They must now face competition from the larger, more efficient, and more

competitive industries in not only the Western states of Germany but the rest of the world as well. The former trading partners of the Eastern states are now their competitors, and the local market can only support a limited amount of output, forcing these industries to look elsewhere for a market. Table 3 presents the problems facing the industries in the Eastern states of Germany and the percentage of all enterprises in that area reporting that particular problem. *(See table 3.)*

PRODUCTION

The second full year after the reunification of Germany, 1992, was a year of production ups and downs. The varied forces influencing German mineral commodity production caused production drops in materials such as steel, an important export item, but caused increases in materials such as cement, needed to help build and repair infrastructure and other projects, especially in the Eastern states.

Mine production of metallic ores in 1992 was limited to two lead-zinc properties (with some byproduct silver) and small amounts of iron ore. Output at the lead-zinc properties dropped by 70% for lead and 73.5% for zinc compared with the previous year. Domestic production of metallic ores has become inconsequential compared to the amount of feed needed to sustain the metal smelting and refining plants operating in Germany. Imported raw materials feed the aluminum, cadmium, cobalt, copper, iron and steel, lead, and zinc industries, all important to the German economy. Production of industrial minerals has been maintained at levels comparable to those of the past few years. Production of cement, gypsum, and dimension stone have been maintained as a result of the building and construction activities involved with the efforts of raising the living and working conditions in the Eastern states to levels comparable to those in the Western states.

Production of marketable anthracite and bituminous coal decreased by 0.8% between 1991 and 1992, principally as a result of decreased demand for domestic coking coal by the German steel industry. Production of steam coal continues to increase in amount and proportion to coking coal and in 1992 accounted for about 45% of total coal production compared with 41% in 1990. Total lignite production in Germany again decreased, a result of decreased production in the Eastern states. Total lignite production dropped by 13.5% in 1992 compared with that of 1991, while production in the Eastern states dropped by 22.8% and production in the Western states increased by 0.6%. Consumption of anthracite and noncoking bituminous coal in industries, other than energy-producing industries, was 85.8% of the total consumed in 1991, broken down as follows: iron and steel basic industry, 26.8%; chemical industry, 26.8%; nonmetallic minerals industry, 24.7%; pulp, paper, and print industry, 7.3%; food, beverages, and tobacco, 5.3%; fabricated metal products and machinery, 3.6%; textiles, wearing apparel, and leather, 2.0%; nonferrous metals basic industry, 1.2%; and all others, 2.3%. In addition, transportation accounted for 0.3% and households and other consumers accounted for the remaining 13.9%. *(See table 1.)*

TRADE

Based on value, exports of domestic products increased by 0.1% in 1992 to $456 billion from $455 billion in 1991, when there was a drop of 3.5%. Imports increased by 0.3% during 1992 to $460 billion compared with $458 billion in 1991, when the value of imports increased by 10.5% compared with the previous year. Based on value, the Eastern states' share of exports in 1992 dropped to 2.3% of the total compared with 2.9% in 1991, and their share of imports dropped to 2.0% of the total imported compared with 2.1% in 1991. German internal trade showed the same direction as in 1991, with increases in value of goods and services both ways. The value of goods and services going into the Eastern states from the Western states in 1992 was $150 billion, an increase of 16%, while the value of goods and services going from the Eastern states to the Western states increased to $22 billion, or an increase of almost 50%.

Export activity by Germany in 1992 was again a disappointment to the German economy. The strength of the Deutschemark, the recession in its export destinations, the shifting of markets in the eastern part of Europe, and high domestic production costs all contributed to the weak export market. Even in German internal trade, the market in the Eastern states for Western states' goods and services did not grow as much as it did in 1991. A drop in Eastern German private consumption and a drop in new investments were principally to blame, but also involved were the continuing restructuring and modernization of the Eastern states in their efforts to produce products competitive on the world market. Despite the shifting markets for goods from the Eastern states of Germany and the growing imports of western products by the former centrally planned economies of eastern Europe, in 1992 54% of goods exported by the Eastern states of Germany were to these former eastern European partners. During 1992, the principal export destinations, based on value, for German products were other EC countries, 53.2%; EFTA countries, 15.1%; the United States, 6.3%; the C.I.S., 2.7%; Japan, 2.5%; and Poland, 1.3%. During 1992, Germany's principal import sources were, based on value, other EC countries, 54.7%; EFTA, 13.1%; the United States, 6.0%; Japan 5.0%; C.I.S., 2.0%, and Poland, 1.0%. *(See tables 4 and 5.)*

STRUCTURE OF THE MINERAL INDUSTRY

The structure of the industry in Germany, the principal companies operating in the production and processing of metals and minerals, is shown in table 2. *(See table 2.)* The restructuring and privatization of the facilities in the Eastern states continued in 1992, with the Treuhandanstalt retaining

control of some of the companies until they are closed or sold. Most of the producing and processing facilities still in operation in the Eastern states are small compared with those in the Western states, except for the lignite and potash operations, which are large by any standards.

COMMODITY REVIEW

Metals

Aluminum.—The aluminum industry in Germany was hit by the problems of the recession as well as the large influx of aluminum metal from the C.I.S., which caused oversupply and, as a consequence, low prices. The low prices, in turn, necessitated cuts in the production of primary aluminum owing to the higher production costs in German, as well as other western European, smelters. For example, VAW aluminium Ag (VAW), Germany's largest aluminum producer, cut capacity at its German smelters by 58,000 tons (almost 10% of total German primary production in 1991) in 1992 by shutting down pots in its plants. Leichtmetall-Gesellschaft mbH (LMG) shut down one of its three potlines at its smelter in Essen, cutting annual capacity by 45,000 tons, or one-third. VAW also continued its plans during 1992 to integrate further by acquiring the diecasting facilities of EB Brühl Aluminiumtechnik GmbH and its subsidiaries and by transferring the production of gravity diecastings from the Nuremburg plant of Alumetall GmbH to a partner in Czechoslovakia, allowing the Nuremburg plant to concentrate on its core business, large pressure diecastings. In 1992, VAW's downstream operations received 259,800 tons of its primary production (8% less than in 1991), and sales to third parties dropped to 116,000 tons (23% lower than in 1991) while primary production dropped by only 5%. Lower demand in the consuming industries, especially the automotive industry, caused the declines.

In contrast to other European secondary smelters, Germany's production of secondary aluminum increased slightly in 1992 with orders dropping near the end of the year. The only aluminum smelter in the Eastern states, the secondary smelter of Chemie AG Bitterfeld-Wolfen, was put up for sale as the Government continued its program of privatization. Production at the plant was 13,550 tons of secondary metal (its full capacity), 10,800 tons of master alloys (80% of capacity), and 2,000 tons of finely divided aluminum powder (50% of capacity). Environmental problems, due to emission levels, have caused the German environmental authorities to allow the smelter, in its present forms, to operate only until 1999. Company officials, however, were planning to build a new 30,000- to 35,000-mt/a secondary smelter on the same site, which would be part of the Bitterfeld-Wolfen 390-hectare industrial park now under construction.

In addition to problems in the aluminum metal sector, problems also were encountered in the aluminum salts sector. Martinswerke GmbH at Bergheim had a sharp reduction in sales of aluminum hydroxide and aluminum oxide. These reductions were attributed to the drop in demand as the recession was felt in the paper, refractory, steel, automotive, and chemical industries.

Steel.—Steel production also was affected by the recession, by oversupply caused partly by increased imports from eastern Europe, and by low prices, all of which resulted in a decrease in production of 6.7%. Production in the Eastern states decreased by 4.2%, and production in the Western states decreased by 6.9%. The strength of the Deutschemark on the export market was only partly offset by lower prices for raw materials. The slump in the demand for steel in the German automobile industry was offset somewhat by the continued demand for steel in the building and construction industries. In an effort to lessen dependence on the steel business, some German steel companies are branching into other areas. Thyssen, for example, has entered into the petroleum business through a joint venture with Elf Aquitaine in the cities of Leuna and Zeitz in the Eastern German state of Saxony. The projects include the construction of a new refinery, the dismantling of old plants, and the handling of the logistics for product storage and transportation. Thyssen, in October of 1992, merged the Thyssen Edelstahtwerke AG with Thyssen Staht AG, and the resulting larger steel business group was working on implementing a rationalizing program to achieve cost reductions in as short a time as possible to remain competitive. Efforts by some other companies to restructure and remain competitive have not been successful. Klöckner Werke, for example, filed for protection from creditors in December. In debt $1,725 million, the organization planned to divest itself of its steel division, which, in terms of steel production, was just outside the top 10 producers in Europe, and concentrate on its profitable plastics and engineering subsidiaries. Near the end of the year, one of Klöckner's owners, Klöckner & Co., provided the steel branch with $100 million to continue operating, but it was uncertain to what extent that money would help.

The restructuring of the German steel industry also was indicated late in 1992 by the merger of Hoesch AG and Friedrich Krupp Ag, the parents of two of Germany's four big steel mills. The merger was expected to realize cost savings from more cooperation in the steel business, but details were not immediately available and the new company, Friedrich Krupp AG Hoesch-Krupp, had not announced its structure at yearend.

Meanwhile, in the Eastern states, Eko Stahl in Eisenhüttenstadt was seeking state money to become more competitive after a failed attempt of a takeover by Krupp. For Eko Stahl to receive state money, the plan would have to be approved by the Treuhandanstalt (its 100% owner), the federal Government, and the EC. If the state money was not approved, the Treuhandanstalt claimed that Eko would stay under the protective cloak of the Treuhandanstalt, receive assistance, and eventually become competitive. One argument for state money was that the entire region around Eisenhüttenstadt depends on the Eko works for jobs and products and that if

the works closed, the costs in unemployment compensation and other social consequences would be much greater than the cost of keeping the plant open. The crisis in the German steel industry as well as those of the other EC countries prompted the steel federation Eurofer to propose a three-point proposal to the EC. Eurofer predicted that without EC intervention, many companies would be turning to their governments for illegal state aid and that the next couple of years could be catastrophic in terms of the social consequences if the steel industries were to fail. The three points proposed by Eurofer were:

- The work force should be reduced by 50,000 at an estimated cost of about $1 billion, to be financed from European Coal and Steel Community (ECSC) reserves;
- Guidelines should be made in accordance with the ECSC treaty on production cuts by companies, totaling an estimated 25 to 30 Mmt/a; and
- The EC should restore quotas on imports from the former U.S.S.R. and eastern Europe as well as strengthen its antisubsidy procedures.

Industrial Minerals

Potash.—Potash production in the Eastern states of Germany increased 3.4% while production in the Western states decreased by 6.9%, for a drop in total German production of 2.5% in 1992 compared with that of 1991. Much of the decrease in production was attributed to the decrease in demand resulting from EC agricultural market reforms (which led to lower agricultural prices and took cropland out of production), surplus capacities, and aggressive pricing policies by the states of the former U.S.S.R. In an effort to lower unit production costs and increase competitiveness, the potash and salt producer Kali und Salz AG (K&S), based in Kassel, proposed forming a new joint venture with Mitteldeutsche Kali AG (MdK), based in Sondershausen and owned 100% by the Treuhandanstalt. During 1992 the Treuhandanstalt had discussions with more than 40 prospective purchasers of MdK, but none of them were willing to purchase the company as a whole and the Treuhandanstalt was not willing to let it be disposed of piece by piece. In an effort to cut costs and eliminate unprofitable branches, K&S closed its Salzdetfurth Mine in March of 1992 and planned to close the plant at Niedersachsen-Riedel and the mine at Bergmannssegen-Hugo following the merger, if successful. The merger must be approved by Germany's Federal Finance Ministry and the European Community Commission. According to the proposal between K&S and the Treuhandanstalt, K&S would contribute assets in the form of six potash and two rock salt plants in return for 51% of the MdK stock, and the Treuhandanstalt would contribute about $650 million in cash as a contribution to the further rehabilitation, modernization, and rationalization of MdK's potash and rock salt plants and retain 49% of its ownership. After the merger, MdK would close the Bischofferode Mine. The proposed capacity reductions and the resulting loss of jobs would affect K&S and MdK about equally. The proposed closures would reduce the annual potash capacity of the new company by 1.2 Mmt to 3.1 Mmt and eliminate about 1 Mmt/a production of industrial and deicing salt, leaving a capacity of 2.1 Mmt/a. K&S would retain ownership of its closed plants, and the closed plants belonging to MdK would be transferred to the German Association for the Utilization and Custody of Closed Mining Operations, a subsidiary of the Treuhandanstalt.

Mineral Fuels

The decrease in lignite production in Germany in 1992 was principally the result of lowered energy consumption owing to the extensive closing of uncompetitive industrial plants. In 1992, lignite production dropped by 22.8% in the Eastern states and increased by 0.6% in the Western states for a total German decrease of 13.5% for 1992 compared with that of 1991. In the Eastern states in 1992, lignite accounted for 57.9% of primary energy consumption while it accounted for only 8.1% in the Western states, for a 16.1% share for Germany as a whole. In the production of electricity, lignite accounted for 95.7% in the Eastern states in 1992 and 20.4% in the Western states, for a 30.6% share for the country as a whole. Output in the Lausitz Basin of the Eastern states declined by 13.1% and in the central lignite fields dropped by 50% in 1992 compared with that of 1991. Further declines were expected because Veag, the Eastern states' electricity supplier, decided not to postpone building three 800-MW coal-fired powerplants. Even further reductions are sure to come as households and small businesses in the Eastern states are refitted to burn natural gas and heating oil rather than the highly polluting brown coal briquets that have been the standard for many decades. At the end of 1992, there was still no decision by the Treuhandanstalt on the privatization of the eastern lignite industry. A West German energy consortium led by Rheinbraun and including PreussenElektra AG, Bayernwerk AG, and RWE Energie AG bid for Lausitzer Braunkohle. A British consortium of NRG Energy Inc. and PowerGen made a bid for the other eastern lignite producer, Vereinigte Mitteldeutsche Braunkohlenwerke AG, which prompted a counterbid from the Rheinbraun consortium. No bid had been accepted at the end of the year, but the Treuhandanstalt indicated that it expected both companies to be privatized in the near future. A possible reluctance by the Treuhandanstalt to accept the offers is the prospect of additional unemployed miners added to the 60,000 who have already lost their jobs since unification. Also looming on the horizon are further pollution control measures for controlling carbon dioxide and nitrous oxides emissions from the browncoal-fired electricity-generating plants that would add an additional $75 per ton to the cost of the production of the lignite. Because the additional $75 per ton is higher than the cost of a ton of imported steam coal, the prospects of domestic lignite being replaced by imported steam coal are very good, especially because the Eastern

states are not covered by the requirement to buy domestically produced hard coal, a provision of the reunification treaty.

INFRASTRUCTURE

Germany has a total of 590,909 km of highways and roads, ranging from the high-speed Autobahn system to undeveloped gravel and packed dirt country roads. Of the total, the Autobahn consists of 8,290 km, national highways consist of 43,786 km, state highways consist of 99,447 km, and municipal, country, and secondary roads consist of 439,386 km. The railroad system consists of 45,468 km, about 90% of which is Government owned. Of the total, 44,769 km is 1.435-m standard gauge and 699 km is 1.000-m gauge. Pipelines include a 3,644-km line for crude petroleum, 3,946 km for refined products, and 97,564 km for natural gas. Inland waterways and canals consist of 7,541 km and have 31 major ports, with the Kiel Canal an important connection between the Baltic and North Seas and the Rhein-Main-Danube Canal a connection between the North Sea and the Black Sea. Major maritime ports include Hamburg, Rostock, Bremerhaven, Bremen, and Wilhelmshaven, which together account for about 70% of total merchandise traffic. In 1992, German maritime ports loaded 53.6 Mmt of merchandise and unloaded 114.6 Mmt, increases of 9.1 Mmt or 20.4% and 12.3 Mmt or 12.0% for loadings and unloadings, respectively. In 1992, the German merchant marine consisted of 607 ships of 1,000 gross tons or more, totaling 5,210,060 gross tons. Of the total, 324 were cargo ships, 135 were container ships, 31 were roll-on-roll-off cargo ships, 22 were liquefied natural gas tankers, 21 were chemical tankers, 15 were bulk carriers, 14 were combination bulk carriers, 11 were oil tankers, 10 were refrigerated cargo carriers, 6 were barge carriers, 5 were combination ore/oil carriers, 5 were railcar carriers, 5 were short-sea passenger carriers, and 3 were passenger ships.

OUTLOOK

Germany's economy will most likely remain in recession until the general world economy improves and the demand for German consumer products increases to levels that can stimulate the German production sector. Unification is costing the Western German states the equivalent of $100 billion per year and although the GDP of the Eastern states is growing, it is growing from such a low level that the growth is not having a significant effect on the economy of the country as a whole. Restructuring industries to be more efficient, in the Western states as well as in the Eastern states, results in an increasing number of jobs being lost, which in turn cuts into the available resources of the Federal Government in the form of payments for unemployment compensation, retraining, and other social costs.

[1]When necessary, conversion from Deutschemark (DM) to US dollars (US$) was made at the rate of DM1.562 = US$1.00.

OTHER SOURCES OF INFORMATION

Agencies

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Wiesbaden, Germany

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Hannover and Berlin, Germany

Bundesministerium für Forschung und Technologie (Federal Ministry for Research and Technology)
Bonn, Germany

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Bonn-Duisdorf, Germany

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Berlin, Germany

Publications

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TABLE 1
GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992
METALS						
Aluminum:						
Alumina, Al_2O_3 equivalent:						
Calcined:						
Eastern states		64,000	69,000	27,000	XX	XX
Western states		939,085	964,017	921,567	XX	XX
Total		XX	XX	XX	863,222	856,972
Hydrate: Western states		1,162,786	1,173,993	1,172,808	1,148,310	1,119,898
Metal:						
Primary:						
Unalloyed:						
Eastern states		61,243	53,930	19,731	XX	XX
Western states		r744,131	r741,994	r720,256	XX	XX
Total		XX	XX	XX	r690,322	602,791
Alloyed: Western states		551,646	533,652	481,318	395,624	400,504
Secondary:						
Eastern states		54,583	53,802	51,580	XX	XX
Western states		516,750	546,420	554,793	XX	XX
Total		XX	XX	XX	r, e520,173	e530,519
Arsenic, white: As_2O_3 content: Western states		e360	e360	e360	e300	e300
Cadmium metal, refinery:						
Eastern states		30	26	17	XX	XX
Western states, including secondary		1,156	1,208	973	XX	XX
Total		XX	XX	XX	1,060	941
Cobalt metal including alloys: Western states		656	733	2 1,303	2 975	2 815
Copper:						
Mine output, Cu content:						
Eastern states		9,019	7,906	3,564	XX	XX
Western states (recoverable)		671	122	3	XX	XX
Total		XX	XX	XX	—	—
Metal:						
Smelter:						
Primary:						
Eastern states		e22,700	e20,100	e14,000	XX	XX
Western states		162,500	176,900	183,600	XX	XX
Secondary: Western states		59,000	79,000	70,000	70,000	70,000
Total smelter		XX	XX	XX	e241,900	e281,100
Refined: Primary including secondary:						
Eastern states		95,100	93,600	56,700	XX	XX
Western states		426,449	475,162	476,242	XX	XX
Total refined		XX	XX	XX	r521,652	581,500
Of which secondary in Western states		234,000	218,000	216,000	216,000	e216,000
Gold, mine output, Au content:						
Eastern states	kilograms	e2,000	2,047	1,751	XX	XX
Western states	do.	e16	e16	e18	XX	XX
Total	do.	XX	XX	XX	e10	—

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992
METALS—Continued						
Iron and steel:						
Ore and concentrate: Western states:						
Gross weight		70,186	101,555	83,473	118,000	180,000
Fe content		9,800	14,200	11,686	17,000	27,000
Metal:						
Pig iron:						
Eastern states		2,786,000	2,732,000	2,163,000	XX	XX
Western states		31,890,000	32,112,000	29,585,000	XX	XX
Total		XX	XX	XX	30,608,000	28,538,000
Ferroalloys:						
Eastern states		131,000	130,000	125,000	54,000	10,000
Western states (includes spiegeleisen, unspecified crude iron, and blast furnace ferromanganese with 2% or more carbon)		481,000	536,000	r e441,000	r e357,000	e353,000
Of which ferrochromium:						
Eastern states		e22,000	e22,000	e21,000	—	—
Western states		e34,900	e33,346	e37,466	e33,654	e26,500
Steel, crude:						
Eastern states		8,131,000	7,829,000	5,546,000	XX	XX
Western states		41,023,000	41,073,000	38,435,000	XX	XX
Total		XX	XX	XX	42,169,000	39,337,000
Semimanufactures:						
Eastern states		5,708,000	e5,600,000	e4,000,000	XX	XX
Western states		30,385,000	31,702,000	29,729,000	XX	XX
Total		XX	XX	XX	32,741,000	31,400,000
Lead:						
Mine output, Pb content, recoverable:						
Western states		14,352	7,420	7,146	6,900	2,100
Metal:						
Smelter:						
Eastern states[e]		20,000	20,000	15,000	XX	XX
Western states		176,600	170,200	162,100	XX	XX
Total		XX	XX	XX	r160,800	175,300
Refined:						
Primary: Western states		176,600	170,200	162,100	160,800	175,300
Secondary: Western states		168,500	179,700	186,700	201,700	179,000
Undifferentiated: Eastern states		39,600	40,100	45,500	—	—
Total		XX	XX	XX	362,500	354,300
Nickel:						
Mine output, Ni content: Eastern states		1,367	1,476	872	—	—
Metal, refined: Eastern states		2,379	2,271	1,657	850	—
Platinum-group metals:						
Mine output, metal content: Eastern states	kilograms	e2,600	2,592	2,023	e1,100	—
Metal, refined: Western states	do.	e68,000	e68,000	e65,000	e65,000	e65,000

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992
METALS—Continued						
Selenium metal:						
Eastern states		e25	e25	e15	XX	XX
Western states		e100	e100	e110	XX	XX
Total		XX	XX	XX	e110	e125
Silver:						
Mine output, Ag content:						
Eastern states	kilograms	62,000	53,000	35,000	XX	XX
Western states	do.	14,672	6,173	5,633	XX	XX
Total	do.	XX	XX	XX	4,477	1,800
Metal, refined:						
Eastern states	do.	e200,000	172,000	175,000	XX	XX
Western states	do.	e622,000	e600,000	e600,000	XX	XX
Total	do.	XX	XX	XX	e700,000	e630,000
Tin:						
Mine output, Sn content: Eastern states		2,474	2,413	1,806	118	—
Metal: Primary including secondary:						
Eastern states		3,322	3,470	2,862	XX	XX
Western states		100	300	400	XX	XX
Total		XX	XX	XX	700	e500
Uranium concentrate, U_3O_8 content:						
Eastern states		e5,000	4,481	3,505	XX	XX
Western states		45	57	11	XX	XX
Total		XX	XX	XX	10	10
Zinc:						
Mine output, Zn content: Western states:						
Analytic content		75,625	63,900	58,200	54,000	14,300
Recoverable content		61,619	53,754	49,141	45,600	12,100
Metal:						
Eastern states		20,000	18,500	12,700	XX	XX
Western states (including secondary)		356,300	353,500	337,600	XX	XX
Total		XX	XX	XX	345,700	383,100
INDUSTRIAL MINERALS						
Abrasives:						
Natural: Pumice: Western states		265,000	330,000	318,000	366,000	591,000
Artificial corundum: Western states[3]		88,253	91,806	87,374	68,542	58,592
Barite, marketable:						
Eastern states (contained $BaSO_4$)		92,100	89,400	25,000	XX	XX
Western states		165,317	144,106	147,776	XX	XX
Total		XX	XX	XX	163,691	154,873
Boron materials; Processed borax, $Na_2B_4O_7 \cdot 10H_2O$ content: Eastern states		e4,000	e4,000	e4,000	e3,000	e2,000
Bromine: Western states		2,000	2,000	1,500	1,500	e750

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	1990	1991	1992
INDUSTRIAL MINERALS—Continued					
Cement:					
Clinker: Western states (intended for market)	948,000	1,300,000	1,310,000	1,052,000	1,221,000
Hydraulic:					
Eastern states	12,516,000	12,264,000	7,228,000	XX	XX
Western states	26,215,000	28,499,000	30,456,000	XX	XX
Total	XX	XX	XX	34,396,000	37,529,000
Chalk, crude including ground:					
Eastern states	365,000	370,000	e300,000	XX	XX
Western states	370,000	421,000	412,000	XX	XX
Total	XX	XX	XX	e600,000	e516,000
Clays:					
Bentonite: Western states[3]	197,000	200,000	223,000	224,000	257,000
Bleaching and Fuller's earth: Western states[3]	670,000	636,000	653,000	708,000	673,000
Ceramic clay:					
Eastern states	264,100	345,000	e300,000	XX	XX
Western states	2,543,000	2,707,000	3,037,000	XX	XX
Total	XX	XX	XX	e2,998,000	3,119,000
Fire clay:					
Eastern states	787,000	766,000	e400,000	XX	XX
Western states	993,000	1,058,000	1,110,000	XX	XX
Total	XX	XX	XX	1,084,000	1,279,000
Kaolin, marketable:					
Eastern states	e300,000	e308,000	e200,000	XX	XX
Western states	672,520	738,000	684,000	XX	XX
Total	XX	XX	XX	r683,505	578,000
Unspecified and other:					
Eastern states	670,000	621,000	e400,000	XX	XX
Western states	505,000	569,000	533,000	XX	XX
Total	XX	XX	XX	761,000	571,000
Diatomite:					
Eastern states	11,000	11,000	e5,000	XX	XX
Western states	47,184	46,800	49,800	XX	XX
Total	XX	XX	XX	44,309	e40,000
Feldspar:					
Eastern states:					
Feldspar sand	66,000	74,000	e70,000	e65,000	e50,000
Feldspar stone	12,000	10,000	e10,000	e10,000	e10,000
Western states: Marketable including byproduct	308,776	332,638	337,572	328,788	328,000
Fluorspar:					
Eastern states	280,100	179,300	120,000	XX	XX
Western states:					
Acid grade	69,940	67,050	r e75,750	XX	XX
Metallurgical grade	7,770	7,450	r e9,550	XX	XX
Total	XX	XX	XX	r e61,000	e60,000

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	1990	1991	1992
INDUSTRIAL MINERALS—Continued					
Graphite: Western states:					
Crude	15,769	e15,800	e15,800	15,807	e15,000
Marketable[4]	r e45,000	r e45,000	r47,332	r45,355	36,909
Gypsum and anhydrite, marketable:					
Eastern states	2,748,000	2,678,000	e2,300,000	XX	XX
Western states	2,317,000	2,201,000	2,172,000	XX	XX
Total	XX	XX	XX	e4,211,000	e4,300,000
Lime, quicklime, dead-burned dolomite:					
Eastern states	3,329,000	3,407,000	e3,000,000	XX	XX
Western states	6,801,000	7,033,000	6,893,000	XX	XX
Total	XX	XX	XX	7,532,000	7,542,000
Magnesium salts (byproduct of potash mining):					
Eastern states	e835,000	e775,000	e585,000	348,000	e200,000
Western states	1,099,000	1,101,000	1,122,000	1,194,000	828,000
Nitrogen: N content of ammonia:					
Eastern states	1,156,000	1,200,000	e700,000	XX	XX
Western states	1,824,416	1,732,117	1,671,444	XX	XX
Total	XX	XX	XX	2,123,331	2,112,524
Phosphate materials:					
Phosphatic fertilizers, P_2O_5 content:					
Eastern states	299,000	287,000	54,000	e50,000	e50,000
Western states	339,000	253,000	r872,564	r685,681	668,160
Thomas slag: Western states:					
Gross weight	104,000	122,000	128,000	127,000	e125,000
P_2O_5 content	15,000	18,000	19,000	19,000	e18,000
Pigments, mineral, natural: Western states	8,143	7,596	6,218	7,043	e6,000
Potash:					
Crude, gross weight:					
Eastern states	35,251,000	32,783,247	e24,700,000	XX	XX
Western states	27,030,000	26,002,000	26,105,200	XX	XX
Total	XX	XX	XX	41,321,700	37,281,000
Crude, K_2O content:					
Eastern states	4,203,000	3,852,484	e2,900,000	XX	XX
Western states	2,869,000	2,752,000	2,723,000	XX	XX
Total	XX	XX	XX	4,673,400	e4,264,000
Marketable, K_2O content:					
Eastern states	3,510,000	3,199,000	2,653,000	XX	XX
Western states	2,290,000	2,182,000	2,216,000	XX	XX
Total	XX	XX	XX	3,855,400	3,758,000
Pyrite, marketable concentrate, gross weight:					
Eastern states	e240,000	230,000	e135,000	r—	—
Western states	313,148	342,051	301,778	219,200	e55,000

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	1990	1991	1992
INDUSTRIAL MINERALS—Continued					
Salt, marketable:					
Marine:					
Eastern states	2,032,000	2,079,000	e2,000,000	XX	XX
Western states	946,000	941,000	785,000	XX	XX
Rock and other:					
Eastern states	3,253,000	3,143,634	e2,450,000	XX	XX
Western states	11,630,475	10,997,147	10,808,186	XX	XX
Total	XX	XX	XX	e16,025,212	e13,434,109
Sodium compounds, n.e.s.:					
Soda ash, manufactured:					
Eastern states	914,000	e800,000	e700,000	XX	XX
Western states	1,404,268	1,443,129	1,435,766	XX	XX
Total	XX	XX	XX	e1,948,496	e1,639,044
Sulfate, manufactured:					
Eastern states	180,000	e175,000	e170,000	XX	XX
Western states	175,067	172,178	167,120	XX	XX
Total	XX	XX	XX	r e288,943	e215,660
Stone, sand and gravel:					
Stone:					
Dimension, crude and partly worked:					
Western states[3]	161,379	170,761	188,776	176,691	178,245
Dolomite:					
Eastern states	596,000	612,000	e450,000	e300,000	—
Western states	1,031,000	848,000	934,000	1,033,000	914,000
Limestone, industrial:					
Eastern states	24,840,000	24,423,000	e15,000,000	6,409,000	10,247,000
Western states	44,402,000	48,075,000	48,716,000	51,697,000	52,813,000
Quartz and quartzite:					
Eastern states	41,300	46,000	e15,000	—	e7,500
Western states	297,000	300,000	283,000	26,000	22,000
Slate:					
Eastern states	98,000	98,000	e75,000	e50,000	e35,000
Western states	26,825	20,588	11,638	14,623	20,420
Sand and gravel:					
Building sand and gravel:					
Eastern states	109,732,500	97,034,000	e50,000,000	25,687,000	40,598,000
Western states	r146,289,000	r158,249,000	r159,091,000	r163,039,000	170,938,000
Gravel including terrazzo splits:					
Eastern states	24,399,200	24,496,000	e22,000,000	20,133,000	29,869,000
Western states	132,351,000	129,778,000	128,176,000	131,804,000	140,091,000
Sand:					
Foundry:					
Eastern states	2,302,000	2,156,000	e1,100,000	e500,000	—
Western states	e3,500,000	3,406,000	2,915,000	2,846,000	2,761,000

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	1990	1991	1992
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel—Continued:					
Sand and gravel—Continued:					
Sand—Continued:					
Industrial (glass):					
Eastern states	1,190,000	1,196,000	e750,000	594,000	543,000
Western states	r6,126,000	r6,356,000	r6,481,000	r7,065,000	7,402,000
Sulfur:					
Pyrites, S content:					
Eastern states	35,000	34,000	e20,000	r—	—
Western states	e140,000	e150,000	e130,000	e95,000	e25,000
Byproduct:					
Eastern states	e315,000	e300,000	e260,000	XX	XX
Western states:					
Natural gas and petroleum	952,283	946,854	858,056	XX	XX
Other	241,052	239,811	282,279	XX	XX
Total	XX	XX	XX	1,186,596	1,138,522
Sulfuric acid: (SO_3)					
Eastern states	799,000	832,000	e200,000	XX	XX
Western states	3,317,927	3,297,671	3,230,614	XX	XX
Total	XX	XX	XX	3,072,521	3,035,872
Talc and steatite: Western states	19,525	20,520	21,378	e21,500	e20,000
Other: Eastern states	5,338,300	6,110,000	e4,000,000	e2,500,000	e1,000,000
MINERAL FUELS AND RELATED MATERIALS					
Carbon black: Western states[3]	379,999	401,853	394,365	379,561	376,384
Coal:					
Anthracite and bituminous, marketable:					
Western states	73,303,643	71,428,367	70,158,527	66,438,000	65,906,000
Lignite:					
Eastern states	310,314,000	300,789,912	249,000,000	XX	XX
Western states	108,630,705	109,912,974	107,599,595	XX	XX
Total	XX	XX	XX	279,403,000	241,751,000
Coke:					
Of anthracite and bituminous coal:					
Eastern states	1,251,000	1,223,000	1,100,000	XX	XX
Western states	18,274,000	18,384,000	17,580,000	XX	XX
Total	XX	XX	XX	15,872,000	14,803,000
Of lignite:					
Eastern states	5,448,000	5,216,000	e4,100,000	XX	XX
Western states	138,000	135,100	174,000	XX	XX
Total	XX	XX	XX	862,000	283,000
Fuel briquets:					
Of anthracite and bituminous coal: Western states	825,000	723,000	756,000	860,000	677,000
Of lignite:					
Eastern states	49,727,000	47,236,276	e47,000,000	XX	XX
Western states	2,526,000	2,158,000	2,397,000	XX	XX
Total	XX	XX	XX	21,049,000	12,224,000

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992
MINERAL FUELS AND RELATED MATERIALS—Continued						
Gas:						
Manufactured:						
Eastern states	million cubic meters	7,485	r6,968	r5,851	r—	e50
Western states:						
Blast furnace	do.	5,007	5,231	e4,730	r e4,100	e4,300
Coke oven	do.	4,392	4,455	e4,250	r e3,250	e3,500
Natural:						
Gross:						
Eastern states	do.	11,936	10,262	r7,000	XX	XX
Western states	do.	16,511	16,388	16,016	XX	XX
Total	do.	XX	XX	XX	21,366	21,112
Marketed:						
Eastern states	do.	e9,000	e7,750	6,713	XX	XX
Western states	do.	14,832	14,716	14,711	XX	XX
Total	do.	XX	XX	XX	19,998	18,800
Peat: Western states:[3]						
Agricultural use		2,668,000	2,836,000	2,983,000	2,876,000	2,717,880
Fuel use		231,509	232,275	237,787	e225,000	187,509
Petroleum:						
Crude:						
Eastern states	thousand 42-gallon barrels	305	355	295	XX	XX
Western states	do.	28,437	27,231	26,046	XX	XX
Total	do.	XX	XX	XX	25,187	23,453
Liquefied petroleum gas:						
Eastern states	do.	3,341	3,271	3,016	XX	XX
Western states (sales)	do.	33,848	31,046	28,894	XX	XX
Total	do.	XX	XX	XX	32,430	30,787
Gasoline including aviation:						
Eastern states	do.	40,494	41,616	39,950	XX	XX
Western states	do.	167,613	173,505	172,806	XX	XX
Total	do.	XX	XX	XX	199,053	198,807
Naphtha:						
Eastern states	do.	NA	NA	NA	XX	XX
Western states	do.	63,742	62,887	63,998	XX	XX
Total	do.	XX	XX	XX	62,607	69,079
Mineral jelly and wax:						
Eastern states (sales)	do.	e800	e750	e700	XX	XX
Western states (sales)	do.	3,618	3,820	3,829	XX	XX
Total	do.	XX	XX	XX	3,062	4,265
Kerosene and jet fuel:						
Eastern states (kerosene only 1988-90)	do.	93	93	e85	XX	XX
Western states (sales)	do.	14,600	15,783	18,785	XX	XX
Total	do.	XX	XX	XX	18,228	e17,127

See footnotes at end of table.

TABLE 1—Continued

GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum—Continued:						
Refinery products—Continued:						
Distillate fuel oil:						
Eastern states	thousand 42-gallon barrels	46,916	47,856	e46,250	XX	XX
Western states	do.	256,099	240,549	252,629	XX	XX
Total	do.	XX	XX	XX	308,404	308,674
Lubricants:						
Eastern states	do.	3,542	3,507	3,430	XX	XX
Western states	do.	4,210	4,343	4,673	XX	XX
Total	do.	XX	XX	XX	4,860	5,110
Nonlubricating oils:						
Eastern states	do.	e200	e200	e150	XX	XX
Western states	do.	5,739	5,805	7,842	XX	XX
Total	do.	XX	XX	XX	7,243	7,292
Residual fuel oil:						
Eastern states	do.	30,336	27,672	e19,980	XX	XX
Western states	do.	66,997	56,068	58,048	XX	XX
Total	do.	XX	XX	XX	75,900	89,822
Bitumen and other residues:						
Eastern states	do.	4,509	4,606	e4,400	XX	XX
Western states	do.	16,257	16,930	17,232	XX	XX
Total	do.	XX	XX	XX	22,047	23,201
Bituminous mixtures:						
Eastern states	do.	e330	e330	e300	XX	XX
Western states	do.	840	872	918	XX	XX
Total	do.	XX	XX	XX	1,417	1,214
Petroleum coke: Western states	do.	7,581	7,961	8,245	8,661	8,626
Unspecified: Western states[3]	do.	18,313	15,159	19,075	20,196	19,437
Total:						
Eastern states	do.	e130,561	e129,901	e118,261	XX	XX
Western states	do.	659,457	634,729	656,975	XX	XX
Total	do.	XX	XX	XX	r e731,679	e752,654

eEstimated. rRevised. NA Not available. XX Not applicable.

[1]Table contains data available through July 30, 1993. Data for the eastern states of Germany have been revised to reflect information that has become available since the unification of the Germanys; however, all the categories of materials might not be entirely compatible with the definitions used for the western states. Further refinement of the data may be made in the future as definitions of categories become available.

[2]Sales.

[3]Production in eastern states has historically been confidential; no basis exists for reliable estimation.

[4]Includes production from imported raw materials.

TABLE 2

GERMANY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	VAW aluminium AG (special aluminas)	Plant at Schwandorf	430.
Do.	Aluminium Oxid Stade GmbH (VAW, 50%)	Plant at Stade	750.
Do.	Martinswerke GmbH (fused alumina, Alusuisse, 100%)	Plant at Bergheim	350.
Aluminum	VAW Aluminium AG	Smelters: Innwerke at Töging, Elbewerk at Stade, Rheinwerke at Neuss, Lippenwerke at Lünen (secondary)	310.
Do.	Leichtmetall-Gesellschaft mbH (Alusuisse, 100%)	Smelter at Essen-Borbeck	90.
Do.	Hamburger Aluminium-Werke GmbH (VAW, 33%)	Smelter at Hamburg	120.
Cement	38 companies, the major ones are:	64 mills (grinding) including:	59,000.
Do.	Heidelberger Zement AG	Plants at Blaubeuren-Schelklingen, Leimen, Hassmersheim, Burglengenfeld, Kiefersfelden, et al.	(9,200).
Do.	Dyckerhoff AG	Plants at Amoneburg, Gollheim, Neuwied, Neubeckum, et al.	(7,250).
Do.	E. Schwenk, Zementwerke KG	Plants at Allmendingen, Karlstadt, and Mergelstetten	(6,000).
Do.	Anneliese Zementwerke AG	Plants at Enniger-loh-Nord, Enniger-loh-Sud, Geseke, and Paderborn	(3,500).
Coal:			
Anthracite and bituminous	Four companies:	About 27 mines, including:	75,000, including:
Do.	Ruhrkohle AG	17 mines in Ruhr region	(54,000).
Do.	Saarbergwerke AG	5 mines in Saar Basin	(11,000).
Do.	Preussag Anthrazit GmbH	Mine at Ibbenbüren	(2,500).
Do.	Eschweiler Bergwerks	Mine in Aachen Basin	(2,500).
Copper	Norddeutsche Affinerie AG (Metallgesellashaft, 35%; M.I.M. Holdings, 35%, Degussa, 30%)	Smelter and refinery, both at Hamburg	290. 350.
Do.	Hüttenwerke Kayser AG	Refinery at Lünen	120.
Lead:			
Mine	Sachtleben Bergbau GmbH	Meggen Mine at Lennestadt	3.
Do.	Preussag AG Metall	Mine at Bad Grund	5.
Metal	Metaleurop Weser Blei GmbH	Smelter and refinery at Nordenham	113. 120.
Do.	Berzelius Metallhütten GmbH	QSL smelter at Stolberg	75.
Do.	do.	Refinery at Duisberg	120.
Do.	Norddeutsche Affinerie AG	Refinery at Hamburg	50.
Lignite	Rheinische Braunkohlen-werke AG (Rheinbraun)	Surface mines in Rhein Basin: Garzweiler, Fortuna/Bergheim, Zukunft/Inden, and Hambach	105,000.
Do.	Braunschweigische Kohlen-Bergwerke AG	Surface mines in Helmsted Basin: Alversdorf, Helmstedt, Schöningen, Offledben, and Buschhaus	4,500.
Do.	LAUBAG (Lausitzer Braunkohle AG)	Surface mines in Lausitz Basin: Cottbus, Glückauf, Oberlausitz, Senftenburg, and Welzow	180,000.
Do.	MIBRAG (Vereinigte Mitteldeutsche Braunkohlenwerke AG)	Surface mines in Bitterfeld Basin: Borna, Deuben, Geiseltal, and Regis	100,000.

TABLE 2—Continued

GERMANY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating commpanies and major equity owners	Location of main facilities	Annual capacity
Natural gas million cubic meters	Brigitta Erdgas und Erdöl GmbH, and Ellwerath Erdgas und Erdöl GmbH	Plants at Clenze and Grossenkneten	9,500.
Do. do.	Mobil Erdgas-Erdöl GmbH	Plants at Scholen	4,000.
Do. do.	Other companies	Plants at Duste, Rutenbrock, and others	2,000.
Petroleum:			
Crude 42-gallon barrels per day	The largest companies are:	6 areas with about 85 oilfields, including:	80,000, including:
Do. do.	Elwerath Erdgas und Erdöl GmbH	West of Ems River	(30,000).
Do. do.	Wintershall AG	Weser-Ems Rivers	(21,000).
Do. do.	Deutsche Texaco AG	Elbe-Weser Rivers	(20,000).
Refined do.	About 25 companies, of which the largest are:	20 refineries, including:	2,062,000 including:
Do. do.	Deutsche Shell AG	Refineries at Godorf, Hamburg, and Grasbrook	(256,000).
Do. do.	Esso AG	Refineries at Karlsruhe and Ingolstadt	(245,000).
Do. do.	Ruhr Oel GmbH	Refinery at Gelsenkirchen	(215,500).
Do. do.	Erdoel Raffinerie Neustadt GmbH	Refinery at Neustadt-Donau	(145,000).
Potash	Kali und Salz AG	Mines at Bergmannssegen-Hugo, Niedersachsen-Riedel, Salzdetfurth, Sigmundshall, Hattorf, Neuhof-Ellers, and Wintershall	2,300 (K_2O).
Do.	MdK (Mitteldeutsche Kali AG)	10 mines mostly in the state of Thüringen	3,500 (K_2O).
Salt (rock)	Kali und Salz AG	Mines at Bad Friedrichshall-Kochendorf, Braunschweig-Luneburg, Heilbronn, Riedel, Stetten, and Wesel (Borth)	15,000.
Steel	Major companies include:	About 25 plants	45,000, including:
Do.	Thyssen Stahl AG	Plants at Krefeld, Duisburg, Hattungen, Krefeld, Oberhausen, and Written	(13,000).
Do.	Stahlwerke Peine-Salzgitter AG	Plants at Peine and Salzgitter	(4,500).
Do.	Krupp Stahl AG	Plants at Bochum and Rheinhausen	(4,500).
Do.	Hoesch AG	Plants at Dortmund	(4,500).
Do.	Klöckner-Werke AG	Plants at Bremen and Osnabruck	(4,200).
Zinc	Ruhr-Zink GmbH	Refinery at Datteln	200.
Do.	Berzelius Metallhütten GmbH	Imperial smelter and fire refinery at Duisburg	100.
Do.	Metaleurop Weser Zink GmbH	Refinery at Nordenham	130.

TABLE 3
PROBLEMS FACING ENTERPRISES IN THE EASTERN STATES OF GERMANY

(By percent of total enterprises)

Problems	Percent
Wages and costs rising too rapidly	73
The share of production costs is too high	10
The production facilities and buildings are obsolete	52
The production facilities and buildings are too large	16
Sales are insufficient	48
The quality of the product inadequate	11
Competetitors, products sell for less	35
Customer service is insufficient	25
Not enough capital for investments	63
Employees lack proper qualifications	29
Qualified workers are difficult to recruit	40
Important achievers have left the enterprise	11
Infrastructure (transport, telecommunications, etc.) at the site is insufficient	46
Property is hard to come by or too expensive	31
Municipal regulations are too cumbersome	53
Sales to eastern Europe are becoming more difficult	34

Source: Wochenbericht, Deutsches Institut für Wirtschaftsforschung, No. 11/93, Mar. 18, 1993, Berlin.

TABLE 4
GERMANY: EXPORTS AND REEXPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	86,019	198,495	—	Czechoslovakia 141,420; Belgium-Luxembourg 15,714; Sweden 10,498.
Oxides and hydroxides	531,314	552,059	30,364	Austria 145,563; Netherlands 98,906; Italy 65,135.
Ash and residue containing aluminum	25,393	29,803	NA	NA.
Metal including alloys:				
Scrap	198,959	316,585	103	France 100,764; Netherlands 68,485; Italy 64,426.
Unwrought	295,309	282,637	2,454	Austria 60,766; France 54,439; Italy 36,523.
Semimanufactures	639,768	656,046	24,709	United Kingdom 103,089; France 101,194; Italy 70,747.
Antimony:				
Ore and concentrate	78	NA		
Oxides and hydroxides	675	NA		
Metal including alloys, all forms	76	144	2	Netherlands 80; Belgium-Luxembourg 17; United Kingdom 15.

See footnotes at end of table.

TABLE 4—Continued

GERMANY: EXPORTS AND REEXPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Arsenic:				
Oxides and acids	344	NA		
Metal including alloys, all forms	2	NA		
Beryllium: Metal including alloys, all forms kilograms	584	433	—	All to United Kingdom.
Bismuth: Metal including alloys, all forms	75	107	(2)	United Kingdom 76; Italy 13; Austria 4.
Cadmium: Metal including alloys, semimanufactures	5	3	(2)	Yugoslavia 2.
Chromium:				
Ore and concentrate	13,466	18,221	—	Sweden 5,278; France 2,980; Austria 2,040.
Metal including alloys, all forms	1,183	1,789	45	France 980; Belgium-Luxembourg 453; United Kingdom 121.
Cobalt:				
Oxides and hydroxides	63	41	1	Italy 12; Austria 9; France 5.
Ash and residue containing cobalt	804	NA		
Metal including alloys, all forms	1,364	1,383	130	Netherlands 251; France 219; Japan 96.
Columbium and tantalum:				
Ore and concentrate	364	124	108	Netherlands 12; Austria 3.
Ash and residue containing columbium and/or tantalum	576	NA		
Metal including alloys, all forms:				
Columbium including rhenium	13	NA		
Tantalum	93	94	45	Austria 23; United Kingdom 18.
Copper:				
Ore and concentrate	130	70	—	Italy 69; Finland 1.
Matte and speiss including cement copper	1,568	1,026	—	Turkey 887; Netherlands 109.
Oxides and hydroxides	2,426	NA		
Sulfate	2,764	3,048	NA	NA.
Ash and residue containing copper	24,365	35,196	NA	NA.
Metal including alloys:				
Scrap	156,553	212,555	385	Italy 57,133; Belgium-Luxembourg 44,563; Netherlands 40,776.
Unwrought	67,072	81,139	268	Belgium-Luxembourg 14,079; Netherlands 12,853; Italy 12,583.
Semimanufactures	551,720	559,476	22,322	Italy 81,248; France 74,095; Austria 53,885.
Gallium, indium, thallium: Metals including alloys, all forms	15	NA		
Germanium:				
Oxides	5	NA		
Metal including alloys, unwrought and scrap	4	5	4	Switzerland 1.
Gold:				
Waste and sweepings	108	33	—	Belgium-Luxembourg 26; Switzerland 4.
Metal including alloys, unwrought and partly wrought	45	64	1	Switzerland 28; Italy 7; Portugal 7.

See footnotes at end of table.

TABLE 4—Continued

GERMANY: EXPORTS AND REEXPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite	4,469	80,829	—	Belgium-Luxembourg 35,074; France 30,561; Austria 14,632.
Pyrite, roasted	18,883	26,438	—	Switzerland 18,869; Belgium-Luxembourg 7,259; Netherlands 129.
Ash and residue containing iron	3,602,355	NA		
Metal:				
Scrap	5,072,703	7,251,019	248	Italy 2,343,175; Netherlands 2,025,129; Belgium-Luxembourg 972,172.
Pig iron, cast iron, related materials	597,651	414,782	888	France 272,499; Italy 42,289; Netherlands 30,493.
Ferroalloys:				
Ferrochromium	51,889	46,597	12,124	France 8,109; Belgium-Luxembourg 5,252.
Ferrocolumbium	591	NA		
Ferromanganese	78,449	56,031	12,490	France 12,232; Belgium-Luxembourg 4,847.
Ferromolybdenum	396	NA		
Ferronickel	1,114	924	—	Belgium-Luxembourg 737; Sweden 186.
Ferrophosphorus	6,589	NA		
Ferrosilicochromium	4,336	2,960	—	Sweden 1,419; Belgium-Luxembourg 1,241.
Ferrosilicomanganese	7,775	9,352	—	Spain 2,689; Austria 1,739; Belgium-Luxembourg 1,599.
Ferrosilicon	64,644	57,913	438	France 16,790; Belgium-Luxembourg 13,095; Italy 8,345.
Ferrotitanium	1,011	NA		
Ferrotungsten	28	NA		
Ferrovanadium	2,497	NA		
Silicon metal	5,740	4,763	378	Italy 1,179; Austria 759; Japan 750.
Unspecified	—	21,433	504	France 5,800; United Kingdom 2,657; Italy 2,223;
Steel, primary forms	14,605	100,403	2,429	United Kingdom 40,145; Italy 34,704; Iran 4,335.
Semimanufactures, all forms	15,408,869	18,392,445	1,113,904	France 2,154,043; Netherlands 2,132,287; United Kingdom 1,654,229.
Lead:				
Ores and concentrate	—	4	4	
Oxides	20,069	23,289	2	France 4,485; Netherlands 4,378; Sweden 2,477.
Ash and residue containing lead	4,396	2,161	NA	NA.
Metal including alloys:				
Scrap	14,813	23,479	—	Netherlands 14,787; Belgium-Luxembourg 3,561; Poland 1,862.
Unwrought	68,563	74,425	240	Austria 20,371; France 13,733; Italy 11,679.
Semimanufactures	17,379	16,872	176	Denmark 4,402; Belgium-Luxembourg 1,886; Netherlands 1,488.

See footnotes at end of table.

TABLE 4—Continued

GERMANY: EXPORTS AND REEXPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Lithium:					
Carbonate		1,685	NA		
Oxides and hydroxides		724	NA		
Magnesium: Metal including alloys:					
Scrap		1,818	2,949	268	Netherlands 333; Japan 143.
Unwrought		644	1,075	—	Austria 427; Sweden 317; Netherlands 77.
Semimanufactures		348	920	2	France 319; United Kingdom 126; Netherlands 106.
Manganese:					
Ore and concentrate		11,066	6,807	37	Spain 1,128; Netherlands 1,064; France 1,025.
Oxides		1,567	1,426	78	Republic of Korea 502; France 293; United Kingdom 134.
Metal including alloys, all forms		1,502	1,679	—	Netherlands 512; Belgium-Luxembourg 281; Bahrain 190.
Mercury		76	NA		
Molybdenum:					
Ore and concentrate, roasted		2,499	2,195	—	Austria 1,000; Netherlands 736; Belgium-Luxembourg 251.
Oxides and hydroxides		493	NA		
Ash and residue containing molybdenum		145	NA		
Metal including alloys:					
Scrap		801	770	128	Austria 151; Japan 131.
Semimanufactures		34	60	1	Austria 29; Brazil 12; Bulgaria 2.
Nickel:					
Ore and concentrate		12	2	(2)	Denmark 1; Netherlands 1.
Matte and speiss		143	2	—	Mainly to Austria.
Oxides and hydroxides		107	NA		
Ash and residue containing nickel		3,010	NA		
Metal including alloys:					
Scrap		9,765	11,063	1,116	Sweden 6,873; Netherlands 1,312; Japan 298.
Unwrought		8,135	8,156	454	France 4,201; Netherlands 1,409; Austria 291.
Semimanufactures		11,485	11,431	2,889	France 2,006; United Kingdom 1,384; Italy 1,038.
Platinum-group metals:					
Waste and sweepings	kilograms	36,682	120,200	12,800	Belgium-Luxembourg 104,900; United Kingdom 1,900.
Metals including alloys, unwrought and partly wrought:					
Palladium	do.	10,727	NA		
Platinum	do.	24,642	NA		
Rhodium	do.	1,015	NA		
Iridium, osmium, ruthenium	do.	307	NA		
Rare-earth metals:					
Oxides and other compounds		249	NA		
Metals including alloys, all forms		6	NA		

See footnotes at end of table.

TABLE 4—Continued

GERMANY: EXPORTS AND REEXPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Silver:				
Waste and sweepings	978	1,396	192	Belgium-Luxembourg 531; United Kingdom 330; Netherlands 205.
Metal including alloys, unwrought and partly wrought	1,576	NA		
Tin:				
Ore and concentrate	—	358	—	Malaysia 338; United Kingdom 20.
Ash and residue containing tin	3,210	518	NA	NA.
Metal including alloys:				
Scrap	316	1,078	6	Netherlands 870; Belgium-Luxembourg 115.
Unwrought	2,383	1,960	4	Netherlands 460; United Kingdom 345; Austria 219.
Semimanufactures	1,677	1,731	16	Austria 330; Italy 203; France 177.
Titanium:				
Ore and concentrate	3,116	2,897	2	Hungary 1,155; France 908; Austria 315.
Oxides	33,074	35,097	12,110	Taiwan 5,662; Belgium-Luxembourg 1,570.
Metal including alloys:				
Scrap including unwrought	1,213	1,332	312	United Kingdom 579; Italy 121.
Semimanufactures	1,017	781	54	United Arab Emirates 137; Denmark 122.
Tungsten:				
Ore and concentrate	26	37	—	Netherlands 36.
Oxides and hydroxides	1,728	NA		
Ash and residue containing tungsten	198	NA		
Metal including alloys:				
Scrap including unwrought	1,696	2,055	743	Austria 514; United Kingdom 143.
Semimanufactures	199	110	2	Spain 17; Italy 14; France 13.
Uranium and thorium:				
Ore and concentrate	2,141	(2)	—	All to France.
Oxides and other compounds	1,070	NA		
Vanadium:				
Oxides and hydroxides	220	NA		
Ash and residue containing vanadium	171	NA		
Metal including alloys, unwrought	401	239	1	United Kingdom 122; Japan 94; China 8.
Zinc:				
Ore and concentrate	31,476	35,456	—	Netherlands 25,227; Belgium-Luxembourg 10,112; Italy 50.
Oxides	19,451	22,750	352	France 4,037; Austria 2,333; Denmark 1,936.
Blue powder	7,834	7,205	NA	NA.
Ash and residue containing zinc	147,108	107,266	NA	NA.
Metal including alloys:				
Scrap	26,419	28,825	249	Taiwan 17,630; Belgium-Luxembourg 6,516; Netherlands 1,771.
Unwrought	94,252	102,256	—	France 33,351; United Kingdom 23,020; Italy 11,041.
Semimanufactures	24,639	34,023	47	France 6,922; Austria 3,987; Netherlands 3,807.

See footnotes at end of table.

TABLE 4—Continued

GERMANY: EXPORTS AND REEXPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Zirconium:					
Ore and concentrate		2,821	NA		
Oxides		272	NA		
Ash and residue containing zirconium		11	NA		
Metal including alloys:					
Scrap including unwrought		79	76	28	France 26; Netherlands 8.
Semimanufactures		18	7	2	France 2; Sweden 1.
INDUSTRIAL MINERALS					
Asbestos, crude		608	2,184	—	Czechoslovakia 1,293; Yugoslavia 437; Belgium-Luxembourg 198.
Barite and witherite		36,000	37,353	90	France 14,887; Belgium-Luxembourg 5,962; Austria 2,479.
Boron materials:					
Crude natural borates		121	NA		
Oxides and acids		53,338	894	—	Philippines 145; Poland 120; Austria 104.
Cryolite and chiolite		154	255	60	Italy 161; Turkey 5.
Diamond, natural:					
Gem, not set or strung	carats	129,391	NA		
Industrial stones	do.	337,547	NA		
Fluorspar		41,232	33,780	—	Austria 11,837; Netherlands 7,972; France 6,995.
Graphite, natural		8,646	7,557	114	Italy 2,002; Austria 1,060; Spain 652.
Kyanite and related materials		12,919	NA		
Magnesite, crude including oxides		68,107	75,739	39	France 44,604; Italy 8,528; Austria 3,750.
Phosphates, crude		5,039	9,517	—	France 4,449; Czechoslovakia 1,974; Switzerland 1,392.
Vermiculite, perlite, similar materials		11,110	11,605	6	Belgium-Luxembourg 6,359; Netherlands 2,873; Switzerland 1,206.
MINERAL FUELS AND RELATED MATERIALS					
Coal: Anthracite and bituminous		5,398,130	3,531,584	—	France 1,090,546; Belgium-Luxembourg 931,602; Italy 460,880.
Coke and semicoke		2,312,650	1,826,344	—	Belgium-Luxembourg 1,097,968; France 166,710; Austria 160,450.
Gas, natural, gaseous	million cubic meters	1,807	1,192	—	Switzerland 1,010; Austria 132; France 15.
Petroleum, crude	42-gallon barrels	95	869,938	—	Poland 607,974; United Kingdom 261,393.

NA Not available.

[1]Table prepared by W. Zajac. Data for 1990 exclude exports to but include exports from the former German Democratic Republic for July-Dec. 1990.

[2]Less than 1/2 unit.

TABLE 5

GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	3,076,544	2,549,118	796	Australia 1,191,781; Sierra Leone 575,681; Guinea 571,717.
Oxides and hydroxides	993,141	947,498	9,926	Australia 271,010; Jamaica 245,197; Italy 151,804.
Ash and residue containing aluminum	44,438	NA		
Metal including alloys:				
Scrap	229,001	195,137	1,247	Netherlands 49,348; Switzerland 19,711; France 19,078.
Unwrought	875,639	1,007,020	5,873	Norway 241,836; U.S.S.R. 140,434; Ghana 64,152.
Semimanufactures	579,561	660,794	5,106	France 129,947; Belgium-Luxembourg 83,783; Netherlands 81,365.
Antimony:				
Ore and concentrate	5	NA		
Oxides and hydroxides	5,517	NA		
Metal including alloys, all forms	3,145	NA		
Arsenic:				
Oxides and acids	1,678	NA		
Metal including alloys, all forms	29	NA		
Beryllium:				
Oxides and hydroxides	(2)	NA		
Metal including alloys, all forms kilograms	1,535	NA		
Bismuth: Metal including alloys:				
Unwrought including scrap	546	NA		
Semimanufactures	89	NA		
Cadmium: Metal including alloys, all forms	530	NA		
Chromium:				
Ore and concentrate	245,513	276,511	106	Republic of South Africa 158,177; Turkey 63,619; Albania 26,207.
Oxides and hydroxides	4,314	4,103	72	China 1,660; Mexico 512; U.S.S.R. 497.
Metal including alloys, all forms	3,235	NA		
Cobalt:				
Ore and concentrate	3	NA		
Oxides and hydroxides	496	503	18	Finland 195; Belgium-Luxembourg 170; United Kingdom 39.
Ash and residue containing cobalt	369	NA		
Metal including alloys, all forms	2,765	NA		
Columbium and tantalum:				
Ore and concentrate	1,302	1,566	(2)	Zaire 999; Australia 234; Canada 193.
Ash and residue containing columbium and/or tantalum	4,243	NA		
Metal including alloys, all forms:				
Columbium including rhenium	49	NA		
Tantalum	196	NA		

See footnotes at end of table.

TABLE 5—Continued

GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Copper:				
Ore and concentrate	487,451	523,395	31	Poland 167,715; Chile 113,394; Papua New Guinea 110,242.
Matte and speiss including cement copper	17,568	19,717	(2)	Australia 7,323; France 7,202; Morocco 2,547.
Oxides and hydroxides	1,611	NA		
Sulfate	10,655	NA		
Ash and residue containing copper	48,987	55,228	NA	NA.
Metal including alloys:				
Scrap	310,643	322,879	4,975	Poland 53,892; Netherlands 51,589; France 49,237.
Unwrought	625,438	684,252	6,416	Chile 136,756; Poland 132,765; U.S.S.R. 110,205.
Semimanufactures	343,171	394,155	3,329	France 93,858; Italy 32,725; United Kingdom 23,506.
Gallium, indium, thallium:				
Metals including alloys, all forms	10	NA		
Germanium:				
Oxides	15	NA		
Metal including alloys, all forms	6	NA		
Gold:				
Waste and sweepings	361	NA		
Metal including alloys, unwrought and partly wrought	118	NA		
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite	43,729,850	43,288,474	32	Brazil 20,009,213; Canada 8,057,450; Sweden 5,692,933.
Pyrite, roasted	160,483	151,422	—	Norway 78,130; Belgium-Luxembourg 33,186; Sweden 25,111.
Metal:				
Scrap	1,100,710	835,073	5,816	France 238,258; Netherlands 192,076; Denmark 118,238.
Pig iron, cast iron, related materials	286,921	403,341	435	Poland 82,271; Canada 74,156; Brazil 69,389.
Ferroalloys:				
Ferrochromium	322,329	328,189	72	Republic of South Africa 149,555; U.S.S.R. 40,179; Zimbabwe 36,772.
Ferrocolumbium	2,158	NA		
Ferromanganese	126,001	130,868	1,015	Norway 36,122; France 22,110; Republic of South Africa 15,584.
Ferromolybdenum	7,881	NA		
Ferronickel	89,529	78,848	640	Greece 26,741; New Caledonia 17,709; Brazil 11,023.
Ferrophosphorus	11,673	NA		
Ferrosilicochromium	12,002	16,716	—	Zimbabwe 12,296; China 2,012; Czechoslovakia 1,434.
Ferrosilicomagnesium	4,121	NA		
Ferrosilicomanganese	101,868	129,579	137	Norway 49,581; Brazil 18,612; Czechoslovakia 17,031.
Ferrosilicon	206,239	192,880	1,364	Norway 72,087; U.S.S.R. 25,381; France 19,973.
Ferrotitanium	5,120	NA		
Ferrotungsten	1,455	NA		
Ferrovanadium	2,702	NA		

TABLE 5—Continued

GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Ferroalloys—Continued:				
Silicon metal	83,577	82,842	1,439	Brazil 24,970; Norway 19,693; France 14,185.
Unspecified	—	44,236	6,758	U.S.S.R. 9,677; United Kingdom 6,307; France 5,297.
Steel, primary forms	37,967	42,317	1	United Kingdom 21,271; Belgium-Luxembourg 16,397; Italy 2,373.
Semimanufactures, all forms	13,764,698	15,460,172	24,970	Belgium-Luxembourg 3,259,321; France 2,408,998; Italy 1,834,325.
Lead:				
Ore and concentrate	205,979	175,821	2,231	Canada 50,080; Sweden 28,782; Ireland 18,239.
Oxides	5,228	5,058	9	Netherlands 1,948; France 1,938; Italy 292.
Ash and residue containing lead	38,017	22,985	NA	NA.
Metal including alloys:				
Scrap	27,641	24,321	129	Hungary 6,907; Denmark 4,958; Poland 4,587.
Unwrought	141,181	141,134	11	United Kingdom 40,829; U.S.S.R. 24,191; Sweden 20,656.
Semimanufactures	6,323	6,275	83	Belgium-Luxembourg 3,266; United Kingdom 1,615; France 682.
Lithium:				
Carbonate	5,490	NA		
Oxides and hydroxides	779	NA		
Magnesium: Metal including alloys:				
Scrap	7,702	NA		
Unwrought	25,385	NA		
Semimanufactures	564	NA		
Manganese:				
Ore and concentrate	368,591	252,537	25	Republic of South Africa 157,714; Gabon 31,991; Australia 27,017.
Oxides	8,547	9,896	219	Japan 3,971; Belgium-Luxembourg 2,482; Netherlands 998.
Metal including alloys, all forms	9,581	NA		
Mercury	189	192	10	Algeria 61; Netherlands 47; Finland 38.
Molybdenum:				
Ore and concentrate	15,929	14,733	4,622	Belgium-Luxembourg 3,923; Canada 1,718.
Oxides and hydroxides	361	NA		
Ash and residue containing molybdenum	228	NA		
Metal including alloys:				
Scrap	652	NA		
Unwrought	151	NA		
Semimanufactures	481	NA		
Nickel:				
Ore and concentrate	28	23	—	All from Republic of South Africa.
Matte and speiss	11,196	11,337	(2)	Australia 10,299; Canada 969.
Oxides and hydroxides	378	NA		
Ash and residue containing nickel	3,103	NA		
Metal including alloys:				
Scrap	8,045	NA		
Unwrought	56,416	51,950	285	U.S.S.R. 22,863; Norway 8,713; Canada 3,572.
Semimanufactures	8,604	8,154	1,480	France 3,921; United Kingdom 1,666.

See footnotes at end of table.

TABLE 5—Continued

GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals:					
Waste and sweepings	kilograms	105,543	45,000	16,700	France 8,100; Czechoslovakia 3,800.
Metals including alloys, unwrought and partly wrought:					
Palladium	do.	26,212	NA		
Platinum	do.	21,880	NA		
Rhodium	do.	1,389	NA		
Iridium, osmium, ruthenium	do.	1,323	NA		
Rare-earth metals:					
Oxides and other compounds		1,871	NA		
Metals including alloys, all forms		162	NA		
Silver:					
Ore and concentrate		938	2,409	16	Sweden 2,191; Canada 138.
Waste and sweepings		2,855	2,097	644	Canada 331; Switzerland 213.
Metal including alloys, unwrought and partly wrought		1,634	NA		
Tin:					
Ore and concentrate		115	45	—	Burundi 38; Zaire 7.
Oxides		44	50	NA	NA.
Ash and residue containing tin		4,423	518	NA	NA.
Metal including alloys:					
Scrap		485	653	—	Netherlands 184; Finland 77; Poland 68.
Unwrought		21,124	21,161	58	Brazil 10,669; Indonesia 2,260; Malaysia 1,792.
Semimanufactures		255	192	6	Belgium-Luxembourg 116; United Kingdom 14.
Titanium:					
Ore and concentrate		517,142	415,123	—	Norway 186,328; Canada 191,586; Egypt 13,531.
Oxides		26,667	23,289	1,498	Belgium-Luxembourg 6,641; France 4,683; Yugoslavia 2,472.
Ash and residue containing titanium		262,990	NA		
Metal including alloys:					
Scrap		478	NA		
Unwrought		3,585	NA		
Semimanufactures		1,923	NA		
Tungsten:					
Ore and concentrate		1,394	566	—	Portugal 140; Australia 120; Peru 72.
Oxides and hydroxides		940	NA		
Ash and residue containing tungsten		18	NA		
Metal including alloys:					
Scrap		716	NA		
Unwrought		757	NA		
Semimanufactures		136	NA		
Uranium and thorium: Oxides and other compounds		1,155	NA		

See footnotes at end of table.

TABLE 5—Continued

GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Vanadium:				
Oxides and hydroxides	597	NA		
Ash and residue containing vanadium	25,923	NA		
Metal including alloys, unwrought	19	NA		
Zinc:				
Ore and concentrate	592,604	624,814	45,147	Canada 219,197; Australia 132,936; Peru 92,821.
Oxides	20,635	17,772	42	France 4,014; Netherlands 3,443; Italy 2,293.
Blue powder	15,076	12,506	(2)	Belgium-Luxembourg 10,205; Norway 1,484.
Ash and residue containing zinc	56,481	45,754	NA	NA.
Metal including alloys:				
Scrap	25,349	17,855	(2)	Netherlands 5,435; Belgium-Luxembourg 2,871; United Kingdom 2,577.
Unwrought	241,980	292,592	1	Belgium-Luxembourg 67,208; Netherlands 45,284; Norway 43,781.
Semimanufactures	34,363	38,148	3,035	France 19,213; Netherlands 4,989.
Zirconium:				
Ore and concentrate	50,225	42,581	8,167	Australia 17,062; Republic of South Africa 14,552.
Oxides and hydroxides	1,341	NA		
Metal including alloys:				
Unwrought including scrap	92	NA		
Semimanufactures	376	NA		
INDUSTRIAL MINERALS				
Asbestos, crude	15,692	4,432	115	Canada 3,672; U.S.S.R. 306; Zimbabwe 139.
Barite and witherite	221,261	169,577	—	France 66,261; China 39,642; Belgium-Luxembourg 37,631.
Boron materials:				
Crude natural borates	75,668	65,641	1,630	Turkey 63,732; Argentina 234.
Oxides and acids	81,899	25,428	735	France 8,990; Italy 6,195; Chile 2,701.
Cryolite and chiolite	1,525	688	—	Denmark 686; France 2.
Diamond, natural:				
Gem, not set or strung carats	596,106	NA		
Industrial stones do.	1,067,101	NA		
Fluorspar	215,271	205,144	—	China 77,397; Republic of South Africa 76,651; Mexico 23,840.
Graphite, natural	35,828	27,793	23	China 13,324; Zimbabwe 5,582; Austria 2,078.
Magnesite, crude including oxides	526,921	526,083	3,749	China 128,933; North Korea 63,994; Greece 54,055.
Phosphates, crude	902,914	704,070	207,427	U.S.S.R. 144,259; Morocco 141,923; Israel 133,870.
Vermiculite, perlite, similar materials	118,141	146,312	168	Greece 101,672; Hungary 19,683; Republic of South Africa 14,401.
MINERAL FUELS AND RELATED MATERIALS				
Coal: Anthracite and bituminous	10,857,038	15,400,361	1,414,242	Republic of South Africa 5,496,148; Poland 3,924,218; Australia 1,284,433.
Coke and semicoke	852,922	1,384,954	30,163	Poland 474,637; Belgium-Luxembourg 252,937; Czechoslovakia 199,706.

See footnotes at end of table.

TABLE 5—Continued

GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Gas, natural	million cubic meters	51,259	60,500	—	U.S.S.R. 29,590; Netherlands 22,110; Norway 8,150.
Petroleum, crude	thousand 42-gallon barrels	535,592	665,974	—	U.S.S.R. 112,102; United Kingdom 104,651; Libya 93,406.

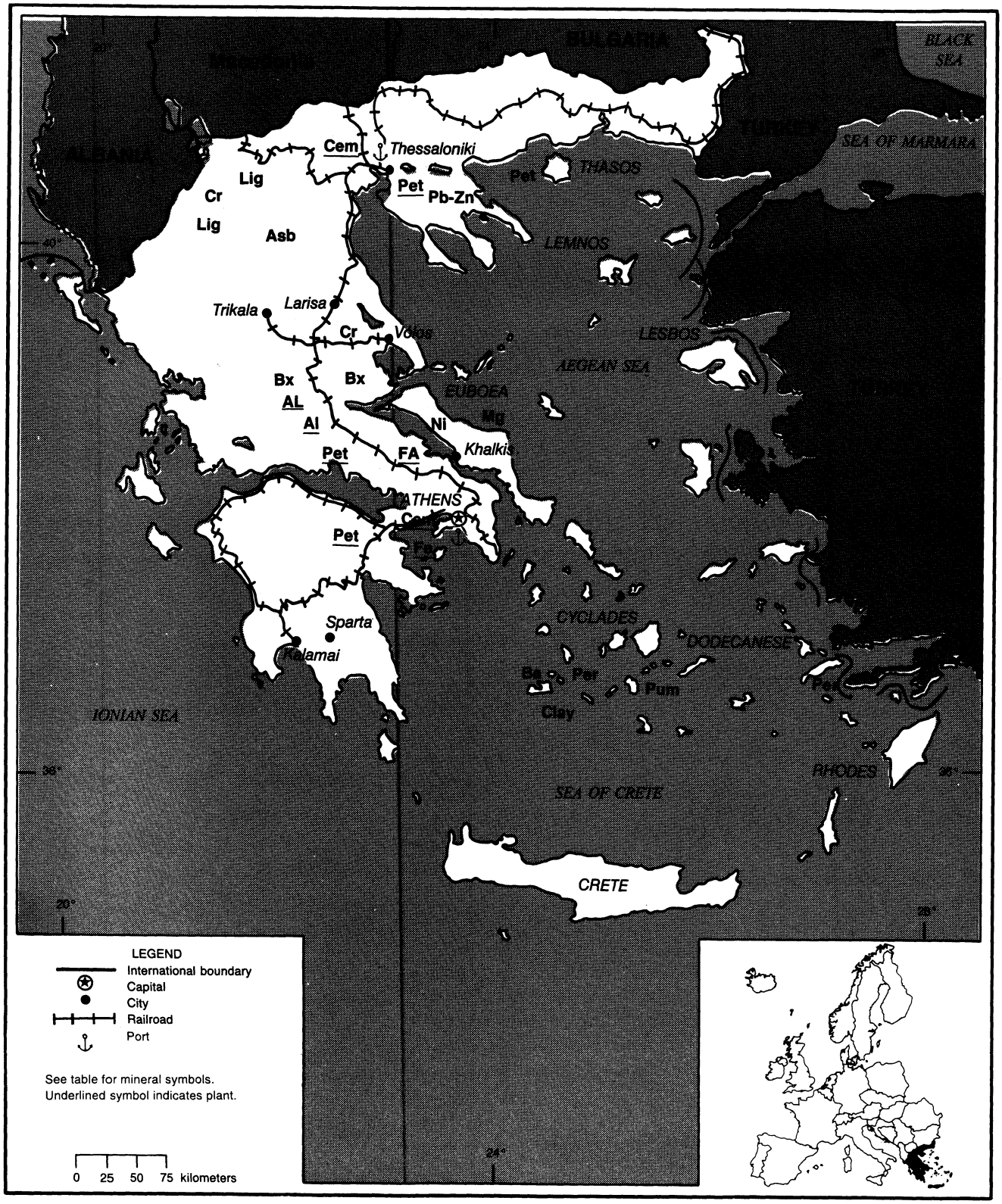
NA Not available.

[1]Table prepared by W. Zajac. Data for 1990 exclude imports from but include imports by the German Democratic Republic for July-Dec. 1990.

[2]Less than 1/2 unit.

GREECE

AREA 132,000 km² **POPULATION 10.1 million**



THE MINERAL INDUSTRY OF

GREECE

By William Zajac

During 1992, Greece continued to be a leading world producer of bentonite, emery, lignite, magnesite, and perlite and a significant European producer of alumina, bauxite, cement, ferronickel, and pumice.

However, despite its history of being a dynamic and serious factor in the economic development of Greece, the mining industry has been seriously affected by the world economic situation and Government economic policies. Important projects such as developing a stainless steel industry and exploiting gold deposits have been delayed once again and some smaller ones have been abandoned for the time being. Some important minerals producing and processing companies have been shut down and are in the process of being liquidated or are up for sale, while others are producing at very low levels. Many of the concerns that are still operational are generating respectable financial results but not nearly at the levels of the recent past. There is still optimism in the Greek minerals industry, however, that a number of companies in liquidation or undergoing restructuring will eventually return to normal and profitable operation. The question remains if the industry will ever regain the importance it held in the past, especially considering the growing importance of minerals producing countries with larger and richer deposits and much lower operational and labor costs.

GOVERNMENT POLICIES AND PROGRAMS

Problems with the country's economic situation, both public and private, continued despite the Government's efforts to lower inflation, cut the public debt, and bring Greece more in line with the standards of the rest of the member nations of the European Communities (EC). The 1992 Government budget remained restrictive despite an important reform of personal taxation that entailed a revenue loss of more than 1% of the GDP on a full-year basis. The emphasis was put on widening the tax base by reducing tax evasion and on real wage cuts in the large public sector, where average wage levels are historically higher than in the rest of the economy. Although the deflation process continued, inflation remained high in 1992, averaging 14% (18% in 1991), and adversely affected growth. Very high interest rates and the decline in private-sector activity also continued to put the brake on economic recovery.

In late 1990 the new Government drafted the "Medium-term Adjustment Program, 1991-93" to deal with the economic imbalances and structural impediments that were responsible for the stagnation of the 1980's. The program's top priority was the reduction of the oversized public sector and high public-sector debts as well as the establishment of a rapid disinflation course and improving the fragile balance of payment position. However, the implementation of the Adjustment Program began to slip in 1991, especially in regard to fiscal consolidation, and the plan was extended a year to 1994.

In June 1992, Parliament passed a major tax reform package that provided for much lower tax rates for large categories of taxpayers but which entailed relatively large losses in tax revenues. To minimize the effect of the loss of tax revenues, the Government attempted to induce people to stop evading taxes and relied on favorable supply-side effects that lower tax rates were expected to have on economic growth. In 1992, the strategy changed from the initial Adjustment Program and indicated a shift in priorities. The new priorities were as follows:

1. A shift away from fiscal consolidation that would entail considerable revenue losses to an increase in the tax base, a tax levy on buildings, and a freeze on the wages of public-sector employees;
2. A shift away from reducing the size of the public sector to reduce costs and improve efficiency to an emphasis on public-sector wage cuts and a reduction of overmanning;
3. A shift to a more gradual approach to solving the economic problems from short-term to longer term measures; and
4. A shift to a reliance on the dynamic effects of the cut in tax rates to boost economic activity, based on the perception of policymakers of the slower pace of budgetary consolidation than originally planned.

Based on information provided by Greek authorities to the Organization for Economic Cooperation and Development (OECD), the preliminary growth of the GDP was about 1.8% again during 1992 based on 1985 prices, with the growth of nonagricultural production accounting for the majority of the growth, a reversal from the previous year. At the same time, inflation dropped to less than 14% by the end of the year from 18% in 1991 and public-sector borrowing requirements dropped to about 14% of the GDP in 1992 from 16% the previous year.

The Government program of denationalization continued in 1992, but at a very slow pace. Two of the largest enterprises under Government control were privatized in 1992. One, the AGET

Heracles cement company, the largest European cement exporter and a very profitable enterprise, was partly privatized, and the proceeds from the sale were expected to reduce the public-sector borrowing requirements by about one-half of 1 percent of the GDP for 1992. The Government has a list of about 70 firms that have been slated for privatization and as many to be liquidated, but very few are expected to be closed completely. Most of the liquidated assets are expected to be bought by other firms, and a large proportion of the capital stock will be used again. Some of these firms and enterprises remain viable enterprises but most are lossmaking with large debts. The assets of liquidated firms are expected to be sold at rather low prices and the receipts used largely to pay overdue debts to banks, social insurance funds, and suppliers. Although total cash receipts are expected to be small (considerably less than originally anticipated), there are expected to be considerable benefits for the economy as a whole and for public finances in the long run. New management and the injection of new capital and new technologies are expected to inject new dynamism into the companies and contribute to helping expand the GDP and exports and create and maintain employment.

Some of the problems encountered in the beginning of this denationalization program have continued. Legal matters, the result of claims made by the owners prior to nationalization, have not been resolved, as has been the case with other problems. These other problems were deficiencies in the administration of the program, lack of coordination between agencies responsible for the privatization, overestimation of the value of the firms, popular belief that a low price corresponded to a selloff to foreigners, the statist attitude of many in decisionmaking positions, and the fear that the restructuring of the privatized firms would lead to job cuts.

PRODUCTION

Production of mineral products in Greece during 1992 generally declined from the levels of past years. In addition to the generally unfavorable worldwide economic conditions and the local economic policy, the turmoil in the political and economic arenas in eastern and central Europe continued to have an adverse effect on the mineral industries of Greece. These areas have traditionally been one of the principal markets for some important commodities produced in Greece, such as bauxite. The decline in the mineral producing and processing industries in this area caused a reduction in the need for the materials produced in Greece, thereby cutting Greek exports and as a consequence, production. The small increases in production in the domestic industries in Greece have not been enough to compensate for the loss of export markets. For example, the production of alumina is estimated to have remained about the same as that in 1991 and the production of primary aluminum increased by only 0.3%, not enough to be able to create enough demand to be able to warrant an increase in bauxite production.

Among metals, Greece has traditionally produced aluminum, ferrochromium, ferronickel, steel, and a small amount of secondary tin. Other metals consumed in Greece must, by necessity, be imported, as must the final forms of the aforementioned metals in forms that cannot be produced in Greece itself. Among the nonmetallic industrial minerals, Greece has traditionally been a producer and processor of materials such as asbestos, magnesite, perlite, pumice, and marble, principally for the export market. Among the mineral fuels, Greece is a major world producer of lignite, principally consumed domestically to produce electricity. Long-range plans, however, call for replacing lignite with cleaner fuels, such as natural gas, for the production of electricity.

TRADE

During 1991, Greece exported goods with a total value of $8,647 million,[1] an increase of 7.8% over the total value of all goods exported during 1991. Of this total, inedible crude nonmetallic materials, excluding fuels, accounted for about $94 million, or 1% of the total; iron and steel accounted for $409 million, or 4.7% of the total (a drop of 1.5% from that of 1991); and alumina and bauxite accounted for $91 million, or 1.1% of the total. Petroleum refinery products exported were valued at $772 million (8.9% of the total), unwrought nonferrous metals and semimanufactures thereof were valued at $357 million (4.1% of the total), and cement accounted for $184 million (2.1% of the total). The EC continued to be the principal market for Greek exports, accounting for 63.5% of the total value and the members of the European Free Trade Association (EFTA) accounted for 6.8% of the total. The United States accounted for 5.7% of the total value of merchandise exported.

The value of total merchandise imports by Greece in 1991 amounted to $21,580 million, an increase of 9.5% from the total value of $19,907 million imported during the previous year. With respect to mineral-related imports, crude petroleum accounted for $1,363 million, or 6.3% of the total value of goods imported and a 36.7% increase over the value of crude petroleum imported during the previous year, with Iran (45%), Libya (33%), and Saudi Arabia (11%) being the principal suppliers. Petroleum products accounted for $554 million, or 2.6% of the total. With respect to sources of imported merchandise, the EC accounted for 60.3% of the total value while EFTA accounted for 5.7% and the United States about 4.3% of the total. The Organization of Petroleum Exporting Nations (OPEC) accounted for about 7.5% of the total value of merchandise imported.

Exports, including reexports, and imports of selected mineral commodities by Greece in 1991 with comparable totals for 1990 are presented in tables 4 and 5.

STRUCTURE OF THE MINERAL INDUSTRY

The Greek mining industry, until recently a dynamic factor in the economic

development of the country, has, in the past few years, been experiencing serious problems, both financial and operational. Many companies, especially those under control of the state, continue to face serious financial problems such as large debt and high operating costs. Some important companies are still in liquidation and their assets are up for sale with the hope of reorganizing, restructuring, and possibly restarting operations. Other companies have declared bankruptcy, and it is extremely uncertain how many of such companies can ever start operations again, not only because of the huge debts owed, but also because of old, outdated facilities and growing environmental concerns. Principal facilities are shown in table 2.

COMMODITY REVIEW

Metals

Aluminum and Alumina.—The aluminum industry was one of the few parts of the mineral industry that remained comparatively healthy in Greece during 1992. Bauxite, alumina, and aluminum metal production remained stagnant during 1992, principally as a result of the loss of export markets resulting from the general worldwide unfavorable economic situation and the large sales of aluminum metal by the former U.S.S.R. in its attempt to raise much needed cash.

The Hellenic Industrial Development Bank (ETBA) remains committed to the construction of an alumina plant in Thisvi, Boeotia, in collaboration with Russia. ETBA has been continuing to look for a third partner in the project for one-third interest, for financing and/or absorbing part of the future production of the plant.

Chromium.—According to press reports, the ferrochromium plant run by Hellenic Ferroalloys was closed in June 1991 after an agreement with the Public Power Corp. (PPC) to restore power collapsed, and the plant had not resumed operation by the end of 1992, effectively stopping chromite and ferrochrome production in Greece.

Nickel.—Despite the discovery of new deposits, high productivity, good sales, new investments, and a new dressing plant, General Mining and Metallurgical Co. S.A. (LARCO), the only ferronickel producer in Greece, again did not have a good year in 1992. Production of ore and concentrates dropped in 1992, but, as a result of richer ore being mined, the amount of ferronickel produced is estimated to have remained about the same as that in 1991.

Industrial Minerals

Asbestos.—Another company facing an uncertain future is the Northern Greece Asbestos Mines (MAVE). The company's activities were suspended early in 1991 for nonpayment of power costs in conjunction with labor disputes. The Government then decided to liquidate the company, but that decision was reviewed near the end of 1991 and a temporary agreement was reached in 1992 between the Government and the labor force that allowed the resumption of operations, but at a greatly reduced level. Another factor being considered is the advisability of resumption of full operations considering the growing opposition to the use of asbestos in the more mature North American and European markets, especially considering the competition from other producers, almost all larger and more efficient.

Cement.—As part of the privatization program, the 69.8% majority stake in the company held by the Industrial Reconstruction Organization (IRO) in one of the largest and most profitable cement companies in Greece, Heracles General Cement Co., was put up for sale in 1991 and was partially privatized in early 1992. In the past, Heracles had about a 44% share of the Greek cement market and one of its two plants, the one at Volos, has a 4.5-Mmt/a capacity, said to be the largest in Europe. The company also has its own shipping fleet and berthing facilities, enabling it to export worldwide, as well as 28 subsidiaries and affiliated companies with activities including ready-mix concrete, mining, quarrying, and transport.

Mineral Fuels

A combination of problems in the Greek economy and in the political and economic arenas of Russia have delayed the construction of a pipeline to deliver natural gas from Russia via the border with Bulgaria to Athens as well as storage facilities at Revythousa in Attica for liquefied natural gas from Algeria. The project would also have local distribution centers along the length of the pipeline. The reaction to these two projects has been very favorable as a result of the positive repercussions expected for the environment due to the replacement of petroleum as an energy source. The cost of the entire project is expected to be about $1.5 billion, and the first natural gas power units had been planned to be in operation by late 1994.

Reserves

Greece has sufficient reserves of bauxite, chromite, lead, nickel, and zinc and a wide range of industrial minerals, especially magnesite and perlite, to supply the domestic industry and export commitments well into the 21st century.

Exploration carried out in 1991 by LARCO at Aghios Ioannis, Euboea, and northern Greece resulted in identifying a new 2 to 3 Mmt of nickel ore and in changing the classification of 2 Mmt from possible to definite. Exploration continued in 1992.

The reserves of selected minerals in Greece are shown in table 3.

INFRASTRUCTURE

The railroad system in Greece, all Government owned, totaled 2,479 km, of which 1,565 km was 1.435-m standard-gauge track (of which 36 km was electrified), 892 km 1.000-m-gauge track, 100 km double track, and 22 km 0.750-m narrow-gauge track. The highway and

road system totaled 38,938 km, of which 16,0909 km was paved, 13,676 km was crushed stone and gravel, 5,632 km was improved earth, and 3,540 km was unimproved earth. The inland waterway system was 80 km, consisting of three coastal canals and three unconnected rivers. The pipeline system consisted of 26 km for crude petroleum and 547 km for refined products.

Greece's major ports were Piraeus and Thessaloniki, and the merchant marine fleet consisted of 958 ships more than 1,000 tons gross weight and totaling 21,585,048 gross weight tons. The merchant fleet consisted of 2 passenger/cargo, 152 cargo, 21 container, 17 roll-on/roll-off cargo, 23 refrigerated cargo, and 1 vehicle carrier ships. The tanker fleet consisted of 185 petroleum/oil/lubricant, 15 chemical, 10 liquefied gas, 25 combination ore/oil, and 5 specialized ships. The merchant fleet also had 707 bulk carriers and 19 combination bulk carriers. In addition to the ships under Greek registry, ethnic Greeks also owned a large number of ships under registry of Cyprus, Lebanon, Liberia, and Panama.

OUTLOOK

The pace of budget consolidation will be an extremely important determinant for the economic development of Greece, and thereby the Greek minerals industry, in 1993. Cuts in the wages of public-service employees since 1990 have brought them to a level that makes them hard to imagine being any lower. This, combined with a planned rise in the wages of senior civil servants, prevents the Government from saving more money in this area. Even though projections by OECD specialists show the interest payments on the public debt (projected to be just over one-half of a percent of the GDP in 1993) to be lowered to a ratio somewhat under 12% of GDP in 1993 due to the favorable effect of the expected drop in inflation, the interest will start to be paid on a higher debt resulting from the capitalization since 1990. The continued troubled regional environment will also not allow Greece to benefit from the expected "peace dividend" that was hoped for as a result of the changing political and economic environments in eastern Europe. The continued sluggish worldwide economic situation, especially in Germany, is expected to further hamper Greek recovery.

[1]Where necessary, values have been converted from Greek drachma (Dr) to U.S. dollars at the rate of DR 189.5=US$1.00 in 1992.

OTHER SOURCES OF INFORMATION

Agencies

The Institute of Geology and Mineral Exploration (IGME)
70 Messoghion Street
608 Athens, Greece
Project Studies and Mining Development Corp. S.A. (GEMEE)
15 Valaoritou Street
106 71 Athens, Greece
Hellenic Industrial and Mining Investment Co. (HIMIC)
3 Korai Street
105 64 Athens, Greece
Hellenic Industrial Development Bank S.A. (ETBA)
18 El Venizelou Street
196 72 Athens, Greece
National Investment Bank for Industrial Development
14 Amalias Avenue
192 36 Athens, Greece
Public Power Corp.
30 Halkopcondyli
104 32 Athens, Greece
Public Petroleum Corp.
119 Kifissias Maroussi
151 24 Attica, Greece
Bauxite Parnasse Mining Co.
21a Amerikis Street
106 72 Athens, Greece
Aluminium de Grece SAIC
1-3 Sekeri
106 71 Athens, Greece

Publications

Statistiki Epeteris Tis Ellados (Statistical Yearbook of Greece), Athens.
OECD Economic Surveys—Greece 1991/1992, Organization for Economic Cooperation and Development, Paris, France.
Mineral Wealth, Jan.-Feb. 1993, No. 82, Athens, Greece.

TABLE 1

GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	1988	1989	1990	1991	1992
METALS					
Aluminum:					
Bauxite	2,460,782	2,550,015	2,495,940	r2,132,716	e2,000,000
Alumina, Al_2O_3 equivalent	514,650	521,000	587,000	624,600	e611,600
Metal:					
Primary	148,253	144,833	149,674	152,368	153,383
Secondary	e7,000	e7,000	2,882	e3,000	e3,000
Chromite:					
Run-of-mine	180,836	187,322	177,400	r113,378	—
Marketable products:					
Direct-shipping ore	e14,000	e15,000	e13,000	e5,500	—
Concentrate	49,535	47,324	22,400	r31,669	—
Iron and steel:					
Iron ore and concentrate, nickeliferous:					
Fe content[3]	640,000	820,000	860,600	814,600	e610,000
Metal:					
Ferroalloys:					
Ferrochromium	44,147	43,579	30,300	e15,000	—
Ferronickel	50,500	41,200	e60,500	64,020	e65,000
Steel, crude	959,000	957,000	999,000	r980,000	924,000
Lead:					
Mine output, Pb content by analysis	25,900	24,500	26,200	31,700	e30,000
Metal:					
Smelter, primary	15,100	5,600	—	—	—
Refined:					
Primary	13,100	5,600	—	—	—
Secondary	2,000	1,400	—	—	—
Total	15,100	7,000	—	—	—
Manganese:					
Ore, crude:					
Gross weight	17,830	18,925	e18,500	13,540	e11,000
Mn content	5,900	6,000	e6,000	e4,480	e3,500
Concentrate:					
Gross weight	3,725	3,034	5,400	3,840	e3,000
Mn content	1,825	1,487	e2,500	1,882	e1,450
Nickel:					
Ore:					
Gross weight	1,572,954	2,013,021	2,112,725	2,023,678	e1,800,000
Ni content of nickeliferous iron ore	15,400	18,900	18,500	24,284	e19,800
Metal: Ni content of ferronickel	13,131	16,097	15,727	16,005	e15,420
Silver: Mine output, Ag content	61	61	63	70	e70
Tin: Metal, secondary	200	800	700	200	e200
Zinc: Mine output, Zn content by analysis	21,200	24,600	26,700	r39,000	e20,000
INDUSTRIAL MINERALS					
Abrasives, natural: Emery	e7,500	e7,000	e7,000	7,855	e7,500
Asbestos:					
Ore	4,000,000	4,500,000	4,320,000	e400,000	—
Processed	71,114	73,300	65,993	e5,500	—

See footnotes at end of table.

TABLE 1—Continued

GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued						
Barite:						
Ore, crude		1,316	1,247	1,617	1,309	1,000
Concentrate		1,407	1,218	e1,250	763	500
Cement, hydraulic		13,053,000	12,535,000	13,561,000	13,580,000	13,100,000
Clays:						
Bentonite:						
Crude		730,525	1,096,177	592,684	600,286	600,000
Processed		502,537	529,802	e500,000	474,796	450,000
Kaolin:						
Crude		127,395	67,234	169,986	189,235	100,000
Processed		4,163	6,946	e17,500	e20,000	10,000
Feldspar		37,531	28,903	17,608	e17,500	15,000
Fluorspar, grade unspecified		604	450	r e200	r e200	200
Gypsum and anhydrite		599,011	540,637	450,149	e450,000	400,000
Magnesite:						
Crude		847,911	903,593	696,900	590,188	250,000
Dead-burned		237,995	214,945	150,300	118,602	50,000
Caustic-calcined		124,140	111,826	119,200	130,801	55,000
Nitrogen: N content of ammonia	e	263,000	242,000	257,000	r210,200	200,000
Perlite:						
Crude		361,849	390,849	e360,000	369,495	325,000
Screened		211,404	217,305	e240,000	286,404	250,000
Pozzolan (Santorin earth)		358,000	786,000	e785,000	536,320	500,000
Pumice		752,525	640,152	e600,000	445,143	400,000
Pyrites, gross weight		130,129	97,051	e70,000	e60,000	55,000
Salt, all types		181,324	148,265	150,000	e150,000	125,000
Silica sand		e38,000	61,144	e60,000	r e55,000	50,000
Sodium compounds:						
Carbonate	e	1,000	900	900	900	750
Sulfate	e	7,000	6,000	6,000	6,000	6,000
Stone: Marble	cubic meters	e655,000	365,146	e300,000	e225,000	225,000
Sulfur:						
S content of pyrites		58,558	57,150	e41,247	35,332	25,000
Byproduct:						
Natural gas	e	135,000	135,000	135,000	125,000	120,000
Petroleum	e	5,000	5,000	5,000	6,000	5,000
Total	e	198,558	197,150	181,247	166,332	150,000
Talc and steatite		1,587	10,518	1,114	790	700
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Lignite		48,091,733	49,772,000	49,909,300	50,537,241	54,413,000
Lignite briquets		130,000	155,000	160,000	e162,000	175,000
Coke: Gashouse	e	19,000	16,000	16,000	16,000	15,000
Gas:						
Manufactured, gasworks	e million cubic meters	19	18	18	18	18
Natural	do.	181	185	191	180	160

See footnotes at end of table.

TABLE 1—Continued

GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude:						
As reported	thousand metric tons	1,142	927	825	843	630
Converted	thousand 42-gallon barrels	8,215	6,666	5,935	6,065	4,500
Refinery products:						
Liquefied petroleum gas	do.	3,990	4,396	4,478	5,951	4,500
Gasoline	do.	25,636	26,648	28,551	26,588	20,000
Mineral jelly and wax	do.	16	39	24	r20	15
Naphtha	do.	5,976	5,177	4,675	1,921	1,500
Jet fuel	do.	14,840	14,768	14,400	r11,600	8,500
Kerosine	do.	163	101	171	r150	110
Lubricants	do.	1,267	1,148	1,323	1,106	800
Distillate fuel oil	do.	25,506	27,848	27,117	24,409	18,000
Residual fuel oil	do.	36,963	37,243	37,269	34,419	25,000
Bitumen	do.	1,291	1,703	1,479	2,048	15,000
Petroleum coke	do.	644	754	748	r700	525
Other	do.	490	616	644	506	400
Refinery fuel and losses[e]	do.	3,240	3,460	3,660	3,000	2,250
Total[e]	do.	120,020	123,900	124,538	112,418	96,600

[e]Estimated. [r]Revised.

[1]Table includes data available through May 28, 1993.

[2]In addition to the commodities listed, other crude construction materials are produced, but no basis exists for estimation of production.

[3]This is the iron content of the nickeliferous ore mined for its nickel content. There is no indication that this iron content is recovered.

TABLE 2

GREECE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Aluminium de Grèce S.A. (60% owned by Pechiney of France)	Distomon, in Boeotia area	600
Aluminum	do.	do.	160
Asbestos	Asbestos Mines of Northern Greece S.A. (MAVE) (Hellenic Industrial Development Bank-Government, 95%; International Finance Corporation, 5%)	Mines at Zidani, near Kozani	110
Do.	do.	Plants at Zidani, near ozani	100
Barite	Silver and Baryte Ores Mining Co. S.A. (Eliopoulos-Kyriacopoulos Group)	Milos Island	10
Bauxite	Bauxites Parnasse Mining Co. S.A. (Eliopoulos-Kyriacopoulos Group)	Mines in Parnassos-Ghion area and Pasha, Euboea Island	2,000
Do.	Eleusis Bauxites Mines, S.A. (ELBAU-MIN) (National Bank of Greece)	Plant in Drama and Eleusis; mines near Drama, Itea, Kimi and Mandra	700
Do.	Delphi-Distomon S.A.; Hellenic Bauxites of Distomon S.A.; (Aluminium de Grèce S.A.) Delphi Bauxites S.A.	Opencast mines at Delphi-Distomon area	500
Do.	Am. E. Barlos-Bauxite Hellas Mining S.A.	Mines at Distomon (Elixon), Beotia	300
Do.	do.	Processing plant at Distomon, Beotia	250

See footnotes at end of table.

TABLE 2—Continued

GREECE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Bentonite:			
Crude	Mediterranean Bentonite Co. S.A. (Industria Chimica Mineraria S.p.A., Italy)	Surface mines on Milos Island	20
Do.	Mykobar Mining Co. S.A. (MI Drilling Fluids)	Mines at Adamas, Milos Island	180
Do.	do.	Plants at Adamas, Milos Island	150
Do.	Silver and Baryte Ores Mining Co.	Mines at Adamas, Milos Island	500
Processed	do.	Plant at Voudia Bay, Milos Island	400
Cement	Halkis Cement Co. S.A.	Micro-Vathi plant, west-central Euboea	3,000
Do.	Halyps Cement S.A. (Ciments Français, France)	Paralia Aspropyrgos plant, Athens	800
Do.	Heracles General Cement Co. S.A. [Industrial Reconstruction Organization (IRO), 69.8%]	Plant at Milaki	1,900
Do.	do.	Plant at Volos	4,600
Do.	Titan Cement Co. S.A.	Elefsis plant, Athens region	400
Do.	do.	Kamari plant, Boeotia	2,600
Do.	do.	Patras plant, northern Peloponnesus	1,900
Do.	do.	Salonica plant, Salonica	1,650
Chromite	Financial Mining-Industrial and Shipping Corp. (FIMISCO) (IRO)	Tsingeli mines and plant near Volos	25
Do.	Hellenic Ferroalloy S.A. (HFA) (Government) (operations suspended in November 1991)	Skoumtsa mines in Vourinos	350
Do.	do.	Skoumtsa concentrator in Vourinos	110
Ferroalloys: Ferrochrome	do.	Tsingeli near Volos	45
Ferronickel, Ni content	General Mining & Metallurgical Co. SA (LARCO) (IRO)	Larymna Metallurgical Plant	25
Lead: Mine: Pb in concentrate	Hellenic Chemical Products and Fertilizer S.A. (Bodossakis Group)	Kassandra mines (Olympias; Stratoni), northeast Chalkidiki	31
Lignite	Public Power Corp. (DEH) (Government)	Aliveri Mine, Euboea Island	420
Do.	do.	Megalopolis Mine, central Peloponnesus	7,000
Do.	do.	Ptolemais Mine, near Kozani	28,000
Magnesite, concentrate	Financial-Mining-Industrial and Shipping Corp. (FIMISCO) (Government owned - IRO)	Mines at Gerorema, Kakavos, and Paraskevorema at Mantoudhi, northern Euboea Island	350
Do.	Grecian Magnesite S.A. (operations suspended in 1992)	Mines at Yerakini and Kastri in Chalkidiki	400
Do.	Magnomin-General Mining Co. S.A. (A subsidiary of Radex Eraclit Industrie Beteiligungs GmbH, Austria)	Mines at Vavdos, Chalkidiki	68
Do.	do.	Processing plant at Vavdos	60
Manganese (battery grade MnO_2 concentrate)	Eleusis Bauxite Mines Mining, Industrial and Shipping S.A. [National Bank of Greece (OAE)]	Nevrokopi, Drama	4
Natural gas million cubic meters per day	Public Petroleum Corp. (DEP) (Government)	Prinos offshore gasfield and oilfield, east of Thasos Island	125
Nickel, ore	General Mining & Metallurgical Co. S.A. (LARCO) (IRO)	Agios Ioannis mines near Larymna	500
Do.	do.	Mines at Euboea	2,500
Perlite	Silver and Baryte Ores Mining Co. S.A.	Kos and Milos Islands	250
Do.	do.	Plant at Pireaus	300
Do.	Otavi Minen Hellas S.A. (Otavi Minen AG, Germany)	Milos Island	120
Do.	Peletico Hellas S.A. (Peletico Ltd. of Cyprus)	do.	20
Do.	N. Bouras & Co.	Kos Island	75

See footnotes at end of table.

TABLE 2—Continued

GREECE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum, refined 42-gallon barrels per day	Hellenic Aspropyrgos Refinery S.A.	Aspropyrgos	95,000
Do.	Motor Oil (Hellas) Corinth Refineries S.A.	Aghii Theodori, Corinth	140,000
Do.	Petrola Hellas S.A.	Eleusis	100,000
Do.	Thessaloniki Refining Co. A.E.	Thessaloniki	76,000
Pozzolan (Santorin earth)	Lava Mining & Quarrying Co. Ltd. (Heracles General Cement Co. S.A.)	Quarries on Ghyali Island	800
Steel, crude	Halyvourgia Thessalias S.A. (A subsidiary of Manessis Bros. and Voyatzis S.A. (65%); the balance, 35%, owned by state-owned National Investment Bank for Industrial Development-NIBID)	Steelworks at Volos (operates two 35-ton electric arc furnaces)	1,500
Do.	do.	do.	300
Do.	do.	do.	200
Do.	Halyvourgiki, Inc.	Steelworks at Eleusis (three 100-ton electric arc furnaces)	1,200
Do.	Helleniki Halivourgia S.A.	Steelworks at Aspropyrgos (operates two 55-ton electric arc furnaces)	400
Do.	Metallurgiki Halyps S.A. (closed in 1988)	Steelworks at Almyros, near Volos (operates two 50-ton electric arc furnaces)	300
Do.	Sidenor S.A. (also known as Halivorgia Voviou Ellados S.A.)	Steelworks at Nea Maguisia, near Thessaloniki (operates two 50-ton and two 30-ton electric arc furnaces)	350
Zinc: Mine: Zn in concentrate	Hellenic Chemical Products and Fertilizer Co. (Bodossakis Group)	Kassandra mines (Olympias; Stratoni), northeast Chalkidiki	25

TABLE 3

GREECE: RESERVES[1] OF SELECTED MINERAL COMMODITIES FOR 1992

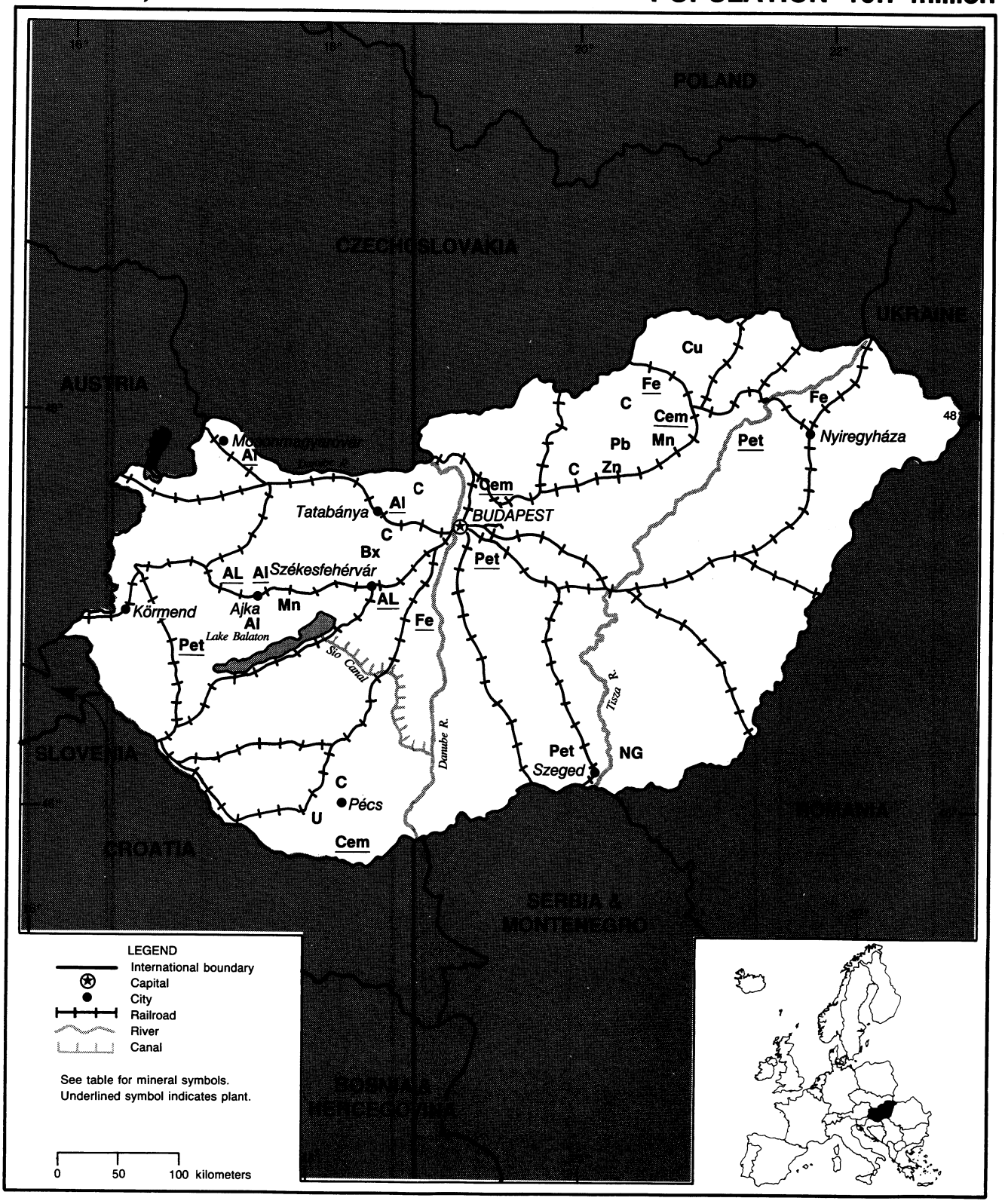
(Million metric tons)

Commodity	Reserves
Asbestos	4
Barite	4
Bauxite	750
Chromite	16
Iron	70
Lead, content of ore	.7
Lignite	3,570
Magnesite	50
Manganese, content of ore	2
Nickel, content of ore	3
Perlite	200
Pyrite	6
Zinc, content of ore	1.3

[1]Measured and inferred reserves.

HUNGARY

AREA 93,000 km² **POPULATION 10.7 million**



THE MINERAL INDUSTRY OF

HUNGARY

By Walter G. Steblez

In 1992, Hungary remained committed to a structural reformation of its economy to a market-based system. With centrally planned production quotas no longer playing a role in the country's industrial activity, arbitrary production of industrial goods had ceased. Mining and manufacturing had to meet the requirements of the market. Although industrial output continued to decline and unemployment continued to rise in 1992, reaching 10.9%, inflation declined from a rate of 35% in 1991 to reportedly an annual rate of 20% in mid-1992. Also, positive trends in foreign trade significantly improved Hungary's balance of payments status at yearend. Foreign investment in Hungary by Western European and U.S. interests, by 1992, amounted to more than one-half of all investments in the former European CMEA member countries from these areas.

By European standards, Hungary remained a major producer of bauxite and a significant European producer of alumina and aluminum products. However, the future of this industry had become uncertain in light of the emerging market forces within the country. Hungary also was one of the few producers of uranium in Europe. Major restructuring activities and rationalization in the country's mineral industry during the year included the closure of bauxite mining operations near Nyirad and the closure of aluminum smelters at Ajka and Tatabánya, reportedly for environmental reasons.

GOVERNMENT POLICIES AND PROGRAMS

The Government of Hungary maintained policies aimed at establishing a functional market economy in the country. The denationalization of state-owned assets continued to be a key element in this process. Major assets that were to remain state-owned were to include the country's airlines, the production of petroleum and natural gas, the telecommunications industry, and some parts of the country's pharmaceutical industry. To accelerate the rate of privatization, new laws were adopted in August 1992 that stipulated the adoption of a market economy corporate structure at the country's industrial enterprises by mid-1993. To encourage domestic investors to participate in the denationalization process, the Government also created employee stock ownership and leasing programs.

As in other former CMEA member countries, the issue of the environmental pollution was a major policy consideration of the Government. The overall neglect of the environment by the Communist Government from 1948 to 1989 resulted in considerable degradation of the country's air and, in some cases, ground and surface waters from industrial point sources such as chemical plants, mines, steel mills, and refineries. The use of high sulfur brown coals and lignites at the country's thermal electric power stations resulted in high concentrations of SO_2, NO_x, and suspended solid particulates, which, in 1988, were measures at 1,230,900 tons, 259,000 tons, and 420,000 tons, respectively. Reportedly, in 1992, the Government of Hungary was in the process of drafting new legislation that would address environmental protection. The draft of the new law, titled "the Basic Laws on the Environment," reportedly would establish regulations on environmental protection, conservation, and regional development. Government agencies that were responsible for enforcing existing regulations concerning environmental protection included the Ministry of the Environment and Regional Planning (KTM) and the Hungarian Mining Office (MBH). KTM could only help in the enforcement of existing environmental protection legislation prescribed by other ministries of the Government. In respect to mining and minerals, Hungary's Ministry of Industry and Commerce had the primary responsibility for establishing environmental regulatory standards. The chief responsibility of MBH was that of a certifying agency. MBH would review technical developmental and operational plans, which had to include provisions concerning environmental protection and land restoration by responsible entities, and oversee their compliance.

PRODUCTION

Hungary's generally declining trend in minerals output largely was the result of the continuing structural adjustment to an emerging market-based economic system. In 1992, the aggregate value of output of the country's mining and extracting sectors fell by about 19% compared with that of 1991. Coal mining declined by more than 22%; however, natural gas and petroleum extraction, respectively, rose in value by slightly more than 5%. The combined value of output of the iron and steel and aluminum sectors fell by about 26%. The decline of production in the building materials sector amounted to about 14%. (*See table 1.*)

TRADE

With the country's state monopoly for

foreign trade having been abolished in 1987, by mid-1992, reportedly, more than 40,000 companies and individuals in Hungary were reported to be engaged in foreign commercial activity. Approximately 93% of the goods imported by Hungary did not require import licenses during the year. The principal exceptions to this were armaments, precious metals, various chemical products, and a small range of consumer goods and durables. Imports were allowed to freely compete with about 70% of the country's domestically produced industrial products.

Preliminary trade data for 1992 indicated substantially no change in the import level for the aggregate category of mineral fuels and electric energy compared with that of 1991 and about a 68% increase in exports for the same category during the same period. The value of exports and imports for mineral fuels and electric energy amounted to Ft (forint) 22.9 million and Ft 127.9 million, respectively.[1] Similarly, imports for the aggregate category of raw materials, semimanufactured goods and spare parts, which included metallic and industrial minerals, compared with 1991, rose by slightly more than 1%. Exports for this category during the same period rose by 2.1%. The value of exports and imports for raw materials and semimanufactured goods amounted to Ft 295.9 million and Ft 322.2 million, respectively.

STRUCTURE OF THE MINERAL INDUSTRY

The information provided in table 2 lists the names of administrative bodies as well as subordinate production units of the main branches of the country's mineral industry. *(See table 2.)*

COMMODITY REVIEW

Metals

Aluminum and Bauxite.—In 1992, after several failed efforts to renegotiate the Russian (formerly Soviet)-Hungarian alumina for aluminum agreement, Hungary's and Russia's respective foreign trade organizations, HungAluker and Raznoimport, signed a new agreement in November. The new Hungarian-Russian alumina for aluminum agreement called for Hungary's shipments of 150,000 tons of alumina per year in exchange for 27,500 tons of metal. The continued use of Russian aluminum smelters in Volgograd to toll-smelt Hungarian alumina and ship the metal back to Hungary by rail was found to be less costly than importing primary ingot in Western Europe for Hungalu's aluminum working subsidiaries.

Hungalu's aluminum smelters at Ajka and Tatabanya were closed during the year as planned, owing to a combination of increased electric power rates and severe air pollution caused by these facilities. However, the company's only remaining smelter, at Inota, continued to operate during the year. Other events in Hungary's aluminum industry included an agreement between Hungalu and the Aluminum Co. of America (Alcoa) of the United States that would allow Alcoa to invest in Hungalu's flat-rolled products and extrusion subsidiary (Kofem) at Szekesfehervar. Alcoa's participation was provide Kofem with technology, know-how, and capital to make the company competitive in Europe.

Copper.—According to officials at Csepel, Hungary's copper metalworking and manufacturing enterprise, from 1988 to 1992 copper imports from former CMEA member countries declined by more than 80% [In 1991, Poland superceded the U.S.S.R. as Hungary's chief supplier of copper from the former CMEA trading area]. With imports from Western European countries also reportedly falling substantially during this period, a much greater share of copper would originate from domestic scrap in 1992, and in the near term.

Iron and Steel.—The future of Hungary's steelmaking operations at Ozd and Miskolc remained important issues in 1992. The Oku bar and section mill at the Ozd Steelworks Co. stopped and started production several times from mid-1991 to February 1992. The reason for the closure was the unit's inability to meet its debt payment obligations, especially to the Hungarian Oil & Gas Corp. (MOL). After operating briefly in February following an agreement with MOL, Oku, reportedly, was again forced to close owing to an inability to pay MOL a Ft 350 million gas bill. The Government of Hungary, reportedly, was no longer willing to subsidize the country's steel industry to the extent that it did in the past. Reportedly, steel industry officials considered that a possible future for Oku was as a rerolling facility.

Similarly, at Miskolc, the Diosgyor Metallurgical Stock Corp. (Dimag), formerly the Lenin Iron and Steel Enterprise, reportedly stopped production because of substantial debts and a lack of working capital. Following the failure of an Austrian-Russian-Ukrainian consortium to acquire Dimag in the early part of the year, the Government of Hungary indicated that it would resume ownership of the enterprise and attempt to find a new partner to help complete a number of modernization projects that were begun in recent years.

Because of pressure during the year from the country's steel producers, Hungary's Ministry of Foreign Economic Affairs announced the imposition of quotas on steel products from the Commonwealth of Independent States (C.I.S.: Russia and other Republics of the former U.S.S.R.) and Czechoslovakia that amounted to 9,000 mt/a and 6,000 mt/a, respectively, for hot-rolled coil and sheet and, reportedly, to 26,000 mt/a each for rebar and wire rod. Hungary's steel producers raised a concern that steel imports from C.I.S. and Czechoslovakia amounted to 500,000 tons in 1991, or about 25% of the domestic output.

Manganese.—The Urkut manganese mine in the Bakony Mountains continued to produce mainly carbonate ores. The significant decline in Hungary's manganese ore output in 1992 continued to reflect the decline in the country's barter-based trade with former CMEA

members. In past years, most of Hungary's manganese was designated for export to fellow CMEA member countries because Hungary lacked the necessary facilities and electric power to produce electric furnace ferromanganese domestically.

Industrial Minerals

In contrast to Hungary's other heavy industries, including metal mining and processing, which showed a declining production trend and a need for extensive rationalization, industrial minerals were seen as having a brighter future. This was mainly because of the forecasted growth in the construction, pharmaceutical, and chemical sectors of the country's economy. Hungary's desire to eventually join the EC would necessitate the adoption of EC standards, including those pertaining to infrastructure. The decline of the country's output of most industrial minerals in 1992 continued to reflect a transitional economy in which the construction industry's old centrally planned priorities were being replaced gradually by market demand.

Mineral Fuels

Coal.—Reportedly, most of the Hungary's coal mines faced insolvency during the year mainly because of high subsidies provided by the Government in past years, which under emerging market conditions proved production costs to have had little bearing on prices. Apart from closure of unprofitable coal mining operations and the privatization of smaller profitable units, the Government's plan to rationalize the coal mining industry was to include the integration of the remaining major coal producers with nearby thermal electric power stations.

Natural Gas and Petroleum.—Hungary continued to rely on the Republics of the former U.S.S.R. to deliver a major portion of its needs of natural gas and petroleum. Late in December 1991, Hungary's foreign trade and petroleum and natural gas industry officials successfully concluded an agreement with their counterparts from C.I.S. concerning natural gas and petroleum deliveries to Hungary in 1992. Hungary's imports of natural gas and petroleum from C.I.S. in 1992 was to amount to 6 Mmt of petroleum and 4.8 Mm^3 of natural gas. Hungary's domestic consumption of these fuels reportedly was expected to be 7.2 Mmt and 10 Mm^3, respectively, with differences accounted for mainly by domestic output.

Reserves

Taking into consideration Hungary's transition to a market economy system, the country's mineral resources would have to be reevaluated from the perspective of market economics. Reserves, as defined by most market economies, are those mineral deposits that can be mined at a profit, under existing conditions with existing technology. In CMEA countries, including Hungary, the previous policies for centrally planned industrial development often had more to do with political rather than economic considerations. The chief principle of industrial development was to attain self-sufficiency at all costs. Centrally planned directives to discover exploitable resources may have resulted in possible overevaluations of collected field data. Consequently, it would probably take Hungary a number of years to determine its real mineral reserves from a market economy standpoint.

The system that was used to measure reserves was based on two cross-imposed classification schemes, one relating to the suitability of the mineral in question for exploitation and the other relating to the reliability of the information on the quantity of mineral in place. The first system determined whether the deposit was exploitable, given current technological capability and industrial need. The second classification related to the reliability of data gathered on the quantity of mineral in situ.

The second classification designated deposits into "reserve" (resource) categories A, B, C_1, and C_2 where sufficient geological data have been gathered relative to the size of the deposit and its mineral grade. In category A the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory, workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained and the quality and technological properties of the ore have been ascertained in detail, assuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of mineral cannot be determined even by a dense exploratory grid. The quality, types, and industrial grades and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes. Taking this system into account, Hungary's major mineral resources in categories $A+B+C_1$ are provided in table 3. *(See table 3.)*

INFRASTRUCTURE

Railways carried a substantial amount of Hungary's mineral freight. The railroad network consisted of 7,779 km of track, of which 7,513 km was 1.435-m standard-gauge track. According to the most recent data, in 1990, of the total volume of mineral freight carried in Hungary, railroads carried 44.8% of the fuels, 18.8% of ores and other mining products, 26% of the construction materials, and 74% of the total amount of iron and steel and nonferrous metal products.

Hungary also had maritime port access on the Baltic Sea in Poland at Gdansk and Gdynia, as well as at Rostock in the former German Democratic Republic. Major ports on the Danube were at Budapest and Dunaujvaros. In 1990, marine transport carried 0.7% of the fuels, 2.8% of the ores and mining-related products, 0.7% of the construction industry's products, and 6.4% of the iron and steel and nonferrous metals.

Hungary's highways had a total length of 130,000 km, of which 28,701 km was part of the national highway system. In 1990, the country's highway system carried 14.2% of the fuels, 78.4% of the ores and mining-related products, 73.1% of the construction industry's products, and 19.6% of the iron and steel and nonferrous metals.

The country's pipeline network consisted of a 1,204-km line to carry crude oil, a 600-km line for refinery products, and a 3,800-km pipeline for natural gas. In 1990, Hungary's pipelines carried 40.3% of the total fuel transport.

The total net installed electric generating capacity as of 1990 amounted to 6,956,000 kW, of which 4,750,000 kW was rated by thermal electric generating plants, 1,760,000 kW by nuclear powerplants, and 46,000 kW by hydroelectric power facilities.

OUTLOOK

Given the Hungarian Government's objective to bring the country into conformity with standards that are current within EFTA and the EC, greater investment can be envisaged for the reconstruction and modernization of the country's infrastructure: transportation networks, commercial buildings, and private and publicly owned dwellings, etc. To accommodate most of these objectives, the country's industrial minerals and construction materials sectors would increase in importance as the demand for cement, quarry products, and other industrial minerals increases. To respond to growing domestic market demands for structural steels, as well as the Government's plans to increase both energy efficiency and minimize environmental degradation, the country's steel industry may adopt the more energy-efficient minimill approach rather than rely on integrated steel mills.

[1]US $1.00=Ft 76.92 (Jan. 1992).

OTHER SOURCES OF INFORMATION

Agency

Iparugyi Miniszterium (Ministry of Industry)
Budapest, Hungary

Publications

Magyar Aluminium (Hungarian Aluminum), Budapest, monthly.
Statistikai Evkonyv (Statistical Yearbook), Budapest.
Statistikai Havi Kozlemenyek (Monthly Statistical Bulletin), Budapest.

TABLE 1

HUNGARY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Bauxite, gross weight	thousand tons	2,593	2,644	2,559	2,037	[3]1,721
Alumina, gross weight, calcined basis	do.	873	882	826	[r]653	[3]548
Metal:						
Primary		74,692	75,195	75,162	[r]63,318	[3]26,865
Secondary		27,000	31,000	[e]30,000	[e]32,000	20,000
Total		101,692	106,195	[e]105,162	[e]95,318	46,865
Copper, metal:						
Smelter, secondary[e]		100	100	100	100	100
Refined including secondary		15,261	13,137	12,817	[e]12,000	12,000
Gallium, metal[e]	kilograms	4,100	4,100	4,100	3,600	3,500
Gold, mine output, Au content[e]	do.	600	600	600	500	500
Iron and steel: Metal:						
Pig iron:						
For steel industry	thousand tons	2,054	1,927	1,682	[r]1,310	1,170
For foundry use	do.	39	27	15	[r]4	6
Total	do.	2,093	1,954	1,697	[r]1,314	[3]1,176
Ferroalloys:[e 4]						
Ferrosilicon		10,000	9,000	9,000	7,000	7,000
Silicon metal		2,000	2,000	2,000	1,000	1,000
Other		1,000	1,000	1,000	500	500
Total		13,000	12,000	12,000	8,500	8,500
Steel:						
Crude	thousand tons	3,583	3,356	2,963	1,931	[3]1,559
Semimanufactures, rolled only	do.	2,793	2,539	2,176	1,534	[3]1,660
Manganese ore:						
Run of mine:						
Gross weight		110,908	108,327	[r]117,400	54,783	[3]32,000
Mn content[e]		24,000	20,000	22,000	10,000	5,800
Concentrate:						
Gross weight		80,983	84,000	60,000	[r]30,000	18,000
Mn content[e]		[3]25,915	27,000	18,000	[r]9,300	5,400
Vanadium, metal[e]		300	300	300	200	200
Zinc: Metal, smelter, secondary		1,565	1,374	[e]1,300	[e]1,200	1,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	3,873	3,857	3,933	2,529	[3]2,236
Clays:						
Bentonite:						
Raw		66,014	59,973	36,600	18,097	[3]23,000
Processed		53,250	47,175	28,600	14,127	15,000
Kaolin:						
Raw		29,572	24,824	18,000	9,400	[3]14,000
Processed		5,329	3,788	3,100	4,815	5,000
Gypsum and anhydrite[e]		[3]117,845	113,000	112,000	110,000	110,000
Lime, calcined	thousand tons	851	878	831	559	[3]444
Nitrogen: N content of ammonia	do.	692	673	445	[r]319	[3]261
Perlite		120,562	108,678	93,000	87,750	93,000

See footnotes at end of table.

TABLE 1—Continued

HUNGARY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
INDUSTRIAL MINERALS—Continued						
Refractory materials, n.e.s.:						
Chamotte products	thousand tons	109	101	77	r28	25
Chrome magnesite products	do.	33	32	29	r9	10
Sand and gravel:						
Gravel	thousand cubic meters	7,769	7,720	5,557	r2,968	3,000
Sand:						
Common[e]	do.	400	400	400	200	200
Foundry	thousand tons	648	649	543	181	3184
Glass	do.	690	791	705	r600	3660
Sodium compounds:						
Hydroxide (caustic soda)		201,784	204,044	193,063	r169,602	3138,642
Sulfate[e]		9,000	9,000	8,000	6,000	6,000
Stone:						
Dimension, all types	thousand tons	5,217	4,677	4,025	r3,350	3,500
Dolomite	do.	1,005	917	778	r454	500
Limestone	do.	7,091	7,259	6,572	r4,328	4,300
Quartzite	do.	42	24	31	r586	500
Sulfur:						
From pyrite[e]		1,000	1,000	1,000	900	900
Byproduct, elemental, all sources[e]		10,000	10,000	9,000	8,000	8,000
Total[e]		11,000	11,000	10,000	8,900	8,900
Sulfuric acid		512,374	482,421	244,051	129,430	391,702
Talc[e]		13,000	12,000	10,000	10,000	10,000
MINERAL FUELS AND RELATED MATERIALS						
Asphalt, natural[e]		3552,334	550,000	500,000	400,000	400,000
Carbon black[e]		5,000	5,000	5,000	4,000	4,000
Coal:						
Bituminous	thousand tons	2,255	2,127	1,736	1,695	31,274
Brown	do.	12,986	12,020	10,373	9,953	37,574
Lignite	do.	5,634	5,883	5,469	5,327	36,988
Total	do.	20,875	20,030	17,578	16,975	315,836
Coke:						
Coke oven:						
Metallurgical	do.	547	602	564	611	3719
Other[e]	do.	150	150	150	150	150
Total[e]	do.	697	752	714	761	869
Gashouse[e]	do.	302	210	200	200	200
Total coke	do.	999	962	914	961	31,069
Fuel briquets	do.	2,302	1,983	1,761	1,924	3678
Gas:						
Manufactured	million cubic meters	52	—	—	—	—
Natural, marketed	do.	6,272	6,176	4,932	5,041	34,932
Natural gas liquids:[e]						
Natural gasoline	thousand 42-gallon barrels	5,500	5,500	5,000	5,000	5,000
Liquefied petroleum gas	do.	2,400	2,400	2,300	2,000	2,000
Peat, agricultural use[e]	thousand tons	70	70	65	65	65

See footnotes at end of table.

TABLE 1—Continued

HUNGARY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude:						
As reported	thousand tons	1,947	1,966	1,974	1,893	3 1,825
Converted	thousand 42-gallon barrels	13,025	13,152	13,206	12,664	3 12,209
Refinery products:[5]						
Liquefied petroleum gas	do.	4,002	3,909	3,840	e3,500	3,500
Gasoline, including naphtha	do.	11,306	11,033	12,343	e11,000	11,000
Kerosene and other light distillates	do.	2,449	2,542	2,373	e2,000	2,000
Distillate fuel oil	do.	24,200	22,902	20,411	e18,000	18,000
Lubricants	do.	1,323	1,302	1,156	e1,000	1,000
Residual fuel oil	do.	11,642	12,075	10,263	e8,000	8,000
Paraffin and petrolatum	do.	236	236	207	e200	200
Asphalt and bitumen	do.	3,345	3,115	2,866	e2,000	2,000
Total e	do.	58,503	57,114	53,459	45,700	45,700

eEstimated. rRevised.

[1]Table includes data available through May 1993.

[2]In addition to the commodities listed, diatomite and a variety of other crude construction materials such as common clays are produced, but available information is inadequate to make reliable estimates of output levels.

[3]Reported figure.

[4]Hungary is believed to produce some blast furnace ferromanganese.

[5]Excludes refinery fuel and losses.

TABLE 2

HUNGARY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand tons per year unless otherwise specified)

Commodity	Major operating companies (all state-owned)	Location of main facilities	Capacity
Alumina	Magyar Aluminiumipari Tröszt (MAT) (Hungarian Aluminum Corp.)	Ajka Timföldgyár plant, about 120 kilometers southwest of Budapest, near Lake Balaton	450
Do.	do.	Almasfuzitö Timföldgyár plant, near the Czechoslovak border, 63 kilometers northwest of Budapest	350
Do.	do.	Moson-Magyarovar plant, in northwest corner of Hungary, about 12 kilometers from Austrian and Czechoslovak border	75
Aluminum, primary	do.	Ajka plant,[1] about 120 kilometers southwest of Budapest, near Lake Balaton	27.5
Do.	do.	Inota plant, near Varpalota, 75 kilometers southwest of Budapest	46.0
Do.	do.	Tatabánya[1] plant, Tatabánya	17.0
Bauxite	Magyar Aluminiumipari Tröszt (MAT) (Hungarian Aluminum Corp.): Bakony Mining Enterprise and Nyirád Darvastó and Halimba Mining Complexes	Bakony District, extending roughly 100 kilometers northeast along Lake Balaton	1,900
Do.	Fejér County Mining Enterprise	Fejér County, Vértes District, about 60 kilometers south of Budapest	1,060
Cement	Cement es Mészmüvek	Bélapátfalva, near Miskolc, 125 kilometers northeast of Budapest	1,200
Do.	do.	Beremend, 45 kilometers south of Pécs	1,100
Do.	do.	Hejöcsaba, 150 kilometers northeast of Budapest	1,600

See footnotes at end of table.

TABLE 2—Continued

HUNGARY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand tons per year unless otherwise specified)

Commodity	Major operating companies (all state-owned)	Location of main facilities	Capacity
Cement	Cement es Mészmüvek	Lábatlan, 20 kilometers north of Tatabánya	500
Do.	do.	Selyp, 50 kilometers north of Budapest	60
Do.	do.	Tatabánya, 80 kilometers west of Budapest	500
Do.	do.	Vác, 50 kilometers north of Budapest	1,200
Coal:			
Bituminous and lignite	Magyar Szénbányászati Tröszt (MSZT) (Hungarian Coal Mining Trust)	Tatabánya and Oroszlány coal mining region, 45 kilometers west of Budapest	8,957
Do.	do.	Mecsek coal mining region, near Pécs and Komló, north of the Yugoslav border	3,100
Do.	do.	Borsod coal mining region, 130 kilometers northeast of Budapest	5,200
Lignite	do.	Thorez opencast mine at Visonta, 80 kilometers northeast of Budapest	7,000
Manganese ore	do.	Urkut manganese ore mines, 120 kilometers southwest of Budapest	160
Natural gas million cubic feet	National Petroleum and Gas Industrial Trust	Szeged and Algyö gasfields, southern Hungary	151,960
Do. do.	do.	Hajduszoboszó gasfield, 180 kilometers east of Budapest	49,440
Do. do.	do.	Smaller gasfields: Szánk, Kardoskut, Békés, Berefurdö, and others	38,740
Petroleum:			
Crude million barrels	do.	Szeged-Algyö field, near Romanian-Yugoslav border;	7
Refined	National Petroleum and Gas Industrial Trust		
Do. do.	Danube Petroleum Refining Co.	Százhalombatta	54.8
Do. do.	Tisza Petroleum Refining Co.	Leninaváros	21.9
Do. do.	Zala Petroleum Refining Co.	Zalaegerszeg	3.7
Steel	Dunaujváros (Danube Steel Works)	60 kilometers south of Budapest	1,400
Do.	Ozd Metallurgical Works	120 kilometers northeast of Budapest	1,100
Do.	Lenin Metallurgical Works	Diosgyör, 145 kilometers northeast of Budapest	1,300

[1]Ceased production in 1992.

TABLE 3

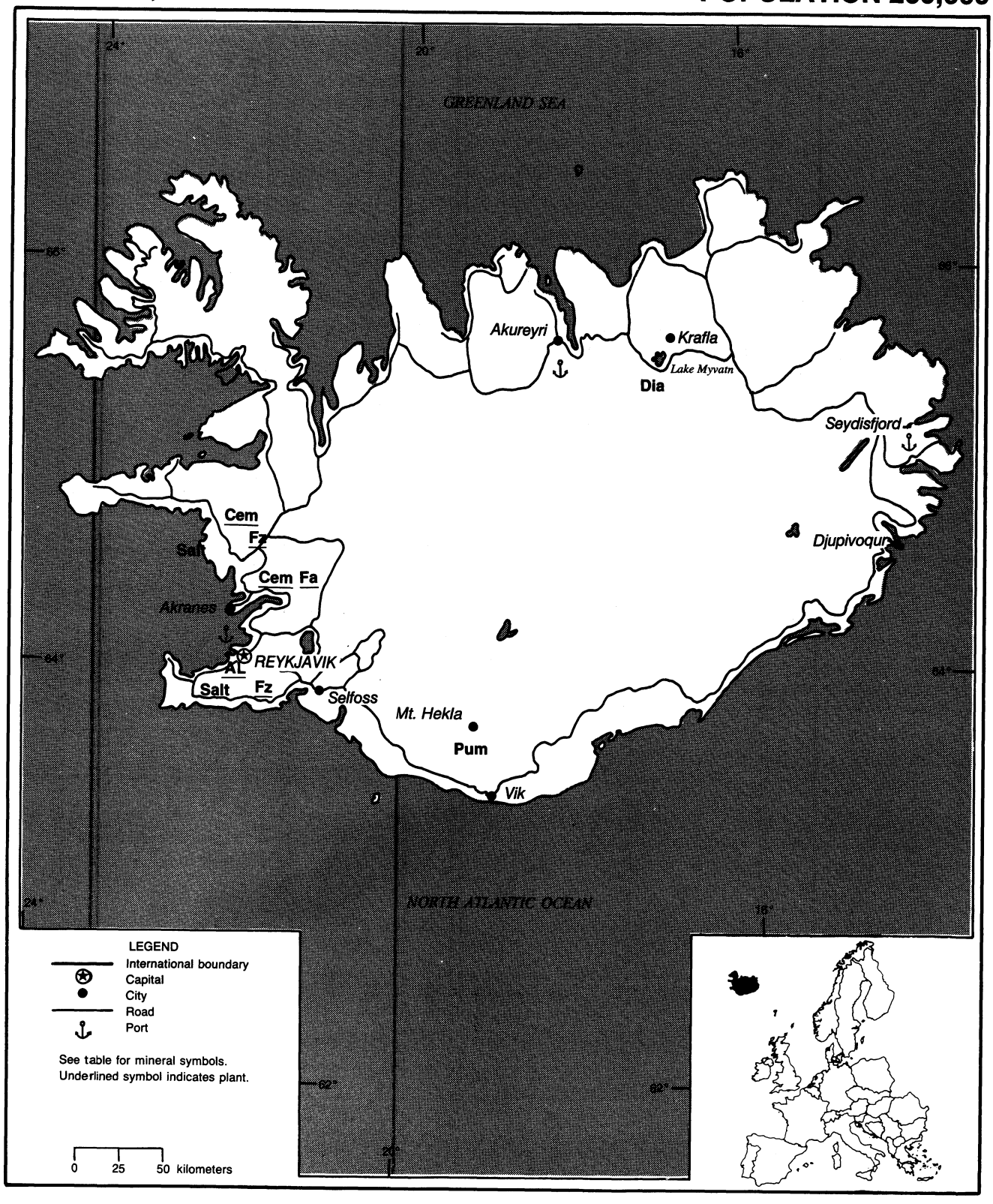
HUNGARY: APPARENT RESOURCES OF MAJOR MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Resources
Bauxite	124.0
Copper, content of ore	1.9
Manganese ore	18.2
Lead, content of ore	.8
Zinc, content of ore	.2
Coal, bituminous	86.3
Coal, brown and lignite	3,193.3
Natural gas million cubic meters	126.7
Petroleum	158.0
Bentonite	15.9
Kaolin	15.7
Perlite	18.1

ICELAND

AREA 103,000 km² **POPULATION 260,000**



THE MINERAL INDUSTRY OF

ICELAND

By Jozef Plachy

Iceland is a mid-Atlantic volcanic island of about 103,000 km^2. As part of the Mid-Atlantic Ridge, Iceland has an almost exclusively igneous geologic structure. Due to abundant hydroelectric and geothermal energy resources, the mineral industry of Iceland is largely composed of metal production from imported raw materials. Iceland presently produces energy-intensive ferrosilicon, aluminum metal, cement, and pumice.

Most of Iceland's planned projects involve continued utilization of inexpensive indigenous electric energy. Two projects debated in 1992 include a new 200,000-mt/a-capacity aluminum smelter and an electric transmission line to Scotland. The start of the smelter construction is contingent on higher aluminum prices. The laying of the undersea cable is expected to be both extremely expensive and technologically complex and would reportedly require foreign assistance.

GOVERNMENT POLICIES AND PROGRAMS

Iceland's Government is highly involved in the country's economy, but this involvement will decrease as the mid-decade association with the European Economic Area (EEA) approaches. Presently, the mineral mining and processing industry consists of both private and Government-owned enterprises. The Ministry of Public Works controls prospecting and mining rights under the amended Mining Law of 1906. The Icelandic Energy Marketing Unit (IEMU), a joint venture between the Ministry of Industry and Energy and the National Power Co. (Landsvirkjun), is responsible for the production, consumption, and possible export of electric energy. The main goal of IEMU is to attract foreign investment in energy-intensive industries.

PRODUCTION

The recession that began in 1988 deepened in 1992. The effect on individual divisions of the mineral industry depended on the main markets of their products. Although the export-oriented production of aluminum and ferrosilicon in 1992 remained about the same as that in 1991, the production of construction materials declined slightly. *(See table 1.)*

TRADE

The trade deficit in 1992 was 3.1% of the gross domestic product, lower than that of the previous year. The value of exports of the mineral industry (aluminum, diatomite, and ferrosilicon) was 1.5% lower than that in 1991, but still contributed about 11.5% to total exports in 1992. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

Most of the mineral industry enterprises are wholly or partially state-owned. The only exceptions are the aluminum smelter ISAL and the currently closed Icelandic Steel Co. *(See table 4.)*

COMMODITY REVIEW

Metals

Aluminum.—Reportedly, because of low metal prices, the Atlantal Group aluminum smelter project has been postponed until sometime between 1995 and 1997. The group is composed of Alumax of the United States, Hoogovens BV of the Netherlands, and Granges AB of Sweden. Alumax, the majority shareholder, was to build a 200,000-mt/a primary smelter at the 100-ha site at Keilisnes on the Reykjanes peninsula, south of Reykjavik.

The ISAL aluminum smelter at Straumsvik near Hafnarfjordur (17 km southwest of Reykjavik) remained the only exporter of aluminum metal in 1992. After withdrawal from the Atlantal Group, Alusuisse-Lonza Holding Ltd. of Switzerland, owner of the ISAL smelter, reportedly planned to increase capacity to 96,000 mt/a and to install a direct casting line to process all production into rolled slab instead of ingot. In September 1992, the last 320 smelting pots were covered, reportedly reducing fluoride emission from 400 tons in 1990 to 100 tons in 1992.

Ferrosilicon.—Icelandic Alloys (Islenska jarnblendifelagid hf), at Grundartangi on the northern shore of Hvalfjordur, West Iceland, continued production at about 70% of the 65,000-mt/a capacity. The ferrosilicon plant, owned by the Government of Iceland (55% of shares), Elkem A/S of Norway (30% of shares), and Sumitomo Corp. of Japan (15% of shares), lost about $8 million in 1991. Nearly all ferrosilicon is exported, while most of the microsilica from the scrubbing equipment was used in the nearby cement plant.

Steel.—After only 1 year of operation, the Icelandic Steel Co. (Islenska

Stalfelagid) in Hafnarfjordur, 15 km southwest of Reykjavik, reportedly ceased production and went into receivership. In February 1992, the 22,000-mt/a-capacity secondary steel producer was offered for sale for about $10 million. At least three foreign firms indicated interest in either operating the plant (St. Louis Colddrawn of the United States), purchasing the equipment (Washington Mills Electrometrics Corp. of the United States), or expanding production (Hamburger Stahlwerke of Germany).

Industrial Minerals

Cement.—The main ingredient for cement production at the 115,000-mt/a-capacity Iceland State Cement Work (Sementsverksmidja Rikisins) in Akranes is located undersea at the Hvalfjordur fjord. At a depth of 30 m to 35 m lies a commercial concentration of shell sand, which, in combination with other indigenous materials and imported gypsum, provides for most of Iceland's cement needs. At the present rate of production, the reserve should last until the year 2020.

Diatomite.—The license of the Diatomite Plant Ltd. (Kisilidjan hf) was extended in March 1992 for 1 more year, but was restricted to a specific area of Lake Myvatn because of adverse effects on sediment displacement. The plant, located in Myvatnssveit and owned by the Government of Iceland (59.8% of shares) and by Celite Corp. of the United States (39.8% of shares), operates only during the summer months (May-September) when the lake is not frozen. The diatomaceous earth is pumped up from the bottom of the lake and is dried in kilns using geothermal energy from 45% to 99% of solid matter. In 1992, the Diatomite Plant applied for permit to transfer production to the Bolar area, which has reserves for 60 to 70 years at the present rate of production. The reserves at Myvatn will be exhausted in 3 to 5 years.

Pumice.—All production of pumice in Iceland is concentrated around Mount Hekla, 110 km east of Reykjavik. The 28-Mm^3 deposit was formed during a volcanic eruption in 1104. The density of the dry, loose pumice is 320 kg/m^3 and is suitable for light concrete and building blocks. With an annual production of about 20,000 tons, the Eldber hf is the largest producer in Iceland. Established in 1984, it is jointly owned by Iceland's Jardenfnaidnadur hf (51% of shares) and UBG Unternehmensbeteiligungen GmbH & Co. of Germany (49% of shares). Pumice in the quarry is 4 m to 6 m thick, covered with an overburden of a maximum of 1 m.

Reserves

The mineral reserves of Iceland consist of industrial minerals, mainly construction materials. In 1990, manganese was discovered in the area of the Reykjanes ridge seabed, southwest of Iceland, but it is not of commercial quality or quantity. *(See table 5.)*

INFRASTRUCTURE

All of Iceland's major cities are on the coast, mainly in the western part of the country, around the capital of Reykjavik. Consequently, most of the 12,343 km of roads, of which 1,450 km is covered with asphalt, are in western Iceland. The rest of the roads (10,893 km) are compacted earth. In the absence of railroads, the secondary transportation mode is aviation. Iceland has 89 airports, 4 with permanent surface runways. The merchant marine has 12 ships of total 57,060 dwt. Major ports are in Reykjavik, Akureyri, Hafnarfjordur, Keflavik, Seydhisfjordur, Siglufjordur, and Vestmannaeyjar.

OUTLOOK

With abundant hydroelectric and geothermal energy, coupled with a lack of significant mineral resources, Iceland will continue to concentrate on processing energy-intensive imported mineral commodities. In addition to the Atlantal Group, Iceland has conducted exploratory talks with Kaiser Aluminum Corp. about possible construction of an aluminum smelter. This would further postpone the construction of the Atlantal Group smelter, because there is not enough hydroelectric power capacity for both at the present time. Beside the smelter, a 30,000-mt/a-capacity aluminum oxide plant is planned for the Hvalfjordur fjord area, north of Reykjavik.

OTHER SOURCES OF INFORMATION

Publications

Economic Statistics, quarterly, Central Bank of Iceland.
OECD Economic Surveys, Organization for Economic Co-operation and Development.
Iceland Review, monthly.
News from Iceland, monthly.
Iceland Review, Business (A Supplement to Iceland Review).

TABLE 1
ICELAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
Aluminum metal, primary[2]		82,034	88,477	r86,773	r88,768	89,000
Cement, hydraulic[3]	thousand tons	132	118	r114	r106	95
Diatomite		25,142	24,900	r26,107	r23,106	22,000
Iron and steel: Ferrosilicon		70,051	72,007	62,791	r50,299	50,000
Nitrogen: N content of ammonia		8,812	9,482	r8,292	r8,917	9,000
Pumice and related volcanic material:						
Pumice		65,444	56,845	r28,237	r33,354	30,000
Scoria		351	367	r657	r389	400
Salte		2,000	2,500	r2,500	r3,000	4,000
Sand:						
Basaltic	cubic meters	2,300	2,100	r50	r50	50
Calcareous, shell	thousand cubic meters	135	119	r111	r106	100
Sand and gravel	do.	4,517	4,421	r4,008	r3,661	3,500
Silica dust[4]		14,234	12,240	11,222	r10,654	10,000
Stone, crushed:						
Basaltic	thousand tons	91	91	r105	r116	100
Rhyolite		28,300	25,811	r24,424	r22,984	22,000

eEstimated. rRevised.
[1]Table includes data available through Apr. 1993.
[2]Ingot and rolling billet production.
[3]Sales.
[4]Byproduct of ferrosilicon.

TABLE 2
ICELAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
Abrasives, n.e.s.: Corundum, emery, pumice, etc.	28,236	33,397	—	Denmark 12,421; United Kingdom 10,658; Norway 5,978.
Aluminum: Metal including alloys:				
Scrap	734	839	—	Netherlands 483; United Kingdom 343; Sweden 13.
Unwrought	86,392	86,267	—	Switzerland 40,746; Germany 24,922; United Kingdom 17,549.
Semimanufactures	(2)	1	—	All to Norway.
Copper: Metal including alloys:				
Scrap	205	371	—	Netherlands 284; Germany 55; Denmark 26.
Semimanufactures	6	5	—	All to Belgium-Luxembourg.
Diatomite and other infusorial earth	24,251	21,788	—	Germany 4,478; Italy 2,686; Denmark 1,731.
Fertilizer materials: Manufactured:				
Unspecified and mixed	6	—	—	
Iron and steel:				
Metal:				
Scrap	4,435	86	—	Denmark 50; Netherlands 35.
Ferroalloys: Ferrosilicon	67,150	53,452	3,300	Japan 27,993; Norway 10,417; United Kingdom, 4,404.
Steel, primary forms	—	9,808	—	Portugal 5,181; United Kingdom 4,370; France 257.
Semimanufactures:				
Flat-rolled products: Of alloy steel	—	10	—	All to Netherlands.

See footnotes at end of table.

TABLE 2—Continued
ICELAND: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
Iron and steel—Continued:					
Semimanufactures—Continued:					
Wire	value, thousands	$6	—	—	
Tubes, pipes, fittings		4	[2]	[2]	
Lead: Metal including alloys, scrap		113	191	—	All to Netherlands.
Other industrial minerals: Crude		4	5	—	All to Norway.
Petroleum refinery products:					
Bitumen and other residues	42-gallon barrels	—	34,233	—	Netherlands 18,446; Italy 15,786.
Unspecified	do.	70	6	—	Mainly to Germany.
Salt and brine		2,321	2,511	—	Greenland 1,585; United Kingdom 370; Spain 241.
Stone, sand and gravel:					
Dimension stone, worked		[2]	12	—	All to Germany.
Gravel and crushed rock		719	433	—	Switzerland 164; Netherlands 105; Germany 86.
Zinc: Metal incuding alloys, scrap		11	1	—	All to United Kingdom.

[1]Table prepared by Amy Burk, International Data Section.
[2]Less than 1/2 unit.

TABLE 3
ICELAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals		1	—		
Aluminum:					
Oxides and hydroxides		160,290	185,459	—	Australia 185,456; Germany 3.
Metal including alloys:					
Unwrought		111	327	—	Sweden 277; United Kingdom 45; Netherlands 3.
Semimanufactures		1,297	1,277	76	Norway 258; Belgium-Luxembourg 192; Germany 158.
Chromium: Oxides and hydroxides		2	3	—	Denmark 1; Germany 1; Netherlands 1.
Cobalt:					
Oxides and hydroxides	value, thousands	$6	$1	—	All from United Kingdom.
Metal including alloys, all forms	do.	$2	$3	—	All from Germany.
Copper:					
Ore and concentrate		338	270	—	Do.
Metal including alloys:					
Unwrought		6	6	—	Denmark 4; Sweden 2.
Semimanufactures		529	341	2	Denmark 137; Germany 78; Hungary 32.
Germanium: Metal including alloys, all forms		—	2	—	All from Norway.
Gold:					
Waste and sweepings	value, thousands	$8	—		
Metal including alloys, unwrought and partly wrought	do.	$184	$187	$45	Netherlands $73; Denmark $22; Switzerland $22.

See footnote at end of table.

TABLE 3—Continued

ICELAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel:					
Iron ore and concentrate, excluding roasted pyrite		17,659	16,844	—	All from Norway.
Metal:					
Scrap		63	—		
Pig iron, cast iron, related materials		33	49	9	Germany 21; United Kingdom 10.
Ferroalloys:					
Ferrochromium		—	21	—	All from Austria.
Ferromanganese		8	70	—	Austria 49; United Kingdom 19; Denmark 1.
Ferronickel		—	1	—	All from Austria.
Ferrosilicomanganese		32	85	—	Austria 51; United Kingdom 24; U.S.S.R. 10.
Ferrosilicon		1	—		
Silicon metal		75	—		
Unspecified		19	13	—	United Kingdom 10; Austria 2.
Steel, primary forms		144	2,764	—	Denmark 2,749; Germany 10; United Kingdom 4.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		6,080	5,590	43	Belgium-Luxembourg 1,822; Netherlands 1,252; Germany 865.
Clad, plated, coated		4,229	5,832	14	Germany 2,669; Belgium-Luxembourg 1,446; United Kingdom 630.
Of alloy steel		570	598	(2)	Germany 210; Sweden 102; Netherlands 74.
Bars, rods, angles, shapes, sections		15,541	17,828	4	Norway 2,967; Sweden 2,867; Poland 2,090.
Rails and accessories		51	13	—	Germany 8; Norway 4.
Wire		254	429	(2)	Sweden 119; Norway 112; Denmark 57.
Tubes, pipes, fittings		7,835	8,070	59	Germany 2,639; Netherlands 2,053; Czechoslovakia 769.
Lead:					
Oxides		9	11	—	Germany 7; Sweden 4.
Metal including alloys:					
Unwrought		147	115	—	United Kingdom 64; Denmark 33; Sweden 18.
Semimanufactures		10	21	—	United Kingdom 10; Germany 9; Denmark 1.
Magnesium: Metal including alloys:					
Semimanufactures	value, thousands	$1	—		
Manganese: Metal including alloys, all forms		—	12	—	Netherlands 6; Norway 6.
Mercury	value, thousands	$3	$2	—	Germany $1; Norway $1.
Nickel:					
Matte and speiss	do.	—	$1	—	All from Italy.
Metal including alloys:					
Unwrought		(2)	1	—	Mainly from United Kingdom.
Semimanufactures	value, thousands	$9	$6	—	United Kingdom $4; Ireland $1.
Platinum-group metals:					
Waste and sweepings	do.	$8	$3	—	All from Denmark.
Metals including alloys, unwrought and partly wrought:					
Platinum	do.	$58	$23	$3	Netherlands $14; Germany $4. Hong Kong $3.
Unspecified	do.	$101	$123	—	Switzerland $90; Netherlands $18; Germany $13.

See footnotes at end of table.

TABLE 3—Continued

ICELAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Silver: Metal including alloys, unwrought and partly wrought	value, thousands	$138	$118	$6	Netherlands $48; Denmark $22; Switzerland $19.
Tin: Metal including alloys:					
Unwrought		1	1	—	Mainly from United Kingdom.
Semimanufactures		31	6	(2)	Denmark 3; Netherlands 1; United Kingdom 1.
Titanium:					
Oxides		433	365	61	United Kingdom 175; Germany 48.
Metal including alloys, all forms		(2)	1	—	All from Belgium-Luxembourg.
Tungsten: Metal including alloys, all forms	value, thousands	$4	—		
Zinc:					
Oxides		9	10	—	Switzerland 5; France 2; Germany 2.
Metal including alloys:					
Unwrought		170	167	3	Norway 89; Belgium-Luxembourg 56; Germany 16.
Semimanufactures		29	25	—	Norway 10; Netherlands 6; France 5.
Other:					
Oxides and hydroxides		13	20	—	Norway 19; United Kingdom 1.
Base metals including alloys, all forms	value, thousands	$1	$1	—	All from United Kingdom.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		24	36	5	Netherlands 19; Italy 5.
Artificial: Corundum		44	26	—	Denmark 22; Germany 1.
Dust and powder of precious and semiprecious stones including diamond	value, thousands	—	$1	$1	
Grinding and polishing wheels and stones		35	40	2	Germany 10; Netherlands 8; Italy 6.
Barite and witherite		3	2	—	Germany 1; Netherlands 1.
Boron materials:					
Crude natural borates		12	11	—	All from Switzerland.
Oxides and acids	value, thousands	$2	$2	—	All from Germany.
Bromine[3]	do.	$4	$4	—	Denmark $1; Norway $1; Sweden $1.
Cement		349	198	—	Germany 59; United Kingdom 42; Denmark 40.
Chalk		245	325	—	Norway 182; United Kingdom 60; France 56.
Clays, crude:					
Bentonite		98	81	—	Mainly from United Kingdom.
Kaolin		57	45	5	Netherlands 24; United Kingdom 11.
Unspecified		175	156	7	United Kingdom 118; Germany 29.
Diamond:					
Natural:					
Gem, not set or strung	value, thousands	$109	$45	$3	Belgium-Luxembourg $29; Denmark $7; Germany $6.
Industrial stones	do.	$54	$56	$6	Belgium-Luxembourg $22; Netherlands $15.
Diatomite and other infusorial earth		24	43	—	Belgium-Luxembourg 38; Germany 4.
Feldspar		7	4	—	All from Sweden.
Fertilizer materials:					
Crude, n.e.s.	value, thousands	$12	$3	$3	

See footnotes at end of table.

TABLE 3—Continued

ICELAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Fertilizer materials—Continued:				
Manufactured:				
Ammonia	2,053	4,957	—	Netherlands 2,043; Belgium-Luxembourg 996; France 952.
Nitrogenous	3,106	2,602	—	Belgium-Luxembourg 1,500; Sweden 940; Norway 104.
Phosphatic	100	1,122	—	All from Sweden.
Potassic	7,017	6,073	—	Germany 5,503; United Kingdom 450; France 120.
Unspecified and mixed	11,539	19,012	1	Norway 10,219; Netherlands 8,730; Denmark 39.
Graphite, natural	12	10	—	Mainly from United Kingdom.
Gypsum and plaster	6,408	6,198	4	Sweden 4,225; Germany 1,322; Spain 622.
Lime	435	662	—	United Kingdom 361; Germany 173; Norway 95.
Magnesium compounds:				
Magnesite, crude value, thousands	$1	$1	—	All from Italy.
Oxides and hydroxides	5	4	—	Mainly from United Kingdom.
Mica:				
Crude including splittings and waste	8	9	—	Norway 8; France 1.
Worked including agglomerated splittings value, thousands	$5	$4	—	Austria $2; United Kingdom $2.
Nitrates, crude	37	—		
Phosphates, crude	—	6	—	All from Germany.
Pigments, mineral: Iron oxides and hydroxides, processed	36	47	—	Denmark 12; United Kingdom 12; Germany 8.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$45	$48	$8	Germany $16; Netherlands $11.
Synthetic do.	$4	$3	—	Denmark $1; Germany $1; United Kingdom $1.
Salt and brine	90,765	68,650	2	Tunisia 29,480; Spain 20,370; France 13,298.
Sodium compounds, n.e.s.:				
Soda ash, manufactured	1,114	999	—	Poland 456; France 306; Germany 182.
Sulfate, manufactured	221	158	—	Germany 126; Sweden 21; Denmark 8.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	476	789	—	Portugal 627; Norway 37; China 30.
Worked	376	456	(2)	Italy 273; Portugal 128; Netherlands 16.
Dolomite, chiefly refractory-grade	284	444	—	Norway 267; United Kingdom 153; Sweden 23.
Gravel and crushed rock	13,486	5,296	—	Norway 5,242; Germany 21; Sweden 20.
Limestone other than dimension	53	21	—	All from Denmark.
Quartz and quartzite	122,382	105,065	6	Spain 97,557; Norway 5,941; Sweden 1,560.
Sand other than metal-bearing	1,026	738	33	Denmark 327; Netherlands 194; Sweden 79.
Sulfur:				
Elemental:				
Crude including native and byproduct	4	—		
Colloidal, precipitated, sublimed	15	—		
Sulfuric acid	313	242	1	Norway 173; Netherlands 40; Denmark 27.
Talc, steatite, soapstone, pyrophyllite	81	81	6	Norway 74; United Kingdom 1.
Vermiculite, perlite, chlorite	1	2	—	Norway 1; United Kingdom 1.

See footnotes at end of table.

TABLE 3—Continued
ICELAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Other:					
Crude		69	15	—	Sweden 10; Netherlands 4; Denmark 1.
Slag and dross, not metal-bearing		14	19	—	All from Germany.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		12	3,032	1	France 3,020; Belgium-Luxembourg 9; Denmark 1.
Carbon black		5	11	—	United Kingdom 8; Sweden 2; France 1.
Coal:					
Anthracite		51,744	41,473	40,245	Canada 1,228.
Bituminous		12,773	19,020	—	Canada 14,089; United Kingdom 4,922; Ireland 9.
Coke and semicoke[4]		29,940	36,948	—	Germany 29,295; France 4,275; China 3,357.
Gas, natural:					
Gaseous	cubic meters	4,150	3,320	—	All from Norway.
Liquefied	do.	26,600	8,400	—	Norway 4,200; United Kingdom 4,200.
Peat including briquets and litter		280	426	—	Finland 199; Sweden 82; Netherlands 60.
Petroleum refinery products:					
Liquefied petroleum gas	42-gallon barrels	14,918	15,776	12	Sweden 6,762; United Kingdom 6,716; Denmark 2,215.
Mineral jelly and wax	do.	1,440	1,432	—	Germany 747; Denmark 291; United Kingdom 125.
Bitumen and other residues	do.	77,289	77,738	—	France 77,592; Belgium-Luxembourg 127; United Kingdom 12.
Bituminous mixtures	do.	39,590	4,921	194	Germany 1,884; Norway 1,636; Netherlands 860.
Petroleum coke	do.	44	44	—	United Kingdom 39; Sweden 5.

[1]Table prepared by Amy Burk, International Data Section.
[2]Less than 1/2 unit.
[3]May include fluorine and iodine.
[4]May include retort carbon.

TABLE 4
ICELAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	ISAL (Alusuisse-Lonza Holding Ltd.)	Straumsvik	96
Cement	Sementsverksmidja Rikisin (state)	Akranes	200
Diatomite	Kisilidjan hf (state, 59.8%)	Myvatnssveit	24
Fertilizer	Aburdarverksmidja Rikisin (state)	Gufunes	60
Ferroalloys	Islenska Jarnblendifelagid hf (state, 55%)	Grundartangi	65
Pumice	Jardenfnaidnadur hf (JEI)	Thorlakshof	30
Do.	Pumice Products Ltd. (B.M. Valla Ltd.)	Mt. Hekla	35
Salt	Islenska Saltfelagid hf (joint Danish and Icelandic venture 50%/50%)	Svartsengi	6

TABLE 5
ICELAND: RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

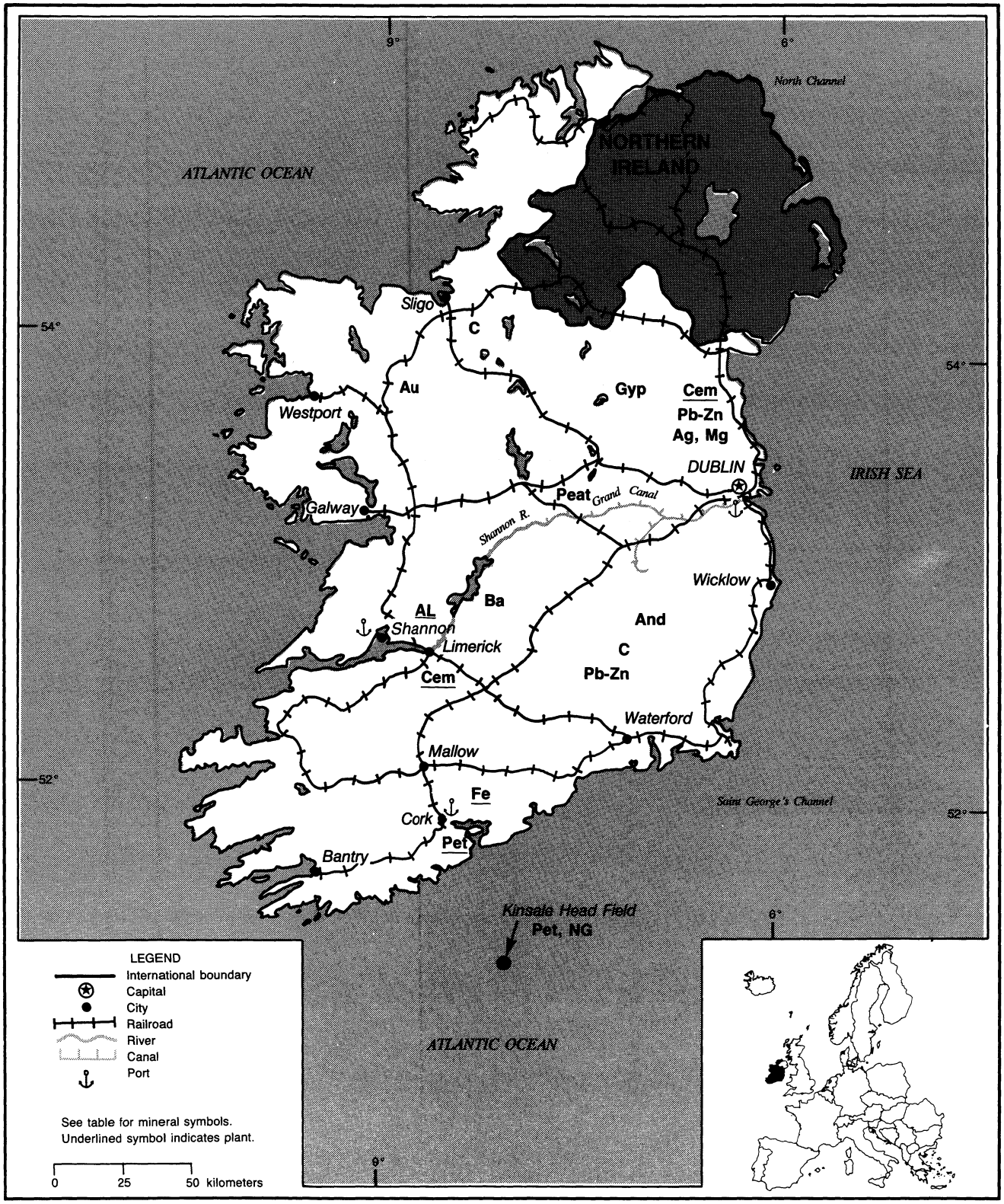
(Million metric tons unless otherwise specified)

Commodity	Amount[e]
Diatomite	2.5
Shell sand	2.5
Perlite	48
Pumice	
million cubic meters	28

[e]Estimated.

IRELAND

AREA 68,890 km² **POPULATION 3.6 million**



THE MINERAL INDUSTRY OF

IRELAND

By Harold R. Newman

Ireland continued as one of Europe's major producers of zinc and a significant producer of alumina, barite, lead, and peat in 1992. The country continued its significance in the EC as a producer of mined lead and zinc. Although the range of minerals exploited in the country has been limited, exploration activity continued to increase, with the main emphasis on gold, lead, and zinc. The country's mineral processing industry was relatively small, as was the demand and consumption of mineral resources.

The downturn in international economic activity led to a corresponding slowdown in Ireland's economic activity. Inflation, at 3.25%, continued at a low level, and the balance of payments continued into surplus. The real GNP growth was estimated to have been 2.5%. The Irish economy has shown a very creditable performance in the past few years, with sustained rates of growth and trade surpluses.

GOVERNMENT POLICIES AND PROGRAMS

As a member of the EC, Ireland was a full participant in the program to complete the single European market, and the country was continuing in those efforts.

The Government was expected to continue to receive EC funding support to assist in constructing and upgrading infrastructure projects, including roads, ports, telecommunications, and indigenous energy development. The EC Directive on Environmental Impact Assessment requires that projects in the extractive industry, including mining of minerals and ores, be subjected to an Environmental Impact Assessment (EIA) of their impact on the environment before development is granted.

The Government responded to this by finalizing comprehensive environmental regulations in relation to mining development. Criteria to address the EIA will be incorporated into mining licenses prior to issuance. Also, prospectors are required to complete an environmental audit. The public and other interests will have an opportunity to comment on the environmental audit before planning permission is given.

Legislation to set up an Environmental Protection Agency was enacted in 1992, and mineral extraction will be licensed by the Agency for discharges to air and water, for noise emissions, and for waste. The Department of Energy will assess the adequacy of any EIA's submitted.

The EIA is not confined to mineral operations. Some other operations that would be impacted are: cement plants; ironworks, steelworks, and foundries with a batch capacity of 5 mt/d or more; integrated chemicalworks; glassworks where capacity exceeds 5,000 mt/a; and artificial mineral fiber factories.

The Industrial Development Authority (IDA) is an agency that was established and fully financed by the Government. IDA's mandate is to create wealth and provide employment by attracting domestic and foreign investment.

The Geologic Survey of Ireland and IDA were engaged in a project to investigate the feasibility of the dimension stone industry in Ireland.

PRODUCTION

Ireland's base metals production, centered mainly on Tara Mines Ltd.'s zinc-lead mine near Navan, County Meath, continued strong. Industrial mineral production, including barite and gypsum, also continued throughout the country. Several industrial minerals projects were awaiting the granting of planning permission and mining leases before moving into production. Natural gas production continued from an area off the southern coast of Ireland near Cork. Reserves were not disclosed, and production from the fields was being carefully managed to extend the life of the area. *(See table 1.)*

TRADE

Ireland's trade sector continued to perform well in 1992. External trade was more diversified than in the past, thus reducing exposure to changed economic conditions in individual overseas markets.

Ireland continued its participation in efforts to create a single European market. Although Ireland was supportive of the single market effort and European economic integration, it has drawn attention to special needs and problems that integration may present to peripheral and less developed regions. EC measures most likely to impact on Ireland's interests are fiscal harmonization and proposals for economic and monetary union. Ireland has been a full participant in the European Monetary System (EMS) since its inception in March 1979. This has provided a framework for improving the economy by stabilizing the Irish pound, containing wage increases, reducing inflation, and encouraging exports.

STRUCTURE OF THE MINERAL INDUSTRY

Ireland has traditionally been a rural-based economy, and farm products continued to contribute significantly to the total export value in 1992. However, Government economic strategy during the past several years has concentrated on building up indigenous industries, including mineral resource development. Under the Minerals Development Acts 1940 to 1979, the Minister for Energy was empowered to grant licenses and mining rights for prospecting as well as subsequent development. Most mineral exploration and development is subject to state regulation. The Geologic Survey of Ireland is responsible for the development of mineral information as well as technical management of the state mineral licensing and leasing system. The Survey also provides technical assistance to the exploration and mining industry.

Ireland is fortunate in respect to mineral resources and has a proven geological potential for a variety of minerals. In 1992, the country was a significant producer of barite, lead, and zinc. Interest in gold exploration was continuing. This interest has been the impetus for the revitalization of the exploration sector within the past few years. Employment in mining and quarrying, including turf, was about 8,000 persons in 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Alumina.—Aughinish Alumina Ltd. (AAL) had, for the most part, completed its $12 million expansion plan to improve efficiency and increase the capacity of its plant from the initial 800,000 mt/a of alumina to 1 Mmt/a. The refinery is currently producing 900,000 mt/a of alumina. The refinery was designed so that production could be doubled or trebled if the world market for alumina improves sufficiently.

The major market for AAL's alumina is primary aluminum smelters. British Alcan Aluminium PLC takes 65% of the refinery's output for its smelter in the United Kingdom. The remaining 35% is taken by Billiton Aluminium Ireland Ltd. for its smelter in Norway.

Gold.—Most exploration activity continued to be focused on four districts in the Caledonides that are known to contain significant gold mineralization. These districts are Avoca and Clontibret in the paratectonic Caledonides, in the east of Ireland. The other two districts occur in the west of Ireland and southern Mayo in the paratectonic Caledonides and Connemara in the orthotectonic Caledonides.

In Februrary 1992, the Mayo County Council (MCC) formally ratified a ban on all mining activities within the context of its County Development Plan. In November 1992, a High Court judge overturned the MCC ban.

Two companies, Glencar Exploration PLC and Andaman Resources PLC, were particularly affected. They have gold exploration projects in Mayo County and had appealed the mining ban.

The ban was contrary to stated Government policy and could have had significant consequences for future investment in the mineral sector if it had been uphelded.

Navan Resources PLC of Ireland and MIM Holdings of Australia were continuing their joint-venture exploration programs in the Central Irish Midlands and in the Scottish Highlands, United Kingdom. MIM and Navan have been exploring for base metals in the Central Irish Midlands since mid-1989.

Lead and Zinc.—A major upswing in activity in the lead and zinc sector was expected in Ireland. The country's output of zinc could double by the second half of the 1990's if the development of two new mines continues as planned. There were also several other potential projects under investigation at yearend.

Tara Mines Ltd. was continuing with its major plant renewal. Technical upgrading of mining and processing operations were under way to raise production levels and ensure maximum efficiency and profitability. The Tara Mine, at Navan, is one of the largest lead-zinc producers in Europe and when the upgrading project is completed in 1993, the mine will have a capacity of 200,000 mt/a of zinc and 38,000 mt/a of lead in concentrates.

The Conroy Petroleum and Natural Resources PLC joint venture was proceeding with plans to develop its deposit in County Kilkenny. The company submitted a planning application based on the construction of an underground mine accessed from the surface by a 13% decline midway between the CW and G ore bodies. These ore bodies were reported to contain an estimated 6 Mmt of ore grading 11.3% zinc and 1.1% lead at a depth of 70 m. The estimated cost of bringing the Galmoy Mine into production in 1993 was $80 million. The mine, with an estimated life of 10 years, would be designed to produce 2,000 mt/a of lead and 60,000 mt/a of zinc in concentrates.

Outokumpu Oy, the Finnish state mining concern, has agreed to furnish technical, financial, and marketing support for the mine development. Outokumpu has a 20% shareholding position in Conroy and is also owner of Tara Mines Ltd.

The joint-venture project of Ivernia West PLC and Chevron Mining PLC was continuing. Ivernia reported that drilling results on the Lisheen ore body in County Tipperary had increased estimated reserves to 18 Mmt of ore grading 13.4% zinc, 2.4% lead, and 38 g of silver per ton of ore. The drilling program was expected to continue into 1993.

The joint venture was proceeding with a full feasibility study and an EIS. This would form the basis for the planning application for the Lisheen Mine development. Lisheen shares the 50-km-long Rathdowney geologic trend with the Galmoy project, 8 km away in County Kilkinney.

Steel.—Irish Steel Ltd. operated a scrap-based minimill near Cork and is the only steel producer in Ireland. The company announced its 1992 sales

decreased over those of the previous year. This was the first decrease since completion of the new rolling mill in 1981 and was a reflection of the cyclic downturn in the steel industry worldwide. Export sales accounted for 88% of total sales.

Privatization of Irish Steel was still under consideration. The company was in negotiations with its work force over a rationalization and investment program. The company went from four to three shifts in both its melting shop and rolling mill and announced a $25 million investment to improve operating efficiency.

Industrial Minerals

There was continued success in the industrial mineral sector, with one andulusite and two gypsum deposits awaiting development. A talc deposit in County Mayo and dolomite and slate deposits in County Tipperary were being evaluated.

Navan Resources PLC was continuing with exploration and a prefeasibility study of an andalusite deposit at Tomduff, County Carlow. Detailed investigations reportedly revealed a mineralized zone consisting of interlayered andalusite schists and quartz-biotite schists with a 9% to 25% andalusite content.

Navan believes the deposit could be developed to produce 50,000 mt/a of concentrate with up to 98% andalusite content. The size range of the concentrate would be 2.8 mm to 10 mm. Another potential economic mineral at the deposit is stavrolite which is used in sandblasting.

Ireland produced significant quantities of synthetic diamonds. Output was not quantitatively reported, and information was not available to make reliable estimates of production.

The two companies that manufacture industrial diamonds and super abrasives are De Beers Industrial Diamonds Division (Ireland), a subsidiary of De Beers Consolidated Mines (Pty) Ltd. of South Africa, and GE Superabrasives Ireland, a subsidiary of General Electric Co. of the United States.

A range of abrasives is produced from synthetic diamond, cubic boron nitride, and polycrystalline diamond (PCD). Trade names for the PCD products are Syndie for wire drawing blanks, Syndrill for rock cutting blanks, and Syndite for cutting tools and wear-resistant parts. All sales are to the export market.

Gypsum Industries PLC continued with open pit mining of the Knocknacran gypsum deposit in County Monaghan. There were estimated reserves for an expected mine life of 20 years operating at a mine capacity of 300,000 mt/a. Reserves at Gypsum's two other mines had been exhausted and they were closed.

Ivernia West PLC submitted a planning application with the Government Planning Authority to develop its Westport talc-magnesite deposit in County Mayo. The application is in the appeal process after initial rejection by the Mayo County Council. If the appeal is successful, Ivernia would proceed with development. The open pit operation would have an initial production capacity of 40,000 mt/a.

Mineral Fuels

Coal production was mainly semibituminous high-ash coal from the Connaught Field, which was used for electricity generation. Marathon Petroleum (Ireland) Ltd. continued with the development of the Ballycotton natural gas field off Ireland's coast in the Celtic Sea. The plan calls for a single subsea well connected with the company's Kinsale Head Platform Bravo 14 km to the south.

The company agreed to sell production from the gasfield to the Irish Gas Board (IGB). Kinsale Head, which has a production rate of about 6 Mm^3/d, is Ireland's only source of natural gas. IGB is the largest single primary energy supplier to the industrial sector. *(See table 3.)*

INFRASTRUCTURE

Ireland has a good network of roads supplemented by a Government-owned railroad. There are the deepwater ports of Cork and Dublin and 10 secondary ports. Most mine sites are easily accessible and no more than 600 km from a deepwater port.

OUTLOOK

Ireland has a proven geologic potential for a variety of minerals. The mineral industry is expected to utilize the opportunities created by the boom in gold and lead-zinc exploration and renewed interest from multinational companies to continue mineral developments.

The Geological Survey of Ireland has an active data collecting program through mapping and resource-related studies and offers technical assistance. This should continue to be a significant benefit and encouragement to companies engaged in mineral resource activities.

[1]Where necessary, values have been converted from Irish pounds (I£) to U.S. dollars at the rate of I£1=US$1.65, the average for 1992.

OTHER SOURCES OF INFORMATION

Agencies

Central Statistics Office
Ardee Road
Rathmines
Dublin 6, Ireland
Central Bank of Ireland
Dame Street
Dublin 2, Ireland
Geologic Survey of Ireland
Beggars Bush
Haddington Road
Dublin 4, Ireland

Publications

Central Statistics Office, Dublin: Statistics Bulletin.
Central Bank of Ireland, Dublin: Quarterly Bulletin.

TABLE 1

IRELAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
METALS						
Alumina	thousand tons	843	841	e885	r 2981	21,007
Iron and steel: Steel, crude	do.	271	324	326	r307	2257
Lead:						
Mine output, Pb content		32,500	e32,100	35,300	r39,900	242,400
Metal, refined, secondary e		11,700	12,000	15,000	r 211,600	212,000
Silver, mine output, Ag content		5,590	e7,247	e8,000	r10,500	213,100
Zinc, mine output, Zn content		173,200	e168,000	166,500	r187,500	2198,500
INDUSTRIAL MINERALS[3]						
Barite	thousand tons	83	82	101	e80	80
Cement, hydraulic e	do.	21,685	1,600	1,625	1,600	1,600
Gypsum	do.	326	300	394	e400	350
Lime e		296,800	111,300	112,000	110,000	110,000
Nitrogen: N content of ammonia	thousand tons	415	386	e395	r 2429	400
Sand and gravel e 4	do.	26,163	7,400	7,500	7,000	7,000
Stone and other quarry products:						
Limestone[4]	do.	9,680	8,874	e9,000	e8,500	9,000
Other[4 5]	do.	1,615	1,967	e2,000	e2,000	2,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, anthracite and bituminous	do.	42	43	e45	e6	10
Gas, natural: Marketed	million cubic meters	57	56	57	56	56
Peat:						
For horticultural use e	thousand tons	r 2301	r 2265	r 2229	r 2249	300
For fuel use:						
Sod peat[6]	thousand tons	r900	r1,389	e1,410	e1,000	1,200
Milled peat[7]	do.	r3,158	r6,374	e5,020	e3,767	5,000
Total	do.	r e4,058	r7,763	e6,430	e4,767	6,200
Peat briquets	do.	378	355	e400	e400	400
Petroleum refinery products:[8]						
Liquefied petroleum gas	thousand 42-gallon barrels	210	244	294	e250	2404
Naphtha	do.	245	408	497	400	2349
Gasoline, motor	do.	1,850	2,831	3,022	3,000	23,065
Distillate fuel oil	do.	3,160	4,118	4,602	4,500	4,000
Residual fuel oil	do.	3,075	3,257	4,049	4,000	4,000
Refinery fuel and losses	do.	400	e400	425	400	375
Total e	do.	28,940	11,258	12,889	12,550	12,193

eEstimated. rRevised.

[1]Table includes data available through Apr. 31, 1993.

[2]Reported figure.

[3]Ireland also produces significant quantities of synthetic diamond and is the major overseas supplier of this material to the United States. However, output is not quantitatively reported, and available general information is inadequate to make reliable estimates of output levels.

[4]Excludes output by local authorities and road contractors.

[5]Includes clays for cement production, fire clay, granite, marble, rock sand, silica rock, and slate.

[6]Includes production by farmers and by Bord Na Mona.

[7]Includes milled peat used for briquet production.

[8]From imported crude oil.

TABLE 2

IRELAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facility	Annual capacity
Alumina		Aughinish Alumina Ltd.	Aughinish Island County Limerick	800
Barite		Magcobar Ireland Ltd.	Silver mines, County Tipperary	240
Cement		Irish Cement Ltd.	Plants in Limerick and Platin	2,000
Lead-zinc		Tara Mines Ltd.	Mine at Navan, County Meath	215
Natural gas	million cubic feet	Marathon Oil Co.	Kinsale Head Field, Celtic Sea	75,000
Peat		Bord Na Mona (Government Peat Board)	Production mainly in flat midlands	4,200
Petroleum, refined	barrels per day	Irish Refining Co.	Refining at Whitegate, near Cork	56,000
Steel		Irish Steel Ltd.	Plant at Haulbowline, near Cork	350

TABLE 3

IRELAND: RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

(Million metric tons unless otherwise specified)

Commodity[1]	Reserves[e]
Barite	1.5
Coal	70
Lead	2
Natural gas, million cubic meters	42
Zinc	5

[e]Estimated.
[1]In situ resources.

ITALY

AREA 301,300 km² **POPULATION 57.9 million**

THE MINERAL INDUSTRY OF

ITALY

By Harold R. Newman

Italy has been a significant processor of imported raw materials as well as a significant consumer and exporter of mineral and metal semimanufactured and finished products. The country was Western Europe's second largest cement producer after Germany and also produced almost one-half of the world's pumice. Moreover, Italy was an important producer of dimension stone, feldspar, and marble. The country's mine output of barite, bentonite, fluorspar, and potash, and the manufacturing of steel products were also of world significance.

The gross domestic product (GDP) increased by 1.2% and industrial production decreased by 2.0% over those of 1991. The slow growth in 1992 was due primarily to high internal interest rates, lower private and public consumption, and a sharp deceleration of investment in construction. The budget deficit, which exceeded 10% of GDP in 1992, is a problem the Government continues to deal with as it moves forward with the European Economic and Monetary Union. At yearend, the unemployment rate was 11% of the working population.

GOVERNMENT POLICIES AND PROGRAMS

The basic mining legislation of Italy is Royal Decree No. 1443 of July 29, 1927, as amended by law No. 1360 of November 7, 1941. This law vests ownership of subsoil minerals to the state. With certain limitations, quarried minerals are the property of the private landowner. Foreigners are permitted to explore, own, and operate mines but must incorporate under Italian laws.

Petroleum activities are governed by law No. 6 of January 1957, as amended by Title II of law No. 613 of July 21, 1967. Ownership of petroleum and gas also is vested in the state. Concessionaires are required to turn over 9% of all extracted hydrocarbons to the state or pay an equivalent sum.

Law No. 752, which regulates mining in Italy, was approved by the Parliament on June 10, 1982. In general, the law strengthens involvement of the Government in the mineral industry. The concessionaires will have to reimburse the state for its contributions, starting after the property has been in production for 3 years. Mining of strategic minerals will be kept operational at the Government's expense. No stockpiling programs are under way in Italy except normal industrial stocks and stocks of crude oil for 90 days of consumption.

Under Italy's mining policy, copper, gold, lead, manganese, molybdenum, nickel, tungsten, zinc, and zirconium were identified as minerals considered essential for the Italian economy and were to be given priority in the funding of Italian companies for exploration abroad.

There has been increasing sensitivity to environmental problems and resistance to the construction of new coal-fired and nuclear electricity-generating plants. Strict enforcement of regulations was expected to induce private and public industries to install more pollution-control devices.

PRODUCTION

The aggregated growth in the extractive industries was minimal. Among the metallic ores, lead, manganese, and zinc were mined in 1992. Italmagnesio SpA's primary magnesium plant at Bolzano operated for 2 months and then suspended operations for the remainder of 1992. The Dosseni magnesium mine remained closed throughout 1992. Reportedly the closure was for economic and environmental reasons. Italmagnesio's magnesium alloy and anode production continued.

Industrial mineral production remained the most important sector with overall output remaining more or less constant. Domestic production of natural gas, petroleum, and lignite continued to increase. Italy's most notable contribution to global mineral commodity supplies continued to be its production of processed materials based on imported raw materials. *(See table 1.)*

In 1992, the country ranked sixth globally in steel production and was third after France and the United Kingdom among EC producers. Also, Italy ranked seventh globally in cement output and first in crude oil refining capacity among EC producers.

Italy has become increasingly dependent on its trade with other EC countries. It has been estimated that Italy's share of total exports going to EC partners has increased from 48% in 1981 to more than 60% in 1991. *(See tables 2, 3, and 4.)*

STRUCTURE OF THE MINERAL INDUSTRY

Both private and public companies own facilities for the production and processing of minerals, metals, fuels, and products. However, some state-owned enterprises are often retained for economic and employment reasons. The Government bank allocates credit to state-owned corporations to avoid the social impact of closure of uneconomic ventures. The primary minerals administrative agency is the Direzione Generale delle Miniere,

which also collects mineral statistics. *(See table 5.)*

COMMODITY REVIEW

Metals

Alumina and Aluminum.—Alumina in Italy was produced only by Eurallumina S.p.A., at Portoscuso in Sardinia. The company was owned jointly by Alumix S.p.A. (52.1%) and by Australian interests. Production of alumina has risen constantly over the past 5 years. Almost all alumina in Italy was produced from imported bauxite, which was obtained from Australia and Guinea. Bauxite was no longer mined in any significant amount in Italy.

Alumix S.p.A., part of the state holding company Eute Fiere Italiane Atacchine, was the only primary aluminum producer in Italy. Alumix operated five smelters: one at Bolzano, one at Porto Marghera, and two at Fusina, all of which are near Venice, and one at Portoscuso in Sardinia.

More than 80% of the production was used domestically. Italy imported almost 50% of its total aluminum requirements. Details on output and/or capacity were not readily available on Italy's several secondary aluminum producers.

Copper.—Italian refined copper production has remained fairly consistent. Nuova Samim S.p.A. was the largest producer of refined copper, lead, and zinc metal in Italy, employing almost 3,350 workers. Samim produced about 55% of Italian copper metal. Virtually all of the country's output was derived from scrap, ashes, slags, and other residues.

Samim also produced antimony metal, bismuth, gold, and silver. All sources of Nuova Samim's scrap, from copper and aluminum cables to batteries, were handled by two subsidiaries, Nonfermet S.p.A. and Eurobatex S.p.A., which selected and sorted the material before passing it on to the refining plants.

Secondary copper was produced by Samim at Paderno Dugnano, near Milan, using alloy scrap and low-grade copper scrap as raw materials. Plant capacity for secondary copper was 50,000 mt/a. Copper scrap from European sources was refined by Samim at Porto Marghera copper-zinc plant, near Venice. Copper cathode capacity at the plant was reportedly increased to 60,000 mt/a in 1991. In an attempt to reduce its cost of scrap material, a new furnace using Boliden technology will produce 25,000 mt/a of blister copper from lower grade dusts, which will then be fed into the existing Maerz anode furnace.

Lead and Zinc.—Italy imported most of its supplies of lead and zinc concentrates, with Canada being the largest single source for lead and zinc concentrates. Within Italy, most of the lead and zinc concentrate production came from Nuova Samim's mines in Sardinia. Samim's lead and zinc smelters were also in Sardinia, and the zinc electrolytic plant was near Venice. The Porto Vesme smelter in Sardinia produced primary lead and zinc metal and cadmium, while the San Gavino complex, near Porto Vesme, produced refined lead and byproducts, such as bismuth, gold, and silver. Secondary lead, including soft lead and alloys, was produced by Samim at the Paderno Dugnano and Marcianise plants, whose capacities were 50,000 mt/a and 35,000 mt/a, respectively.

In 1992, Nuova Samim operated the country's largest zinc smelter in Crotone. This smelter was acquired from Pertusola Sud S.p.A. in 1990. This acquisition expanded Nuova Samin's control over the country's lead and zinc industry. Samim operated four zinc plants, with a total capacity of 349,000 mt/a. The company also produced cadmium and germanium.

Steel.—Italy was the third largest producer of crude steel in the EC, after France and the United Kingdom. About 40% of steel in Italy was produced by basic oxygen furnaces and 60% was produced by electric arc furnaces. In Italy about one-half of the steel was produced by private companies, with the rest by Government-owned enterprises. All iron ore, almost 17 Mmt, was imported in 1991, of which 37% came from Australia and 35% from Brazil. The country's steel industry imports about 3.5 Mmt/a of scrap, mostly from France and Germany.

Ilva S.p.A. was the country's largest steel company. All the profitable activities and assets of the Finsider companies—Italsider, Nuova Deltasider, and Terni Acciai Speciali—were transferred to Ilva. This marked the end of Ilva's current restructuring plan, drawn up in 1988 by the Italian Government and the EC Commission. With a crude steel output of about 10.6 Mmt/a, Ilva was the sixth largest steel producer in the world. Flat products were the company's main strength, with Taranto being one of the largest flat-rolled steel centers in the world. Ilva employed about 48,000 workers in 1992. Almost 20% of the company's steel was exported. Ilva continued to be a major importer of metallurgical coal, primarily from the United States.

Ilva was in the process of divesting itself of facilities to make long products and go almost entirely to light, flat-rolled products. The company has reportedly set a 12- to 18-month target for private investment into the company's core business and for the sale or closure of the rest. Investors could be either domestic or foreign.

Ilva Terni, the stainless steel flat products group, was in the process of replacing two Sendzimir mills. These would be replaced by a single new mill supplied by Mannesmann Demag of Germany and would have a capacity of 70,000 to 80,000 mt/a. The new mill is higher powered and capable of rolling 600 m/minute of 132-cm-wide sheet. It would produce the thinner gauge stainless steel required in the production of ferritic grades of material.

Industrial Minerals

Asbestos.—Amiantifera di Balangero S.p.A. was the only company in Italy that produced asbestos. The San Vittore Mine was the only significant asbestos producer

in Western Europe. The surface mine is in the village of Balangero near Lonzo, about 50 km north of Turin. Reserves were estimated to be large, and the grade of asbestos averages more than 6% fiber. Tailings were stored in a valley about 4 km from the mill. Owing to reduced demand, production started to decline in the late 1970's. It went from 165,000 tons in 1977 to about 35,000 tons in 1990.

At yearend 1990, the mine had ceased production and remained closed through 1992. The future of the mine was reportedly uncertain because of environmental problems. With the Government's announcement of new legislation that would result in the termination of chrysotile and amphibole applications within Italy, the mine most likely will remain permanently closed.

Barite.—There were mainly three operating companies in Italy producing barite: Mineraria Baritina SpA, with mines at Trentino, Monte Elto, and Primaluna, east of Milan; Samatec S.p.A. with one mine at Mastricarro in Calabri and one mine at Schilipario in the Alps; the Sardinian regional government's holding company Ente Mineraria Sarda, with mines at Barega (Iglesias Province), Mont 'Ega (Narcao Province), and Monte Tamara Province in Sardinia.

Most of the mines produced a 91% to 92% $BaSO_4$ granulated barite that was used by the well-drilling industry. The Mont 'Ega Mine produced a relatively high-grade 97% barite material that was used by the chemical industry.

Cement.—Italy was a major EC producer of cement, second only to Germany in the EC and ranked seventh in the world. Italcementi S.p.A. was the largest of Italy's 50 cement producers, with about 40% of the Italian market.

Clays and Refractory Materials.—Unimin S.p.A. was the largest supplier of raw materials for the abrasive and refractory markets in Italy. Unimin's production facilities were in the city of Massa, in the Carrera area. Unimin imported bauxite from Brazil and China, kyanite from Brazil, flint clay and kaolin from China, and andalusite from South Africa to augment its domestic raw material production.

Most of Italy's bentonite mining took place on the island of Sardinia, with processing plants on the mainland. More than one-half of the country's bentonite production comes from Industria ChImica Carlo Laviosa S.p.A. The company's main mining activity was in the Pedra de Fogu and Puntenuova areas of Sardinia. Production from these areas fed the processing plants at Oristano in Sardinia and at Livorno, south of Pisa. Montmorillonite clay (white bentonite) was quarried at S'Aliderru in northwestern Sardinia. Caffaro S.p.A., operating in Sardinia, was Italy's only producer of acid-activated montmorillonite. The clay was shipped to the company's plant at Porto Marghera near Venice. Several small bentonite producers operated on the mainland, at Foggia in the district of Puglia, and at Pietracuta di S. Leo in the Pesaro district. Acdal S.p.A., a subsidiary of Industria Generale Ceramiche S.p.A., produced about 150,000 mt/a of clay from its Cave del Mastro operation at Lozzolo, near Gattinara, in the Province of Vercelli. About 80% of the clay was used in the manufacturing of tile. Industria Chimica Carlo Laviosa S.p.A. produced clay at Cagliari in Sardinia. The company operated several quarries in the Province of Nuoro, with production amounting to about 130,000 mt/a.

Feldspar.—Italy was the world's leading producer of feldspar and feldspathic minerals. These materials were important constituents of ceramic tile. Italy accounted for 30% of world tile output and more than 50% of the total tile produced in the EC. In Italy there were more than 350 small companies producing tiles, employing about 30,000 workers. Clay was imported from France, Germany, and the United Kingdom.

The largest producer of albite was Maffei S.p.A., which operated a surface mine at Pinzola in the Trentin district. Miniera di Fragne S.p.A. also produced albite from its surface mine at Mud di Mezzo and processed the material at its processing plant at Aladna Valsesia in Vercelli.

Fluorspar.--Production of fluorspar in Italy has been declining since 1984. The main fluorspar-producing area was in the Gerrai region about, 40 km from Cagliari, Sardinia. Six mines were in operation in 1991: two in Sardinia, operated by Mineraria Silius S.p.A. at Genna Tres Montes and Muscadroxiu, and four in the Latium/Lazio area. Soricom S.p.A. operated the mine at Pianciano, and IPIM S.p.A. operated mines at Prato del Casone and Acquaforte e Valentano.

Assets and operations of Mineraria Silius were taken over by Nuova Mineraria Silius S.p.A. in early 1992. However, the Sardinian regional autonomous government maintained its majority share in the company's equity. Production capacity of Mineraria Silius was about 110,000 mt/a of fluorspar, 30,000 mt/a of barite, and 15,000 mt/a of lead concentrate.

Marble.—Marble and travertine production from the world-famous quarries at Massa and Carrara has increased slightly in the past 2 years.

Italian marble occurred in many localities, from the Alps to Sicily, and was quarried at hundreds of operations. The most important geographic area producing white marble was in the Apuan Alps in Tuscany, particularly near the town of Carrara. The Lazio region, Lombardy, the Po Valley, Puglia, the Island of Sicily, and Venice were important colored marble-producing areas. About one-half of production was in block form, and 45% of total production was exported. Annual output of the Carrara district is about 700,000 tons, or almost 35% of the country's total white marble production.

Other major areas included the Valle di Susa, near Turin in the northwestern Italian Alps; the valley of the Po River in Lombardy; the Verona-Vicenza area of

Venice; and the vicinity of Benevento, northeast of Naples in southern Italy. Reserves are considered to be unlimited.

Perlite.—Since the closing of the perlite mines on the Island of Ponza off the coast of Naples, most of the perlite produced in Italy comes from Sardinia. Perlite was produced by Perlite S.p.A. at Monti Arci from a volcanic zone of that name in west-central Sardinia. Perlite's processing facilities were at Torre Grande near the Port of Oristano.

Potash.—The production of potash dropped from 1.73 Mmt in 1989 to 940,000 tons in 1992. The main reason for the decline was the result of a severe drought that has restricted availability of process water to the plants. At yearend the three underground mines that were operating in Sicily were at Pasquasia, Racalmuto, and Realmonte.

Pumice and Pozzolan.—Italy was the world's leading producer of pumice and pozzolan. The Mediterranean Island of Lipari, 40 km off the northern coast of Sicily, was the focus of the Italian pumice industry. Two companies in Italy quarried pumice for world markets—Italpomice S.p.A. and Pumex S.p.A. Pumex, with about a 650,000-mt/a capacity, was Italy's largest pumice producer. The company quarried the Mount Pelato deposit on Lipari. Most pumice was exported to the United Kingdom. W.R. Luscombe Ltd., formerly an equity partner, became a wholly owned subsidiary of Pumex. Italpomice produced pumice at Acqualcalda on Lipari, with an output of about 70,000 mt/a.

Pyrite.—Pyrite was mined almost exclusively by Solmine S.p.A. at Compiano and Niccioleta underground mines in Tuscany. The Niccioleta Mine was closed in late 1992 because of mineral reserve depletion and associated problems. Societa Edem S.p.A. produced small amounts of pyrite in its Val de Castello Mine.

Salt.—Italy's three major producers of salt were Italkali Societa Italiana, Solvay S.p.A., and Societa Montecatina. Salt was produced at seven areas in Italy. Italkali, based in Sicily, was a major producer of rock salt, with underground mines at Racalmuto and Realmonte in Agrigento, Petralia in Palermo, and Pasquasia in Enna. In addition, Solvay S.p.A. operated mines in Tuscany at Buriano, Ponteginori, and Querceto. Societa Montecatina operated the Timpa del Salto salt brine chamber at Calabria. The ultrapure (99.9% NaCl) salt was shipped to the Endichem plant at Porto Marghera to produce chlorine and sodium.

Sulfur.—Italy, once the world's leading producer of mined sulfur, was a modest producer of sulfur in 1992, obtaining one-half or more of its output as a byproduct of petroleum refinery operations. Other sources were iron and cupreous pyrite deposits in the Maremma district of Tuscany. Elemental sulfur was obtained from pyrite from two mines operated by Solmine S.p.A. in southern Tuscany. Sulfuric acid was produced at the Torviscosa plant near Porto Marghera.

Talc.—Talco e Grafite Val Chisone S.p.A. operated two underground mines at Pinerolo near Turin. The talc, mined from metamorphic rocks, has been of very high quality. Talco owned 10% interest in an open pit mine at Orani, in Sardinia, with the other 90% belonging to the Sardinian Mining Board. Talco Sarda S.p.A. also operated a mine at Orani. Talco e Grafite Val Chisone S.p.A. operated an underground mine at Fontane, and Industria Mineraria Italiana S.p.A. (IMI) operated mines at Largone and Predaccia in Val Malenco, northern Italy. About 35% of IMI's production was reportedly exported to France, Germany, and the Netherlands.

Mineral Fuels

The country relied heavily on imported energy, satisfying 80% of total demand with purchases from abroad. Energy was the largest deficit item in the trade account. Ente Nazionale Electria (ENEL), the state electricity corporation, imported about 15% of its electricity from France and Switzerland.

Coal.—Domestic production of lignite in Italy was based on two surface mines in Umbria and Tuscany, operated by ENEL for use in domestic electricity production. The only operational subbituminous underground coal mine in Italy was in Sardinia, owned by Carbosulcis S.p.A. Italy was heavily dependent on imported coal, mostly from the United States and South Africa, to meet its coal requirements.

Geothermal Energy.—Most Italian geothermal energy is produced in the Larderello, Monte Amiata, and Travale areas in Tuscany.

Natural Gas and Petroleum.—There were more than 100 natural gas fields in operation, of which 70% were located offshore. Natural gas supplied almost 25% of Italy's total energy needs. About 35% was produced domestically. More than 25% was imported from Algeria through a 1,070-km-long gas line from Algeria to Mazzara del Vallo in Sicily. The former U.S.S.R. continued to supply 25% of the country's natural gas through a pipeline across Austria and Czechoslovakia.

About 20% of Italy's very small domestic petroleum production came from Sicily. With an annual consumption of almost 95 Mmt of petroleum, Italy was the EC's second largest petroleum consumer after Germany.

Unione Petrolifera represented the country's private oil companies. The Saras refinery was the largest in Italy and reportedly was the most competitive in the Mediterranean area.

Italy was almost totally dependent on imported petroleum. With no large coal or gas industries, petroleum accounted for 75% of the country's energy needs.

Reserves

Statistics on Italian reserves have not been published. Italy was considered to have sufficient reserves of asbestos, feldspar, marble, potash, pumice, salt, talc, and travertine, while deposits of coal, petroleum, and natural gas were insufficient to meet domestic needs. There were also smaller reserves of bauxite, magnesium, manganese, pyrite, silver, and a number of other minerals. *(See table 6.)*

INFRASTRUCTURE

A total of 20,085 km of railroad track was operational in 1992. Highways totaled 294,410 km. Superhighways totaled 5,900 km, and 7,010 km of Italy's roads was unpaved, mostly in the southern half of the country. There were 1,203 km of crude oil pipelines in service, 2,143 km of refined product pipelines, and 13,740 km of gas pipelines.

OUTLOOK

Public and private spending on environmental controls will continue to grow, particularly in the areas of water treatment and transportation equipment and services, urban and industrial waste disposal, soil contamination, and emissions. Mining of metallic ores is expected to decline slightly. The metals processing industry, based primarily on imported stocks, will continue to play an important role in Italy's economy. Italy is expected to remain a large producer of secondary aluminum and the second largest producer, after Germany, of crude steel in the EC. The industrial minerals quarrying industry and preparation plants will remain significant in Italy, especially the production of barite, cement, clays, fluorspar, marble, and talc. Italy will continue to be the world's leading producer of feldspar, feldspathic minerals, and pumice. Domestic output of natural gas, crude petroleum, and petroleum refinery products is expected to grow, while Italy will continue to depend on imported coal, gas, and petroleum.

OTHER SOURCES OF INFORMATION

Agencies

Ministero dell' Industria, del Commercio e dell' Artiginato (Ministry of Industry, Commerce and Small Business)
Rome, Italy
Includes:
Direzione Generale delle Miniere (General Directorate of Mines)
Corpo delle Miniere (Bureau of Mine Inspection)

Publications

Annuario di Statistiche Industriali (Yearbook of Industrial Statistics).
Annuario Statistico Italiano (Italian Statistical Yearbook).
Bolletino Mensile di Statistica (Monthly Bulletin of Statistics).
Relazione sul Servizio Minerario e Statistica delle Industrie Estrative in Italia (Report of the Mineral and Statistical Service of the Extractive Industries); published annually.
Statistica Mensile del Commercio con l'Estero (Monthly Foreign Trade Statistics).
Statistica Annuale del Commercio con l'Estero (Annual Foreign Trade Statistics).
L'Industria Mineraria (Minerals Industry) published monthly.

TABLE 1

ITALY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Alumina		708,158	722,226	752,000	804,596	800,000
Bauxite		17,125	11,761	338	r e8,600	2,000
Metal:						
Primary		226,300	219,500	231,900	205,636	2160,700
Secondary		378,000	390,000	349,600	343,000	2353,100
Antimony:						
Mine output, Sb content		24	—	—	—	—
Oxides, gross weight[3]		731	856	940	861	21,172
Bismuth metal		32	46	34	45	50
Cadmium metal, smelter		686	776	691	658	2742
Copper: Metal, refined, all kinds		75,400	83,300	83,000	e82,500	76,000
Iron and steel: Metal:						
Pig iron	thousand tons	11,349	r17,795	11,883	10,856	210,462
Ferroalloys:						
Blast furnace:						
Ferromanganese		27,169	26,738	30,842	r 2—	—
Spiegeleisen		251	—	—	—	—
Silicon pig iron[e]		1,000	1,000	1,000	600	500
Electric furnace:						
Ferrochromium		77,123	r75,567	53,103	47,082	62,000
Ferromanganese		12,280	14,220	10,995	14,145	10,000
Ferrosilicon		51,131	65,171	39,761	12,648	12,000
Silicomanganese[e]		69,000	47,000	56,000	55,000	50,000
Silicon metal[e]		18,000	19,000	r13,000	r 26,200	210,000
Other[e]		14,500	15,000	14,500	14,500	12,000
Total[e]		270,454	r263,696	r219,201	r150,175	156,500
Steel, crude	thousand tons	23,760	25,213	25,439	25,046	224,904
Semimanufactures	do.	20,700	22,000	23,105	23,817	223,331
Lead:						
Mine output, Pb content		16,503	17,544	16,042	14,200	12,000
Metal, refined:						
Primary		72,204	74,205	r64,591	r111,696	2102,000
Secondary		111,600	112,000	102,200	96,500	284,300
Total		183,804	186,205	r166,791	r208,196	2186,300
Magnesium:						
Mine output, Mg content		6,878	7,096	7,921	3,912	—
Metal, primary		5,589	5,768	r5,725	5,115	500
Manganese, mine output:						
Gross weight		9,701	5,899	6,654	8,340	8,200
Mn content		2,538	1,475	r1,664	2,350	2,000
Silver metal	kilograms	91,563	97,036	103,400	176,475	2127,000
Zinc:						
Mine output, Zn content		37,150	43,258	43,043	36,349	36,000
Metal, primary		242,117	259,481	264,395	263,775	2252,600

See footnotes at end of table.

TABLE 1—Continued

ITALY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS						
Asbestos		94,549	44,348	3,862	r e15,000	—
Barite		77,273	60,331	44,345	88,486	85,000
Bromine e		450	400	400	400	300
Cement, hydraulic	thousand tons	37,884	39,385	r39,975	r39,711	40,400
Clays, crude:						
Bentonite	do.	301	234	228	385	360
Refractory excluding kaolinitic earth	do.	454	559	641	r462	400
Fuller's earth	do.	39	44	46	r23	30
Kaolin	do.	71	64	67	49	45
Kaolinitic earth	do.	19	19	r18	16	15
Diatomite e		28,000	25,000	25,000	r23,000	26,000
Feldspar		1,367,776	1,350,733	1,605,431	1,304,203	1,300,000
Fluorspar:						
Acid-grade		81,700	66,600	81,822	60,650	55,000
Metallurgical-grade		58,157	59,679	40,661	37,868	25,000
Total		139,857	126,279	122,483	98,518	80,000
Gypsum	thousand tons	e1,300	1,231	1,262	r e1,285	1,300
Lime, hydrated, hydraulic and quicklime e	do.	3,900	3,900	3,850	3,800	3,600
Nitrogen: N content of ammonia	do.	1,561	1,446	1,197	r1,147	1,098
Perlite e		70,000	71,000	71,000	70,000	65,000
Pigments, mineral: Iron oxides, natural e		850	850	850	800	700
Potash, crude salts:						
Gross weight	thousand tons	1,577	1,730	661	429	940
K_2O equivalent	do.	197	208	138	63	200
Marketable product, K_2O equivalent	do.	148	r112	r51	31	100
Pumice and related materials: e						
Pumice and pumiceous lapilli	do.	730	700	725	700	600
Pozzolan	do.	5,000	4,500	4,500	4,500	4,500
Pyrite, all types, gross weight	do.	774	836	806	553	450
Salt:						
Marine, crude[4]	do.	680	e685	e680	r e450	500
Rock and brine	do.	3,609	3,501	3,752	r3,504	3,200
Sand and gravel: e						
Volcanic sand	do.	100	100	100	100	100
Silica sand	do.	4,300	4,500	4,300	4,200	4,000
Other sand and gravel	do.	123,000	124,000	124,000	125,000	125,000
Sodium compounds: e						
Soda ash	do.	612	615	610	600	600
Sodium sulfate	do.	127	130	125	125	125
Stone: e						
Dimension:[5]						
Calcareous:						
Alabaster	do.	20	25	20	20	20

See footnotes at end of table.

TABLE 1—Continued

ITALY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued						
Stone[e]—Continued:						
Dimension[5]—Continued:						
Calcareous—Continued:						
Marble in blocks:						
White	thousand tons	1,600	1,650	1,700	1,600	1,700
Colored	do.	1,800	1,900	1,950	1,900	1,800
Travertine	do.	1,100	1,150	1,150	1,100	1,000
Other:						
Granite	do.	2,500	2,500	2,500	2,500	2,500
Sandstone	do.	1,800	1,800	1,800	1,800	1,800
Slate	do.	120	120	120	120	120
Crushed and broken:[e]						
Dolomite	do.	850	900	900	800	800
Limestone	do.	110,000	120,000	120,000	120,000	125,000
Marl for cement	do.	11,000	10,500	r 2 12,601	2 13,123	13,000
Serpentine	do.	1,500	1,500	1,500	1,500	1,500
Quartz and quartzite	do.	250	250	250	250	250
Sulfur: Recovered as elemental and in compounds:						
S content of pyrite	do.	310	325	290	e200	180
Byproduct, oil refining and other sources[e]	do.	310	315	2 297	280	290
Total[e]	do.	620	640	587	480	470
Talc and related materials		158,722	145,888	151,566	161,200	170,000
MINERAL FUELS AND RELATED MATERIALS						
Asphalt and bituminous rock, natural		56,907	r e45,000	r39,756	r39,330	36,000
Carbon black[e]		155,000	155,000	155,000	150,000	140,000
Coal:						
Lignite	thousand tons	1,600	1,485	r1,493	1,554	1,000
Subbituminous (Sulcis coal)		48,408	69,420	56,300	172,400	125,000
Coke, metallurgical	thousand tons	5,884	e5,900	r6,205	r5,771	5,350
Gas, natural	million cubic meters	16,634	16,978	17,296	17,398	18,150
Natural gas liquids[e]	thousand 42-gallon barrels	400	400	400	400	400
Petroleum:						
Crude	do.	32,784	31,197	31,619	29,344	30,000
Refinery products:						
Liquefied petroleum gas	do.	30,712	24,638	26,251	24,580	25,000
Gasoline	do.	139,102	135,498	153,149	151,513	150,000
Naphtha	do.	15,806	16,168	15,355	r15,782	16,000
Jet fuel	do.	14,128	16,624	e17,000	e16,000	16,000
Kerosene	do.	30,349	31,007	e31,500	e30,000	30,000
Distillate fuel oil	do.	188,685	191,140	216,318	221,569	220,000
Residual fuel oil	do.	156,783	154,898	154,512	148,278	150,000

See footnotes at end of table.

TABLE 1—Continued

ITALY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum—Continued:						
Refinery products—Continued:						
Other	thousand 42-gallon barrels	49,287	61,292	33,649	32,165	35,000
Refinery fuel and losses	do.	45,367	40,089	e41,500	e40,000	38,000
Total	do.	670,219	671,354	e689,234	re679,887	680,000

eEstimated. rRevised.

[1]Table includes data available through July 1993.

[2]Reported figure.

[3]Antimony content is 83 % of gross weight.

[4]Does not include production from Sardinia and Sicily estimated at 200,000 tons annually.

[5]Output of limestone and serpentine for dimension stone is included with "Stone: Crushed and broken." In addition to the commodities listed, a variety of other dimension stone was produced and previously listed, but available general information was inadequate for continued reliable estimation of output levels.

TABLE 2

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Destinations, 1989	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	534	166	—	France 48; Spain 47; Netherlands 28.
Alkaline-earth metals	161	82	17	Japan 60; Brazil 4.
Aluminum:				
Ore and concentrate	14,332	23,374	95	Turkey 14,502; United Kingdom 2,579; Austria 2,462.
Oxides and hydroxides	402,607	425,358	31	Netherlands 229,874; Yugoslavia 63,864; U.S.S.R. 41,650.
Ash and residue containing aluminum	5,054	3,891		West Germany 2,194; France 891; Sweden 609.
Metal including alloys:				
Scrap	8,044	10,365	34	France 6,097; West Germany 2,708; Netherlands 521.
Unwrought	38,336	29,814	17	West Germany 5,671; France 4,989; India 3,110.
Semimanufactures	162,482	182,502	3,485	West Germany 52,347; France 29,180; Spain 11,308.
Antimony:				
Ore and concentrate	—	29	—	All to France.
Oxides	36	52	—	Portugal 24; Spain 15; West Germany 5.
Ash and residue containing antimony	—	1,800	—	All to Belgium-Luxembourg.
Metal including alloys, all forms	9	14	—	France 10; Spain 2; Switzerland 1.
Arsenic:				
Oxides and acids	37	4,794	8	France 2,323; United Kingdom 891; West Germany 820.
Metal including alloys, all forms	—	10	—	All to Spain.
Beryllium:				
Oxides and hydroxides	6	—		
Metal including alloys, all forms	7	4	—	France 2.
Bismuth: Metal including alloys, all forms	22	32	—	Netherlands 15; United Kingdom 10; West Germany 5.
Cadmium: Metal including alloys, all forms	559	741	3	Netherlands 447; Belgium-Luxembourg 231; United Kingdom 45.
Chromium:				
Ore and concentrate	13,474	2,999	—	Austria 1,918; Yugoslavia 600; Switzerland 250.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Destinations, 1989	
			United States	Other (principal)
METALS—Continued				
Chromium—Continued:				
Oxides and hydroxides	—	4,991	1,620	France 1,265; Switzerland 440.
Metal including alloys, all forms	26	817	—	Republic of Korea 464; Hong Kong 41; Pakistan 41.
Cobalt:				
Ore and concentrate	25	—		
Oxides and hydroxides	213	218	—	France 175; West Germany 25; United Kingdom 18.
Metal including alloys, all forms	100	123	3	United Kingdom 38; West Germany 33; Netherlands 18.
Columbium and tantalum:				
Ore and concentrate	24	72	—	Austria 26; Belgium-Luxembourg 24; Indonesia 20.
Metal including alloys, all forms:				
Columbium (niobium)	2	—		
Tantalum	3	15	—	West Germany 12; Austria 2; Turkey 1.
Copper:				
Ore and concentrate	520	974	—	West Germany 671; France 174; Belgium-Luxembourg 129.
Matte and speiss including cement copper	155	101	11	Spain 31; Netherlands 24; West Germany 15.
Oxides and hydroxides	2,002	1,846	45	West Germany 564; Denmark 280; France 179.
Sulfate	7,938	8,390	725	France 2,375; West Germany 1,239; Netherlands 872.
Ash and residue containing copper	23,074	13,509	—	Spain 5,717; West Germany 4,608; Belgium-Luxembourg 2,006.
Metal including alloys:				
Scrap	19,410	26,324	2	West Germany 18,206; Belgium-Luxembourg 3,796; France 1,512.
Unwrought	21,354	22,087	227	France 9,350; West Germany 3,304; United Kingdom 1,830.
Semimanufactures	165,593	173,777	2,913	France 63,152; West Germany 27,867; Spain 15,776.
Gallium, indium, thallium: Metals including alloys, all forms	32	11	2	Japan 4; U.S.S.R. 2.
Germanium:				
Oxides	16	—		
Metal including alloys, all forms	5	17	—	France 9; Japan 6; West Germany 1.
Gold:				
Waste and sweepings value, thousands	$1,201	$235	$64	Yugoslavia $72; France $58.
Metal including alloys, unwrought and partly wrought kilograms	11,732	11,846	1,025	Switzerland 8,886; United Kingdom 742.
Hafnium: Metal including alloys, all forms value, thousands	$7	—		
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite	285	536	—	France 360; Israel 78; Spain 44.
Pyrite, roasted	20,848	38,555	—	France 32,792; Greece 4,703; Austria 363.
Metal:				
Scrap	27,578	29,314	34	West Germany 17,237; France 7,043; Belgium- Luxembourg 3,246.
Pig iron, cast iron, related materials	48,476	67,645	915	Spain 13,391; Netherlands 12,223; West Germany 10,187.
Ferroalloys:				
Ferrochromium	25,194	29,543	3,511	Belgium-Luxembourg 10,687; France 10,316; West Germany 4,964.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Destinations, 1989	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Ferroalloys—Continued:				
Ferrocolumbium	89	54	—	France 28; Netherlands 24; Tunisia 2.
Ferromanganese	5,117	4,150	2,023	Yugoslavia 509; Republic of Korea 714.
Ferromolybdenum	—	9	—	Yugoslavia 8; Venezuela 1.
Ferronickel	3	5	—	West Germany 3; United Kingdom 2.
Ferrosilicochromium	1,438	298	—	France 96; Belgium-Luxembourg 85; West Germany 84.
Ferrosilicomagnesium	NA	976	34	France 449; Brazil 141; Republic of South Africa 140.
Ferrosilicomanganese	3,288	9,463	212	France 6,434; Turkey 1,470; Bulgaria 800.
Ferrosilicon	16,950	21,945	46	West Germany 7,551; France 7,660; Turkey 2,586.
Ferrotitanium	1,518	1,909	274	Austria 660; West Germany 655; Belgium-Luxembourg 384.
Ferrotungsten	34	75	—	All to France.
Ferrovanadium	—	41	—	Sweden 21; Netherlands 17.
Silicon metal	5,021	5,585	568	West Germany 4,117; Switzerland 560; United Kingdom 240.
Unspecified	4,711	3,315	535	Japan 740; France 676; Romania 560.
Steel, primary forms	169,837	366,385	19,974	Morocco 126,260; France 71,289; West Germany 36,274.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	1,444,346	1,747,993	122,069	France 297,456; West Germany 220,439.
Clad, plated, coated	351,153	324,465	14,738	France 45,134; Spain 26,296; Hungary 18,220.
Of alloy steel	189,325	183,161	15,501	West Germany 36,665; France 27,127.
Bars, rods, angles, shapes, sections	2,604,499	3,261,901	16,823	West Germany 968,821; France 753,102; Algeria 279,401.
Rails and accessories	66,226	83,974	28	Turkey 29,614; Iran 22,660; Egypt 7,165.
Wire	266,913	290,598	3,018	France 75,744; Switzerland 54,778; West Germany 40,383.
Tubes, pipes, fittings	1,699,027	1,469,544	113,029	U.S.S.R. 297,444; West Germany 265,752; France 261,272.
Lead:				
Ore and concentrate	15,764	30,518	—	Turkey 9,400; Belgium-Luxembourg 4,305; Bulgaria 4,178.
Oxides	6,674	10,992	1	U.S.S.R. 7,770; Algeria 2,292; Venezuela 210.
Ash and residue containing lead	12,721	5,148	—	Canada 5,078; United Kingdom 66; France 3.
Metal including alloys:				
Scrap	698	1,392	—	France 1,132; Greece 176; Netherlands 50.
Unwrought	41,333	26,964	—	Turkey 8,017; Austria 4,130; United Kingdom 4,086.
Semimanufactures	533	817	80	France 118; Israel 106; Greece 78.
Lithium: Oxides and hydroxides	7	64	—	U.S.S.R. 63; Yugoslavia 1.
Magnesium: Metal including alloys:				
Scrap	266	378	—	West Germany 290; France 57; United Kingdom 20.
Unwrought	4,038	3,634	38	West Germany 1,921; Switzerland 437; Austria 238.
Semimanufactures	682	941	128	West Germany 185; Belgium-Luxembourg 156.
Manganese:				
Ore and concentrate, metallurgical-grade	667	572	—	France 565; United Kingdom 7.
Oxides	175	479	4	Austria 200; Bulgaria 120; Belgium-Luxembourg 116.
Metal including alloys, all forms	34	124	—	France 43; Congo 39; Belgium-Luxembourg 24.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	Destinations, 1989	
				United States	Other (principal)
METALS—Continued					
Mercury		38	68		France 30; Venezuela 30; New Zealand 3.
Molybdenum:					
Ore and concentrate: Unroasted		—	2	—	All to United Kingdom.
Oxides and hydroxides		3	—		
Metal including alloys:					
Scrap		24	54	—	All to West Germany.
Unwrought		—	135	—	West Germany 116; France 14; United Kingdom 5.
Semimanufactures		156	48	—	West Germany 24; Belgium-Luxembourg 23.
Nickel:					
Ore and concentrate		23	58	—	All to West Germany.
Matte and speiss		21	29	—	France 25; Indonesia 4.
Oxides and hydroxides		—	21	20	United Kingdom 1.
Ash and residue containing nickel		427	242	—	Finland 77; Netherlands 68; Austria 61.
Metal including alloys:					
Scrap		600	472	147	West Germany 280; United Kingdom 37.
Unwrought		843	485	1	United Kingdom 440; Yugoslavia 15; Netherlands 12.
Semimanufactures		934	1,396	46	Egypt 216; France 209; West Germany 188.
Platinum-group metals:					
Waste and sweepings	value, thousands	$7,150	$6,903	$7	West Germany $5,264; Switzerland $877; Japan $142.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	407	357	—	Switzerland 127; United Kingdom 118; France 36.
Platinum	do.	1,202	3,701	—	France 2,042; United Kingdom 1,144; Switzerland 305.
Rhodium	do.	255	109	18	United Kingdom 71; France 11.
Iridium, osmium, ruthenium	do.	(2)	1,039	—	West Germany 1,030; France 9.
Rare-earth metals including alloys, all forms		780	22	17	Brazil 4; Greece 1.
Selenium, elemental		108	54	—	West Germany 51; United Kingdom 2.
Silicon, high-purity		175	355	240	Japan 107.
Silver:					
Ore and concentrate		61,700	71,225	—	Japan 44,500; France 25,000; Republic of Korea 1,000.
Waste and sweepings[3]	value, thousands	$592	$716	$432	France $50; United Kingdom $41.
Metal including alloys, unwrought and partly wrought	kilograms	970,684	141,599	1,000	Switzerland 71,417; United Kingdom 21,473; France 13,261.
Tin:					
Ore and concentrate		99	107	—	United Kingdom 106; Qatar 1.
Oxides		227	272	6	Netherlands 87; Spain 52; United Kingdom 30.
Ash and residue containing tin		1	21	—	All to United Kingdom.
Metal including alloys:					
Scrap		61	156	—	United Kingdom 155.
Unwrought		182	162	—	Netherlands 119; Yugoslavia 15; France 6.
Semimanufactures		112	521	37	Austria 182; Guinea 62; France 45.
Titanium:					
Ore and concentrate		1,280	402	—	Yugoslavia 315; West Germany 85; Libya 2.
Oxides		2,344	1,380	—	Libya 420; Malaysia 264; France 160.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Destinations, 1989	
			United States	Other (principal)
METALS—Continued				
Titanium—Continued:				
Ash and residue	—	3,697	—	All to France.
Metal including alloys:				
Scrap	176	268	105	United Kingdom 75; West Germany 68.
Unwrought	131	49	15	West Germany 24; Spain 5.
Semimanufactures	154	610	—	West Germany 104; Turkey 43; France 32.
Tungsten:				
Ore and concentrate	52	81	—	West Germany 40; Spain 24; France 17.
Metal including alloys:				
Scrap	75	59	—	Switzerland 23; West Germany 19; Belgium-Luxembourg 11.
Unwrought	3	26	—	France 12; Austria 9; West Germany 2.
Semimanufactures	53	48	—	Netherlands 20; Sweden 12; Austria 4.
Uranium and thorium:				
Ore and concentrate value, thousands	$13	$63	—	Tunisia $59; West Germany $4.
Oxides and other compounds do.	$781	$3,178	$48	United Kingdom $3,121; West Germany $8.
Vanadium:				
Ore and concentrate	12	129	—	West Germany 118; France 11.
Oxides and hydroxides	523	75	—	All to Yugoslavia.
Ash and residue containing vanadium	3,161	1,888	1,506	West Germany 381.
Metal including alloys, semimanufactures	3	9	—	All to Spain.
Zinc:				
Ore and concentrate	21,310	20,230	—	Austria 14,346; Bulgaria 4,488; France 1,105.
Oxides	8,367	9,439	155	U.S.S.R. 5,978; East Germany 1,667; France 1,270.
Blue powder	553	871	—	West Germany 428; United Kingdom 106.
Ash and residue containing zinc	15,215	19,509	—	West Germany 6,555; France 4,206; Belgium-Luxembourg 3,239.
Metal including alloys:				
Scrap	4,742	7,583	—	West Germany 2,310; Taiwan 2,174; France 1,924.
Unwrought	52,338	48,849	2,000	Turkey 11,328; Netherlands 10,600; Greece 5,999.
Semimanufactures	1,174	9,281	27	West Germany 4,457; Saudi Arabia 790; Libya 517.
Zirconium:				
Ore and concentrate	9,321	5,657	—	Hungary 1,818; Spain 971; France 707.
Oxides	15	70	—	France 48; Venezuela 20; Switzerland 2.
Ash and residue containing zirconium	25	25	—	All to Belgium-Luxembourg.
Metal including alloys:				
Scrap	10	50	—	Greece 30; Taiwan 20.
Unwrought	161	199	—	Egypt 84; France 72; Chile 25.
Semimanufactures	57	537	—	France 153; Turkey 110; Yugoslavia 74.
Other:				
Ores and concentrates[4]	573	167	8	France 88; United Kingdom 23; West Germany 20.
Oxides and hydroxides	319	244	32	West Germany 64; Belgium-Luxembourg 27.
Ashes and residues	18,289	14,733	—	Canada 5,992; Belgium-Luxembourg 4,592; West Germany 2,942.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Destinations, 1989	
			United States	Other (principal)
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	40,260	38,547	1,551	United Kingdom 15,430; West Germany 8,113; Spain 11,930.
Artificial:				
Corundum	11,324	26,901	—	Netherlands 13,000; France 4,291; Austria 2,720.
Silicon carbide	14,383	15,096	40	France 3,292; West Germany 2,279; Republic of Korea 1,817.
Dust and powder of precious and semiprecious stones excluding diamond kilograms	196	1,193	—	Switzerland 871; Spain 181; Belgium-Luxembourg 65.
Grinding and polishing wheels and stones	27,223	31,776	1,596	Saudi Arabia 4,884; France 3,772; West Germany 1,931.
Asbestos, crude	50,743	37,532	—	West Germany 7,529; Thailand 7,003; France 6,943.
Barite and witherite	9,989	8,740	34	Libya 7,435; West Germany 241; Spain 180.
Boron materials:				
Crude natural borates	1,620	330	18	Yugoslavia 98; Ecuador 42; Algeria 26.
Elemental	(2)	—		
Bromine	7	12	—	Israel 6; Turkey 3; Romania 1.
Cement	357,347	351,387	2	Switzerland 174,729; Libya 65,486; Algeria 28,011.
Chalk	3,848	1,271	—	Switzerland 1,096; Canada 82; West Germany 32.
Clays, crude:				
Bentonite	37,172	59,564	—	France 29,677; United Kingdom 6,143; Norway 5,720.
Chamotte earth including dinas earth	449	1,445	—	West Germany 629; Switzerland 503; France 145.
Fire clay	630	1,150	—	Belgium-Luxembourg 546; France 334; Dominica 634.
Fuller's earth	4	81	—	Switzerland 39; Tunisia 29; Austria 5.
Kaolin	39,249	44,313	—	France 41,357; Tunisia 1,425; Greece 306.
Unspecified	2,330	3,549	—	France 1,373; Austria 792; Switzerland 649.
Cryolite and chiolite	178	138	—	West Germany 122; Switzerland 15; Denmark 1.
Diamond, natural:				
Gem, not set or strung carats	18,928	11,851	2	West Germany 4,000; Switzerland 1,510; Belgium-Luxembourg 8.
Industrial stones do.	10,786	2,737	—	France 1,657; Netherlands 500.
Dust and powder kilograms	731	626	388	United Kingdom 97; West Germany 38.
Diatomite and other infusorial earth	2,538	2,952	6	Libya 602; Austria 509; Spain 402.
Feldspar, fluorspar, related materials:				
Feldspar	34,717	29,936	—	West Germany 15,771; Switzerland 6,407; Algeria 1,400.
Fluorspar	19,574	1,381	—	Tunisia 1,167; Austria 148; Venezuela 66.
Unspecified	161	—		
Fertilizer materials:				
Crude, n.e.s.	15,292	25,370	19	France 14,202; Switzerland 3,529; West Germany 2,119.
Manufactured:				
Ammonia	80,806	214,442	—	Spain 101,090; Senegal 75,424; Greece 32,346.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	Destinations, 1989	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued:					
Manufactured—Continued:					
Nitrogenous		1,136,989	978,395	32,365	Spain 190,434; Greece 168,455; Turkey 138,904.
Phosphatic		463	994	—	Libya 580; Switzerland 301; Lebanon 40.
Potassic		76,455	135,313	19	Greece 48,235; China 19,925; Japan 13,200.
Unspecified and mixed		699,984	670,037	5,835	France 177,112; West Germany 116,133; China 113,129.
Graphite, natural		394	905	5	Indonesia 355; France 122; Singapore 167.
Gypsum and plaster		13,272	16,159	5	Switzerland 12,960; Greece 680; Austria 414.
Iodine		10	63	—	France 58; Netherlands 5.
Kyanite and related materials:					
Andalusite, kyanite, sillimanite		1,272	971	—	West Germany 749; Netherlands 57; Switzerland 47.
Mullite		65	56	—	France 32; Spain 24.
Lime		19,277	26,629	—	Switzerland 18,373; Uganda 4,037; Kenya 2,094.
Magnesium compounds:					
Magnesite, crude		3,307	3,716	61	Spain 734; Netherlands 612; France 476.
Oxides and hydroxides		108,283	126,366	48	West Germany 29,983; Netherlands 27,971; Republic of South Africa 19,377.
Mica:					
Crude including splittings and waste		783	430	—	Belgium-Luxembourg 208; Austria 104; West Germany 57.
Worked including agglomerated splittings		162	218	3	France 47; West Germany 23; Spain 17.
Nitrates, crude		466	351	—	Hungary 140; Syria 126; Malta 42.
Phosphates, crude		828	2,342	—	Libya 1,000; Albania 300; West Germany 295.
Pigments, mineral:					
Natural, crude		372	636	—	France 119; Switzerland 79; Mexico 71.
Iron oxides and hydroxides, processed		9,475	10,604	16	France 2,421; United Kingdom 2,013; West Germany 1,643.
Potassium salts, crude		28	485	—	West Germany 139; Zimbabwe 112; Saudi Arabia 98.
Precious and semiprecious stones other than diamond:					
Natural	kilograms	645	1,606	82	West Germany 1,272; Switzerland 93; Greece 52.
Synthetic	do.	8,029	3,794	6	Panama 1,149; Switzerland 1,030; Greece 141.
Pyrite, unroasted		5,458	5,809	242	West Germany 3,078; France 784; Austria 656.
Quartz crystal, piezoelectric	kilograms	8	2		
Salt and brine		358,350	81,855	3,981	Netherlands 18,125; France 15,827; Greece 14,976.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		47,158	46,878	—	Greece 14,393; Israel 12,838; Algeria 5,099.
Sulfate, manufactured		6,867	12,004	40	Egypt 2,950; Jordan 2,000; Tunisia 2,950.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		401,716	498,093	4,031	Japan 82,023; Spain 64,444; West Germany 44,514.
Worked		1,965,000	2,121,967	262,763	West Germany 525,315; Saudi Arabia 193,372.
Dolomite, chiefly refractory-grade		36,387	33,994	—	France 17,554; Switzerland 6,907; West Germany 4,370.
Gravel and crushed rock		933,235	1,028,367	1,315	Switzerland 410,229; Belgium-Luxembourg 115,466; Kuwait 100,455.
Limestone other than dimension		701	947	21	Japan 455; Switzerland 146; Austria 122.

See footnotes at end of table.

TABLE 2—Continued

ITALY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Destinations, 1989	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Stone, sand and gravel—Continued:				
Quartz and quartzite	14,267	18,203	81	France 7,355; West Germany 4,609; Switzerland 498.
Sand other than metal-bearing	214,772	273,485	—	Switzerland 265,499; Yugoslavia 2,253; Hungary 1,031.
Sulfur:				
Elemental:				
Crude including native and byproduct	979	4,222	—	Yugoslavia 3,001; Venezuela 641; Malta 176.
Colloidal, precipitated, sublimed	279	482	—	France 321; Malta 71; West Germany 24.
Dioxide	572	1,587	—	West Germany 650; Belgium-Luxembourg 400; Spain 247.
Sulfuric acid	260,916	317,442	2,510	Turkey 188,303; Spain 48,081; Lebanon 23,449.
Talc, steatite, soapstone, pyrophyllite	42,327	41,976	2,655	West Germany 19,394; France 3,632; United Kingdom 3,141.
Vermiculite, perlite, chlorite	39,177	49,766	—	United Kingdom 32,811; France 13,370; West Germany 2,820.
Other:				
Crude	12,586	10,735	19	Switzerland 2,613; Turkey 1,244; Brazil 600.
Slag and dross, not metal-bearing	82,592	70,768	—	Greece 38,285; Yugoslavia 22,173; West Germany 2,952.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	14,973	10,848	23	Austria 3,417; Libya 3,359; Switzerland 1,217.
Carbon:				
Carbon black	67,556	54,816	—	Turkey 11,689; France 11,409; Yugoslavia 8,522.
Gas carbon	46	589	—	West Germany 271; Austria 143; France 137.
Coal:				
Anthracite	333	126	—	Iran 35; Thailand 35; Spain 25.
Bituminous	84,296	27,251	—	Tunisia 18,911; Yugoslavia 7,050; France 1,218.
Briquets of anthracite and bituminous coal	64	3	—	All to Maldives.
Lignite including briquets	—	20	—	All to Nigeria.
Coke and semicoke	191,281	165,321	15,799	Morocco 31,256; Austria 28,837; France 27,531.
Gas, natural:				
Gaseous thousand cubic meters	844	3	—	U.S.S.R. 2; United Kingdom 1.
Liquefied do.	22,677	34,454	—	Malta 15,224; Libya 11,448; Switzerland 5,872.
Peat including briquets and litter	181	349	8	West Germany 151; France 64; Yugoslavia 49.
Petroleum:				
Crude thousand 42-gallon barrels	4,266	5,051	1,400	Spain 3,459; West Germany 190.
Refinery products:				
Liquefied petroleum gas do.	2,277	1,830	174	France 349; Tunisia 329; Libya 311.
Gasoline do.	37,102	36,315	3,517	France 9,417; Libya 4,895; Switzerland 3,949.
Mineral jelly and wax do.	32	29	—	Morocco 6; West Germany 5; Netherlands 4.
Kerosene and jet fuel do.	13,613	1,606	10	Cyprus 422; Switzerland 191; Canada 114.
Distillate fuel oil do.	19,217	23,168	8	France 9,134; Spain 1,830; Tunisia 1,761.
Lubricants do.	4,350	4,890	43	West Germany 403; Greece 378; Netherlands 331.
Residual fuel oil do.	22,402	24,722	9,656	Tunisia 2,877; Malta 1,716.
Bitumen and other residues do.	416	604	(2)	Switzerland 223; Tunisia 144; France 94.
Bituminous mixtures do.	45	42	(2)	Tanzania 13; Switzerland 10; France 4.
Petroleum coke do.	181	25	—	Yugoslavia 13; Austria 8; Algeria 3.

NA Not available.

[1]Table prepared by Theodore T. Spittal.

[2]Less than 1/2 unit.

[3]May include other precious metals.

[4]May include other precious metal ores and concentrates.

TABLE 3

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Sources, 1989	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	3,942	4,162	9	West Germany 2,209; France 867; Yugoslavia 481.
Alkaline-earth metals	84	119	1	France 76; West Germany 30; Canada 9.
Aluminum:				
Ore and concentrate thousand tons	1,407	1,466	—	Guinea 706; Australia 653; China 56.
Oxides and hydroxides	330,008	243,024	430	Spain 56,979; Guinea 56,738; West Germany 49,420.
Ash and residue containing aluminum	94,940	110,589	37	Austria 48,598; U.S.S.R. 47,364; France 10,135.
Metal including alloys:				
Scrap	183,881	207,982	15,794	France 60,574; West Germany 49,148; Austria 17,532.
Unwrought	417,408	461,004	36	Netherlands 127,738; Yugoslavia 96,386; West Germany 52,257.
Semimanufactures	199,426	211,656	6,119	West Germany 67,832; France 34,376; Belgium-Luxembourg 17,470.
Antimony:				
Ore and concentrate	155	27	—	All from France.
Oxides	2,066	2,116	3	France 662; Belgium-Luxembourg 603; United Kingdom 333.
Ash and residue containing antimony	108	108	—	All from Canada.
Metal including alloys, all forms	578	845	—	Netherlands 277; China 231; West Germany 194.
Arsenic:				
Oxides and acids	539	537	—	Belgium-Luxembourg 289; France 181; Portugal 44.
Metal including alloys, all forms	71	144	1	Netherlands 58; France 50; China 26.
Beryllium:				
Oxides and hydroxides	20	—		
Metal including alloys, all forms	1	7	1	West Germany 6.
Bismuth: Metal including alloys, all forms	93	80	2	United Kingdom 29; Netherlands 13; China 11.
Cadmium: Metal including alloys, all forms	83	59	3	Finland 30; Netherlands 15; Belgium-Luxembourg 9.
Chromium:				
Ore and concentrate	308,141	383,158	—	Albania 166,797; U.S.S.R. 95,998; Republic of South Africa 65,861.
Oxides and hydroxides	1,867	2,084	16	West Germany 1,215; United Kingdom 432; Poland 223.
Metal including alloys, all forms	373	289	2	United Kingdom 194; West Germany 32; France 26.
Cobalt:				
Ore and concentrate	48	56	—	All from West Germany.
Oxides and hydroxides	412	473	—	Belgium-Luxembourg 271; Finland 134; United Kingdom 38.
Metal including alloys, all forms	521	609	9	Belgium-Luxembourg 167; West Germany 119; France 74.
Columbium and tantalum: Metal including alloys, all forms: Tantalum	2	2	2	
Copper:				
Ore and concentrate	1,310	302	—	Spain 153; West Germany 125; Belgium-Luxembourg 24.
Matte and speiss including cement copper-	520	40	—	Finland 39.
Oxides and hydroxides	845	560	170	Norway 257; Belgium-Luxembourg 71.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Sources, 1989	
			United States	Other (principal)
METALS—Continued				
Copper—Continued:				
Sulfate	1,407	1,090	—	West Germany 452; Czechoslovakia 280; France 152.
Ash and residue containing copper	6,915	8,826	167	Albania 8,251; Yugoslavia 166.
Metal including alloys:				
Scrap	136,701	163,875	5,095	West Germany 52,372; France 45,869; United Kingdom 22,473.
Unwrought	398,363	408,549	2,875	Chile 134,686; Zambia 38,570; Peru 38,542.
Semimanufactures	212,162	242,230	440	France 77,708; West Germany 72,534; Belgium-Luxembourg 29,734.
Gallium, indium, thallium: Metals including alloys, all forms value, thousands	$154	$303	$109	United Kingdon $131; Peru $24; Belgium-Luxembourg $18.
Germanium:				
Metal including alloys, all forms do.	$209	$562	$51	Belgium-Luxembourg $492; United Kingdom $19; West Germany $3.
Gold:				
Waste and sweepings do.	$684	$1,970	$491	Switzerland $661; Iran $53; Sweden $49.
Metal including alloys, unwrought and partly wrought kilograms	350,830	284,821	1,591	Republic of South Africa 145,975, Switzerland 112,619; West Germany 7,169.
Hafnium: Metal including alloys, all forms	(2)	—		
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite thousand tons	16,197	18,201	(2)	Brazil 5,235; Liberia 2,604; Mauritania 2,532.
Pyrite, roasted	27	122,608	—	Canada 122,419; France 129; Liberia 32.
Metal:				
Scrap thousand tons	5,058	5,747	167	West Germany 2,048; France 1,583; U.S.S.R. 510.
Pig iron, cast iron, related materials	942,240	1,266,722	383	U.S.S.R. 436,446; Algeria 126,191; France 119,920.
Ferroalloys:				
Ferrochromium	90,768	98,759	1,480	Republic of South Africa 29,509; Yugoslavia 16,944; Zimbabwe 16,286.
Ferrocolumbium	1,165	1,187	—	Brazil 556; West Germany 294; United Kingdom 231.
Ferromanganese	89,017	90,884	—	France 44,025; Republic of South Africa 26,315; West Germany 6,074.
Ferromolybdenum	2,485	2,776	10	Austria 932; United Kingdom 520; France 512.
Ferronickel	20,539	16,441	22	Colombia 5,339; Dominican Republic 4,451; New Caledonia 3,431.
Ferrosilicochromium	1,487	1,237	—	West Germany 1,187; France 25; United Kingdom 21.
Ferrosilicomanganese	38,195	59,610	—	Norway 28,116; France 10,846; Republic of South Africa 7,226.
Ferrosilicotitanium	NA	130		United Kingdom 66; France 37; Belgium-Luxembourg 27.
Ferrosilicon	60,112	61,169	—	Norway 21,830; Yugoslavia 12,402; France 12,208.
Ferrotitanium	805	974	—	United Kingdom 681; Belgium-Luxembourg 132; Netherlands 97.
Ferrotungsten[4]	229	340	—	Netherlands 259; Austria 49; France 20.
Ferrovanadium	1,086	821	—	Austria 406; West Germany 183; Belgium-Luxembourg 172.
Silicon metal	14,737	21,544	—	Norway 7,994; France 4,316; China 2,386.
Unspecified	7,886	12,533	757	France 3,903; Norway 3,548; West Germany 3,270.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Sources, 1989	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Steel, primary forms thousand tons	1,961	1,800	37	Brazil 533; United Kingdom 206; West Germany 204.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	3,745,847	4,796,957	201,757	France 1,237,723; West Germany 760,814; Belgium-Luxembourg 759,903.
Clad, plated, coated	746,513	843,950	53,285	France 197,546; Belgium-Luxembourg 173,660; West Germany 149,621.
Of alloy steel	377,893	407,957	2,385	West Germany 122,095; Belgium-Luxembourg 88,998; France 72,746.
Bars, rods, angles, shapes, sections thousand tons	1,534	1,570	2	West Germany 359; France 297; United Kingdom 156.
Rails and accessories	65,720	110,016	1	West Germany 30,675; Netherlands 20,494; France 18,357.
Wire	115,855	131,787	29	Yugoslavia 33,885; Belgium-Luxembourg 25,554; Czechoslovakia 13,625.
Tubes, pipes, fittings	526,874	695,862	58,773	West Germany 165,007; France 124,085; Austria 55,777.
Lead:				
Ore and concentrate	96,713	112,015	—	Canada 30,519; Australia 19,281; Republic of South Africa 16,895.
Oxides	674	10,673	58	U.S.S.R. 9,370; West Germany 653; Algeria 191.
Ash and residue containing lead	2,063	374	—	Switzerland 176; United Kingdom 113; Tunisia 61.
Metal including alloys:				
Scrap	16,160	7,697	—	Switzerland 4,149; France 1,868; Tunisia 875.
Unwrought	116,604	109,079	—	Morocco 28,212; West Germany 15,702; France 10,909.
Semimanufactures	1,987	2,275	1	Belgium-Luxembourg 746; West Germany 680; Sweden 299.
Lithium: Oxides and hydroxides	383	155	3	West Germany 63; China 36; U.S.S.R. 30.
Magnesium: Metal including alloys:				
Scrap	901	1,965	86	West Germany 1,011; Netherlands 358; Belgium-Luxembourg 134.
Unwrought	2,870	2,622	36	Norway 833; Netherlands 563; France 477.
Semimanufactures	183	563	22	France 314; Belgium-Luxembourg 70; Netherlands 53.
Manganese:				
Ore and concentrate, metallurgical-grade	264,330	390,049	—	Gabon 225,890; Brazil 97,466; Republic of South Africa 46,196.
Oxides	4,175	4,542	19	Belgium-Luxembourg 1,502; France 1,430; Greece 589.
Metal including alloys, all forms	2,676	1,978	144	France 686; United Kingdom 324; Republic of South Africa 302.
Mercury	189	189	(2)	Netherlands 80; Turkey 48; Algeria 20.
Molybdenum:				
Ore and concentrate:				
Roasted	2,737	2,444	120	Netherlands 1,465; Chile 480; Belgium-Luxembourg 170.
Unroasted	66	187	—	France 122; West Germany 21; Belgium-Luxembourg 20.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	Sources, 1989	
				United States	Other (principal)
METALS—Continued					
Molybdenum—Continued:					
Oxides and hydroxides		173	76	—	China 50; West Germany 14; Netherlands 12.
Metal including alloys:					
Scrap		(2)	26	—	France 25.
Unwrought		2	30	1	West Germany 21; United Kingdom 5.
Semimanufactures		160	137	27	Austria 35; Belgium-Luxembourg 29; United Kingdom 29.
Nickel:					
Ore and concentrate		3	25	—	Austria 22; Netherlands 2.
Matte and speiss		6,973	10,520	—	U.S.S.R. 3,451; Australia 2,696; Canada 1,499.
Oxides and hydroxides		108	114	—	Finland 51; Netherlands 37; Canada 10.
Ash and residue containing nickel		264	12	—	All from West Germany.
Metal including alloys:					
Scrap		117	42	—	United Kingdom 26; France 10; Netherlands 6.
Unwrought		16,942	16,762	153	U.S.S.R. 5,034; Norway 2,257; Republic of South Africa 2,148.
Semimanufactures		3,308	3,208	593	West Germany 1,305; United Kingdom 720; Sweden 143.
Platinum-group metals:					
Waste and sweepings	value, thousands	$16,151	$18,171	$8,431	Greece $2,474; Yugoslavia $1,926; Netherlands $1,770.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	69,968	4,534	425	West Germany 1,643; United Kingdom 1,642; Switzerland 690.
Platinum	do.	10,533	2,707	—	Switzerland 1,425; West Germany 322; United Kingdom 43.
Rhodium	do.	345	196	—	United Kingdom 188; West Germany 5.
Iridium, osmium, ruthenium	do.	1,251	561	182	Republic of South Africa 315; United Kingdom 48; West Germany 11.
Rare-earth metals including alloys, all forms		69	71	(2)	Netherlands 35; Austria 24; France 3.
Selenium, elemental		20	26	1	Canada 11; Japan 8; Netherlands 3.
Silicon, high-purity		1,513	1,062	64	France 569; West Germany 225; Norway 170.
Silver:					
Waste and sweepings[5]	value, thousands	$24,809	$23,082	$8,156	United Kingdom $6,263; France $5,116.
Metal including alloys, unwrought and partly wrought	kilograms	658,024	601,991	931	Switzerland 324,859; West Germany 303,320; Mexico 75,846.
Tellurium, elemental	value, thousands	$84	$50	$4	West Germany $21; Netherlands $15; Canada $9.
Tin:					
Ore and concentrate		—	25	—	All from Malaysia.
Oxides		7	7	—	All from West Germany.
Ash and residue containing tin		—	19	—	All from Philippines.
Metal including alloys:					
Scrap		3	31	—	Switzerland 22; Malta 5; West Germany 3.
Unwrought		6,662	6,223	—	Malaysia 2,993; Indonesia 1,174; Brazil 785.
Semimanufactures		415	807	6	United Kingdom 430; West Germany 230; Singapore 61.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Sources, 1989	
			United States	Other (principal)
METALS—Continued				
Titanium:				
Ore and concentrate	48,568	50,086	—	Canada 45,134; Republic of South Africa 3,595; Netherlands 684.
Oxides	21,955	25,083	62	West Germany 6,011; United Kingdom 5,514; France 2,876.
Ash and residue containing titanium	84,753	118,357	—	Republic of South Africa 97,435; Canada 16,096; France 4,826.
Metal including alloys:				
Scrap	2,751	1,763	473	Austria 907; West Germany 200; U.S.S.R. 59.
Unwrought	116	326	31	China 42; United Kingdom 35; France 32.
Semimanufactures	805	1,400	118	Japan 430; West Germany 183; France 148.
Tungsten:				
Ore and concentrate	41	40		Austria 30; West Germany 10.
Oxides and hydroxides	13	3	—	Austria 2; France 1.
Metal including alloys:				
Scrap	3	(2)	—	All from West Germany.
Unwrought	(2)	101	54	United Kingdom 13; France 8; West Germany 8.
Semimanufactures	74	128	44	West Germany 26; France 22; United Kingdom 20.
Uranium and thorium:				
Ore and concentrate	NA	96	—	Tunisia 77.
Oxides and other compounds value, thousands	$1,364	$8,339	$5	United Kingdom $8,182; Switzerland $148; Canada $4.
Metal including alloys, all forms:				
Uranium do.	NA	$90	$30	United Kingdom $44; France $15; West Germany $2.
Thorium do.	NA	$1	—	All from Belgium-Luxembourg.
Vanadium:				
Oxides and hydroxides	84	71	—	Netherlands 37; Belgium-Luxembourg 34.
Ash and residue containing vanadium	805	430	—	All from Austria.
Metal including alloys, all forms value, thousands	$1	$15	$9	West Germany $4; United Kingdom $2.
Zinc:				
Ore and concentrate	429,578	392,304	5,959	Canada 106,691; Ireland 86,452; Peru 59,563.
Oxides	9,631	12,380	—	France 3,947; Netherlands 2,229; West Germany 1,752.
Blue powder	2,214	3,380	—	West Germany 1,442; Belgium-Luxembourg 869; Norway 487.
Ash and residue containing zinc	17,465	15,852	—	West Germany 7,022; France 2,834; Spain 1,681.
Metal including alloys:				
Scrap	9,631	11,164	—	France 6,335; West Germany 2,074; United Kingdom 720.
Unwrought	71,160	89,809	1,875	West Germany 21,511; Belgium-Luxembourg 16,081; Netherlands 13,854.
Semimanufactures	6,705	5,689	2	West Germany 2,975; France 1,596; Belgium-Luxembourg 546.
Zirconium:				
Ore and concentrate	82,675	81,434	4,551	Australia 59,070; Republic of South Africa 15,750; China 939.
Oxides	451	545	2	France 418; West Germany 89; United Kingdom 28.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	Sources, 1989	
				United States	Other (principal)
METALS—Continued					
Zirconium—Continued:					
Metal including alloys:					
Scrap		34	27	—	Australia 21; West Germany 6.
Unwrought		26	170	19	West Germany 84; Australia 51; China 20.
Semimanufactures		222	13	6	West Germany 5; United Kingdom 1.
Other:					
Ores and concentrates		2,850	6,436	—	Greece 5,714; Australia 604; Netherlands 49.
Oxides and hydroxides		697	1,450	(2)	Austria 768; Belgium-Luxembourg 401; West Germany 135.
Ashes and residues		4,641	9,798	26	Yugoslavia 5,367; France 3,482; Belgium-Luxembourg 235.
Base metals		NA	4	(2)	United Kingdom 2; West Germany 1.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		35,596	53,621	71	Turkey 26,688; Greece 26,247; France 234.
Artificial:					
Corundum		33,470	37,472	745	Austria 11,979; Yugoslavia 7,162; West Germany 4,819.
Silicon carbide		30,187	30,718	1	West Germany 7,644; France 7,190; Norway 6,372.
Dust and powder of precious and semi-precious stones excluding diamond	kilograms	1,145	586	36	Panama 350; United Kingdom 123.
Grinding and polishing wheels and stones		4,385	5,481	24	France 2,353; West Germany 748; Austria 673.
Asbestos, crude		46,165	60,594	573	Canada 39,220; Greece 8,096; U.S.S.R. 7,702.
Barite and witherite		39,936	61,779	3	Tunisia 17,575; India 11,000; Morocco 10,200.
Boron materials:					
Crude natural borates		124,700	165,329	299	Turkey 136,937; Argentina 20,366; Malta 7,300.
Elemental		(2)	—		
Oxides and acids		11,215	9,092	585	France 3,252; Turkey 3,074; Argentina 1,155.
Bromine		2,228	1,787	—	Israel 1,758.
Cement	thousand tons	1,889	2,347	(2)	Greece 1,364; Yugoslavia 637; Cyprus 195.
Chalk		12,760	12,647	—	France 12,316; West Germany 154; Austria 65.
Clays, crude:					
Bentonite		52,110	72,727	813	Greece 43,016; Morocco 16,250; West Germany 5,097.
Chamotte earth		64,601	70,421	2,066	France 31,123; West Germany 16,246; China 11,550.
Fuller's earth		3,554	5,167	379	Spain 4,022; Algeria 250; France 235.
Fire clay		124,302	148,896	40	France 84,743; West Germany 58,932; Spain 4,927.
Kaolin		673,009	696,289	190,115	United Kingdom 272,154; France 73,484; West Germany 65,051.
Unspecified	thousand tons	1,293	1,542	(2)	West Germany 1,361; France 787; United Kingdom 48.
Cryolite and chiolite		1,237	246	—	Denmark 108; West Germany 90; Poland 48.
Diamond, natural:					
Gem, not set or strung	carats	1,981,707	2,170,329	1,881	Belgium-Luxembourg 1,339,866; India 627,577; Israel 147,498.
Industrial stones	do.	316,734	283,038	39,717	Belgium-Luxembourg 230,597; Taiwan 10,000; Finland 1,100.
Dust and powder	kilograms	8,755	7,982	1,574	Switzerland 4,017; Ireland 750.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	Sources, 1989	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Diatomite and other infusorial earth		7,213	7,475	548	France 5,747; Iceland 672; Spain 236.
Feldspar, fluorspar, related materials:					
Feldspar		22,773	33,619	(2)	Turkey 16,902; West Germany 5,802; Greece 3,270.
Fluorspar		63,197	104,246	—	Republic of South Africa 30,085; France 29,585; Morocco 14,599.
Unspecified		8,366	37,177	82	Canada 20,160; Norway 14,094; Netherlands 2,711.
Fertilizer materials:					
Crude, n.e.s.		5,493	7,109	30	France 2,834; Brazil 300; West Germany 122.
Manufactured:					
Ammonia		330,121	162,738	—	U.S.S.R. 101,882; Hungary 15,222; Qatar 10,696.
Nitrogenous		428,273	563,898	18,557	Netherlands 139,098; Austria 86,029; West Germany 80,051.
Phosphatic		222,255	254,616	—	Israel 112,563; Tunisia 95,558; France 25,877.
Potassic		762,326	772,454	748	U.S.S.R. 238,514; Israel 171,766; Spain 94,071.
Unspecified and mixed	thousand tons	961	1,033	144	Tunisia 234; Morocco 133; France 69.
Graphite, natural		6,739	10,840	7	West Germany 3,036; Yugoslavia 2,440; Brazil 1,956.
Gypsum and plaster		29,498	39,823	2,845	Spain 11,557; Greece 10,688; West Germany 10,019.
Iodine		991	1,107	35	Chile 445; Japan 585.
Kyanite and related materials:					
Andalusite, kyanite, sillimanite		23,259	23,243	635	Republic of South Africa 13,586; Spain 3,763; West Germany 2,466.
Mullite		2,639	1,349	—	West Germany 1,033; United Kingdom 313; Spain 3.
Lime		10,266	13,124	—	Yugoslavia 10,142; France 2,289; West Germany 578.
Magnesium compounds:					
Magnesite, crude		28,772	29,137	1	Turkey 23,970; Greece 2,700; Austria 1,275.
Oxides and hydroxides		77,456	94,558	1,035	China 17,098; Greece 15,682; Austria 13,563.
Other		3,727	4,258	—	West Germany 2,284; East Germany 1,900; France 72.
Mica:					
Crude including splittings and waste		1,761	1,479	82	France 601; Austria 299; United Kingdom 204.
Worked including agglomerated splittings		597	599	20	France 178; Belgium-Luxembourg 130; Japan 108.
Nitrates, crude		8,131	6,338	5	Chile 3,123; West Germany 1,080; France 665.
Phosphates, crude	thousand tons	1,164	1,057	105	Morocco 340; Togo 240; Israel 201.
Phosphorus, elemental		188	441	—	Romania 250; U.S.S.R. 71; France 69.
Pigments, mineral:					
Natural, crude		446	614	(2)	Yugoslavia 183; Cyprus 177; Portugal 96.
Iron oxides and hydroxides, processed		27,243	30,751	117	West Germany 20,178; France 6,381; Austria 764.
Potassium salts, crude		1,587	1,725	—	France 1,422; West Germany 280; Seychelles 23.
Precious and semiprecious stones other than diamond:					
Natural	kilograms	31,090	9,830	11	India 1,864; West Germany 1,530; Thailand 934.
Synthetic	do.	15,611	13,108	3,394	Thailand 5,567; Switzerland 2,312.
Pyrite, unroasted		117,634	88,116	1	U.S.S.R. 88,048; Peru 64; West Germany 2.
Quartz crystal, piezoelectric	kilograms	679	380	—	Japan 325; Belgium-Luxembourg 24; West Germany 15.
Salt and brine		706,134	646,571	2	France 279,570; Tunisia 110,009; Egypt 104,649.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1988	1989	Sources, 1989	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Sodium compounds, n.e.s.:				
Soda ash, manufactured	84,039	88,688	—	Austria 37,235; Yugoslavia 12,054; France 9,291.
Sulfate, manufactured	43,201	77,037	65	Austria 27,927; West Germany 13,477; France 13,388.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked thousand tons	1,472	1,548	16	Spain 348; Republic of South Africa 291; Brazil 266.
Worked	15,937	22,104	203	Portugal 5,459; Spain 3,355; Greece 2,807.
Dolomite, chiefly refractory-grade	3,990	8,552	—	Yugoslavia 3,634; France 1,747; West Germany 1,094.
Gravel and crushed rock	49,201	105,773	3,049	Yugoslavia 64,126; France 29,236; West Germany 6,261.
Limestone other than dimension	513	480	—	West Germany 361; Yugoslavia 95; Netherlands 24.
Quartz and quartzite	100,162	107,527	110	Switzerland 40,293; Spain 27,713; Greece 23,941.
Sand other than metal-bearing thousand tons	1,096	1,274	1	France 702; Belgium-Luxembourg 259; West Germany 149.
Sulfur:				
Elemental:				
Crude including native and byproduct	264,761	186,303	5	Saudi Arabia 79,015; Poland 38,829; Iraq 33,480.
Colloidal, precipitated, sublimed	1,111	1,434	—	West Germany 1,000; Yugoslavia 322; Netherlands 62.
Dioxide value, thousands	NA	$4	$4	
Sulfuric acid	59,337	47,916	26	Spain 20,326; Yugoslavia 11,051; Austria 5,578.
Talc, steatite, soapstone, pyrophyllite	37,059	45,074	80	Austria 15,423; France 11,054; China 10,685.
Vermiculite, perlite, chlorite	46,874	54,568	8	U.S.S.R. 25,140; Republic of South Africa 10,629; Greece 9,444.
Other:				
Crude	78,870	101,530	3,239	Spain 33,873; Yugoslavia 15,744; West Germany 9,454.
Slag and dross, not metal-bearing	15,949	14,252	20	France 6,594; West Germany 1,030; Venezuela 349.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	2,551	885	589	France 163; West Germany 103; Belgium-Luxembourg 15.
Carbon black	28,245	32,481	2,004	France 14,047; Netherlands 4,413; West Germany 4,173.
Coal:				
Anthracite thousand tons	2,853	2,875	390	Republic of South Africa 1,977; Colombia 332; U.S.S.R. 125.
Bituminous do.	15,957	17,371	9,999	Republic of South Africa 3,193; Netherlands 1,164; Australia 1,012.
Briquets of anthracite and bituminous coal	7,003	5,078	—	France 4,925; West Germany 153.
Lignite including briquets	146,362	517,061	181,499	Australia 169,681; West Germany 116,124; Netherlands 35,342.
Coke and semicoke	204,319	497,320	7,826	West Germany 342,099; France 54,802; Yugoslavia 37,875.
Gas, natural: Liquefied	123,344	227,832	—	Libya 217,872; Algeria 6,751; Yugoslavia 3,171.
Peat including briquets and litter	261,213	287,134	175	West Germany 186,731; U.S.S.R. 40,615; Netherlands 38,956.

See footnotes at end of table.

TABLE 3—Continued

ITALY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	Sources, 1989	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum:					
Crude	thousand 42-gallon barrels	471,912	505,524	186	Libya 147,624; Egypt 70,053; U.S.S.R. 51,733.
Refinery products:					
Liquefied petroleum gas	do.	15,004	17,260	27	Algeria 6,245; France 3,038; Saudi Arabia 2,151.
Gasoline	do.	29,689	25,708	48	Kuwait 4,208; Iraq 3,815; Saudi Arabia 3,382.
Mineral jelly and wax	do.	253	289	6	West Germany 54; Hungary 50; France 37.
Kerosene and jet fuel	do.	909	417	—	Libya 285; Bulgaria 51; Czechoslovakia 46.
Distillate fuel oil	do.	42,415	46,589	3	Romania 15,090; Algeria 9,682; Libya 5,613.
Lubricants	do.	1,215	1,340	37	Romania 311; Netherlands 218; France 167.
Residual fuel oil	do.	141,019	156,870	574	U.S.S.R. 48,608; Romania 13,646; Kuwait 11,765.
Bitumen and other residues	do.	2,101	1,430	706	Yugoslavia 318; Greece 194; Spain 157.
Bituminous mixtures	do.	18	11	—	West Germany 3; United Kingdom 3; Sweden 2.
Petroleum coke	do.	11,588	13,016	11,355	U.S.S.R. 786; United Kingdom 270; Canada 215.

NA Not available.
[1]Table prepared by Ronald L. Hatch.
[2]Less than 1/2 unit.
[3]Includes ferrosilicotitanium.
[4]Includes ferrosilicotungsten.
[5]May include other precious metals.

TABLE 4

ITALY: BALANCE OF PAYMENTS FOR SELECTED MINERAL COMMODITIES,[1] IN 1991

(Thousand dollars)

Mineral commodity	Exports to EC	Imports from EC	Net gain or (loss)	Exports to the world	Imports from the world	Net gain or (loss)
Crude industrial minerals:						
Feldspar	2,521	3,821	(1,300)	3,482	15,235	(11,753)
Magnesite	1,237	1,471	(234)	1,885	3,857	(1,972)
Slate	469	1,368	(899)	2,271	1,575	696
Other	164,623	497,103	(332,480)	377,681	1,104,121	(726,440)
Total	168,850	503,763	(334,913)	385,319	1,124,788	(739,469)
Metalliferous ores:						
Copper	309	832	(523	570	848	(278)
Lead	853	6,591	(5,738)	3,077	30,896	(27,819)
Tin	49	—	49	77	1,077	(1,000)
Zinc	165	40,163	(39,998)	367	134,007	(133,640)
Other (including waste and scrap)	121,579	998,989	(877,410)	208,282	2,086,506	(1,878,224)
Total	122,955	1,046,575	(923,620)	212,373	2,253,334	(2,040,961)
Nonmetallic mineral manufactures	702,112	290,351	411,761	1,848,922	461,747	1,387,175
Metals:						
Iron and steel	3,264,322	4,148,800	(884,478)	5,547,906	6,009,401	(461,495)
Mercury	93	363	(270)	126	385	(259)
Other nonferrous metals	1,107,232	2,085,047	(977,815)	1,655,031	4,297,364	(2,642,333)
Total	4,371,647	6,234,210	(1,862,563)	7,203,063	10,307,150	(3,104,087)
Mineral fuels	1,427,568	1,382,534	45,034	3,352,024	17,078,886	(13,726,862)

[1]Table prepared by Harold Willis, Section of International Data.

TABLE 5

ITALY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Eurallumina S.p.A. (Alumix S.p.A. 52.1%; Comalco 26.9%, Clarendon 21%—both Australian companies)	Plants at Portoscuso, in Sardinia; at Porto Marghera, near Venice	720.
Aluminum	Alumix S.p.A. (EFIM)	Smelters at Porto-scuso, in Sardinia; at Bolzano, Porto Marghera, and two at Fusina, all near Venice	255.
Asbestos	Amiantifera di Balangero S.p.A.	Mine at Balangero, near Turin	100.
Barite	Bariosarda S.p.A. (Ente Mineraria Sarda)	Mines at Barega, and Mont Ega, in Sardinia	100.
Do.	Edem S.p.A. (Government)	Mines at Val di Castello, in Lucca	20.
Do.	Edemsarda S.p.A. (Soc. Imprese Industriali)	Mines at Su Benatzu, Sto Stefano, and Peppixeddu, in Sardinia	20.
Do.	Minieraria Baritina S.p.A.	Mines at Marigole, Monte Elto, and Primaluna, near Milan	20.
Cement	52 companies, of which the largest are—	97 plants, of which the largest are—	45,000, including—
Do.	Italcement-Fabbriche Riunite Cemento S.p.A.	19 plants, of which the largest are Calusco, Monselice, and Collefero	(16,003).
Do.	"Cementir"-Cementerie del Tirreno S.p.A.	Plants at Arquasta Scivia, Livorno, Maddaloni, Napoli, Spoleto, and Taranto	(6,250).
Do.	Unicem S.p.A.	Plants at Guidonia, Lugagnano, Morano, Piacenza, S'Arcangelo di Romagna, and Settimello	(4,630).
Copper, refined	Nuova Samim S.p.A. (ENI)	Refineries at Porto Marghera, and Pieve Vergonte	46.
Do.	Europa Metalli-LMI S.p.A.	Refineries at Campo Tizzoro, Fornaci di Barga, and Villa Carcina	26.
Do.	Chimet S.p.A.	Refinery at Arezzo	13.
Feldspar	At least 5 companies, of which the largest are—		1,500, including—
Do.	Maffei S.p.A.	Surface mines at Pinzola, Sondalo, and Campiglia Marittima; underground mine at Vipiteno	(200).
Do.	Miniera di Fragne S.p.A.	Surface mine at Aladna Valsesia	(60).
Do.	Sabbie Silicee Fossanova S.p.A. (Sasifo)	Surface mine at Fossanova	(30).
Lead-zinc	Nuova Samim S.p.A. (ENI)	Mines at Masua, Monteponi (Montevecchio, San Giovanni, San Benedetto) in Sardinia; at Raibl, in Veneto region	60.
Do.	Others		10.
Lead metal	Nuova Samim S.p.A. (ENI)	Refinery at San Gavino, in Sardinia	80.
Do.	do.	Kivcet smelter and Imperial smelter at Porto Vesme, in Sardinia	114.
Zinc metal	do.	Plants at Crotone and Porto Vesme, in Sardinia; and Porto Marghera, near Venice	349.

TABLE 5—Continued

ITALY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Lignite	Ente Nazionale per L'Energia Elettrica (ENEL)	Surface mines at Pietrafitta, in Umbria, and San Barbara, in Tuscany	1,500.
Magnesium metal	Societa Italiana Magnesio S.p.A. (INDEL)	Dosseni Mine	65.
Do.	do.	Plant at Bolzano	7.
Marble white	A number of companies including—	Quarries mostly at Carrara and Massa	2,000 including—
Do.	Mineraria Marittima Srl	Quarry at Carrara	(500).
Do.	Industria dei Marmi Vicentini S.p.A.	Quarries in the Carrara area	(300).
Do.	Figaia S.p.A.	do.	(100).
Petroleum:			
Crude thousand 42-gallon barrels per day	Ente Nazionale/Idrocarburi (ENI)	Oilfields: Offshore Sicily and in the Adriatic Sea; onshore in Po River Valley	90.
Refined	do.	About 30 refineries	2,000.
Potash ore	Industria Sali Potassici e Affini per Aziono S.p.A.	Underground mines at Corvillo, Pasquasia, Racalmuto, and San Cataldo, in Sicily	1,300.
Do.	Sta Italiana Sali Alcalini S.p.A.—Italkali	Undergound mines at Casteltermini and Pasquasia, in Sicily	700.
Pumice	Pumex S.p.A.	Quarries on the Lipari Island, north of Sicily	650.
Do.	Sta Siciliana per l'Industria ed il Commercio della Pomice di Lipari—Italpomice S.p.A.	do.	200.
Pyrite	Solmine S.p.A.—Sta Lavorazione Minerali e Derivati S.p.A. (Samim, 51%; Agip S.p.A., 49%)	Underground mines at Campiano and Niccioleta	900.
Salt rock	Italkali Societa Italiana S.p.A. (Sta Italiana Sali Alcalini S.p.A.—Italkali)	Underground mines at Petralia, Racalmuto, and Realmonte, in Sicily	4,000.
Do.	Solvay S.p.A.	Underground mines at Buriano, Pontteginori, and Querceto in Tuscany	2,000.
Steel crude	Ilva S.p.A. (Government)	34 steel plants, of which—	13,000.
Do.	do.	Plant at Taranto	(8,000).
Do.	Riva S.p.A.	About 5 plants	5,000.
Do.	Others	Various locations	10,000.
Talc	Talco e Grafite Val Chisone S.p.A.	Mines at Pinerolo, near Turin, and at Orani, in Sardinia	120.
Do.	Industria Mineraria Italiana S.p.A.	Mine at Largone Predaccia	20.
Do.	Talco Sarda S.p.A.	Mine at Orani, in Sardinia	20.

TABLE 6
ITALY: ESTIMATED RESERVES[1] OF MAJOR MINERAL COMMODITIES FOR 1992

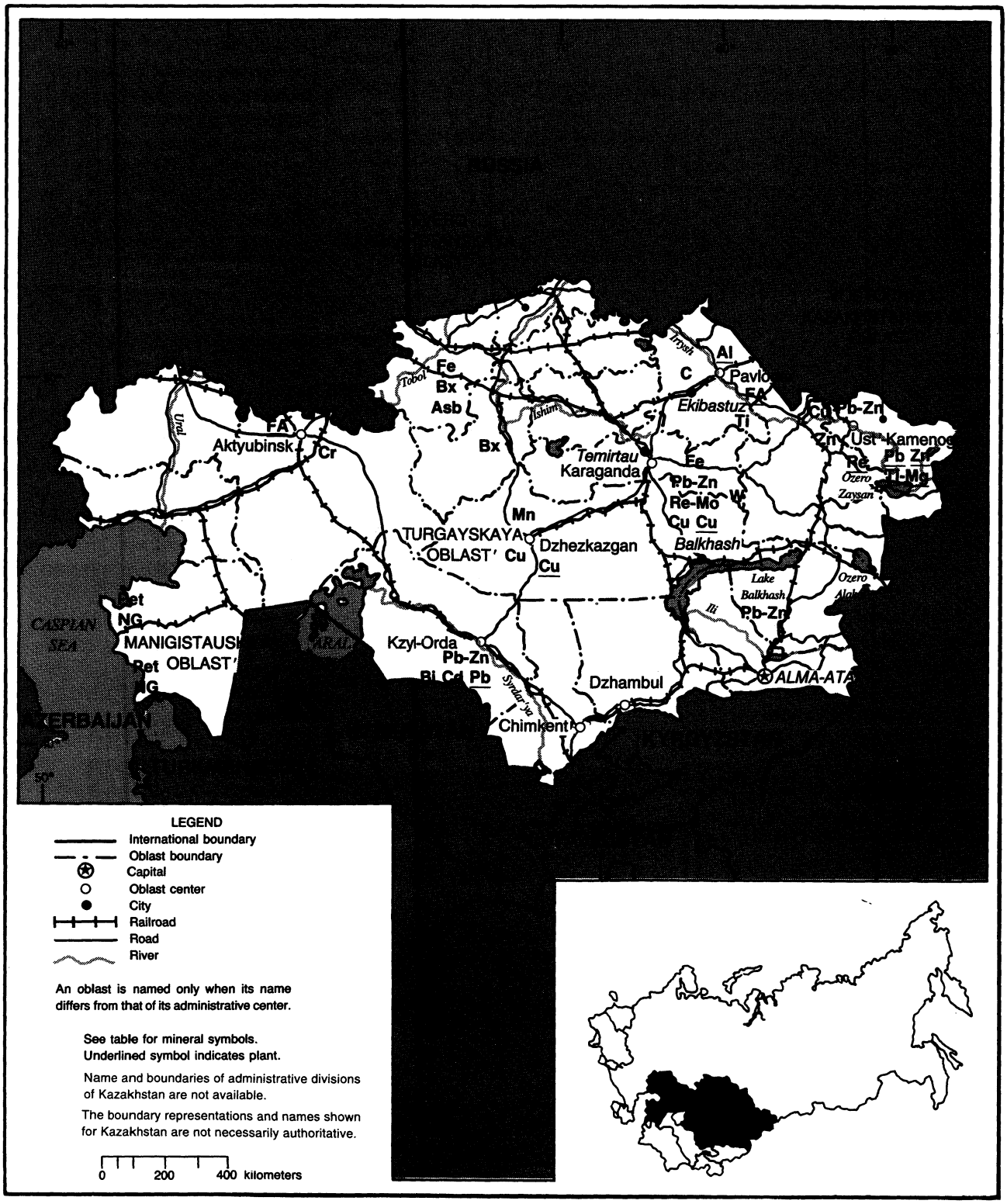
(Metric tons)

Commodity	Reserves
Asbestos	35,000
Barite	2,000
Cement	44,000
Fluorspar	6,000
Ilmenite	9,000
Marble	2,000,000
Potash	20,000
Rutile	20,000
Salt	1,000,000
Sulfur	10,000
Talc	45,000
Travertine	450,000

[1]Measured and inferred reserves.

KAZAKHSTAN

AREA 2,717,300 km² **POPULATION 17.1 million**



LEGEND

- International boundary
- Oblast boundary
- Capital
- Oblast center
- City
- Railroad
- Road
- River

An oblast is named only when its name differs from that of its administrative center.

See table for mineral symbols.
Underlined symbol indicates plant.

Name and boundaries of administrative divisions of Kazakhstan are not available.

The boundary representations and names shown for Kazakhstan are not necessarily authoritative.

0 200 400 kilometers

THE MINERAL INDUSTRY OF

KAZAKHSTAN

By Richard M. Levine

Kazakhstan, like other former Soviet republics, experienced high inflation and a decrease in production in 1992. Plans to move Kazakhstan to a market economy were only in their initial stages because Kazakhstan's leadership was advocating a moderate rate of economic transition. Much of Kazakhstan's economic activity was conducted within the framework of the Commonwealth of Independent States (C.I.S.), an organization designed to coordinate economic activity among successor states of the former U.S.S.R. Kazakhstan was one of the main proponents for strengthening economic relations within the C.I.S.

PRODUCTION

Kazakhstan, which, after Russia, was the second largest country in land area to form from the republics of the former U.S.S.R. is endowed with large reserves of a wide range of minerals. Kazakhstan, along with Russia, was one of the major mineral producing republics of the former U.S.S.R. and produced a major portion of the metals, including beryllium, bismuth, cadmium, chromite, copper, ferroalloys, lead, magnesium, rhenium, silver, titanium, uranium, and zinc. It had significant production of a number of other metals, industrial minerals, and fuels, including arsenic, barite, coal, gold, molybdenum, natural gas, petroleum, phosphate rock, and tungsten. In 1992, there was a decrease in output in Kazakhstan's major nonferrous metals sector with reported decreases in the production of copper, lead, titanium, and zinc, and there were also reported decreases in output in the ferrous metals and fuel sectors. *(See table 1.)*

TRADE

Reportedly, Kazakhstan's trade balance was favorable in 1992, with petroleum, petroleum products, and metals comprising two-thirds of the value of exports. *(See table 2.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, the major mineral industries in Kazakhstan were state owned, although, as with all former Soviet republics, plans were being formulated and enacted for some forms of privatization. *(See table 3.)*

COMMODITY REVIEW

Metals

Aluminum.—The Pavlodar alumina plant in Kazakhstan was the largest producer of alumina in the former U.S.S.R. with a capacity of 1.2 Mmt/a of alumina. In 1993, it was projected to produce 1,000,050 tons of alumina. The Pavlodar plant also produced 40% of the gallium output of the former U.S.S.R.

The Pavlodar plant uses domestic and imported bauxites. The Pavlodar plant reportedly is considering constructing an integrated aluminum smelter with a capacity of 215,000 mt/a. There initially were plans to develop an aluminum smelter when the plant was constructed in 1959, but the Ministry of Nonferrous Metallurgy decided instead to construct aluminum smelters in Tajikistan and at Sayanogorsk, Russia. Pavlodar ships most of its alumina to Russia to Sayanogorsk and Novokuznetsk, with some also to Bratsk.

Chrome.—Kazakhstan produced about 3.6 Mmt of chromite in 1992, which was more than 95% of the amount produced in the former U.S.S.R. In 1991, Kazakhstan reportedly exported 718,000 tons of chromite. Both production and exports of chromite were near peak levels. The Donskoy plant reportedly plans to raise production to 4 Mmt/a.

Copper.—The Dzhezkazgan enterprise in Kazakhstan is the country's largest copper producer with output in 1992 estimated to be 200,000 tons of refined copper. The other major copper refinery in Kazakhstan is at the Balkhash mining and metallurgical complex. With the breakup of the U.S.S.R., Dzhezkazgan is increasing its copper exports, with exports having grown from 35,000 tons in 1987 to 115,000 tons in 1990 and 1991.

Gold.—Kazakhstan reportedly produced 24 tons of gold in 1992. The majority of this gold was produced as a byproduct of copper and lead-zinc mining. A Canadian company, Gold Belt Resources, is to participate in processing gold from slag heaps from the Leninogorsk polymetallic mining complex. These slag heaps reportedly contain about 85 tons of gold and 650 tons of silver.

The country's major gold-producing consortium, Kazalmazzoloto, together with the National State Bank of Kazakhstan, drew up a program for quadrupling Kazakhstan's gold production by 1997. Kazakhstan, through this program, intends to form a stable gold reserve, initiate jewelry production, and produce industrial goods with gold components.

Ferroalloys.—The Yermak ferroalloy plant has the capacity to produce 700,000 mt/a of ferrosilicon and 400,000 mt/a of ferrochromium. The Yermak plant also produces tantalum and ferrosilicochromium. Approximately 150,000 mt/a of ferrosilicon is consumed in Kazakhstan, and the rest is shipped either to other C.I.S. countries or abroad. The other producer of ferrochrome in Kazakhstan is the Aktyubinsk plant, with total ferrochromium output in 1992 of 250,000 tons.

Lead-Zinc.—Kazakhstan was producing about 70% of the lead and 50% of the zinc output of the former U.S.S.R. All of Kazakhstan's lead was smelted at the Ust-Kamenogorsk metallurgical plant, which sells its lead both inside and outside Kazakhstan, but its major consumers are in Russia. After the collapse of the U.S.S.R., the Ust-Kamenogorsk plant established preferential prices for consumers in Kazakhstan that were 17% to 35% lower than those for consumers outside the country. However, in 1993 Ust-Kamenogorsk raised its prices for domestic consumers to eliminate this preferential system, which the Russians claimed was discriminatory.

Silver.—Kazakhstan reportedly produced 49.4% of the silver output in the former U.S.S.R. in 1991. Silver production was a byproduct of nonferrous metals production and in 1991 had reached about 1,000 mt. In 1992 silver output was estimated to have decreased by 10%. Byproduct silver was produced at the Ust-Kamenogorsk, Leninogorsk, and Chimkent metallurgical plants. Kazakhstan reportedly contains 25.9% of the silver reserves of the former U.S.S.R.

Titanium.—The Ust-Kamenogorsk plant, with an estimated capacity of 35,000 mt/a of titanium sponge, produced 40% of the titanium sponge in the former U.S.S.R. All raw material for titanium production came from Ukraine and Russia, which caused raw material shortages at Ust-Kamenogorsk.

The Kazakhstan Government drew up a program for the development of its titanium industry. The program calls for the development of ilmenite deposits, including the Kara-Otkel and Peschanka deposits in eastern Kazakhstan and the Shokash ilmenite-zirconium deposits in the Aktyubinsk region of Kazakhstan. The program further calls for the renovation and expansion of current metallurgical facilities at Ust-Kamenogorsk with the goals of increasing sponge production capacity by 25% and creating titanium dioxide production capacity.

Industrial Minerals

Diamonds.—The Tselinny chemical complex, one of Kazakhstan's uranium processing complexes, reportedly was planning to develop the Ozernoye industrial diamond deposit and to construct processing and cutting plants. The deposit will be developed by open pit mining. Foreign investment was being sought to implement the project.

Mineral Fuels

Petroleum.—In 1992, Kazakhstan extracted 25.66 Mmt of crude oil in comparison with extraction of 26.4 Mmt in 1991. Kazakhstan exported 4.391 Mmt of oil to countries outside the former U.S.S.R. in 1992. Plans reportedly call for increasing oil production to 90 to 100 Mmt/a by the year 2000. The U.S. firm Chevron has negotiated to develop the Tengiz oil deposit in Kazakhstan, which will be responsible for a good deal of the increased output. Domestic consumption will be in the range of 26 to 27 Mmt/a, with the rest of the projected production available for export.

Kazakhstan has estimated reserves of 4.5 billion tons of oil. These include 2.12 billion tons of explored oil reserves (economic reserves under the Soviet system of reserve classification) and 688 Mmt of explored gas condensate reserves. At present in Kazakhstan, 160 oilfields and gasfields have been discovered, including 81 oilfields, 27 gasfields with associated oil, 7 gas condensate fields, 5 oilfields with gas deposits, 21 oilfields with gas condensate deposits, and 19 gasfields. Of these, 58 fields currently are under development. Most of the explored fields are in the Caspian Sea Basin and are characterized as having difficult geological conditions. Developing these fields requires equipment and technology that Kazakhstan lacks, and Kazakhstan therefore is seeking the participation of foreign investors in the development of these fields.

Uranium.—Kazakhstan had been extracting about 30% of the uranium produced in the former U.S.S.R.; in 1992, Kazakhstan reportedly extracted about 3,000 tons. However, it is not know if this amount still represented about 30% of the total output of the countries of the former U.S.S.R. Kazakhstan was planning to market uranium in the United States and Europe. Uranium production came from three deposits: the Stepnogorsk, which supplied the Tselinny chemical plant in northern Kazakhstan; the Shevchenko, which supplied the Prikaspisky ore enrichment center in western Kazakhstan; and the Taboshara deposit in southern Kazakhstan.

Reserves

Kazakhstan has large reserves of a wide range of important mineral commodities. These reserves have made Kazakhstan one of the most important mineral producing countries of the former U.S.S.R. Actual reserve figures or reserve estimates, however, currently are not available for most of these mineral commodities, which are nonferrous metals and hydrocarbons for which the former U.S.S.R. classified reserve figures as state secrets.

INFRASTRUCTURE

Kazakhstan, which is approximately four times as large as the State of Texas,

is the second largest country in land area and fourth most populous to form from the former U.S.S.R. Kazakhstan borders Russia to the north, China to the east, and Kyrgyzstan, Uzbekistan, and Turkmenistan to the south. Although landlocked, Kazakhstan borders two major inland seas, the Aral and the Caspian. The Aral Sea, however, is drying up as a result of a major environmental catastrophe. The result is the contamination of agricultural lands and populated regions with salts and contaminants blown from the dry sea bottom, and climate changes that are less conducive to agriculture, including hotter temperatures and less rainfall.

Major lakes in Kazakhstan include the Balkhash, Zaysan, and Alakol. There are about 4,000 km of navigable river routes. The major rivers are the Irtysh, Syrdarya, Ishim, Ili, and Chu; these rivers are important sources of hydroelectric power and provide water for irrigation.

As of 1990 Kazakhstan had 14,460 km of railroads not including industrial lines and 189,000 km of highways, of which 80,900 km was dirt roads. The country had 3,300 km of oil pipelines and 2,100 km of gas pipelines.

Covering a large area, Kazakhstan extends from the Volga River to the Altai Mountains and from plains in western Siberia to desert in Central Asia. The climate in Kazakhstan has wide temperature variations both between the northern and southern parts of the country and between summer and winter temperatures. In the coldest northern regions winter temperatures average -20° C in comparison with -1° C in the south while in summer the climate in the northern part averages 18° C while in the south it averages 29° C.

The population of Kazakhstan is almost evenly split between Kazakhs and Russians, with each comprising about 40% of the total population. The remaining ethnic groups are primarily other Slavic groups and German Russians.

OUTLOOK

The outlook for Kazakhstan's mineral industry could be quite favorable given the size and variety of its mineral reserves and that Kazakhstan has a wide range of mineral commodities that it produces in excess of its consumption needs, which could be exported. Most of these minerals still are exported to the C.I.S. countries, particularly Russia, but a larger percentage of these minerals now is being shipped to world markets. Kazakhstan has the potential to be a much larger supplier of minerals to world markets if it diverts trade from the C.I.S. and further develops its mineral reserves. For example, Kazakhstan is now one of the world's leading producers of chromite and will be increasing its chromite output. Although most of its chromite output formerly was for consumption in the U.S.S.R. and East Europe, if this chromite instead was to be supplied to world markets, Kazakhstan's increased chromite exports could have a major effect on world chromite markets.

The major issue for Kazakhstan will be whether it will continue to trade the majority of its mineral output within the C.I.S. or whether it will attempt to sell these mineral commodities on world markets. Several factors are important. As Kazakhstan makes the transition to market economy criteria, it is not yet clear what percentage of its mineral production would be economically competitive under market economy conditions, particularly given the cost of transporting these minerals to world markets. Also, by trading its minerals within the C.I.S., Kazakhstan is able to obtain a large number of commodities needed by other sectors of its economy at below world market prices and may consider this as favorable terms of trade.

Also, a number of Kazakhstan's mineral industries will require substantial investment to become major world suppliers. For example, Kazakhstan has large petroleum reserves that require considerable investment and state-of-the-art technology to develop. The exploitation of Kazakhstan's large petroleum reserves already is being planned with the participation of Chevron Corp. of the United States, and this development will be a significant source of fuel and hard currency earnings. Kazakhstan now has significant production of a wide range of ferrous and nonferrous metals and is capable of increasing production of these metals if investment is made in developing deposits and mines and in renovating metallurgical facilities. It still remains to be seen whether foreign investors can be attracted to participate in the development of some of Kazakhstan's major mineral industries, including its copper and lead-zinc industries. Kazakhstan's future as a major world mineral producer will depend in large measure on its ability to attract investment to develop and renovate its mineral industries.

TABLE 1
KAZAKHSTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
METALS	
Alumina	1,100,000
Arsenic trioxide	3,000
Bauxite	500,000
Beryllium, metal	(1)
Bismuth	55
Cadmium	1,000
Chromite	3,600,000
Copper:	
Mine output, metal content	300,000
Metal:	
Smelter	275,000
Refined	275,000
Ferroalloys:	
Ferrochromium	600,000
Ferrosilicon	600,000
Gold	24
Iron and steel:	
Pig iron	4,300,000
Steel, crude	5,800,000
Steel, finished	4,100,000
Iron ore, marketable	17,300,000
Lead:	
Mine output, metal content	170,000
Metal: Smelter	200,000
Magnesium	20,000
Manganese ore, marketable	35,000
Molybdenum, mine output, metal content	5,000
Silver	900
Tin, mine output, metal content	500
Titanium, metal	25,000
Tungsten concentrate, W content	500
Zinc:	
Mine output, metal content	250,000
Metal	240,000
INDUSTRIAL MINERALS	
Asbestos, all grades	1,000,000
Barite	200,000
Boron	100,000
Cement	6,000,000
Fluorspar	100,000
Phosphate rock	12,000,000
Sulfur	200,000
MINERAL FUELS	
Coal	127,000,000
Natural gas, million cubic meters	8,800
Petroleum, crude	25,660,000
Uranium concentrate, U content	3,000

TABLE 2
KAZAKHSTAN: REPORTED MINERAL EXPORTS IN 1992

(Metric tons)

Commodity	Quantity
Chromite	718,000
Coal	581,000
Copper	105,600
Lead	55,800
Oil	4,391,000
Zinc	73,500

TABLE 3

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity
Alumina	Pavlodar alumina refinery	Pavlador	1,200,000.
Arsenic, trioxode	Chimkent polymetallic enterprise and other nonferrous metallurgical enterprises	Chimkent	3,500.
Asbestos	Dzhetygara complex	Kustanay oblast	2,000,000 total.
Do.	Chilisay complex	Aktyubinsk phosphorite basin	
Barite	Karagailinskiy mining and beneficiation complex	Karagaili region	300,000 total.
Do.	Tujuk Mine	Alma-Ata region	
Do.	Achisay polymetallic complex	Kentau region	
Bauxite	Turgai, Krasnooktyabr bauxite mining complexes	Central Kazakhstan	600,000 total.
Beryllium, metal	Ulbinskiy metallurgical plant	Ust-Kamenogorsk	NA.
Bismuth, metal	Ust-Kamenogorsk lead-zinc metallurgical plant	do.	NA.
Do.	Leninogorsk Lead Smelter	Leninogorsk	NA.
Cadmium	Leninogorsk mining and beneficiation complex	do.	1,200.
Chromite	Donskoy mining and beneficiation complex	Khromtau region	3,800,000.
Coal	Karaganda basin	Central and North Central part of the country	50,000,000.
Do.	Ekibastuz basin	do.	85,000,000.
Do.	Maykuben basin	do.	10,000,000.
Do.	Turgay basin	do.	1,000,000.
Copper, mining, recoverable copper content	Balkhash	Balkhash region	50,000.
Do.	Dzhezkazgan	Dzhezkazgan region	250,000.
Do.	Irtysh	Irtysh region	10,000.
Do.	Leninogorsk	Leninogorsk region	16,000.
Do.	Zhezkent	Zhezkent region	25,000.
Do.	Zyryanovsk mining and beneficiation complexes	Zyryanovsk region	5,000.
Do.	East Kazakhstan copper-chemical complex	Ust-Kamenogorsk region	12,000.
Copper: Metallurgy, metal	Balkhash	Balkhash region	200,000.
Do.	Dzhezkazgan	Dzhezkazgan region	250,000.
Do.	Irtysh smelting and refining complexes	Irtysh region	40,000.
Ferroalloys	Aktyubinsk plant	Aktyubinsk	High-carbon 60% ferrochrome, 150,000; medium-carbon 60% ferrochrome, 130,000.
Do.	Yermak plant	Yermak	Ferrosilicon, 700,000; ferrosilicochrome, 700,000; high-carbon ferrochrome, 400,000.
Gallium	Pavlodar alumina plant	Pavlodar	NA.
Gold	Byproduct of polymetallic ores and native gold mining	Colocated with nonferrous metals mining	35.
Iron and steel:			
Pig iron	Karaganda Steelworks	Karaganda	5,100,000.

TABLE 3—Continued

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity[e]
Iron and steel—Continued:			
Steel, crude	Karaganda Steelworks	Karaganda	6,300,000.
Steel, finished	do.	do.	4,700,000.
Iron ore, marketable	Sokolovsko-Sarbayskiy, Lisakovskiy mining and metallurgical complexes	Kustanay oblast	25,000,000 total.
Lead and zinc, mining: (recoverable lead and zinc content of ore)	Achisay	Kentau and Karatau regions	Lead 40,000, zinc 20,000.
Do.	Akchatau	Balkhash region	Lead 10,000, zinc 30,000.
Do.	Irtysh	Ust-Kamenogorsk region	Lead 10,000, zinc 50,000.
Do.	Karagaili	Karagaili region	Lead 20,000, zinc 55,000.
Do.	Leninogorsk	Leninogorsk region	Lead 60,000, zinc 120,000.
Do.	Tekeli	Tekeli, Taldi-Kurgan regions	Lead 20,000, zinc 30,000.
Do.	Zhayrem	Zhayrem region	Lead 30,000, zinc 50,000.
Do.	Zhezkent	Semipalatinsk region	Lead 10,000, zinc 30,000.
Do.	Zyryanovsk complexes	Zyryanovsk region	Lead 20,000, zinc 40,000.
Do.	East Kazakhstan copper-chemical complex	Ust-Kamenogorsk region	Zinc 15,000 (lead currently not recovered).
Metallurgy, metal	Chimkent lead smelter	Chimkent	130,000 (lead).
Do.	Ust-Kamenogorsk lead smelter	Ust-Kamenogorsk	120,000 (lead).
Do.	Leninogorsk electrolytic zinc plant	Leninogorsk	95,000 (zinc).
Do.	Ust-Kamenogorsk electrolytic zinc plant	Ust-Kamenogorsk	220,000 (zinc).
Manganese ore	Atasu deposit	Karaganda oblast	200,000 total.
Do.	Dzhezdy deposit	Dzhezkazgan oblast	
Do.	Ushkatyn deposit	Zhayrem complex	
Molybdenum ore, Mo content	Akchatau tungsten-molybdenum complex	Dzhezkazgan oblast	6,000, total.
Do.	Kounrad Mine	Balkhash complex	
Do.	Karaobinskoye deposit	Karaoba region	
Do.	Sayak deposit	Sayak region	
Metal	Akchatau molybdenum metal plant	Dzhezkazgan oblast	NA.
Petroleum and natural gas	Aktyubinskneft	Aktyubinsk region	27,000,000 (total crude oil), 9 million cubic meters.
Do.	Embaneft	Embinskiy district	
Do.	Mangyshlakneft	Mangyshlak Peninsula	
Do.	Tengiz deposit	Tengiz deposit	
Phosphate rock	Karatau production association	Dzhambul and Chimkent oblast	12,500,000 total.
Do.	Chilisay mining directorate	Aktyubinsk phosphorite basin	
Rare metals (columbium, indium, selenium, telurium)	Belogorsky rare metals plant	Belogorsk	NA.
Do.	Chimkent polymetallic plant	Chimkent	NA.

TABLE 3—Continued

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

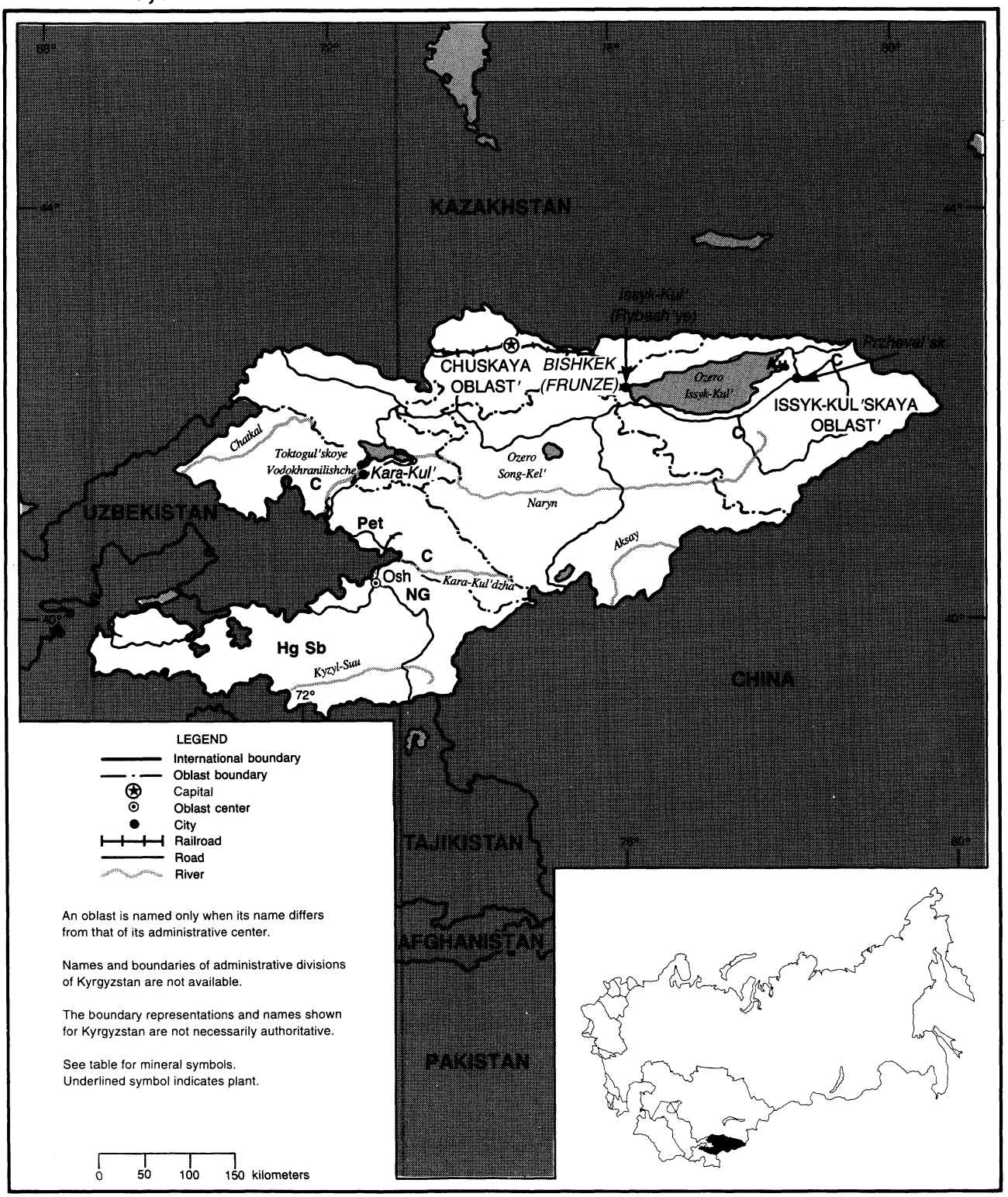
(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity[e]
Rare metals (columbium, indium, selenium, telurium)—Continued:	Ust-Kamenogorsk lead-zinc plant	Ust-Kamenogorsk	NA.
Do.	Akchatau mining and beneficiation complex	Dzhezkazgan oblast	NA.
Rhenium	Balkhash copper mining and metallurgical complex	Balkhash	NA.
Tantalum	Yermak ferroalloy plant	Yermak	NA.
Tin	Akchatau mining and beneficiation complex	Akzhal deposit, Dzhezkazgan oblast	600.
Titanium, metal	Ust-Kamenogorsk titanium-magnesium plant	Ust-Kamenogorsk	35,000.
Silver, byproduct	Ust-Kamenogorsk	do.	1,000 total.
Do.	Leninogorsk	Leninogorsk	
Do.	Chimkent metallurgical plants	Chimkent	
Uranium, U content	Stepnogorsk	Stepnogorsk	6,000 total.
Do.	Shevchenko	Shevchenko	
Do.	Taboshara	Taboshara	
Do.	Prikaspiskiy ore enrichment center	Shevchenko	
Do.	Tselinny chemical complex	Stepnogorsk	

[e]Estimated. NA Not available.

KYRGYZSTAN

AREA 198,500 km² **POPULATION 4.6 million**



THE MINERAL INDUSTRY OF

KYRGYZSTAN

By Richard M. Levine

Kyrgyzstan, like many other former Soviet republics, in 1992 was experiencing economic difficulties owing in part to fuel shortages as Russia increased the price for coal, oil, and gas beyond Kyrgyzstan's ability to pay. As a way out of this dilemma, Kyrgyzstan was seeking foreign investment to develop its oil and gold resources as well as its other mineral resources.

GOVERNMENT POLICIES AND PROGRAMS

Kyrgyzstan's President declared the need to coordinate energy policy and reverse the decline in energy production. He stated that initial Government efforts to replace central ministries with market economy structures did not work because the lack of a previously existing free market sector led to the takeover of the energy complex by monopolistic formations from the old structure, which were not more efficient. He therefore called for resurrecting the old ministries or creating new centralized coordinating bodies.

PRODUCTION

Kyrgyzstan played a leading role in the former U.S.S.R the production of two nonferrous metals, mercury and antimony. Along with some industrial minerals, Kyrgyzstan also produced coal, gas, and oil, but was still significantly dependent on imported energy. Annual oil production of 125,000 tons, coal production of 2.6 million tons, and natural gas production of 55 million cubic meters were far below their consumption levels. Annual oil consumption was about 1.8 million tons, coal consumption 4.3 million tons, and natural gas consumption 2.3 billion cubic meters. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992 the major mineral-producing enterprises in Kyrgyzstan were state owned, although as with all former Soviet republics, plans were being formulated and enacted for some forms of privatization. *(See table 2.)*

COMMODITY REVIEW

Metals

Antimony.—The Kadamzhay plant in Kyrgyzstan was the sole producer of antimony metal in the former U.S.S.R.; it has the capacity to produce up to 20,000 tons of antimony per year. Russia in the past had supplied Kadamzshay with 70% of its raw material, with 12% supplied by Tajikistan and 18% supplied by local Kyrgyzstan sources. Russia received up to 12,000 tons per year of antimony from Kadamzhay. With the breakup of the U.S.S.R., the raw material supply for Kadamzhay is no longer secure, and Russia is planning to construct its own antimony production facilities.

Gold.—Gold production in Kyrgyzstan reportedly was 4 to 5 tons per year [according to a report in the Interfax Mining Report, December 4-11, 1992, pp. 2,3] but the year for this production was not specified. A report from Kyrgyzkabar via ITAR-TASS news agency, Moscow, world service in english, 22 Dec. 92 reported that Kyrgyzstan's gold production in 1992 was just over 1 ton compared with more than 2 tons in 1991.

Kyrgyzstan was seeking foreign investment to help develop its gold industry, and in 1992 Cameco Corp. signed an agreement to develop the Kumtor gold deposit in the Issyk-Kulskiy region of the country. It was reported to be the third largest gold deposit in the former U.S.S.R. Reserves at Kumtor are estimated at 360 tons.

The Kyrgyzkumtor joint venture was formed to exploit this deposit with Kyrgyzstan's Kyrgyzzoloto having a 66.5% interest and Cameco a 33.5% interest. Gold output from Kumtor is projected to be 16 tons per year. The average gold content of Kumtor ore is reportedly 4.4 grams per ton, and the ore also has a silver content of 2 grams per ton and a tellurium content of 9.7 grams per ton; the ore has a 4% sulfur content and 0.14% tungsten content. The deposit will be developed by open pit mining down to 650 meters and then developed by underground mining.

Kyrgyzstan reportedly also has a number of other significant gold deposits, including the Dzheruy deposit suitable for open pit development with reserves of 70 tons with the gold content of the ore averaging 6 grams per ton; the Makmal deposit suitable for open pit development with reserves of 50 tons averaging 10 to 12 grams per ton; and the Taldybulak deposit, which is in the initial stage of underground development with reserves of 60 tons averaging 7 to 8 grams per ton. All of these deposits including Kumtor are suitable initially for open pit

exploitation.

At yearend, Kyrgyzstan reportedly produced its first gold at a metallurgical shop in the Chuy Valley. The shop was said to be capable of producing 30 tons of gold per year of 99.99% purity.

At the start of 1993, all of Kyrgyzstan's gold mining enterprises were combined into one concern called Kyrgysaltyn. The previous system, it was claimed, whereby gold was mined by a number of separate enterprises, led to the uncontrolled export of precious and rare-earth metals.

Mercury.—Kyrgyzstan in the mid-1980's produced about 600 tons of mercury per year which was 70% of the mercury metal output of the former U.S.S.R. Kyrgyzstan had been shipping its entire mercury output to Russia. Russia is now planning to develop its own mercury metal production based on Russian raw material, which 67 will fully satisfy Russia's mercury needs. Kyrgyzstan's mercury reserves are estimated to be 25,000 tons of mercury contained in the Chonkoyskoye and Chauvayskoye deposits.

Uranium.—The Kara-Balta plant, which specialized in the production of enriched uranium, was converted to gold production. Kyrgyzstan has a number of uranium ore mines, including those near the Issyk-Kul Lake, in Min-Kush in central Kyrgyzstan, in Kadji-Say in eastern Kyrgyzstan, and in Tyuamuyun in southern Kyrgyzstan.

Reserves

Kyrgyzstan has significant reserves of a number of mineral commodities, but data are not yet available to make adequate estimates of these reserves. Kyrgyzstan's most significant reserves in terms of value are its gold reserves, which reportedly exceed 500 tons in deposits slated for development. However, Kyrgyzstan also has reserves of metals, including antimony, bauxite, copper, iron, lead and zinc, mercury, tin, and tungsten; of industrial minerals, including barite, fluorspar, magnesite, salt, talc, and a range of construction materials, precious and semiprecious stones including rubies, topaz and many other types; and fuels including coal, gas, oil, oil shale, and peat.

INFRASTRUCTURE

Kyrgyzstan is a landlocked country bordering Tajikistan and China to the south, Uzbekistan to the east, and Kazakhstan to the north. The major form of transport is truck transport. As of 1990, Kyrgyzstan had 30,300 kilometers of roads, of which 22,600 was paved or graveled, and only 370 kilometers of railroad lines. More than 97% of freight transport was by truck. A gas pipeline passes through Kyrgyzstan from Uzbekistan to Kazakhstan. Kyrgyzstan is a mountainous country with mountains comprising three-fourths of its territory. Many of the major mineral deposits are in mountainous regions with difficult transport problems.

OUTLOOK

Kyrgyzstan has large gold reserves slated for development, which should provide a significant source of hard currency earnings. The future of several of Kyrgyzstan's other major mineral industries, however, is in doubt. Its antimony industry was dependent on ores imported primarily from Russia, and Russia is now planning to construct its own facilities to process these ores. Even if Kyrgyzstan could find a new source of antimony raw materials for its metallurgical plant, either by developing domestic deposits or receiving foreign supplies, it would have a difficult time profitably marketing antimony on world markets because of the large supply of antimony already being provided by China. Kyrgyzstan's main customer for mercury, Russia, is planning to develop its own metallurgical facilities to process Russian ore and make Russia self-sufficient in mercury. With the world-wide decreasing demand for mercury, it does not seem likely that Kyrgyzstan easily will find other outlets for its mercury production. Therefore, without Russia as its main supplier of raw materials for antimony and main customer for antimony and mercury metal, it is doubtful as to whether Kyrgyzstan could continue to produce its present quantities of mercury and antimony.

TABLE 1
KYRGYZSTAN: ESTIMATED PRODUCTION OF MAJOR MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Antimony:	
Mine output, metal content	2,000
Metal	11,000
Cement	1,000,000
Gold	1
Mercury:	
Mine output, metal content	300
Metal	400
Natural gas, million cubic meters	100
Petroleum, crude	90,000

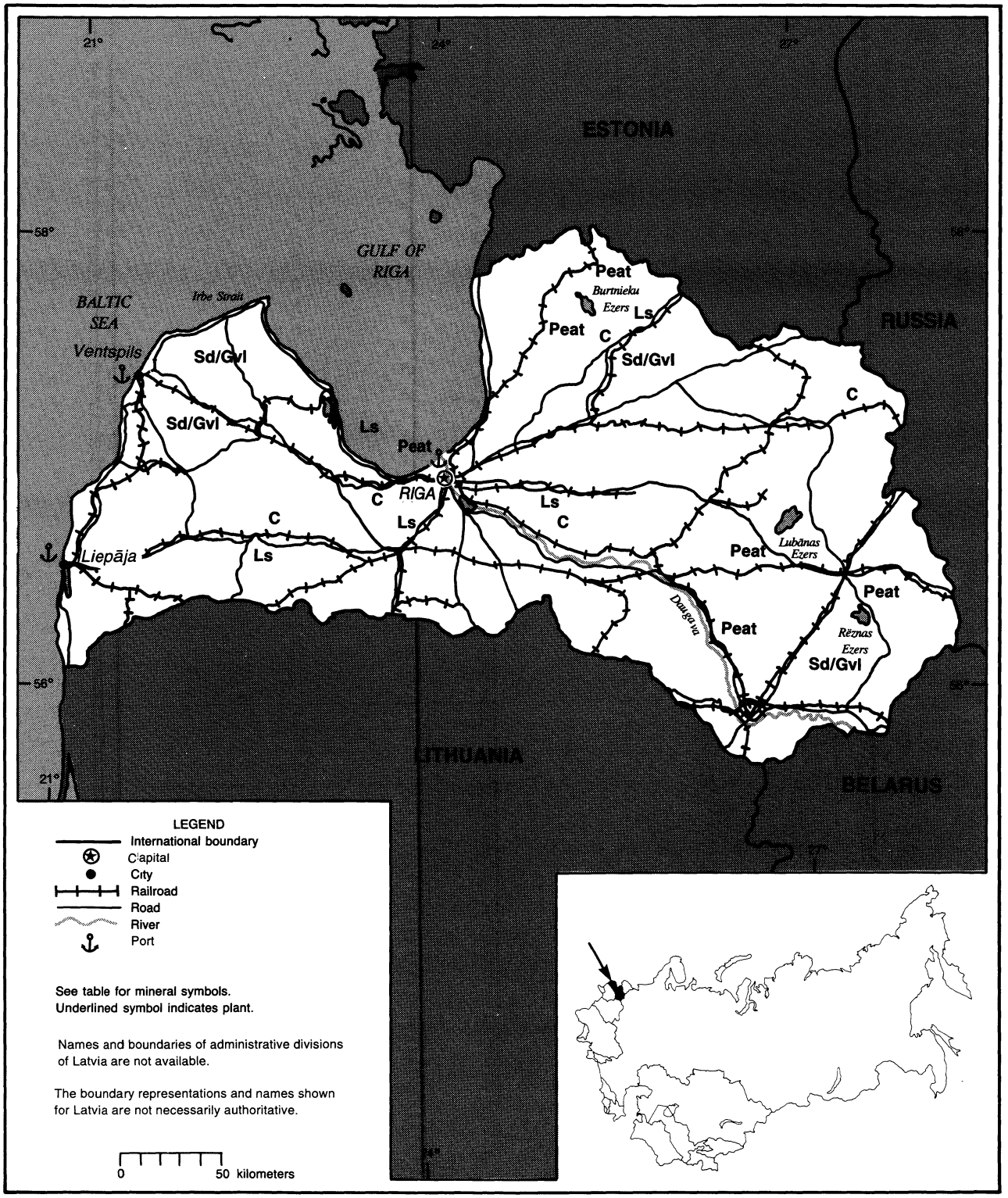
TABLE 2
KYRGYZSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Antimony, metal	Kadamzhay mining and metallurgical complex	Kadamzhay	20,000.
Cement	Kantskiy cement plant	Kantskiy region	1,500,000.
Gold	Kyrgyzstan gold mining complex	Toguz-Toro intermontaine basin of Tien Shan Mountains	5.
Mercury, metal	Khaydarkan mining and metallurgical complex	Khaydarkan	650.
Natural gas and petroleum, million cubic meters	Approximately 300 wells: major deposits include Changyr-Tashskoye	Western Kyrgyzstan near Mayli-Say	150 (natural gas).
Do. do.	Izbaskentskoye, Mayli-Suyskoe, Chigirchikskoye Karagachskoye, Togap-Beshkentskoye, Suzaskoye	do.	150,000 (petroleum).

LATVIA

AREA 64,100 km² **POPULATION 2.7 million**



THE MINERAL INDUSTRY OF

LATVIA

By Richard M. Levine

Latvia has a small mineral industry engaged primarily in mining peat and industrial minerals, including clays, dolomite, gypsum, limestone, sand for glass and brick production, and sand and gravel for construction uses. Latvia supplies about 85% of the raw materials for its cement industry. In the mid-1980's, reportedly, there were 3 clay mines producing clay suitable for light concrete aggregates, 14 enterprises producing bricks and drainage pipes, 85 peat deposits under exploitation producing peat for both fuel and agricultural use, a gypsum mining and processing complex, a number of dolomite mines, and 22 sand and gravel pits.

GOVERNMENT POLICIES AND PROGRAMS

Latvia was dependent on imported fuel for practically all of its energy requirements and was experiencing serious energy shortages in 1992. Latvia planned to privatize its state oil supply enterprise, Latvijas nafta, to eliminate its monopoly status. With privatization it was believed there would be greater responsiveness to averting fuel shortages. Plans called for the state to retain five oil depots for storage of strategic reserves.

PRODUCTION

Owing to energy supply problems and other economic difficulties that followed the breakup of the U.S.S.R., it is estimated that there was a decrease in mineral production. However, it also is estimated that peat production did not decline significantly as the peat industry would supply Latvia with a badly needed fuel. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, most major mineral-producing enterprises in Latvia were state owned, although as with all former Soviet republics, plans were being formulated and enacted for the privatization of enterprises. *(See table 2.)*

RESERVES

Reserves in Latvia were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

INFRASTRUCTURE

Latvia is bounded on the west by the Baltic Sea and Gulf of Riga, to the north by Estonia, to the south by Lithuania, and to the east by Russia and Belarus. Latvia is one of the major outlets for exports of raw materials from the countries of the former U.S.S.R. from its ports of Ventspils and Liepaya on the Baltic Sea, Riga on the Gulf of Riga, and the city of Daugavpils on the Daugava River, which flows to Riga. There is about 2,400 kilometers of rail lines and 59,500 kilometers of roads, of which 33,000 kilometers is hard surfaced. Crude oil and refined products are shipped to Latvia via pipeline. The population of Latvia is 52 % Latvian and 34% Russian, with the remaining nationalities Belarussian, Ukrainian, Polish, and others.

OUTLOOK

Latvia has to find a means of acquiring affordable fuel and other mineral raw materials. When Latvia became free of Soviet control, it lost access to its supply of minerals at subsidized prices, which has caused considerable hardship for the Latvian economy. The question that is now central for the Baltic states as well as the other countries of the former U.S.S.R. is the forms of economic and political cooperation that they will seek with each other and with the rest of the world to alleviate the serious problems caused by the breakdown in the former Soviet supply system and the loss of former Soviet bloc markets.

One major source of revenues from minerals has been the transshipment from Latvia of minerals produced in Russia and other new countries of the former U.S.S.R. to world markets. A percentage of these shipments was made without the authorization of the governments of the countries where the mineral production occurred. Revenues from these shipments could be lost to Latvia if the countries of the former U.S.S.R. are able to exert tighter controls over mineral exports.

TABLE 1
LATVIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Cement	400,000
Clays (cubic meters)	700,000
Gypsum	350,000
Limestone	1,000,000
Peat	3,500,000
Sand and gravel cubic meters	1,500,000
Industrial silica sand (for silica bricks) do.	50,000
Industrial silica sand (for glass)	30,000

TABLE 2
LATVIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Major commodity	Major operating companies	Location of main facilities	Annual capacity
Clays (for cement)	Broceni, Liberty deposits	Broceni region	325,000 total for both deposits.
Gypsum	Saurieshi deposit	Southeast of Riga	500,000.
Limestone (for cement)	Satini-Sesile deposit Kumas deposit	Broceni region	325,000 total for both deposits.
Peat	Production at 85 deposits, the largest of which are Lielays, Medema, Olgas, Sedas, and Skrebelyu-Skruzmanyu	Northeastern and southeastern parts of the country	4,000,000 total.
Sand and gravel	Production at 22 open pits, the largest of which are the Garkalane, Ellerne, Yaunsaty, Yanopolye-Tuchi, and Kurzemye	Deposits located in all regions of the country	2,000,000 total.

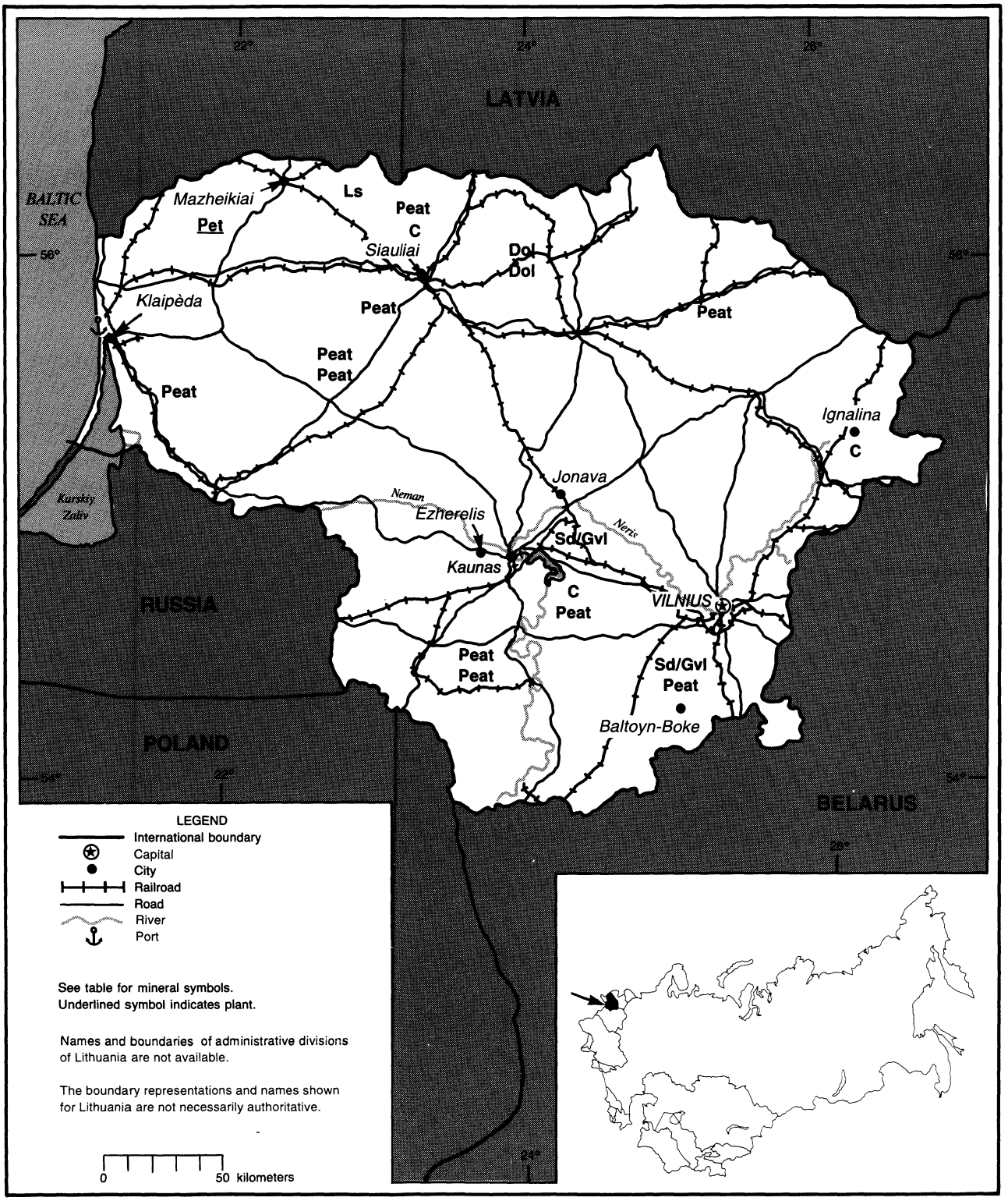
TABLE 3
LATVIA: RESOURCES OF MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Quantity
Clays for cement	10,100
Clays for ceramics, cubic meters	79,100,000
Gypsum	715,000
Peat	346,000

LITHUANIA

AREA 65,200 km² **POPULATION 3.8 million**



THE MINERAL INDUSTRY OF

LITHUANIA

By Richard M. Levine

Lithuania's mineral industry mined primarily peat and industrial minerals used in construction, including dolomite, clays, limestone, and sand and gravel. Although not a major mineral producer, Lithuania in 1992 served as a major transshipper to Western markets of minerals from Russia and other countries of the former U.S.S.R. Mineral shipments from Lithuania were not subject to the control of Russia or other states of the former U.S.S.R., and by shipping minerals from Lithuania and other Baltic States it was possible to circumvent these Governments' export regulations.

Lithuania suffered a serious shortage of energy in 1992; oil, natural gas, coal, and fuel for the Ignalina nuclear powerplant had to be purchased at world prices, and accordingly, there was a significant decline in economic activity. Regarding Lithuania's energy balance for fossil fuels, imported petroleum products accounted for 70% of the fossil fuel energy requirements, imported natural gas 16%, and imported hard coal 14%. Sales of industrial goods in 1992 were only 51.6% of the 1991 level. In an effort to conserve energy, the Government authorized local authorities to limit supplies of hot water and reduce home heating, which resulted in considerable hardship for the population.

PRODUCTION

The mining industry of Lithuania extracted peat and industrial minerals, including clays and sand and gravel. The industrial minerals industry was of significant magnitude as Lithuania ranked fourth among the republics of the former U.S.S.R. in the production of lime, fifth in the production of cement, and sixth in the production of bricks. There were more than 290 enterprises engaged in the production of industrial minerals and more than 240 sand and gravel deposits under exploitation. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, most major mineral-producing enterprises in Lithuania were state owned, although as with all former Soviet republics, plans were being formulated and enacted for the privatization of enterprises. *(See table 2.)*

COMMODITY REVIEW

Metals

The Chairman of Lithuania's state bank announced that Lithuania's gold supply totaled 5.78 tons, of which 2.9 tons was kept in Great Britain, 2.2 tons in France, and 0.5 ton in Switzerland. The location of the remaining gold was not reported.

This gold had belonged to Lithuania before 1940 and had been deposited in Western banks. When Lithuania regained its independence from the former U.S.S.R., the gold was returned.

Minerals Fuels

Peat.—Peat was extracted by 11 enterprises exploiting 55 deposits. Large enterprises included the Siauliai, which exploited the Didisis-Tiryalis and Sulinkiu deposits; the Yezherelskoe, which exploited the Yezherelis and Palyes deposits; the Ionavskoe, which exploited the Paraystis and Didisis-Raystas deposits; and the Baltoyi-Bokeskoye, which exploited a deposit of the same name.

Petroleum.—Oil exploration had been under way in Lithuania for more than 30 years. Explored oil reserves are reportedly 8 million tons with the resource base reportedly 47 million tons. The Mazheikiai oil refinery was built with plans for extracting oil in Lithuania. In 1992, Lithuania produced only 63,700 tons of oil. Foreign investment was being sought for future oil development. The Mazheikiai oil refinery in Lithuania was the only refinery in the Baltic States. Owing to cutbacks in oil supplies from Russia, only 40% to 50% of the refinery's capacity of 12 million tons was utilized in 1992. Russia supplied Lithuania with 5.5 million tons of oil in 1992, according to the terms of an intergovernmental agreement. For 1993, the Lithuanian state oil enterprise, Nafta, signed an agreement with the Russian firm LUKoil to supply the Mazheikiai refinery with 6 million tons of oil. According to the contract, 20% of the refinery products will go to Lithuania and the remaining 80% will be marketed in Russia.

The Government of Lithuania established a site for a new marine oil terminal. It will consist of three parts. Oil residue tanks are planned to be placed at the present oil terminal in the port of Klaipeda, main oil tanks are to be constructed at Kopustai, and buffer vessels and pumping stations will be at Melnrage near Klaipeda. The U.S. firm Fluor Daniel International Corp. will participate in the design and construction of the new terminal. Projected completion time is 4 years.

RESERVES

Reserves in Lithuania were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

OUTLOOK

Lithuania is engaged in a difficult process of economic transformation and is assessing its economic relations, including its mineral supply needs, in terms of both its long-range goal of becoming a market economy country integrated with the market economy countries of Europe, and its present necessity to receive a significant portion of its fuel and raw material requirements from the countries of the former U.S.S.R. The pace of this transformation is one of the major political as well as economic problems confronting Lithuania. The raw material supply situation, particularly for fuels, is a crucial element in these considerations. Without adequate fuel supplies from Russia, Lithuania has found it difficult to generate economic growth and to prevent economic decline and a lowering of the living standard. Therefore, Lithuania will be seeking to maintain its mineral supplies from Russia and other countries of the former U.S.S.R. and will be engaged in both economic and political decisions as to how to best achieve its goal of economic transformation while preventing economic hardships and disruptions.

TABLE 1
LITHUANIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity	1992
Cement	2,000
Clays:	
Clays (for bricks) million cubic meters	.7
Clays (for concret aggregates) do.	.3
Cement	800
Limestone	5,000
Peat	1,500
Sand and gravel million cubic meters	15
Sand, glass	80

TABLE 2
LITHUANIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Cement	Akmyantsementas enterprise	Akmyane	2,500.
Clays (for brick production) cubic meters	Production at 19 deposits with the largest production facilities: The Daugelskoye plant exploiting the Daugelai deposit	Daugelai	1,500,000 (total for 19 deposits).
Do. do.	The Ignalinskoye plant exploiting the Dinsa deposit	Ignalina region	
Do. do.	The Tauragskoye deposit exploiting the Taurage deposit	Taurage region	
Clays (for concrete aggregates)	Krunay deposit	Krunay region in central Lithuania	500.
Clays (for cement)	Saltiniskiai deposit	Saltiniskiai region	2,000.
Limestone	Karpenai deposit for cement production	Karpenai region	8,000.
Peat	Production at 11 enterprises exploiting 55 deposits. Largest enterprises are: Siauliai exploiting Didisis-Tiryalis and Sulinkiu deposits	Siauliai region	350.
Do.	Ezherelskoye exploiting Ezherelis and Pales deposits	Ezherelis region	400.
Do.	Ionovskoye exploiting Paraistis and Disisis-Raystas deposits	Paraistis region	300.
Do.	Baltoyi-Bokeskoye exploiting Baltoyi and Vokeskoye deposits	Baltoyi-Boke region	300.
Petroleum products	Mazheikiai petroleum refinery	Mazheikiai	12,000.
Sand and gravel cubic meters	246 deposits under exploitation. Largest enterprises: Trakaijskoye association exploiting Serapinishkes deposit	Trakai region	3,000 (total for 246 deposits).
Do.	Rizgonskiy plant and Yurbarkskiy plant exploiting Rizgonys and Kalnenay deposits	Rizgonys region	
Sand (for glass)	Anyksciai deposit	Anyksciai	150.

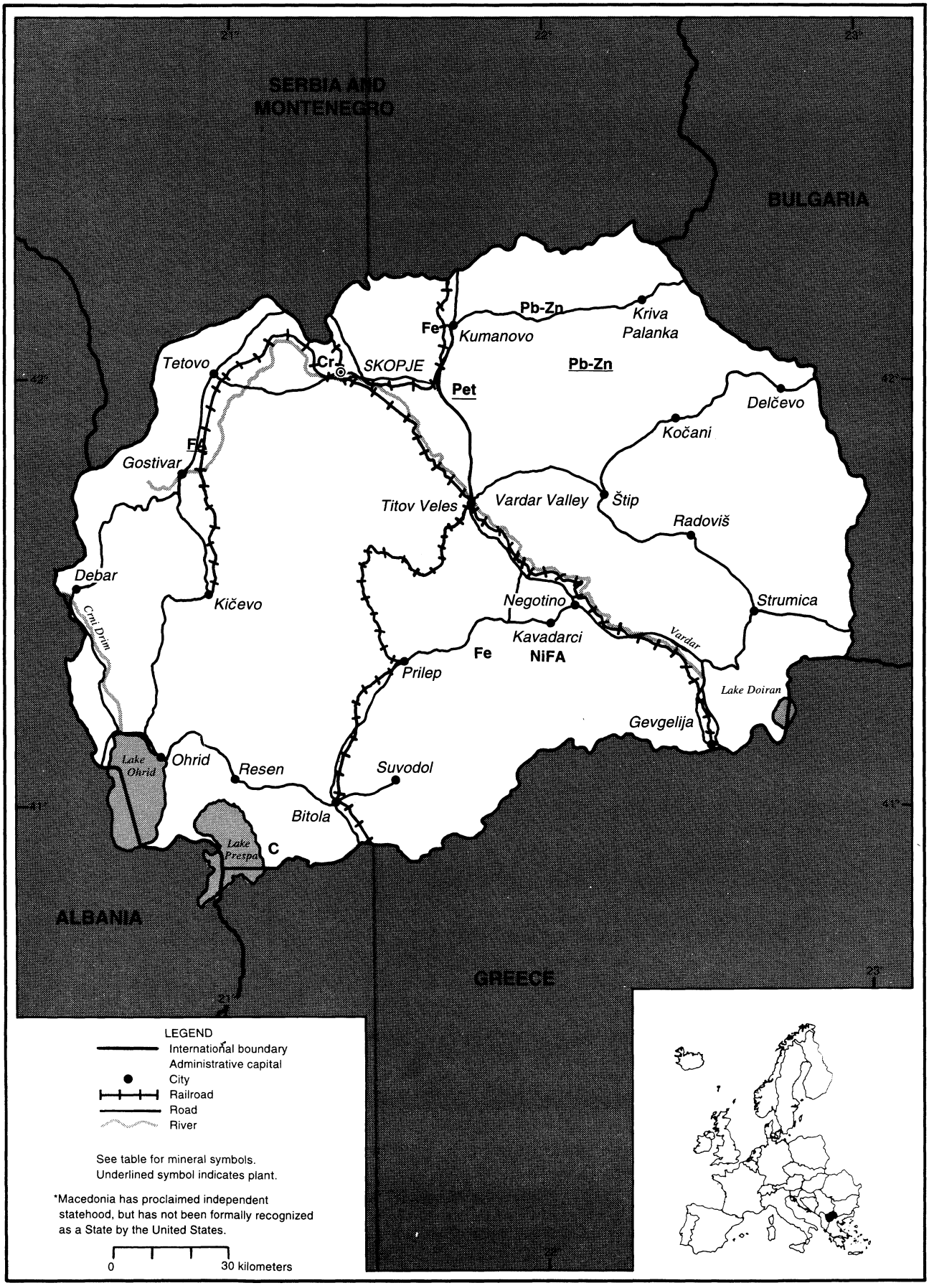
TABLE 3
LITHUANIA: RESOURCES OF MAJOR MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Resources
Limestone	277,000
Peat	327,000
Clays (for bricks) cubic meters	70,000,000
Sand and gravel do.	408,000,000

Macedonia*

AREA 25,333 km² **POPULATION 2.2 million**



THE MINERAL INDUSTRY OF

MACEDONIA

By Walter G. Steblez

In 1992, the Federal Republic of Yugoslavia, as an internationally recognized entity, ceased to exist. The civil war that began in the second half of 1991, involving the Federal Government (supported by the Republics of Serbia and Montenegro) and the Republics of Croatia and Slovenia, spread to the Republic of Bosnia and Hercegovina in 1992. Although the fighting between the Federal Government of Yugoslavia and the Republics of Slovenia and Croatia, respectively, ceased and subsided by mid-1991 and early 1992, heavy and almost continuous military actions were conducted throughout the year in Bosnia and Hercegovina between ethnic factions of Bosnians, Croatians, and Serbians over the control of large areas of Bosnia and Hercegovina that included several of the major industrial cities within the former Yugoslavia. While the Republics of Bosnia and Hercegovina, Croatia, Macedonia, and Slovenia seceded from the Yugoslav union, Serbia and Montenegro continued to preserve a Federal union, claiming continuity as the Federal Republic of Yugoslavia. However, neither the Government of the United States nor the governments of most of the members of the international community recognized this claim. Following secession from Yugoslavia in early 1992, Macedonia encountered serious difficulties in respect to international recognition, owing to Greece's demand that the term "Macedonia" be applied only to the northern province of Greece bordering the former Yugoslav Republic of Macedonia. Because Greece was a full voting member in NATO and the EC, Macedonia remained diplomatically unrecognized by the EC, Canada, and the United States throughout 1992. Additionally, the political dispute with Greece over the "Macedonia" eponym resulted in a de facto trade embargo because of the international economic sanctions placed against Serbia and Montenegro with which Macedonia has a common border, coupled with Greece's political hostility and reported closure of its border to Macedonia.

Macedon of antiquity, which included the present territories of "Yugoslav" Macedonia, the Macedonian province of Greece, and a small area in present-day Bulgaria, was renowned for silver and gold mining. Ancient Macedon's mineral wealth, to a large extent, was a major underpinning to that country's imperial expansion in the 4th century B.C.

In more recent years, the Republic of Macedonia was a major producer of minerals in the former Yugoslavia. Macedonia's output of major minerals in 1990, as a percent of total output for Yugoslavia, amounted to 12.3% for copper ore and 36.9% for lead and zinc ore. Output of smelter and refined lead amounted to 25.6% and 26.7%, respectively, for the same period; silver amounted to 14.7%; and zinc smelter secondary and zinc refined output was 100% and 45.3%, respectively, of total production. Additionally, steel (electric furnace) production was 16.5% of total output. In respect to industrial minerals, Macedonia's production of bentonite, dolomite, gypsum, and pumice in 1990 amounted to 65.3%, 58.1%, 10.2%, and 48.7%, respectively, of the former Yugoslavia's total production.

The country's production of lignite in 1990 represented 10.4% of the former Yugoslavia's total output that year but was the only fossil fuel that was produced. The dislocation of the former Yugoslavia's mineral industry and commerce in 1992 resulted in apparently significant shortfalls in minerals production in Macedonia as well as in other former constituent Republics.

GOVERNMENT POLICIES AND PROGRAMS

Although the primary concern of the Government of Macedonia was reportedly the issue of international recognition, apparently some effort was directed at maintaining levels of industrial production that would ensure minimally acceptable levels of unemployment. Reportedly, the country continued to implement plans to modernize its ferroalloy-producing facilities during the year.

PRODUCTION

The production table for Macedonia was compiled from data presented in a variety of statistical publications of the former Yugoslavia through 1991. The major portion of the country's production statistics, however, was obtained from "Industrijska Proizvodnja," an annual statistical compendium published in Belgrade through 1990 that presented production data by constituent Federal Republics, as well as by total output for the former Yugoslavia. *(See table 1.)*

TRADE

Detailed official information concerning foreign trade for 1992 largely was unavailable. However, aggregated data available for trade returns for 1990 for the value of the country's exports and imports showed Macedonia's exports, valued in U.S. dollars, to have amounted to about 4% of Yugoslavia's exports during that year. Similarly, Macedonia's

imports in 1990 amounted to about 6% of total imports by the former Yugoslavia. The value of the country's exports of crude materials (including nonfuel minerals) amounted to more than 4% of the total exports for 1990 by the former Yugoslavia. Macedonia's imports in this category amounted to about 8% of the total.

STRUCTURE OF THE MINERAL INDUSTRY

Table 2 lists the apparent administrative bodies as well as subordinate production units of the main branches of the country's mineral industry for 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Chromite.—Macedonia was the sole producer of chromite in the former Yugoslavia. Small amounts of relatively low-grade chromite were mined from deposits at Radusa, near Skopje. The ore was reportedly concentrated to about 48% Cr_2O_3 at the nearby Gorce Petrov beneficiation plant, which also in the 1980's processed low-grade ore from northern Albania.

Copper.—Before 1992, a relatively small amount of copper (about 12% total production by the former Yugoslavia) ore was mined and beneficiated at Bućim in Macedonia by Rabotna Organizacija za Rudarstvo i Metalurgija za Baker (RZB Bućim). However, copper concentrates from RZB Bućim were smelted and refined at the Bor smelting and refining facilities in Serbia, and there has been little indication as to whether this relationship between RZB Bućim and Bor was continued after the secession of Macedonia from Yugoslavia.

Ferroalloys.—In 1991, Macedonian industry sources reported that Feni-Rudnici i Industrija za Nikel, Celik i Antimon (Feni), Macedonia's nickel mining and processing and ferronickel smelting complex, would restart nickel smelting and refining operations in late 1992 after an 8-year closure. Feni, restructured as a joint stock company renamed Feni-Mak-Kavadarci, reportedly planned to produce 7,120 mt/a of nickel metal for export. Presumably, the nickel output would be in addition to the output of ferronickel. The cost of Feni-Mak's restructuring and modernization program was reported to have amounted to about $19.5 million. Reportedly, in early 1992, the company's officials reported that the effort to put the plant into operation would continue.

Iron and Steel.—Despite considerable difficulties during the first half of 1992, associated with the civil war in the former Yugoslavia, the nongovernmental Yugoslav Iron and Steel Industry Federation, which consisted of steelworks in Bosnia and Hercegovina, Macedonia, and Serbia and Montenegro, continued its attempt to follow guidelines proposed by British Consulting Ltd. to rationalize the steel industries in these Republics to Western European standards. However, this effort apparently came to an end with continued fighting in Bosnia and Hercegovina and the imposition of economic sanctions on Serbia and Montenegro by the UN. Steel production in Macedonia was carried out by Rudnici i Zeljezarnica Skopje at the electric furnace-based steel plant in Skopje.

Lead and Zinc.—Macedonia was a major producer of lead and zinc ore in the former Yugoslavia, with output, according to 1990 data, comprising about 37% of the former Yugoslavia's total production of ore. The ore at the major lead and zinc deposit at Zletovo, near Probistip, occurs in veins along shear zones deposited within dacite-ignimbrites and quartz latite as a fill of fissure systems and replacement of wall rocks. The veins, reportedly, generally range from 1 to 2 m in thickness, although some were found to be 5 to 6 m in width. The average length of the ore veins was 2 to 3 km. The principal ore mineral was galena associated with sphalerite and relatively minor quantities of pyrite, siderite, tetrahedrite, chalcopyrite, and other minerals. Reportedly, the Zletovo mine and the smaller Sase mine, near Makedonska Kamenica, had the capacity to produce more than 1 Mmt/a of ore, grading 4% Pb and 6% Zn, by underground mining. The ore was concentrated, smelted, and refined domestically. The Zletovo Imperial Smelter, operated by Zletovo Rudnici za Olovo i Cink, was rated to produce 40,000 mt/a of Pb, 60,000 mt/a of Zn, 18 to 20 mt/a of Ag, and 150 mt/a of Cd.

Industrial Minerals

Macedonia had been an important Yugoslav producer of a wide range of industrial minerals that included clays, feldspar, gypsum, pumice, stone, and talc for domestic as well as for some export needs.

Mineral Fuels

Macedonia produced only small amounts of lignite and consequently was a net importer of fuels needed by its economy. Presumably, the country's energy situation became strained in 1992, owing to the dissolution of former Yugoslavia and the subsequent disruption of routine commerce and trade in the area. In September, the Government of Greece indicated that it would allow deliveries of petroleum to Macedonia through Greece's territory only with the provision that bills of lading and related documents contain the formulation "the former Yugoslav Republic of Macedonia" rather than Macedonia.

Reserves

The eventual development and transformation of Macedonia's economy to a market-based system would require a reevaluation of the country's mineral resources from a market perspective. Reserves, as defined by market economy countries, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other nonmarket

economy countries, such as the former Yugoslavia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade. In category A the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1 the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of minerals cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively. The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes.

INFRASTRUCTURE

Macedonia's inland system of ways and communications consisted of railroads and highways and waterways. Although data in respect to the total lengths of the railroad and inland waterway systems had not yet been officially reported, the highway and road system reportedly consisted of 10,591 km of paved, gravel, and earth-surfaced road, of which 5,091 km was paved, 1,404 km was gravel, and 4,096 km was earth surfaced. The country was entirely landlocked and did not possess a merchant marine fleet nor pipelines for carriage of natural gas and petroleum.

OUTLOOK

Macedonia had not been directly affected by the civil war in the former Yugoslavia and the country's industries and infrastructure remained intact. However, owing to Macedonia's relative political isolation and commercial restrictions in respect to Greece and Serbia and Montenegro, few markets appear to be available that can absorb the output of the country's mineral industry.

OTHER SOURCES OF INFORMATION

Agency

Ministry of Industry
Skopje, Macedonia

Publication

Industrijska Proizvodnja, 1988-1990, published in Belgrade (Serbia and Montenegro).

TABLE 1

MACEDONIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum: Metal, ingot; primary and secondary		5,099	5,384	5,487	5,000	4,000
Antimony: Mine and concentrate ouput:[e]						
Ore, gross weight		[3]3,030	3,400	1,500	[3]—	—
Concentrate, gross weight		[3]60	60	25	[3]—	—
Cadmium, smelter output[e]	kilograms	[3]244	280	210	160	110
Chromite:						
Ore, gross weight		11,538	12,721	10,843	[e]6,000	6,000
Concentrate (produced largely from imported ores)		30,146	22,934	22,058	[e]14,000	10,000
Copper: Mine and concentrator output:						
Ore, gross weight	thousand tons	3,922	3,826	3,706	3,852	3,000
Cu content of ore		9,782	8,876	8,634	[e]9,200	7,200
Concentrate, gross weight		44,316	41,956	36,434	36,000	30,000
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	184,583	412,000	45,000	[e]25,000	20,000
Fe content of ore[e]		[3]23,663	80,000	3,000	1,000	1,000
Concentrate[e]		[3]75,353	65,000	55,000	30,000	15,000
Pellets[e]		[3]24,800	[3]60,991	50,000	25,000	10,000
Agglomerate		52,809	79,000	31,000	[e]20,000	5,000
Metal:						
Ferroalloys:						
Ferrochromium, low C		5,128	5,862	5,094	[e]3,000	1,000
Ferrosilicochromium		2,340	3,815	4,199	[e]2,000	1,500
Ferrosilicon		61,936	57,605	51,812	[e]35,000	30,000
Silicon		4,344	4,344	1,802	[e]1,800	1,000
Total		73,748	71,626	62,907	[e]41,800	33,500
Pig iron		115,349	139,000	53,000	[e]50,000	20,000
Crude steel:						
From oxygen converters		114,430	139,000	65,000	[e]65,000	20,000
From electric furnaces		144,087	85,000	182,000	[e]80,000	30,000
Total		258,517	224,000	247,000	[e]145,000	50,000
Semimanufactures[e]		[3]83,251	84,000	65,000	45,000	20,000
Lead:						
Mine and concentrate output:						
Ore, gross weight (Pb, Zn ore)		1,044,662	1,330,000	1,357,000	[e]900,000	400,000
Pb content of ore		37,460	45,000	47,000	[e]30,000	12,000
Concentrate, gross weight		24,140	32,000	33,000	[e]20,000	15,000
Metal:						
Smelter, primary and secondary		31,064	31,000	33,000	[e]18,000	10,000
Refined, primary and secondary		18,897	19,000	22,000	[e]14,000	8,000
Silver	kilograms	17,689	16,973	15,495	[e]12,000	10,000
Zinc:						
Zn content of Pb Zn ore		25,459	30,000	32,000	18,000	16,000
Concentrator output, gross weight		12,930	23,000	23,000	15,000	8,000

See footnotes at end of table.

TABLE 1—Continued

MACEDONIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS—Continued						
Zinc—Continued:						
Metal:						
Zn, smelter, primary		56,316	55,900	56,734	e50,000	30,000
Zn, refined, primary and secondary:						
Smelter		11,234	12,089	18,252	7,372	7,000
Electrolytic		40,767	38,101	34,148	32,000	25,000
INDUSTRIAL MINERALS						
Cement	thousand tons	781	769	639	600	500
Clays:						
Bentonite		76,504	76,000	67,000	e45,000	40,000
Fire clay:						
Crude		140	[3]—	—	—	—
Calcined		118	[3]—	—	—	—
Feldspar		30,405	34,000	30,934	e30,000	20,000
Gypsum:[e]						
Crude		[3]64,299	[3]67,000	58,000	44,000	30,000
Calcined		[3]20,421	[3]19,000	15,000	11,000	7,000
Lime		56,000	69,000	47,000	e40,000	20,000
Pumice and related materials: Volcanic tuff[e]		[3]245,000	250,000	250,000	200,000	100,000
Quartz, quartzite		[3]178,919	[3]—	—	—	—
Sand and gravel, excluding glass sand	thousand cubic meters	138	135	194	e150	130
Stone, excluding quartz and quartzite:						
Dimension: Crude:						
Ornamental	square units	415,000	464,000	e450,000	e400,000	300,000
Crushed and brown, n.e.s.	thousand cubic meters	698	927	e900	e700	400
Other	cubic meters	19,000	20,000	e20,000	e15,000	10,000
Sulfur: Byproduct of metallurgy[e]	thousand tons	9	9	9	8	6
Talc:						
Crude		29,204	26,614	20,069	e20,000	15,000
Washed		27,566	24,590	17,984	e17,000	10,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Lignite	thousand tons	4,641	5,687	6,635	e6,000	5,000
Refinery products[e]	thousand 42-gallon barrels	10,000	14,000	15,000	12,000	10,000

[e]Estimated.

[1]Table includes data available through July 1993.

[2]In addition to commodities listed, common clay and diatomite also are produced, but available information was inadequate to make reliable estimates of output levels.

[3]Reported figure.

TABLE 2

MACEDONIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

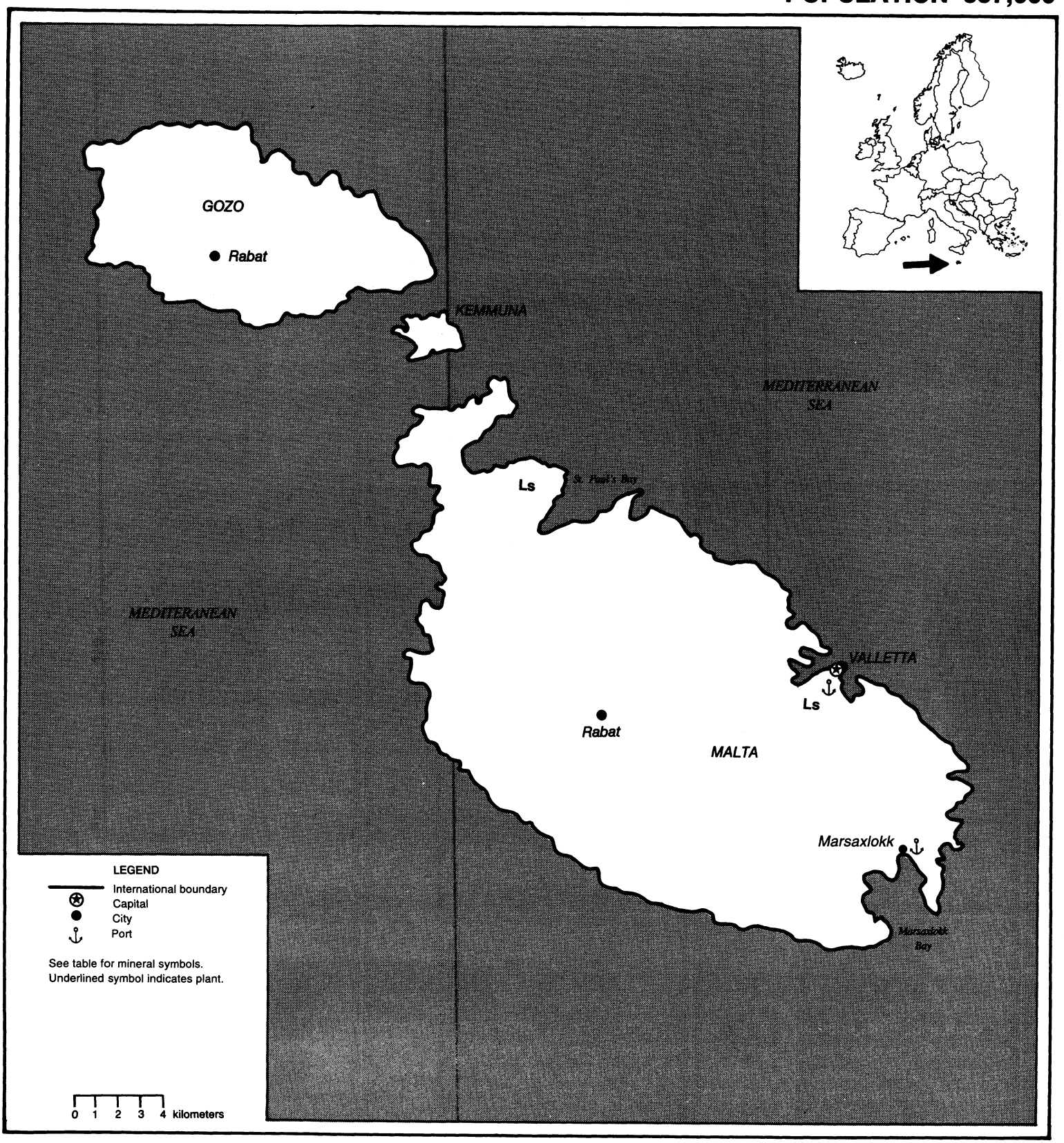
Commodity	Major operating companies	Location of main facilities	Annual capacity
Cement	Azbestcementa "Usje" Preduzece za Proizvodnju Cementa	Plant at Skopje	2,190
Chromite, concentrate	Jugohrom, Hemijsko-Elektrometalurški-Kombinat	Concentrator at Raduša, Macedonia	150
Copper ore	Bućim, Rabotna Organizacija za Rudarstvo i Metalurgija za Baker	Mine and mill at Bućim, near Radoviš, Macedonia	7,000
Ferroalloys	Jugohrom, Hemijsko-Elektrometalurški-Kombinat	Plant at Jegunovce, Macedonia	80
Iron ore	Skopje Rudnici i Zeljezarnica Skopje	Mines at Tajmište, Demir Hisar, and Damjan, Macedonia	1,000
Lead-zinc ore	Prepobotuvacki, Kombinat Zletovo-Sasa:		
	Sase, Rudnici za Olovo i Cink	Mine and mill near Kamenica, Macedonia	300
	Zletovo, Rudnici za Olovo i Cink	Mine and mill near Probistip, Macedonia	700
Lead metal	Zletovo, Topilnica za Cink i Olovo	Imperial Smelter at Titov Veles, Macedonia	40
Do.	do.	Refinery at Titov Veles, Macedonia	40
Nickel: Ore	Feni-Rudnici i Industrija za Nikel, Celik i Antimon	Mine and opencast mine near Kavadarci, Macedonia	2,300
Metal	do.	Ferronickel Plant at Kavadarci, Macedonia	[1]16
Pig iron	Skopje, Rudnici i Zeljezarnica Skopje	5 Elkem electric furnaces at Skopje, Macedonia	430
Steel, crude	Skopje, Rudnici i Zeljezarnica	Plant at Skopje, Macedonia	980
Zinc metal	Zletovo, Topilnica za Cink i Olovo	Imperial Smelter plant and refinery at Titov Veles, Macedonia	65

[1]Nickel in ferronickel.

MALTA

AREA 320 km²

POPULATION 357,000



THE MINERAL INDUSTRY OF

MALTA

By Jozef Plachy

The importance of Malta's mineral industry rests mainly on trade and storage of crude oil and refinery products. Production of industrial minerals is only of regional importance, contributing less than 0.5% to the gross domestic product. The modest production of salt, from the desalination of sea water, has to be augmented with imports.

In the petroleum industry, the "Terminal One" storage and blending facility in the Marsaxlokk Freeport Terminal was completed in 1992. The new port, a Maltese-German joint venture, will be able to accommodate three vessels of up to 100,000 dwt.

In August 1992, the Maltese Government reportedly awarded a petroleum-sharing contract to Shell Malta, a Royal Dutch Shell subsidiary, and its Saudi Arabian partner Nimir. Exploratory drilling rights had reportedly previously been awarded to the American Oil Co. and British Petroleum.

Of a total of 2,550 industrial establishments, about 50 are involved in quarrying; employing approximately 370 people, less than 0.3% of the total work force.

All limestone quarries are owned and worked by construction companies. Globigerina limestone, known locally as "franka" stone, is used mainly for production of building blocks, while the leftover irregular pieces are crushed and used as aggregate in construction. The Coralline limestone is blasted, crushed, screened, and used for manufacture of lime or as an additive in concrete. At the present rate of production, the estimated 2 million cubic meters of reserves should last for the next 200 years.

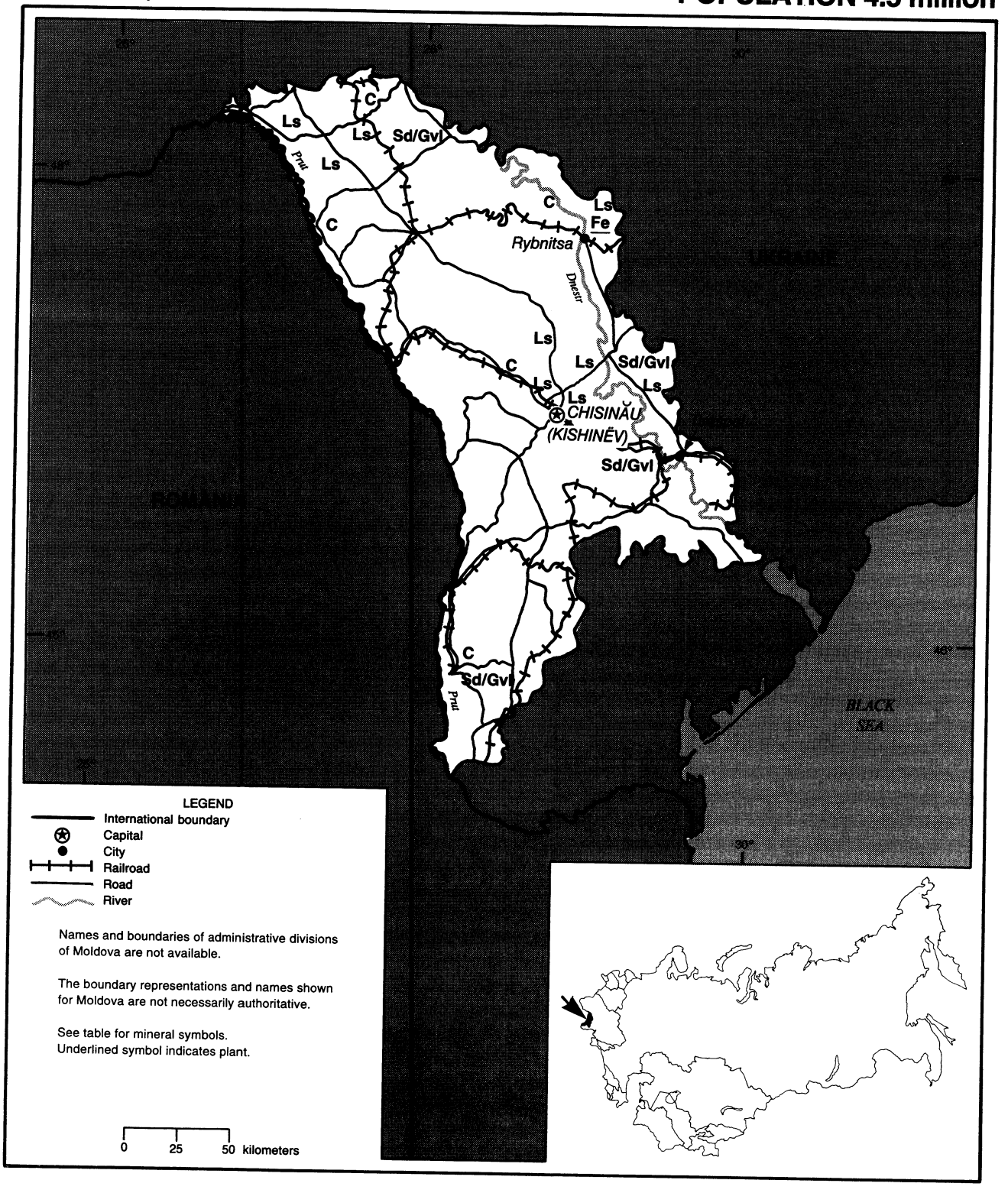
TABLE 1
MALTA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1]

Commodity		1988	1989	1990	1991	1992
Lime	cubic meters	5,500	5,500	5,500	5,500	5,500
Limestone	thousand cubic meters	600	600	600	600	600
Salt	metric tons	100	100	r 230	r30	30

rRevised.
[1]Table includes data available through Apr. 1993.
[2]Reported figure.

MOLDOVA

AREA 33,700 km² **POPULATION 4.5 million**



THE MINERAL INDUSTRY OF

MOLDOVA

By Richard M. Levine

Moldova has a small mineral industry, the output of which, according to Soviet statistics, accounted for less than 1% of the value of Moldova's industrial output in the mid-1980's.

The economy of Moldova experienced serious problems in 1992 owing to both the breaking of commercial ties with regions of the former U.S.S.R. and to the civil war in its Transdniester region. Moldova had been receiving more than 90% of its industrial raw materials and more than 98% of its fuels from other regions of the former U.S.S.R. In 1992, reportedly, production fell by 22% and inflation was over 1,000%.

For 1993, Moldova signed a bilateral agreement with Russia whereby Russia will supply Moldova with fuels, ferrous and nonferrous metals, and other raw materials in exchange for refrigerators, tractor trailers, food, tobacco products, and wine.

PRODUCTION

The mineral industry was primarily engaged in mining and producing industrial minerals, including cement, dimension stone, gypsum, limestone, and sand and gravel. There are more than 100 deposits in Moldova being exploited for industrial minerals. Moldova also has a steel minimill in Rybnitsa. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, the major mineral-producing enterprises in Moldova were state owned although, as with all former Soviet republics, plans were being formulated for some form of privatization. The privatization and the timetable for its completion were still not established at the end of 1992. *(See table 2.)*

COMMODITY REVIEW

Energy.—Moldova was almost entirely dependent on imports for fuels, importing 4 billion m^3 of natural gas, 275,000 tons of gasoline, and 430,000 tons of diesel fuel from Russia in 1992. With the rise in the price of fuel imported from Russia, it was becoming important for Moldova to have its own energy supply. Oil and natural gas deposits were found in the southern part of the country, but further exploration work was not possible owing to a lack of funds.

Petroleum.—The Government of Moldova was undertaking a feasibility study for building an oil terminal near the village of Dzhurdzhuleshty, near the confluence of the Prut and Danube Rivers. The new oil terminal would enable Moldova to import oil via sea routes. Western investment would be necessary to construct the port facilities. The port would be able to handle river and oceangoing vessels, including tankers with a capacity to carry 5,000 tons of freight as well as freighters with a 6,000 tons displacement. The port is expected to handle 4.5 million tons of freight per year.

Reserves

Reserves in Moldova were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economic system that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

INFRASTRUCTURE

Moldova is on the western edge of the former U.S.S.R. It is bordered by Romania to the west and is otherwise encircled by Ukraine. It was the second smallest republic in area of the former U.S.S.R. Moldova has one major waterway, the Dniester River, which flows through Belarus, Moldova, and Ukraine to the Black Sea southwest of Odessa.

Moldova has 1,150 km of railroad lines and 20,000 km of highways, of which 13,900 km is hard surfaced.

Moldova shares a common border with Romania and the Moldovan language is a form of the Romanian language. Although more than 65% of its population is ethnic Moldovan, 13% of the population is ethnic Russian and 14% ethnic Ukrainian. Because of its location, history, and ethnicity, Moldova has cultural and economic links with Romania, as well as with Ukraine, Russia, and other CIS states. The question still remains concerning the degree of political and economic integration that Moldova will pursue with Romania and other CIS states.

OUTLOOK

Moldova is almost entirely dependent on outside sources for its mineral raw material requirements with its current mineral supply coming almost entirely

from the countries of the former U.S.S.R. As a member of the CIS, Moldova will have to negotiate its terms of trade with its CIS suppliers and trade its output for needed minerals. Moldova currently produces few goods that would be significant sources of hard currency earnings. This could influence Moldova to remain within the CIS trading system where its goods already have developed markets. If Moldova, instead of remaining in the CIS, decides to join in some political formation with Romania, its mineral supply outlook will more resemble that of Romania. Although Romania has a significant petroleum extraction and refining industry that could somewhat improve Moldova's petroleum supply, Romania also needs to import petroleum to supply its refineries and is by no means in the league of an oil-rich country. Basically, Romania, too, was almost entirely dependent on the former U.S.S.R. for the majority of its mineral requirements and also lacks ready world markets for its output. Thus, Moldova's mineral supply picture, for the near future, still will be linked to its trade with the countries of the former U.S.S.R.

TABLE 1
MOLDOVA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity		1992
Cement		1,700
Cement raw materials:		
Clays		400
Limestone		1,500
Gypsum		300
Sand and gravel	thousand cubic meters	5,000
Steel, crude		400

TABLE 2
MOLDOVA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity[e]
Cement	Rybnitsa cement plant	Rybnitsa	2,500,000.
Gypsum	Krivskiy and Drepkautskiy gypsum mines	In northwest corner of Moldova	500,000 (total of both mines).
Steel, crude	Moldova steel plant	Rybnitsa	700,000.

[e]Estimated.

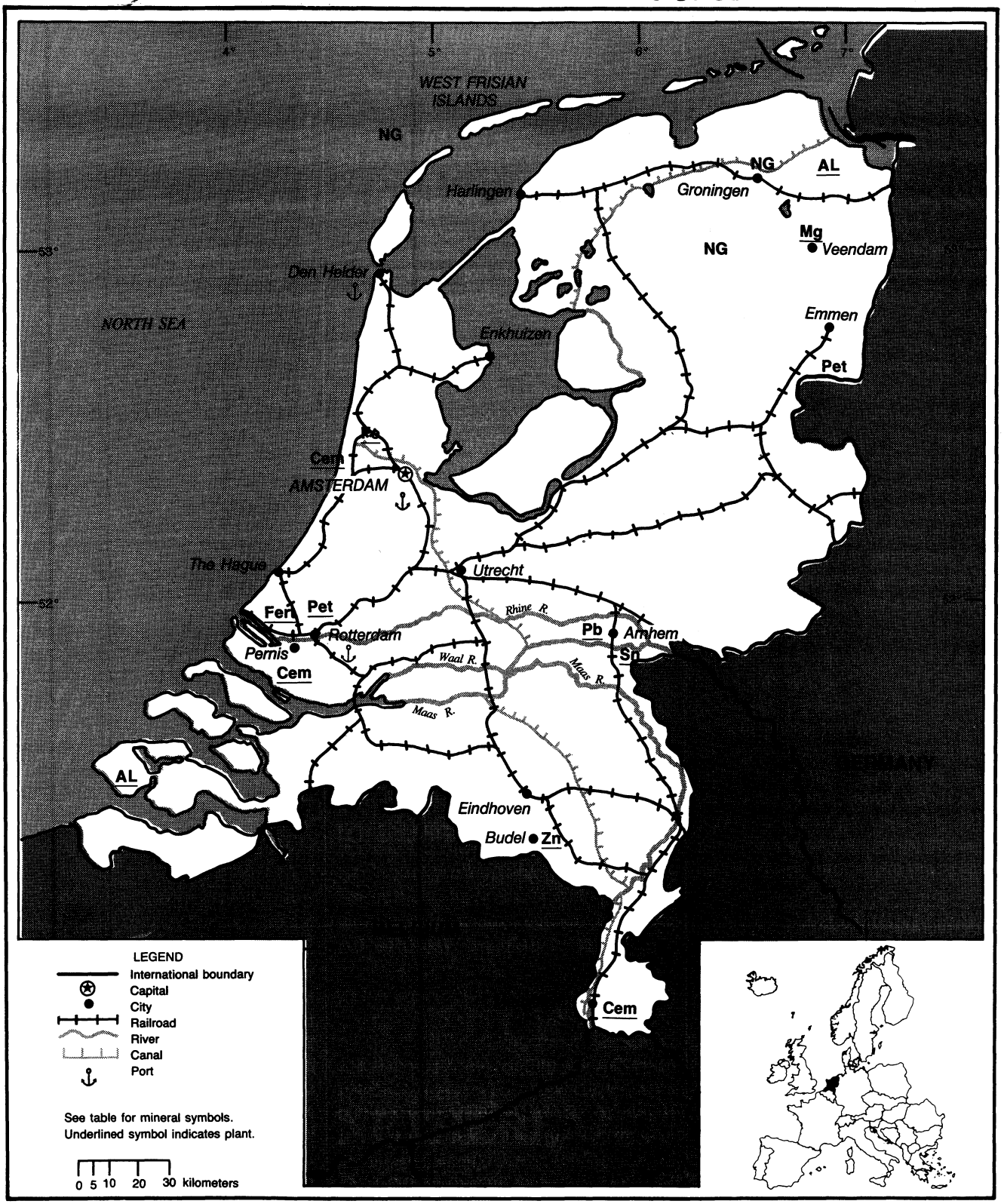
TABLE 3
MOLDOVA: RESOURCES OF MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Resources
Coal, brown	38,000
Diatomite	29,000
Gypsum	54,000
Sand for glassmaking	17,000
Sand and gravel thousand cubic meters	295,000

NETHERLANDS

AREA 34,000 km² **POPULATION 14.8 million**



THE MINERAL INDUSTRY OF

THE NETHERLANDS

By William Zajac

In comparison with the rest of the world, the Dutch economy did surprisingly well during 1992, even though a number of Dutch companies, both involved in the minerals industry and not, did not have as good a year as during the past few years. The average profitability of the corporate sector fell as a result of a sharp rise in wage costs per unit of output and the need to make price concessions in the face of international competition. This competition grew strongly near the end of the year as the currencies of a number of countries that represent more than 20% of the Dutch export market decreased in value against the guilder. During 1992, the Netherlands economy showed a growth in the GDP of 1.5% to $314 billion[1] and inflation, at the end of the year, stood at 2.75%, a drop from 4.75% a year earlier. Average unemployment for 1992 was down somewhat compared with 1991, 6.7% versus 7.0%, but started to climb again at the end of 1992.

GOVERNMENT POLICIES AND PROGRAMS

The Dutch Government in 1992 again was able to achieve the planned reduction in the financing deficit, a policy aimed at not allowing the national debt to rise so high that interest payments become the overriding expenditure item. The business community urged the Government to alter the structure of public expenditure, making more funds available for infrastructure, education, and research and reducing the number of benefit claimants in relation to the number of employed people. To this end, the Ministry of Economic Affairs proposed the coordination and support of cooperation between companies as well as between the business world and education and research institutions.

In addition to working on the economy, the Dutch Government was also involved with industry in environmental matters. For example, in March 1992, the Government signed a Declaration of Intent with 25 companies in the basic metals industry. This declaration covered a period of 20 years and included procedures on integrating environmental objectives. The declaration also took the objectives of the National Environmental Policy Plans and other Government plans that have been framed at the national level and applied them at the industry level. The objectives were the reduction of emissions into the atmosphere, water, and soil; energy conservation; waste problems; soil cleaning; external safety; odors; noise; and environmental problems within the work premises. The intent was an integrated approach to the problems, treating all the individual environmental aspects as a whole with the aim of coordinating the policies of all the authorities concerned—the Ministry of Housing, Planning, and the Environment, the municipality, the province, and the Department of Public Works. At the company level, the plants that have signed the agreement were required to draw up a plant environmental plan describing the company's intended activities and efforts on environmental matters over a period of 4 years. Allowances were to be made for technological state-of-the-art and economic conditions.

PRODUCTION

The Netherlands is principally a processor of imported raw materials, with domestic mineral production being limited to crude petroleum, natural gas, salt, and industrial sand. Of the unwrought metals produced, secondary aluminum and lead were produced using both domestic and imported raw materials, but the primary metals were processed from imported materials. The mineral fuels sector is the most important in terms of production of mineral commodities, and the Netherlands remained in the top five world producers of natural gas with a slight increase in production in 1992. *(See table 1.)*

TRADE

Trade is an important aspect of the Netherlands' economy. In 1991, exports amounted to 54.1% of the GDP and imports amounted to 48.9% of the GDP. Principal exports in 1991 were machinery and transport equipment (23.5% of the total), food (17.3%), chemicals (16.1%), energy (9.7%), and metals (6.6%). Principal imports in 1991 were machinery and electrical equipment (22.6% of the total), food, beverages, and tobacco (11.7%), manufactured goods excluding metals (9.4%), transport equipment (9.2%), and energy (8.6%). The Netherlands recorded a negative trade balance for the first time in many years in 1991 of -$3,330 million, which grew in 1992 to -$6,960 million compared with positive balances of $377 million in 1990 and $4,595 million in 1989. The negative trade balance resulted in a growing negative balance in extra-European Communities (EC) trade and a shrinking positive balance in intra-EC trade. In 1992, extra-EC trade recorded a negative trade balance of $26,735 million (-$25,430 million in 1991) and a positive balance in 1992 intra-EC trade of $19,220 ($21,140 million in 1991). In 1992 total exports amounted to $140,980 million and total imports amounted to $147,935 million. Principal export

destinations in 1991, based on value, were the EC (81.2%)—Germany (31.3%), Belgium-Luxembourg (15.2%), France (11.3%), and the United Kingdom (9.9%)—with deliveries to the United States totaling 4.1%. Principal import sources in 1991, based on value, were the EC (64.1%)—Germany (25.6%), Belgium-Luxembourg (14.2%), the United Kingdom (8.7%), and France (7.6%)—with deliveries from the United States totaling 7.8%. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

The principal industrial plants related to the minerals industry in the Netherlands with capacities are shown in table 4. *(See table 4.)*

COMMODITY REVIEW

Metals

Although the Netherlands produces primary aluminum (7% of the west European total) and primary zinc (9.3% of the west European total), the most important metal industry is steel. The steel industry in the Netherlands is dominated by Hoogovens IJmuiden, a wholly owned subsidiary of the Hoogovens Groep BV. Production by this company increased in 1992, but the principal reason was that one of the blast furnaces was out of commission for refurbishing during part of 1991. In general, the situation in the steel industry in the Netherlands reflected the negative situation in the steel industry in the rest of the EC. The continuing fall in the prices of the products produced, resulting from the oversupply on the west European market, caused Hoogovens to post a loss of $133 million in 1992 after sustaining a loss of $52 million in 1991. This excess supply was caused by the increased efficiency of the west European steel plants; reduced exports to the United States, the C.I.S., and east European markets; the weakness of the U.S. dollar; and increased imports from east Europe. These factors caused the price for Hoogovens' products to fall 20% in the past 3 years—6% coming between 1991 and 1992 alone. Prices for raw materials and energy were virtually the same as in the previous year, otherwise the losses could have been much worse. The situation in the aluminum industry mirrored that of the steel industry. Oversupply was caused by lower demand and high imports from the C.I.S., resulting in low prices and production cuts. The Hoogovens aluminum division reported a loss in 1992 of $92 million, compared with a profit of $2 million in 1991.

Industrial Minerals

Other than salt and sand, the Netherlands produced no natural industrial minerals but, as in the metals sector, was a major processor of raw materials. Crude mineral products such as barites, bentonites, and magnesium salts were imported, processed, and then exported in a marketable form. Barite, for example, was imported from a variety of sources, ground and processed to specifications, and exported as filler material for carpet backing, sound dampening materials, rubber and plastics additives, and paint primers. Of the processed barite, the domestic market consumed less than 15% of the product and the remainder was exported worldwide. Other mineral products handled in similar fashion included, but were not limited to, bauxite (nonmetallurgical), boron materials, dolomite, emery, magnesite, manganese (nonmetallurgical), perlite, steatite, talc, vermiculite, and zircon.

Mineral Fuels

Natural Gas.—The Netherlands imported British natural gas for the first time in October 1992 as a result of a purchase by Nederlandse Gasunie, the Dutch state supply company, of the British reserves in the British-Dutch Markham field in the North Sea. The gas was to be delivered through a 24-inch spur line to the Dutch offshore gas pipeline system to Den Helder. Supply was expected to reach 1.1 billion cubic meters per year. In another development, Gasunie agreed to sell Ruhrgas AG of Germany an additional 70 billion cubic meters of gas, which will extend Ruhrgas' contract with Gasunie until the year 2013. This contract resulted from the decision by the Dutch Government to allocate an additional 200 billion cubic meters of gas for export. Estimated reserves of Dutch gas at the end of 1992 were put at 1,950 billion cubic meters, down from 1,970 billion cubic meters at the beginning of 1992.

Petroleum, Crude.—The Netherlands has been producing crude petroleum since the mid-1940's, starting with the Schoonebeek field. Since then, the country has produced a cumulative of 565 billion barrels both onshore and offshore. Dutch reserves of petroleum at the end of 1992 were put at 145 million barrels, about the same as at the beginning of the year, and enough for about another 7 years of production at current production levels.

INFRASTRUCTURE

The Netherlands rail system has a total of 3,037 km of track, of which 1,871 km is electrified and 1,800 km is double track. The Netherlands Railway operates 2,871 km of 1.435-m standard gauge and 166 km is privately owned. Highways in the country total 108,360 km, of which 92,525 km is paved (2,185 km limited access, divided highways) and 15,835 km is gravel and crushed stone. Inland waterways consist of 6,340 km, of which 35% is usable by craft of 1,000-metric-ton capacity or larger. Pipelines consist of 418 km for crude petroleum, 965 km for petroleum products, and 10,230 km for natural gas. The Dutch merchant marine consists of 345 ships of 1,000 gross tons or more totaling 2,630,962 gross tons. Of the total, there are 191 cargo ships, 30 refrigerated cargo ships, 27 chemical tankers, 24 container ships, 22 oil tankers, 12 roll-on-roll-off vessels, 10 liquefied gas tankers, 10 multifunction large load carriers, 9 bulk carriers, 3 combination bulk carriers, 3 short-sea passenger vessels, 2 livestock carriers, and 2 specialized tankers. In addition to

the vessels registered in the Netherlands, Dutch-owned ships are also registered in the Netherlands Antilles. The major maritime ports of the Netherlands are Amsterdam, Den Helder, Eemshaven, IJmuiden, Rotterdam, and Vlissingen. There are 29 inland ports. Of the major maritime ports, Rotterdam is by far the most active. Of the total merchandise handled in 1991 (the latest year for which the U.S. Bureau of Mines has data), Rotterdam accounted for 79.5% of merchandise unloaded and 69.4% of merchandise loaded. Amsterdam was second with 7.6% of merchandise unloaded and 10.5% of merchandise loaded.

OUTLOOK

With the uncertain economic situation around the world, forecasts of economic or other performance are speculative at best. Much depends on the recovery prospects of the Netherlands' trading partners because so much depends on the country's processing of imported raw materials and the market for the value-added products. With respect to the steel industry, factors include the results of discussions between the European Commission and the west European steel producers on existing overcapacity, on the level of imports from eastern Europe, and on resolving trade problems with the United States. Overall, prospects for industrial and economic growth do not look promising until the recessions in Germany and other EC members, as well as in the United States, end.

[1]Where necessary, conversions from Dutch guilders (Nfl) to U.S. dollars (US$) were made at the rate of Nfl1.758=US$1.00.

OTHER SOURCES OF INFORMATION

Agencies

Rijks Geologische Dienst
(Geological Survey of the Netherlands)
Spaarne 17
2000 AD Haarlem
Ministerie van Economische Zaken
Inspecteur Generaal der Mijnen
(Ministry of Economic Affairs,
Inspector General of Mines)
Bezuidenhoutseweg 30
2594 AV The Hague
Centraal Bureau voor de Statistiek
(Central Bureau of Statistics)
Prinses Beatrixlaan 428
2270 AZ Voorburg

Publications

Statistical Yearbook of the Netherlands Central Bureau of Statistics.
Maanadstatistiek van de Industriek (Monthly Statistical Bulletin of Manufacturing), Central Bureau of Statistics.
Maandschrift (Monthly Bulletin), Central Bureau of Statistics.
De Nederlandse Energiehuishouding, (The Energy Economy of the Netherlands), Central Bureau of Statistics.
Various company annual reports, including Koninklijke Nederlandsche Hoogovens en Staalfabrieken NV (Royal Netherlands Hoogovens and Steel Works NV).

TABLE 1

NETHERLANDS: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992
METALS						
Aluminum metal:						
Primary		278,198	r274,100	r269,992	r263,910	235,134
Secondary		115,866	130,158	134,221	114,300	151,400
Cadmium metal, primary		563	505	590	549	594
Iron and steel:						
Ore, sintered (from imported ore)		3,935,000	4,042,200	4,061,100	r3,950,200	e4,100,000
Metal:						
Pig iron including blast-furnace ferroalloys (if any)		4,994,000	5,163,100	4,959,900	r4,696,500	4,852,000
Steel:						
Crude		5,518,000	5,680,600	5,411,800	r5,171,300	5,438,000
Semimanufactures		5,034,000	5,116,400	r5,005,200	r4,909,500	e5,000,000
Lead metal, refined, secondary		39,500	41,500	44,100	33,700	24,300
Tin metal:						
Primary		3,478	4,529	5,900	r4,800	—
Secondary		r200	r200	e200	e200	—
Total		3,678	4,729	e6,100	e5,000	—
Zinc metal, primary		211,019	3202,962	3208,532	3211,082	3210,000
INDUSTRIAL MINERALS						
Cement, hydraulic		3,418,000	3,540,600	3,728,900	r3,546,000	e3,410,000
Nitrogen: N content of ammonia		r2,694,516	r2,900,838	r3,188,209	r3,032,522	2,666,600
Salt, all types		3,693,000	3,756,000	3,653,000	r3,417,000	e3,500,000
Sand, industrial		25,999,000	25,647,000	25,137,000	e25,000,000	e20,000,000
Sodium compounds, n.e.s.:						
Carbonate, synthetic		e400,000	e400,000	e400,000	r400,000	e400,000
Sulfate:e						
Natural		22,000	22,000	22,000	22,000	22,000
Synthetic		15,000	15,000	15,000	15,000	15,000
Sulfur:						
Elemental byproduct:						
Of metallurgye		125,000	125,000	120,000	115,000	115,000
Of petroleum and natural gas		e215,000	e260,000	3285,000	e290,000	e290,000
Totale		340,000	385,000	405,000	405,000	405,000
Sulfuric acid, 100% H_2SO_4		1,143,500	e1,150,000	e1,150,000	e1,150,000	e1,150,000
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		107,500	114,000	112,100	r111,200	e110,000
Coke, metallurgical		2,908,000	2,898,000	r2,736,000	r2,933,000	2,918,000
Gas:						
Manufactured	million cubic meters	9,446	10,016	10,272	r9,570	e9,500
Natural:						
Gross	do.	r68,326	r73,089	r74,137	r82,649	e83,000
Marketed	do.	65,610	71,715	72,238	81,666	81,829
Natural gas liquids	thousand 42-gallon barrels	3,077	3,596	3,655	r e3,700	e3,700
Peat, agriculturale		300,000	300,000	300,000	300,000	300,000
Petroleum:						
Crude	thousand 42-gallon barrels	26,644	23,113	24,081	r22,207	19,947

See footnotes at end of table.

TABLE 1—Continued

NETHERLANDS: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum—Continued:						
Refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	26,576	r29,870	r31,784	r29,708	31,703
Mineral jelly and wax	do.	960	693	590	e600	e600
Gasoline, motor	do.	68,757	70,890	72,930	r74,333	73,484
Naphtha and white spirit	do.	95,948	91,732	85,629	82,918	69,389
Jet fuel	do.	r38,479	42,848	40,048	r38,296	40,734
Kerosene	do.	4,720	4,123	3,387	r2,581	2,745
Refinery gas	do.	21,594	22,153	23,364	e21,240	e21,240
Lubricants	do.	5,712	e4,242	r4,186	r3,983	3,702
Distillate fuel oil	do.	137,488	129,521	116,689	r131,132	140,988
Residual fuel oil	do.	95,464	93,720	88,878	r96,330	108,305
Bitumen	do.	4,721	4,933	r4,290	r4,012	3,729
Unspecified	do.	25,326	25,165	29,148	e25,000	e25,000
Total	do.	r525,745	r519,889	r500,924	r e510,131	e521,619

eEstimated. rRevised.

[1]Table includes data available through July 1993.

[2]In addition to the commodities listed, the Netherlands produces construction materials such as sand and gravel, but output is not reported and no basis exists to make reliable estimates of output.

[3]Sales.

TABLE 2

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	—	19	—	Germany 11; India 6; Belgium-Luxembourg 1.
Alkaline-earth metals	—	20	—	Germany 12; Italy 5; France 2.
Aluminum:				
Ore and concentrate	25,048	21,909	—	Belgium-Luxembourg 11,182; United Kingdom 2,386; France 1,819.
Oxides and hydroxides	101,247	95,242	515	Germany 50,695; United Kingdom 14,593; Republic of South Africa 6,309.
Ash and residue containing aluminum	12,307	NA		
Metal including alloys:				
Scrap	132,672	129,089	—	Germany 44,770; Belgium-Luxembourg 30,477; France 27,202.
Unwrought	362,464	332,411	606	Belgium-Luxembourg 120,413; France 100,993; Germany 72,196.
Semimanufactures	170,173	177,565	143	Germany 79,803; Belgium-Luxembourg 35,007; France 21,218.
Antimony:				
Oxides	495	NA		

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Antimony—Continued:					
Metal including alloys, all forms		15	4	—	Norway 2; Belgium-Luxembourg 1; France 1.
Arsenic: Metal including alloys, all forms		27	NA		
Beryllium: Metal including alloys, all forms	value, thousands	—	$2	(2)	Mainly to Belgium-Luxembourg.
Bismuth: Metal including alloys, all forms		46	8	(2)	Germany 3; United Kingdom 3; Israel 2.
Cadmium: Metal including alloys, all forms		500	493	36	Belgium-Luxembourg 155; United Kingdom 128; Japan 80.
Chromium:					
Ore and concentrate		37,703	37,183	—	Germany 15,613; France 9,730; Italy, 5,092.
Oxides and hydroxides		361	204	—	Germany 64; France 52; Italy 46.
Metal including alloys, all forms		50	49	—	Germany 40; United Kingdom 5; Brazil 1.
Cobalt:					
Ore and concentrate		—	1	—	All to Germany.
Oxides and hydroxides		45	40	—	Germany 12; Belgium-Luxembourg 11; Hungary 5.
Ash and residue containing cobalt		153	NA		
Metal including alloys, all forms		93	184	20	United Kingdom 52; Japan 51.
Columbium and tantalum: Metal including alloys, all forms		1	6	—	Yugoslavia 5; Germany 1.
Copper:					
Ore and concentrate		94	19	—	All to Belgium-Luxembourg.
Matte and speiss including cement copper		126	1,331	29	Republic of South Africa 760; United Kingdom 488.
Oxides and hydroxides		138	NA		
Sulfate		6,718	NA		
Ash and residue containing copper		8,081	NA		
Metal including alloys:					
Scrap		83,437	107,608	382	Germany 40,346; Belgium-Luxembourg 33,341; Italy 7,508.
Unwrought		8,972	6,710	2,093	Germany 3,644; Spain 263.
Semimanufactures		66,439	63,236	10,620	Germany 16,863; United Kingdom 7,675; Belgium-Luxembourg 5,556.
Gallium, indium and thallium: Metal including alloys, all forms		8	—		
Germanium: Metal including alloys, all forms	value, thousands	$14	$16	—	Belgium-Luxembourg $15; Germany $1.
Gold:					
Waste and sweepings	do.	$12,474	$8,130	—	Germany $4,670; France $1,636; Belgium-Luxembourg $824.
Metal including alloys, unwrought and partly wrought	kilograms	1,643	2,000	103	Switzerland 537; Germany 527; Belgium-Luxembourg 335.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite		82,283	65,318	—	Belgium-Luxembourg 47,245; Germany 8,837; France 2,348.
Pyrite, roasted		559	545	—	Spain 500; Australia 39; Germany 6.
Metal:					
Scrap	thousand tons	2,621	3,529	75	Turkey 1,189; Belgium-Luxembourg 391; Spain 288.

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Pig iron, cast iron, related materials		1,419	3,889	25	Belgium-Luxembourg 2,307; Germany 875; France 295.
Ferroalloys:					
Ferrochromium		3,355	1,314	—	Belgium-Luxembourg 906; Spain 350; Germany 47.
Ferromanganese		132	315	—	Belgium-Luxembourg 108; Germany 99; Hong Kong 38.
Ferromolybdenum		464	NA		
Ferronickel		—	8	—	All to Germany.
Ferrosilicochromium		—	8	—	All to Belgium-Luxembourg.
Ferrosilicomanganese		19	20	—	Germany 19; Belgium-Luxembourg 1.
Ferrosilicon		325	341	—	Germany 259; France 25; Spain 21.
Ferrotitanium and ferrosilicotitanium		208	NA		
Silicon metal		4,859	[3]5,108	—	Germany 4,969; France 98; United Kingdom 25.
Unspecified		203	1,158	(2)	Germany 479; Italy 224; France 205.
Steel, primary forms	thousand tons	1,152	997	55	Belgium-Luxembourg 171; Germany 163; Italy 82.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated	do.	2,532	2,451	349	Germany 659; Belgium-Luxembourg 492; United Kingdom 233.
Clad, plated, coated		689,351	744,023	19,682	United Kingdom 147,944; Germany 128,083; Belgium-Luxembourg 104,007.
Of alloy steel		23,646	27,996	12	Germany 14,559; Belgium-Luxembourg 7,946; France 1,085.
Bars, rods, angles, shapes, sections		664,485	691,205	4,914	Germany 340,429; Belgium-Luxembourg 167,739; United Kingdom 52,825.
Rails and accessories		27,073	19,234	(2)	Italy 9,447; Iran 3,645; Germany 2,641.
Wire		13,770	12,510	138	France 3,446; Germany 1,648; Switzerland 1,501.
Tubes, pipes, fittings		541,737	1,202,541	8,174	Norway 668,787; Germany 151,303; Belgium-Luxembourg 114,483.
Lead:					
Ore and concentrate		—	35	—	All to Belgium-Luxembourg.
Oxides		6,923	7,517	—	Ireland 2,272; Germany 2,243; Czechoslovakia 1,405.
Ash and residue containing lead		3,589	NA		
Metal including alloys:					
Scrap		26,534	25,768	—	Belgium-Luxembourg 12,388; France 12,127; Germany 791.
Unwrought		17,678	17,864	—	Germany 12,705; Portugal 2,089; Belgium-Luxembourg 1,958.
Semimanufactures		5,902	4,273	3	Belgium-Luxembourg 1,296; United Kingdom 1,224; France 502.
Lithium: Oxides and hydroxides		18	NA		
Magnesium: Metal including alloys:					
Scrap		878	581	297	Germany 102; Italy 68.
Unwrought		6,596	6,752	—	Germany 3,717; Turkey 1,591; United Kingdom 744.
Semimanufactures		498	54	—	Germany 24; Belgium-Luxembourg 14; New Zealand 9.

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Manganese:					
Ore and concentrate		45,429	48,876	9	Belgium-Luxembourg 12,771; Germany 7,413; Republic of South Africa 7,232.
Oxides		647	416	—	Germany 139; Spain 103; Belgium-Luxembourg 60.
Metal including alloys, all forms		1,983	2,050	—	France 969; Germany 317; United Kingdom 169.
Mercury		154	69	—	Germany 28; France 10; Ireland 9.
Molybdenum:					
Ore and concentrate:					
Roasted		14,403	11,849	17	Belgium-Luxembourg 1,989; Japan 1,886; Germany 1,628.
Unroasted		1,581	2,399	—	Sweden 1,919; Germany 177; Italy 67.
Oxides and hydroxides		1,451	NA		
Ash and residue containing molybdenum		356	NA		
Metal including alloys:					
Unwrought		37	27	—	France 18; Germany 6; Belgium-Luxembourg 3.
Semimanufactures		163	171	2	Belgium-Luxembourg 110; Germany 23; United Kingdom 12.
Nickel:					
Ash and residue containing nickel		4,347	NA		
Metal including alloys:					
Scrap		5,500	5,938	13	Finland 4,619; Germany 573; Belgium-Luxembourg 351.
Unwrought		365	238	20	Germany 73; Canada 40; Italy 26.
Semimanufactures		270	231	56	Belgium-Luxembourg 76; Germany 23.
Platinum-group metals:					
Waste and sweepings	value, thousands	$30,571	$31,369	$2,838	France $12,980; Belgium-Luxembourg $6,053; Germany $5,462.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	173	NA		
Platinum	value, thousands	$3,863	$20,027	$20	Germany $10,638; United Kingdom $3,184; Belgium-Luxembourg $2,457.
Rhodium	kilograms	20	NA		
Iridium, osmium, ruthenium	do.	13	NA		
Unspecified	value, thousands	—	$2,535	$948	France $752; Belgium-Luxembourg $366.
Rare-earth metals:					
Waste and sweepings	do.	—	$15,748	$5	France $5,810; Germany $5,746; United Kingdom $2,040.
Metal including alloys, all forms	kilograms	—	3,000	—	All to Finland.
Selenium, elemental		4	420	—	Germany 6; Spain 5; United Kingdom 3.
Silicon, high-purity		25	NA		
Silver:					
Waste and sweepings[5]	value, thousands	$16,584	$15,748	$5	France $5,810; Germany $5,746; United Kingdom $2,040.
Metal including alloys, unwrought and partly wrought	do.	$15,825	$10,789	$29	Germany $4,693; Spain $2,259; Belgium-Luxembourg $1,002.
Tin:					
Ore and concentrate		—	150	—	United Kingdom 145; Germany 3; Italy 2.
Oxides		9	NA		

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Tin—Continued:				
Ash and residue containing tin	877	NA		
Metal including alloys:				
Scrap	367	685	—	Belgium-Luxembourg 396; Germany 193; United Kingdom 63.
Unwrought	2,553	1,877	—	Germany 1,144; France 209; Belgium-Luxembourg 148.
Semimanufactures	955	874	4	Germany 390; France 198; United Kingdom 113.
Titanium:				
Ore and concentrate	30,326	29,405	—	Germany 5,182; France 3,437; United Kingdom 2,830.
Oxides	1,614	1,046	—	Germany 446; Belgium-Luxembourg 199; France 155.
Metal including alloys:				
Unwrought including scrap	89	132	8	Germany 84; United Kingdom 21; Spain 10.
Semimanufactures	87	35	1	Belgium-Luxembourg 12; Italy 11; Germany 4.
Tungsten:				
Ore and concentrate	214	—		
Metal including alloys:				
Unwrought including scrap	594	304	169	Germany 119; France 13.
Semimanufactures	210	111	3	Belgium-Luxembourg 88; United Kingdom 5; Brazil 4.
Uranium and thorium:				
Oxides and other compounds value, thousands	$333,207	$237,821	$51,431	United Kingdom $73,655; Germany $45,751.
Metal including alloys, all forms, uranium do.	$330	$82	$43	France $19; Belgium-Luxembourg $16.
Vanadium:				
Ash and residue containing vanadium	145	NA		
Metal including alloys, all forms value, thousands	—	$11	—	France $7; Germany $4.
Zinc:				
Ore and concentrate	48	32	—	France 24; Germany 7; Nigeria 1.
Blue powder	602	634	—	Belgium-Luxembourg 311; Singapore 78; United Kingdom 74.
Ash and residue containing zinc	17,756	NA		
Metal including alloys:				
Scrap	23,621	21,473	—	Belgium-Luxembourg 7,226; Germany 5,814; France 1,387.
Unwrought	162,419	148,619	201	Germany 42,164; United Kingdom 29,827; France 24,994.
Semimanufactures	7,815	7,865	—	Germany 5,023; France 1,180; Denmark 547.
Zirconium:				
Ore and concentrate	24,263	21,041	—	Germany 6,917; France 3,844; United Kingdom 3,360.
Oxides	84	NA		
Metal including alloys:				
Unwrought including scrap	38	6	—	Belgium-Luxembourg 5; Germany 1.
Semimanufactures	6	20	—	Egypt 16; Germany 3; France 1.
Other:				
Ores and concentrates	220	382	—	Germany 216; Denmark 74; Sweden 26.
Oxides and hydroxides	45	1,982	46	Austria 577; Germany 346; Italy 328.
Ashes and residues	3,922	51,294	363	Germany 20,332; Belgium-Luxembourg 14,703; India 2,838.
Base metals including alloys, all forms	—	3	(2)	Mainly to France.

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		9,125	8,796	15	Thailand 1,946; Belgium-Luxembourg 1,912; France 1,310.
Artificial:					
Corundum		1,053	1,631	—	Italy 508; Sudan 322; Germany 299.
Silicon carbide		6	32	—	Germany 27; Belgium-Luxembourg 2; Italy 2.
Dust and powder of precious and semiprecious stones including diamond	value, thousands	$112	$200	—	Belgium-Luxembourg $89; Germany $45; Israel $25.
Grinding and polishing wheels and stones		8,854	7,483	94	Germany 2,398; United Kingdom 1,109; France 1,035.
Asbestos, crude		162	53	—	Denmark 20; Kenya 13; France 10.
Barite and witherite		73,133	87,869	126	United Kingdom 34,949; Denmark 20,547; Germany 18,549.
Boron materials:					
Crude natural borates		28,149	9,798	27	Belgium-Luxembourg 4,937; Czechoslovakia 502; Germany 336.
Oxides and acids		1,921	1,887	NA	NA.
Bromine		586	e550	—	Germany 147; France 132; Belgium-Luxembourg 81.
Cement		693,275	698,683	284	Belgium-Luxembourg 385,912; Germany 183,804; United Kingdom 84,852.
Chalk		28,242	36,610	—	Belgium-Luxembourg 34,284; France 1,290; Germany 906.
Clays, crude:					
Bentonite		40,936	35,805	6	Germany 12,176; Belgium-Luxembourg 10,507; United Kingdom 5,535.
Chamotte earth		2,209	NA		
Fire clay		515	NA		
Fuller's earth		670	NA		
Kaolin		153,738	166,337	111	Belgium-Luxembourg 114,991; Germany 26,635; France 11,900.
Unspecified		266,943	213,381	7	Germany 120,913; Belgium-Luxembourg 86,936; France 3,185.
Cryolite and chiolite		26	1	—	All to Spain.
Diamond:					
Gem, not set or strung	value, thousands	$113,558	$75,652	$28,197	Switzerland $12,822; Thailand $11,964.
Industrial stones	do.	$20,814	$13,380	$1,999	Belgium-Luxembourg $4,795; Germany $3,186.
Diatomite and other infusorial earth		866	778	—	Belgium-Luxembourg 170; France 167; Cameroon 115.
Feldspar, fluorspar, related materials:					
Feldspar		1,840	32,454	10	Germany 15,357; Italy 8,731; Belgium-Luxembourg 5,821.
Fluorspar		1,704	1,234	—	Belgium-Luxembourg 821; Hungary 282; Turkey 40.
Unspecified		28,124	NA		
Fertilizer materials:					
Crude, n.e.s.		254,946	311,083	—	Belgium-Luxembourg 204,629; Germany 63,532; France 35,673.
Manufactured:					
Ammonia	thousand tons	1,166	1,194	—	Belgium-Luxembourg 425; United Kingdom 249; France 161.

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued:					
Manufactured—Continued:					
Nitrogenous	thousand tons	4,818	4,639	142	Germany 1,438; France 827; Belgium-Luxembourg 417.
Phosphatic	do.	266	285	(2)	United Kingdom 112; France 87; Germany 46.
Potassic	do.	127	87	(2)	Germany 75; Belgium-Luxembourg 5; Denmark 2.
Unspecified and mixed	do.	1,576	1,384	(2)	France 280; Germany 236; United Kingdom 118.
Graphite, natural		1,880	2,082	4	Germany 849; Spain 414; France 255.
Gypsum and plaster		72,695	63,434	—	Belgium-Luxembourg 35,472; Germany 27,068; Sweden 4,422.
Iodine		214	NA		
Kyanite and related materials		1,384	NA		
Lime		9,142	13,452	—	Belgium-Luxembourg 6,274; Germany 5,189; Nigeria 505.
Magnesium compounds:					
Magnesite, crude		5,457	5,967	19	Germany 5,087; France 476; Belgium-Luxembourg 241.
Oxides and hydroxides		47,970	58,385	90	Germany 27,709; Belgium-Luxembourg 5,441; France 4,991.
Other		561	NA		
Mica:					
Crude including splittings and waste		1,985	2,065	—	France 814; Italy 262; Germany 172.
Worked including agglomerated splittings		12	18	(2)	Switzerland 6; Germany 4; Poland 4.
Nitrates, crude		295	2,431	—	Germany 1,578; Belgium-Luxembourg 571; France 155.
Phosphates, crude		211,330	159,236	—	Germany 121,856; Belgium-Luxembourg 13,650; France 10,404.
Pigments, mineral:					
Natural, crude		478	NA		
Iron oxides and hydroxides, processed		7,812	7,317	450	Germany 2,645; France 1,120; United Kingdom 451.
Potassium salts, crude		274	304	—	Germany 282; Belgium-Luxembourg 22.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$5,167	$4,256	$201	United Kingdom $1,551; Germany $519; Sweden $467.
Synthetic	do.	—	$100	—	Switzerland $52; Belgium-Luxembourg $7.
Pyrite, unroasted		65	153	—	Belgium-Luxembourg 77; Germany 67; New Zealand 6.
Quartz crystal, piezoelectric	value, thousands	—	$44	$37	Belgium-Luxembourg $7.
Salt and brine	thousand tons	2,662	3,085	—	Belgium-Luxembourg 899; France 28; unspecified 2,158.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		192,700	206,912	—	Germany 76,881; Belgium-Luxembourg 35,968; Denmark 10,062.
Sulfate, manufactured		22,096	28,586	(2)	Germany 9,880; Belgium-Luxembourg 4,924; France 2,959.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		r29,405	57,987	37	Germany 42,954; Belgium-Luxembourg 7,255; United Kingdom 4,049.
Worked		r70,430	59,948	61	Germany 34,391; Belgium-Luxembourg 18,665; Austria 1,838.

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel—Continued:					
Dolomite, chiefly refractory-grade		25,537	22,641	—	Belgium-Luxembourg 11,182; Germany 8,145; Italy 884.
Gravel and crushed rock	thousand tons	1,273	1,508	(2)	Belgium-Luxembourg 999; United Kingdom 299; Germany 197.
Limestone other than dimension		5,795	8,766	11	Germany 8,174; Belgium-Luxembourg 525; France 43.
Quartz and quartzite		16,347	13,096	220	Belgium-Luxembourg 6,042; United Kingdom 2,174; Japan 1,686.
Sand other than metal-bearing	thousand tons	11,845	11,650	—	Belgium-Luxembourg 10,909; Germany 486; France 212.
Sulfur:					
Elemental:					
Crude including native and byproduct		148,042	135,135	1	Belgium-Luxembourg 118,002; Germany 8,032; France 5,764.
Colloidal, precipitated, sublimed		72	87	—	France 34; Germany 31; Italy 12.
Dioxide		873	989	—	Portugal 787; Belgium-Luxembourg 116; Germany 40.
Sulfuric acid		206,653	187,500	—	Belgium-Luxembourg 92,467; Germany 81,224; France 7,095.
Talc, steatite, soapstone, pyrophyllite		19,449	25,858	122	Belgium-Luxembourg 7,241; Germany 7,093; Sweden 2,994.
Vermiculite, perlite, chlorite		6,170	2,873	—	Germany 2,607; Belgium-Luxembourg 174; Austria 61.
Other:					
Crude		280,429	331,216	383	Belgium-Luxembourg 118,049; Germany 107,926; France 30,904.
Slag and dross, not metal-bearing		882,934	760,744	518	Belgium-Luxembourg 393,684; France 155,036; Germany 68,783.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		393	966	—	Germany 701; Belgium-Luxembourg 265.
Carbon black		109,891	116,283	94	France 37,933; Germany 28,755; Belgium-Luxembourg 18,276.
Coal:					
Anthracite	thousand tons	341	288	—	Belgium-Luxembourg 99; France 58; United Kingdom 47.
Bituminous	do.	1,933	1,432	—	Germany 1,091; Belgium-Luxembourg 187; France 142.
Briquets of anthracite and bituminous coal		512	460	—	France 340; Colombia 59; Belgium-Luxembourg 25.
Lignite including briquets		3,194	69	—	Germany 42; France 27.
Coke and semicoke		844,277	957,900	—	Belgium-Luxembourg 337,217; France 216,380; Finland 175,920.
Gas, natural: Gaseous	million cubic meters	34,171	24,813	—	Germany 14,454; Italy 3,824; France 3,472.
Peat including briquets and litter		551,804	577,911	20	Belgium-Luxembourg 262,983; France 118,482; Germany 105,261.
Petroleum:					
Crude	thousand 42-gallon barrels	8,971	8,113	—	United Kingdom 7,597; Belgium-Luxembourg 502; Germany 14.
Refinery products:					
Liquefied petroleum gas	do.	5,313	8,861	24	Belgium-Luxembourg 3,445; Germany 3,322; United Kingdom 1,075.
Gasoline	do.	93,052	95,600	2,321	Germany 60,545; Belgium-Luxembourg 10,421; France 5,948.

See footnotes at end of table.

TABLE 2—Continued

NETHERLANDS: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum—Continued:					
Refinery products—Continued:					
Mineral jelly and wax	thousand 42-gallon barrels	600	380	7	France 147; Germany 97; Italy 34.
Kerosene and jet fuel	do.	29,902	29,052	—	Germany 20,629; Belgium-Luxembourg 3,115; United Kingdom 1,006.
Distillate fuel oil	do.	106,148	99,009	—	Germany 53,088; Belgium-Luxembourg 30,466; Switzerland 2,190.
Lubricants	do.	4,957	5,009	41	Belgium-Luxembourg 838; United Kingdom 458; Germany 431.
Residual fuel oil	do.	83,736	89,470	5,050	Belgium-Luxembourg 13,871; United Kingdom 11,987; unspecified 63,612.
Bitumen and other residues	do.	1,936	1,891	—	Germany 742; Belgium-Luxembourg 324; Norway 256.
Bituminous mixtures	do.	547	821	(2)	Germany 584; Norway 116; Belgium-Luxembourg 92.

[r]Revised. NA Not available.
[1]Table prepared by Amy Burk.
[2]Less than 1/2 unit.
[3]May include high-purity silicon.
[4]May include other metalloids.
[5]May include other precious metals.
[6]May include iodine and fluorine.

TABLE 3

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	1,871	1,934	433	France 913; Germany 581.
Alkaline-earth metals	172	NA		
Aluminum:				
Ore and concentrate	142,916	133,475	899	Greece 97,926; China 14,746; Germany 10,062.
Oxides and hydroxides	502,766	429,149	8,828	Suriname 285,171; Jamaica 72,187; Germany 41,267.
Ash and residue containing aluminum	11,068	NA		
Metal including alloys:				
Scrap	126,757	118,181	846	Germany 60,670; Belgium-Luxembourg 16,874; France 14,738.
Unwrought	190,224	183,067	1,155	Norway 48,328; Germany 23,614; U.S.S.R. 19,710.
Semimanufactures	191,856	185,797	2,136	Germany 57,422; Belgium-Luxembourg 52,418; United Kingdom 12,036.
Antimony:				
Oxides	1,531	NA		
Metal including alloys, all forms	51	72	(2)	Hong Kong 30; China 13; Germany 13.

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Arsenic:					
Oxides and acids		—	6,523	10	Germany 3,992; China 692; Japan 281.
Metal including alloys, all forms		30	NA		
Beryllium: Metal including alloys, all forms	value, thousands	$571	$220	$205	Germany $10; Belgium-Luxembourg $5.
Bismuth: Metal including alloys, all forms		41	26	(2)	Belgium-Luxembourg 10; China 5; United Kingdom 5.
Cadmium: Metal including alloys, all forms		32	5	(2)	Belgium-Luxembourg 3; Germany 2.
Chromium:					
Ore and concentrate		54,066	34,378	—	Republic of South Africa 32,613; Germany 930; Belgium-Luxembourg 463.
Oxides and hydroxides		2,128	1,802	707	United Kingdom 497; Germany 416.
Metal including alloys, all forms		261	174	(2)	Sweden 75; U.S.S.R. 26; China 17.
Cobalt:					
Ore and concentrate		—	6	—	All from Belgium-Luxembourg.
Oxides and hydroxides		329	316	—	Belgium-Luxembourg 228; Finland 52; China 26.
Metal including alloys, all forms		127	154	(2)	U.S.S.R. 87; Germany 28; France 12.
Ash and residue containing cobalt		82	NA		
Columbium and tantalum:					
Ore and concentrate		—	24	—	All from Belgium-Luxembourg.
Metal including alloys, all forms, tantalum	value, thousands	$367	$159	$11	Germany $92; Austria $28; Belgium-Luxembourg $17.
Copper:					
Ore and concentrate		476	148	—	Australia 140; Belgium-Luxembourg 8.
Matte and speiss including cement copper		—	121	—	Germany 50; Belgium-Luxembourg 46; United Kingdom 22.
Oxides and hydroxides		752	NA		
Sulfate		9,866	NA		
Ash and residue containing copper		2,050	NA		
Metal including alloys:					
Scrap		78,218	95,616	1,191	Germany 41,692; Belgium-Luxembourg 17,748; France 5,818.
Unwrought		25,660	19,732	189	U.S.S.R. 8,651; Germany 6,314; Belgium-Luxembourg 1,704.
Semimanufactures		112,726	113,906	565	Germany 45,505; Belgium-Luxembourg 37,733; France 13,212.
Gallium, indium and thallium: Metal including alloys, all forms	value, thousands	$416	NA		
Germanium:					
Oxides	do.	$686	NA		
Metal including alloys, all forms	do.	$195	$49	—	Germany $22; Belgium-Luxembourg $15; Japan $12.
Gold:					
Waste and sweepings	do.	$1,850	$465	—	Germany $276; United Kingdom $102; Belgium-Luxembourg $65.
Metal including alloys, unwrought and partly wrought	kilograms	5,770	10,265	1,004	United Kingdom 3,768; Germany 3,697.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite	thousand tons	8,303	7,892	—	Brazil 2,327; Australia 1,656; Norway 1,456.
Pyrite, roasted		10,894	11,982	—	Belgium-Luxembourg 11,931; Germany 51.

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal:				
Scrap thousand tons	1,171	2,025	3	Germany 1,643; Belgium-Luxembourg 123; Denmark 68.
Pig iron, cast iron, related materials	73,082	69,063	346	Germany 21,866; U.S.S.R. 13,157; Canada 8,143.
Ferroalloys:				
Ferrocolumbium	104	NA		
Ferrochromium	8,084	2,035	28	Germany 1,006; United Kingdom 452; Belgium-Luxembourg 262.
Ferromanganese	17,450	17,151	280	Norway 6,749; France 5,568; United Kingdom 1,654.
Ferromolybdenum	544	NA		
Ferronickel	100	19	—	Japan 10; Germany 8; Austria 1.
Ferrophosphorous	254	NA		
Ferrosilicochromium	72	43	—	All from Germany.
Ferrosilicomanganese	7,050	2,794	2	Norway 910; Republic of South Africa 685; France 600.
Ferrosilicon	8,085	7,642	34	Germany 3,617; Norway 1,648; Sweden 794.
Ferrotitanium and ferrosilicotitanium	288	NA		
Ferrovanadium	62	NA		
Silicon metal	8,812	[3]8,880	([2])	Norway 3,565; Brazil 2,262; China 1,683.
Unspecified	1,368	4,421	([2])	United Kingdom 1,507; France 1,046; Germany 746.
Steel, primary forms	77,461	72,720	593	Germany 65,989; United Kingdom 2,683; Belgium-Luxembourg 2,185.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	1,424,746	1,552,699	153	Germany 640,264; Belgium-Luxembourg 509,580; Sweden 54,697.
Clad, plated, coated	597,193	596,344	1,603	Germany 246,852; Belgium-Luxembourg 209,710; United Kingdom 46,481.
Of alloy steel	133,671	145,764	178	Germany 47,737; Belgium-Luxembourg 30,189; Sweden 18,132.
Bars, rods, angles, shapes, sections	1,741,716	1,731,803	1,457	Germany 631,888; Belgium-Luxembourg 516,278; United Kingdom 207,676.
Rails and accessories	42,445	44,937	—	Germany 18,322; France 11,370; Belgium-Luxembourg 8,071.
Wire	129,797	130,163	107	Germany 56,403; Belgium-Luxembourg 51,871; France 7,947.
Tubes, pipes, fittings	1,068,844	932,744	4,096	Germany 529,016; France 110,330; Belgium-Luxembourg 74,682.
Lead:				
Oxides	4,702	4,435	2	Germany 3,970; France 372; United Kingdom 70.
Ash and residue containing lead	2,293	NA		
Metal including alloys:				
Scrap	20,185	21,196	774	Germany 15,845; Poland 1,293; Belgium-Luxembourg 1,164.
Unwrought	39,077	43,885	32	Belgium-Luxembourg 13,347; France 9,230; United Kingdom 8,264.
Semimanufactures	11,172	10,540	8	Belgium-Luxembourg 8,051; Germany 1,418; France 620.
Lithium: Oxides and hydroxides	181	NA		

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Magnesium: Metal including alloys:					
Scrap		749	329	19	Germany 138; France 71; Belgium-Luxembourg 36.
Unwrought		7,831	3,386	1,671	Norway 1,203; France 325.
Semimanufactures		491	320	20	Germany 241; Switzerland 28.
Manganese:					
Ore and concentrate		71,157	65,906	—	Belgium-Luxembourg 16,983; Congo 14,718; Australia 11,556.
Oxides		1,033	NA		
Metal including alloys, all forms		2,263	1,750	35	China 796; Republic of South Africa 502; Germany 233.
Mercury		106	82	2	Sweden 27; Belgium-Luxembourg 18; Spain 15.
Molybdenum:					
Ore and concentrate:					
Roasted		1,013	2,512	423	Chile 1,468; Iran 299.
Unroasted		21,192	16,579	15,301	Peru 700; Iran 306.
Oxides and hydroxides		18	NA		
Ash and residue containing molybdenum		72	NA		
Metal including alloys:					
Unwrought including scrap		108	86	35	Germany 47; Belgium-Luxembourg 4.
Semimanufactures		59	52	4	Belgium-Luxembourg 23; Poland 9; Austria 7.
Nickel:					
Oxides and hydroxides		200	NA		
Ash and residue containing nickel		2,304	NA		
Metal including alloys:					
Scrap		2,797	3,611	73	Germany 980; United Kingdom 409; United Arab Emirates 366.
Unwrought		1,387	1,307	15	United Kingdom 774; Belgium-Luxembourg 153; U.S.S.R. 90.
Semimanufactures		1,198	1,226	96	United Kingdom 404; Germany 301; France 178.
Platinum-group metals:					
Waste and sweepings	value, thousands	$3,684	$1,225	$238	Belgium-Luxembourg $691; Denmark $209.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	2,151	NA		
Platinum	value, thousands	$5,187	$15,504	$1,583	United Kingdom $4,465; France $3,191; Switzerland $2,812.
Rhodium	kilograms	60	NA		
Iridium, osmium, ruthenium	do.	27	NA		
Unspecified	value, thousands	—	$7,988	$3,083	U.S.S.R. $2,051; Belgium-Luxembourg $1,404.
Rare-earth metals including alloys, all forms		12	156	(2)	France 89; Germany 53; Canada 5.
Selenium, elemental		13	64	1	Germany 17; China 15; Denmark 11.
Silicon, high-purity		12	NA		
Silver:					
Ore and concentrate[5]	value, thousands	—	$5	—	All from Belgium-Luxembourg.
Waste and sweepings[5]	do.	$538	$1,021	—	Germany $475; Denmark $156; United Kingdom $151.
Metal including alloys, unwrought and partly wrought	do.	$19,178	$15,647	$526	Germany $4,818; France $4,513; United Kingdom $2,407.
Tellurium, elemental		7	—		

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Tin:				
Ore and concentrate	10,586	6,180	18	United Kingdom 3,367; Peru 975; Portugal 751.
Oxides	98	NA		
Ash and residue containing tin	1,304	NA		
Metal including alloys:				
Scrap	393	476	—	Germany 172; Belgium-Luxembourg 107; Portugal 52.
Unwrought	3,055	2,726	—	United Kingdom 827; Brazil 743; Belgium-Luxembourg 528.
Semimanufactures	147	201	1	Germany 120; Belgium-Luxembourg 31; Portugal 25.
Titanium:				
Ore and concentrate	59,999	57,896	10,036	Australia 18,077; Sierra Leone 14,116.
Oxides	10,036	6,369	624	Germany 1,161; Belgium-Luxembourg 1,108; Finland 795.
Ash and residue containing titanium	48	NA		
Metal including alloys:				
Unwrought including scrap	440	345	73	Austria 99; U.S.S.R. 85.
Semimanufactures	347	129	13	Germany 35; United Kingdom 26; France 22.
Tungsten:				
Ore and concentrate	453	1	—	All from Belgium-Luxembourg.
Metal including alloys:				
Unwrought including scrap	693	302	192	Germany 78; Belgium-Luxembourg 14.
Semimanufactures	78	34	2	Belgium-Luxembourg 18; Germany 7.
Uranium and thorium:				
Oxides and other compounds value, thousands	$3,970	$577	—	Belgium-Luxembourg $568; Germany $5; France $4.
Metal including alloys, all forms, uranium do.	$72,347	$85,698	—	France $45,342; United Kingdom $29,863; U.S.S.R. $7,323.
Vanadium:				
Oxides and hydroxides	10	NA		
Ash and residue containing vanadium	129	NA		
Metal including alloys, all forms	—	3	—	Mainly from Germany.
Zinc:				
Ore and concentrate	465,923	410,911	38,032	Australia 107,539; Canada 95,663; Ireland 62,875.
Oxides	6,489	5,025	39	Germany 1,689; China 1,475; France 466.
Blue powder	2,750	2,893	—	Norway 1,196; Germany 1,074; Belgium-Luxembourg 406.
Ash and residue containing zinc	26,319	NA		
Metal including alloys:				
Scrap	5,055	5,604	—	Germany 1,733; France 1,288; Belgium-Luxembourg 1,094.
Unwrought	26,187	25,958	—	Belgium-Luxembourg 7,813; Germany 4,757; Finland 5,226.
Semimanufactures	6,724	5,290	—	Germany 3,283; Belgium-Luxembourg 527; United Kingdom 79.
Zirconium:				
Ore and concentrate	52,737	52,198	1,118	Republic of South Africa 29,072; Australia 21,259.
Oxides	72	NA		
Metal including alloys:				
Unwrought including scrap	27	45	36	France 4; United Kingdom 4.
Other:				
Oxides and hydroxides	248	3,266	92	Belgium-Luxembourg 755; Germany 730; France 388.

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Other—Continued:					
Ashes and residues		4,736	46,894	3,214	Belgium-Luxembourg 22,459; Germany 12,872.
Base metals including alloys, all forms		15	1	(2)	Mainly from Germany.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		240,764	285,781	22	Germany 274,517; Turkey 9,935; Belgium-Luxembourg 584.
Artificial:					
Corundum		11,332	9,546	459	Germany 3,727; United Kingdom 1,570; France 1,227.
Silicon carbide		4,601	3,622	7	Germany 1,926; Belgium-Luxembourg 972; Norway 487.
Dust and powder of precious and semiprecious stones including diamond	value, thousands	$2,372	$2,131	$66	Mainly from Belgium-Luxembourg.
Grinding and polishing wheels and stones		5,419	4,793	98	France 1,540; Germany 1,365; Italy 441.
Asbestos, crude		6,252	6,272	1	Canada 3,061; U.S.S.R. 1,600; Republic of South Africa 1,558.
Barite and witherite		94,774	95,498	—	China 90,047; Germany 3,401; Belgium-Luxembourg 1,184.
Boron materials:					
Crude natural borates		28,430	24,985	1,936	Turkey 13,295; Belgium-Luxembourg 9,565; Germany 125.
Oxides and acids		5,956	5,680	1,514	France 1,635; Italy 1,414.
Bromine		10,640	e9,116	—	Israel 8,558; Belgium-Luxembourg 50; United Kingdom 10.
Cement	thousand tons	3,720	3,711	344	Germany 1,671; Belgium-Luxembourg 1,592; Poland 56.
Chalk		102,369	107,658	—	France 52,185; Germany 42,853; Belgium-Luxembourg 11,326.
Clays, crude:					
Bentonite		108,305	73,326	6,941	Greece 43,415; Germany 9,776.
Chamotte earth		24,165	NA		
Fuller's earth		5,428	NA		
Fire clay		58,325	NA		
Kaolin		478,972	496,870	98,365	United Kingdom 121,321; Germany 70,440.
Unspecified		552,502	718,360	25,034	Germany 636,050; France 14,091.
Cryolite and chiolite		62	2	—	All from Germany.
Diamond:					
Gem, not set or strung	value, thousands	$142,079	$88,311	$8,066	Belgium-Luxembourg $31,980; Switzerland $30,779; Panama $10,722.
Industrial stones	do.	$14,443	$9,528	$1,036	United Kingdom $4,677; Belgium-Luxembourg $2,722.
Diatomite and other infusorial earth		25,398	22,214	5,238	Denmark 14,547; Germany 668.
Feldspar, fluorspar, related materials:					
Feldspar		12,739	82,889	—	Canada 47,864; Norway 27,158; Germany 5,883.
Fluorspar		30,520	10,494	15	Germany 5,788; Spain 2,060; China 1,613.
Unspecified		59,724	—		
Fertilizer materials:					
Crude, n.e.s.		236,436	310,059	—	Germany 215,012; Belgium-Luxembourg 83,214; Austria 8,460.
Manufactured:					
Ammonia		20,579	25,923	(2)	United Kingdom 15,978; Belgium-Luxembourg 5,555; Germany 3,014.
Nitrogenous		470,283	517,257	45	Belgium-Luxembourg 192,311; France 100,832; Spain 79,189.
Phosphatic		182,429	196,093	2	Israel 166,317; Germany 19,011; Belgium-Luxembourg 7,050.

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued:					
Manufactured—Continued:					
Potassic		612,734	550,991	(2)	Israel 231,041; Germany 146,157; Belgium-Luxembourg 62,329.
Unspecified and mixed		291,860	199,329	624	Belgium-Luxembourg 92,336; Israel 47,643; Germany 14,015.
Graphite, natural		4,467	2,305	26	China 1,486; Germany 505; Australia 264.
Gypsum and plaster		508,775	359,418	1,570	Germany 154,397; Belgium-Luxembourg 92,579; France 81,883.
Iodine		502	NA		
Kyanite and related materials:					
Mullite		655	NA		
Unspecified		5,623	NA		
Lime		831,492	797,730	2	Belgium-Luxembourg 489,181; Germany 307,066; France 1,274.
Magnesium compounds:					
Magnesite, crude		2,743	4,167	—	Belgium-Luxembourg 1,158; Italy 926; Greece 643.
Oxides and hydroxides		107,093	101,936	172	China 74,314; Greece 11,872; Germany 3,672.
Other		31,322	NA		
Mica:					
Crude including splittings and waste		3,341	2,311	311	India 585; Canada 560; Germany 377.
Worked including agglomerated splittings		69	25	(2)	Belgium-Luxembourg 11; Switzerland 9; Japan 2.
Nitrates, crude		19,300	20,468	—	Belgium-Luxembourg 18,310; Poland 956; Czechoslovakia 475.
Phosphates, crude	thousand tons	2,236	2,029	635	Morocco 454; Jordan 303.
Phosphorous, elemental		33	NA		
Pigments, mineral:					
Natural, crude		623	606	—	Canada 581; Singapore 15; Germany 10.
Iron oxides and hydroxides, processed		12,267	11,090	124	Germany 8,846; United Kingdom 1,114; Italy 351.
Potassium salts, crude		682	3,358	—	Germany 2,846; Belgium-Luxembourg 511.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$4,044	$3,546	$980	Thailand $990; Germany $632.
Synthetic	do.	$4,620	$2,163	$617	Japan $1,410; Belgium-Luxembourg $67.
Pyrite, unroasted		1,203	463	—	Germany 194; Belgium-Luxembourg 162; Italy 107.
Quartz crystal, piezoelectric	value, thousands	—	$20	$4	Hong Kong $7; Germany $5.
Salt and brine		264,166	425,042	40	Belgium-Luxembourg 183,054; Germany 127,820; Poland 25,764.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		60,288	72,950	7,467	Germany 61,560; Belgium-Luxembourg 1,697.
Sulfate, manufactured		r42,208	37,233	21	Germany 14,183; Belgium-Luxembourg 10,537; Spain 8,432.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked	thousand tons	956	973	(2)	Germany 604; Belgium-Luxembourg 311; India 12.
Worked	do.	107	118	(2)	Italy 45; Belgium-Luxembourg 36; Portugal 9.
Dolomite, chiefly refractory-grade	do.	845	850	(2)	Belgium-Luxembourg 697; Germany 65; Norway 41.
Gravel and crushed rock	do.	20,772	19,625	552	Germany 12,010; Belgium-Luxembourg 4,795; United Kingdom 1,915.
Limestone other than dimension	do.	892	880	—	Belgium-Luxembourg 834; Germany 39; Norway 3.

See footnotes at end of table.

TABLE 3—Continued

NETHERLANDS: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel—Continued:					
Quartz and quartzite	thousand tons	56	51	[2]	Germany 33; Norway 10; Belgium-Luxembourg 4.
Sand other than metal-bearing	do.	8,884	8,766	2	Germany 6,666; Belgium-Luxembourg 1,726; Norway 205.
Sulfur:					
Elemental:					
Crude including native and byproduct		188,336	130,244	—	Germany 126,546; Belgium-Luxembourg 2,666; Poland 725.
Colloidal, precipitated, sublimed		278	154	1	Germany 68; United Kingdom 60; Belgium-Luxembourg 25.
Dioxide		3,538	6,131	—	Germany 5,427; France 508; Belgium-Luxembourg 173.
Sulfuric acid		644,390	691,393	3	Germany 264,936; Finland 155,072; Norway 124,595.
Talc, steatite, soapstone, pyrophyllite		73,985	73,598	425	France 21,517; Sweden 12,118; Australia 9,384.
Vermiculite, perlite, chlorite		20,359	18,091	—	Greece 13,110; Republic of South Africa 3,150; Germany 1,382.
Other:					
Crude	thousand tons	665	828	9	Germany 410; Belgium-Luxembourg 337; Australia 16.
Slag and dross, not metal-bearing	do.	2,176	1,798	[2]	Germany 1,123; Belgium-Luxembourg 668; Republic of South Africa 5.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		1,031	1,243	666	Germany 497; Belgium-Luxembourg 80.
Carbon black		21,937	20,517	3,914	Germany 12,387; France 2,268.
Coal:					
Anthracite	thousand tons	308	274	—	Republic of South Africa 174; Germany 37; China 27.
Bituminous	do.	17,196	15,365	6,293	Australia 4,347; Colombia 1,739.
Briquets of anthracite and bituminous coal		933	923	—	Germany 798; Belgium-Luxembourg 126.
Lignite including briquets	thousand tons	77	56	—	Mainly from Germany.
Coke and semicoke	do.	350	[7]345	[2]	Poland 100; Germany 68; Belgium-Luxembourg 61.
Gas, natural: Gaseous	million cubic meters	2,694	1,302	—	All from Germany.
Peat including briquets and litter	thousand tons	1,386	1,719	[2]	Germany 1,531; Finland 53; U.S.S.R. 53.
Petroleum:					
Crude	thousand 42-gallon barrels	366,636	362,325	—	Saudi Arabia 130,860; Iran 59,640; United Kingdom 44,195.
Refinery products:					
Liquefied petroleum gas	do.	22,966	20,699	53	Saudi Arabia 6,709; United Kingdom 5,206; Germany 2,577.
Gasoline:					
Aviation	thousand 42-gallon barrels	5,457	NA		
Motor	do.	27,120	28,560	536	Belgium-Luxembourg 6,579; United Kingdom 5,381; Algeria 3,579.
Mineral jelly and wax	do.	320	394	6	Germany 170; France 127; United Kingdom 46.
Kerosene and jet fuel	do.	2,263	3,147	[2]	Belgium-Luxembourg 2,069; France 202; Spain 202.
Distillate fuel oil	do.	33,274	21,194	1,156	U.S.S.R. 13,316; Belgium-Luxembourg 2,402.
Lubricants	do.	2,351	1,953	77	Belgium-Luxembourg 567; France 378; Italy 343.
Residual fuel oil	do.	24,871	22,811	366	U.S.S.R. 11,675; Belgium-Luxembourg 4,775; Turkey 1,092.
Bitumen and other residues	do.	818	584	[2]	Belgium-Luxembourg 299; Germany 257; Sweden 27.
Bituminous mixtures	do.	123	274	1	Belgium-Luxembourg 206; Germany 64; United Kingdom 3.
Petroleum coke	do.	2,313	2,815	1,001	Germany 759; Norway 490.

[r] Revised. NA Not available.
[1] Table prepared by Amy M. Burk.
[2] Less than 1/2 unit.
[3] May include high-purity silicon.
[4] May include phosphorus and tellurium.
[5] May include other precious metals.
[6] May include fluorine and iodine.
[7] May include gas carbon.

TABLE 4

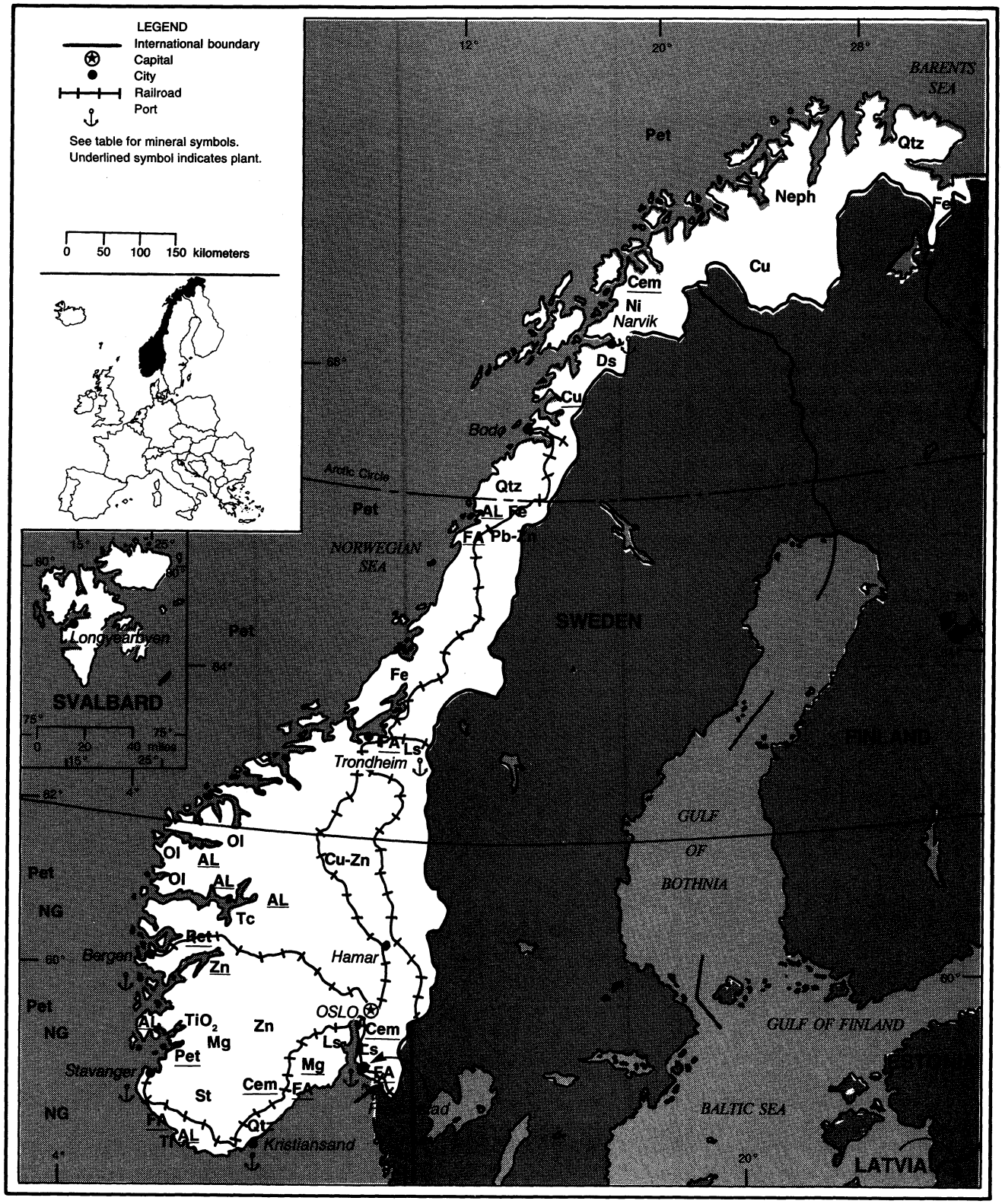
NETHERLANDS: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facility	Annual capacity
Aluminum, primary	Hoogovens Aluminium BV	Smelter at Delfzijl	95.6
Do.	Pechiney Nederland NV	Smelter at Vlissingen	178
Cadmium tons	Budelco BV (Australian Overseas Smelting Pty Ltd., 50%; Kempensche Zinkmaatschappij Zincs de la Campine BV, 50%)	Plant at Budel-Dorplein	650
Cement	ENCI Nederland BV (Eerste Nederlandse Cement Industrie NV)	10 plants at Maastricht	2,700
Do.	Cementfabriek IJmuiden BV	3 plants at IJmuiden	1,600
Do.	Cementfabriek Rozenburg BV	2 plants at Rozenburg	920
Lead	Hollandse Metallurgische Industrie Billiton BV	Electrolytic plant at Arnhem	35
Do.	Billiton Witmetaal BV	Electrolytic plant at Naarden	6
Magnesia	Billiton Refractories BV	Plant at Veendam	100
Do.	MAF Magnesite BV	Plant at Vlaardingen	40
Natural gas million cubic meters per day	Nederlandse Aardolie Maatschappij BV (NAM)	Groningen, Leeuwarden, Assen, and other onshore gasfields, and several offshore wells in the North Sea	225
Petroleum, crude barrels per day		766 wells (204 producing) including:	83,500
Do. do.	AMOCO, CONOCO, and UNOCAL	North Sea Fields: Haven, Helder, Helm, Hoorn, Kotter, Logger, and Rijn	(63,000)
Do. do.	NAM	Onshore Fields: Berkel, DeLier, Ijselmonde, Meerkapelle, Pernis West, Pinacker, Rotterdam, Schoonebeck, Werkendam, and Zoetemeer	(20,500)
Refineries do.	6 companies, of which the major ones are:		1,230,500
Do.	Netherlands Refining Co.	Refinery at Rotterdam	(446,000)
Do.	Shell Nederland Raffinaderij BV	Refinery at Pernis	(374,000)
Do.	Esso Nederland BV	Refinery at Rotterdam	(175,000)
Do.	Total Raffinaderij Nederland NV	Refinery at Vlissingen	(150,000)
Salt	Akzo Salt & Basic Chemicals BV	Hengelo Mines	2,000
Do.	do.	Delfzijl Mines	2,000
Sodium:			
Carbonate, synthetic	do.	Plant at Delfzijl	380
Sulfate, synthetic	do.	do.	600
Steel	Hoogovens IJmuiden BV	Plant at IJmuiden	6,100
Tin	Budelco BV	Smelter and refinery at Arnhem	7
Zinc	do.	Electrolytic plant at Budel-Dorplein	210

NORWAY

AREA 324,000 km² **POPULATION 4.2 million**



THE MINERAL INDUSTRY OF

NORWAY

By Jozef Plachy

The Norwegian mineral industry contributed significantly to the economy of Norway. The availability of inexpensive hydroelectric power provides the basis for the country's metal processing industry, mainly aluminum and ferroalloys, and North Sea petroleum and natural gas provide Norway with significant export revenues. The Norwegian industrial minerals industry consists of an export-dominated sector (ilmenite, olivine, nepheline syenite, talc, graphite, feldspar, and quartz) and domestic-oriented sector (limestone for cement and quartzite for ferrosilicon).

GOVERNMENT POLICIES AND PROGRAMS

The immense profitability of offshore hydrocarbon production repeatedly distorted the onshore industries. In the past, the needed structural changes in the mainland were supplanted by Government subsidies derived from offshore industry. However, because of the anticipated membership in the European Community (EC) and the European Economic Area (EEA), Norwegian Government interference in the market has been gradually cut back. As the Government subsidies were reduced, domestic industries were reportedly obliged to improve efficiency while reducing production costs. Because of these changes, production growth of the mainland economy in 1992 was appreciably higher than that of the previous years, but still lower than growth of offshore hydrocarbon production.

PRODUCTION

Approximate production values in the mineral industry for 1991, the latest data available, were reportedly $1.3 billion for metallic minerals, $350 million for industrial minerals, and $15 million for coal. The income from offshore hydrocarbon production in 1991 was reportedly in excess of $7 billion, and petroleum production in 1992 reportedly increased 17% in 1992. *(See table 1.)*

TRADE

Norway's economy is highly dependent on trade. More than one-half of Norway's gross domestic product is derived from trade, with about 45% of the total coming from hydrocarbons alone. Three-quarters of the raw materials for the country's minerals processing industry is imported. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

The Norwegian Government has historically exerted significant control over the use of natural resources and minerals processing. In recent years, the Government, in search of greater efficiency and anticipated membership in the EC, has reportedly privatized a number of mineral industry enterprises. Nonetheless, in 1992, the Norwegian Government reportedly still controlled all hydrocarbon Norwegian production facilities through the state-owned Den norske stats olieselskap A/S (Statoil). In November 1992, the Norwegian Government abolished the so-called "gliding scale," which allowed the Government to increase its stake as the fields were developed.

Norsk Hydro A/S, Norway's largest publicly owned industrial complex, is engaged in electric power generation, oil and gas extraction, light metal production, and petrochemicals production. Norsk Hydro's oil and gas production reached 8.3 Mmt of oil equivalent, about 70% of which was petroleum. Out of about 14 billion kW•h of electricity used by Norsk Hydro in 1992, 10 billion kW•h was used by Hydro Aluminum. Nearly 10 billion kW•h was generated by Hydro's own power facilities, mainly hydroelectric powerplants. *(See table 4.)*

COMMODITY REVIEW

Metals

Aluminum.—During 1992, the aluminum market was marked by stagnating demand, continued high production worldwide, and substantially increased exports from the former U.S.S.R. to Western markets. As a result, the price of primary aluminum remained low, compelling further cutbacks in Norwegian aluminum production. With about 600,000 mt/a of production from five smelters, Hydro Aluminium A/S, part of the Light Metal Div. of Norsk Hydro A/S, is the largest producer of primary aluminum in Norway.

The only other producer of primary aluminum in Norway is Elkem Aluminium ANS, the aluminum division of Elkem A/S. Smelters in Farsund and Mosjoen have a total capacity of about 225,000 mt/a.

Ferrosilicon.—Fesil, the larger of two major ferrosilicon producers (about 275,000-mt/a capacity) is a subsidiary of four ferrosilicon producers—Ila og Lilleby Smelterverk, A/S Hafslung Metal, Finnfjord Smelterverk A/S, and Rana Metal. Elkem, the second largest producer of ferrosilicon, with about a

190,000-mt/a capacity, has three plants in Alvik, Orkanger, and Straumen.

Ferromanganese.—A letter of intent was reportedly signed with the Australian company, Broken Hill Proprietary Co. Ltd. (BHP) in 1992. According to this proposal, BHP will take 49% interest in Elkem's two ferromanganese plants in Porsgrunn and Sauda, while Elkem will acquire a 49% interest in a newly established subsidiary of Groote Eylandt Mining Co. (Gemco). Gemco's subsidiary will supply manganese ore from Groote Eylandt to Elkem's two Norwegian manganese alloy plants and to Elkem Marietta's ferroalloy plant in the United States.

Magnesium.—Hydro Magnesium A/S, part of the Light Metal Div. of Norsk Hydro A/S, has reportedly decided to invest $200 million in restructuring the existing Porsgrunn plant and to finance a recycling feasibility study. According to Hydro Magnesium, 40% of magnesium cast ends up as scrap, and, until now, has been discarded. For economic and environmental reasons, Hydro Magnesium is planning to build a recycling plant at Heroya. The new plant, presently under preliminary study, might be ready as early as 1994. It will use similar technology as the Hydro plant in Becancour, Canada, built in 1992.

Steel.—The new Nordic steel group, formed as a result of the takeover of Sweden's Fundia AB by Norway's Norsk Jernverk and Finland's Rautaruukki, commenced operation on January 1, 1992. The new company, named Fundia, is divided into four divisions (reinforcing steel, merchant bar, wire, and structural steel) with a total capacity of 1.37 Mmt/a.

A new iron foundry, owned by Ulstein Jernstoperi A/S in Hordvikneset, north of Bergen, came on-stream in 1992. The production of 5,000 mt/a in 1992 should reportedly reach 8,500 mt/a by 1997, close to the estimated capacity of 10,000 mt/a. All the metal is melted in two 4 ton electric furnaces moved from the old foundry and two new 6 ton electric furnaces. Except for 20 to 30 tons of pig iron annually, all the feed is scrap. Although most of the production is either spheroidal graphite ductile or grey iron, about 300 mt/a of compacted graphite or vermicular iron also is produced. At present, about one-half of the annual production is absorbed by the Ulstein group, while the rest is sold in Denmark, Norway, and Sweden.

Titanium.—Titania A/S, owned by Kronos Norge A/S, a subsidiary of NL Chemicals Inc., is one of the few companies producing ilmenite from a hard-rock deposit. A 300-Mmt deposit near Tellnes, discovered in 1954, is a 2.3-km-long lens with 18% TiO_2, 2% magnetite, and 0.25% sulfides. Because the quality of the ilmenite concentrate is relatively low (44% to 45% TiO_2, 2% to 3.5% SiO_2, 34.5% to 35.5% FeO, 12% to 13% Fe_2O_3, and 3.5% to 5.1% MgO), it is used mostly for slag production (25%) and for titanium dioxide (20%).

Industrial Minerals

Nepheline Syenite.—Elkem Nefelin A/S, one of the world's three largest producers of nepheline syenite, was reportedly sold in 1992 to Unimin Corp. of Canada. The underground mine, now renamed North Cape Nefelin A/S, is at Stjernoy in northern Norway. The reportedly 1,700-m-long, 300-m-wide, and 500-m-deep deposit has a reported proven reserve of 300 Mmt. The nepheline syenite rock reportedly consists of perthitic potassium feldspar (56%) and albite, crossed by veins of nepheline (34%) and other minerals.

Olivine.—Reportedly one of the world's largest deposits of olivine is on the southwest coast of Norway. It reportedly covers an area of 6 km^2 and represents an estimated reserve of 2 billion tons. The average mineral content is reportedly 92% olivine, 5% pyroxene and serpentine, 1.5% chlorite, and 1% spinel.

Reportedly, the estimated 1992 production of 3 Mmt represents about 50% of world production. With a reported annual production of about 2 Mmt, A/S Olivine is the largest of three producers. The other two are Franzefoss Bruk A/S, which works the Lefdal deposit at Bryggja, and Industrimineraler A/S, which works the Stranda deposit. A/S Olivine's open pit mine at Aheim is 4 km from the plant and the harbor and is connected with a conveyor belt in a tunnel.

Mineral Fuels

During 1992, drilling reportedly began on 42 exploration wells on the Norwegian continental shelf. Planned exploration for 1993 reportedly includes only about 34 to 37 wells. This reduction of drilling activities supposedly reflects the anticipation of future low to moderate prices.

The 14th licensing round was announced on December 22, 1992. The application deadline was March 1st, and the dispersion of awards is expected in the second half of 1993. The 14th round will cover 50 blocks, of which 25 are in the North Sea, 13 off central Norway, and 12 are in the Barents Sea. Since the repeal of the "gliding scale," this will be the first licensing round in which the Norwegian Government (Statoil) will have to decide the degree of participation in each field at the time of licensing.

Natural Gas.—According to revised estimates, the natural gas reserves should last for about 80 years, based on expected future production. Production of 65 billion m^3, more than double the present production of 28.5 million m^3, is to be attained by about the year 2005. Based on signed sales contracts, most of the production is to be exported, mainly to the United Kingdom. The latest pipeline, approved by the Norwegian Parliament in February 1992, connects the Heidrun field with Tjeldbergodden in Norway.

The latest gasfield being developed is the Sleipner East. It had been approved for development in 1986. After a delay reportedly caused by an explosion, the production start is now slated for October 1993. By that time, both Zeepipe and condensate pipe will reportedly be finished. The Zeepipe, connecting the Sleipner Field with Zeebrugge in Belgium, will reportedly be extended to

Troll Field by 1996. The condensate pipeline will reportedly transport unprocessed condensate from Sleipner field to Karsto in Norway, where it will be fractionated into commercial gas products and stable condensate.

No decision has reportedly been reached about the development of the Sleipner West Field, which contains estimated reserves of 140 billion m^3 of natural gas. Ownership of this field includes the Norwegian Government (52.6%) and Exxon Corp. (28%).

Petroleum.—Based on current oil production, reserves should last for about 45 years. The average 1992 production of 2.1 Mbbl/d (of which 80,000 bbl/d was produced onshore) was reportedly 14% higher than that in 1991. According to Norsk Hydro, it could be further increased by increasing the recovery factor from its present 37% to at least 56%, reportedly already achieved at its Oseberg Field. Already, by doubling the water injection, the production of Gyda Field was reportedly boosted from an average of 11,000 bbl/d to 80,000 bbl/d.

Reserves

Based on new exploration of the continental shelf, the Norwegian petroleum directorate raised the estimate of reserves by about 12%, to 4.7 billion tons of petroleum and 5,200 billion m^3 of natural gas. *(See table 5.)*

INFRASTRUCTURE

Most of Norway's land transportation is concentrated in the better developed southern portion of the country. In the less populated northern part, bisected by many fjords and mountain ranges, the arctic conditions make development of modern surface transportation infrastructure difficult. The country has more than 79,540 km of roads and 4,223 km of standard-gauge railroad track, most of which is electrified. With one exception, (Narvik) all the major ports for the 867 ships of Norway's merchant marine are in the southern portion of the country (Bergen, Fredrikstad, Kristiansand, Oslo, Stavanger, and Trondheim).

The transportation system for natural gas and petroleum consists of a system of pipelines connecting Norway, the United Kingdom, and Germany with different gasfields and oilfields in the Continental Shelf. The natural gas pipeline system include Norpipe, Statpipe, Frigg, and the future Zeepipe. Norpipe connects the Heimdal and Ekofisk Fields plus Statpipe to Emden in Germany. The Frigg system consists of two 810-mm pipelines from Odin and Frigg to St. Fergus in Scotland. Crude oil pipelines include Norpipe from Ekofinsk to Teesside in the United Kingdom, and the Oseberg pipeline to Oygarden in Norway.

OUTLOOK

The structural changes reportedly taking place in Norway's mineral processing sector, combined with the elimination of a special tax levied on electricity to energy intensive industries and Norway's planned admission to the EC, should go a long way toward making Norway's minerals processing industry more competitive in European markets in the future.

OTHER SOURCES OF INFORMATION

Agencies

Norges geologiske undersokelse
P.O. Box 3006 Lade 7002
Trondheim, Norway
The Royal Ministry of Petroleum and Energy in Norway
P.O. Box 8148 Dep. 00330
Oslo 1, Norway

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TABLE 1

NORWAY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
METALS						
Aluminum:						
Primary		864,190	863,354	845,068	832,558	812,850
Secondary		e7,200	67,305	49,036	63,066	57,043
Cadmium, smelter		169	207	286	227	247
Cobalt		1,951	1,946	1,830	1,983	2,293
Copper:						
Mine output:						
Concentrate		82,830	91,008	97,614	84,592	49,645
Cu content		15,877	16,497	19,745	17,393	12,668
Metal, primary and secondary:						
Smelter		31,729	34,980	36,458	38,445	39,259
Refined		31,729	34,980	36,458	38,445	39,259
Gallium[e]	kilograms	5,000	5,000	4,000	—	—
Gold	do.	677	703	802	e800	e800
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand tons	2,644	2,358	2,081	2,209	2,152
Fe content	do.	1,718	1,532	1,352	1,435	1,403
Metal:						
Pig iron	do.	367	240	—	—	—
Ferroalloys:						
Ferrochromium[e]		—	—	30,000	90,000	90,000
Ferromanganese		361,345	220,591	213,266	173,212	202,680
Ferrosilicomanganese		232,501	270,305	223,310	226,737	213,106
Ferrosilicon (75% basis)		380,976	398,744	397,520	377,455	367,034
Silicon metal		88,854	100,194	76,601	e65,000	e60,000
Other[e]		14,000	14,000	14,000	14,000	14,000
Total		1,077,676	1,003,834	954,697	946,404	946,820
Steel, crude	thousand tons	869	678	376	438	446
Semimanufactures, rolled[e]	do.	700	r556	350	300	300
Lead, mine output:						
Concentrate		4,945	6,012	5,699	6,739	6,950
Pb content		2,801	3,188	3,017	3,517	3,767
Magnesium, primary		50,317	49,827	48,222	44,322	30,404
Nickel:						
Mine output:						
Concentrate		8,000	13,000	23,391	21,156	31,306
Ni content		e500	780	3,100	2,200	3,398
Metal, primary		52,547	54,886	57,812	58,730	55,686
Platinum-group metals[e 3]	kilograms	1,555	1,555	1,500	1,500	1,500
Titanium:						
Ilmenite concentrate	thousand tons	898	930	814	r625	718
TiO_2 content	do.	398	412	361	r277	318
Zinc:						
Mine output:						
Concentrate		33,250	29,324	34,124	36,690	40,450
Zn content		17,783	15,023	17,546	18,886	21,058

See footnotes at end of table.

TABLE 1—Continued

NORWAY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[p]
METALS—Continued						
Zinc—Continued:						
Metal, primary		121,156	120,404	125,052	[r]124,916	127,564
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	1,428	1,375	1,261	1,147	1,266
Feldspar[e]		90,000	90,000	90,000	90,000	100,000
Graphite		—	1,800	[e]5,000	6,930	[e]5,000
Lime, hydrated, and quicklime[e]	thousand tons	100	100	100	100	100
Mica, flake[e]		3,000	3,000	3,000	3,000	3,000
Nepheline syenite[e]	thousand tons	[2]262	[2]262	250	[r]300	350
Nitrogen: N content of ammonia	do.	424	467	431	384	[e]350
Olivine sand[e]	do.	2,000	2,000	[r]2,900	[r]3,000	3,000
Pyrite	do.	304	244	303	306	[e]300
Stone, crushed:[e]						
Dolomite	do.	550	550	525	[r]600	650
Limestone	do.	4,000	4,200	4,000	[r]3,800	3,500
Quartz and quartzite	do.	800	800	800	800	900
Sulfur:						
Pyrite, S content	do.	152	122	[e]125	[e]125	[e]125
Byproduct of:[e]						
Metallurgy	do.	80	75	75	75	75
Petroleum	do.	10	13	15	15	15
Total	do.	242	210	215	215	215
Talc, soapstone, steatite[e]	do.	100	100	100	80	60
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	do.	275	413	358	[r]389	449
Coke, all grades	do.	161	[e]50	—	—	—
Gas, natural:						
Gross	million cubic meters	31,520	31,964	27,817	28,315	28,500
Marketed[4]	do.	28,400	28,700	25,400	[e]25,000	27,736
Peat:[e]						
For agricultural use	thousand tons	30	30	30	30	30
For fuel use	do.	1	1	1	1	1
Petroleum:						
Crude[5]	thousand 42-gallon barrels	397,947	560,252	609,381	679,184	793,553
Natural gas liquids	do.	27,230	22,707	33,060	17,204	17,200
Refinery products:						
Naphtha	do.	3,363	4,504	[e]4,200	[e]4,200	[e]4,200
Gasoline	do.	11,968	14,917	27,134	[r]23,228	27,572
Kerosene	do.	5,786	6,682	8,327	[e]8,300	[e]8,300
Distillate fuel oil	do.	32,764	34,072	44,502	[r]44,769	47,035
Residual fuel oil	do.	8,032	11,102	9,444	[r]9,961	11,085
Other[e]	do.	4,200	4,300	[2]4,093	4,000	4,000
Refinery fuel and losses[e]	do.	4,000	4,000	4,000	4,000	4,000
Total[e]	do.	70,113	79,577	101,700	[r] [e]98,458	[e]106,192

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Table includes data available through Apr. 1993.

[2]Reported figure.

[3]Data represent exports.

[4]Reported as total methane sales.

[5]Excluding natural gas liquids.

TABLE 2

NORWAY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals: Alkaline earth metals		—	1	—	All to Netherlands.
Aluminum:					
Ore and concentrate		—	28	—	All to Sweden.
Oxides and hydroxides		104	36	—	Sweden 30; United Kingdom 2; United Arab Emirates 1.
Metal including alloys:					
Scrap		28,754	28,407	21	Germany 12,213; Netherlands 4,376; Spain 2,453.
Unwrought		777,327	810,224	147	Germany 195,456; Netherlands 147,166; United Kingdom 127,871.
Semimanufactures		136,972	126,565	840	Germany 27,977; United Kingdom 23,810; Sweden 16,807.
Antimony: Metal including alloys, all forms		2	—		
Cadmium: Metal including alloys, unwrought including waste and scrap		287	232	96	Belgium-Luxembourg 105; United Kingdom 26; Germany 5.
Chromium:					
Ore and concentrate		27	37	—	All to Sweden.
Oxides and hydroxides		13	8	—	United Arab Emirates 6; Malaysia 1.
Cobalt:					
Oxides and hydroxides	value, thousands	$1	$1	—	All to Egypt.
Metal including alloys, unwrought including waste and scrap		1,853	2,011	777	Netherlands 582; Japan 380; United Kingdom 180.
Copper:					
Ore and concentrate		90,189	91,627	—	Finland 63,541; Germany 8,593; Yugoslavia 6,000.
Matte and speiss including cement copper		599	—		
Metal including alloys:					
Scrap		10,790	11,404	127	Germany 4,496; Denmark 1,835; Sweden 1,267.
Unwrought		57,033	37,755	—	Sweden 11,083; United Kingdom 9,961; France 9,728.
Semimanufactures		3,433	4,695	1	Denmark 1,677; Germany 1,123; Sweden 749.
Gold:					
Waste and sweepings	value, thousands	$1,288	$1,740	$7	Switzerland $907; Germany $545; Sweden $155.
Metal including alloys, unwrought and partly wrought	kilograms	770,528	925,792	—	Sweden 452,286; United Kingdom 317,521; Denmark 59,283.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite	thousand tons	2,113	2,099	—	Germany 848; United Kingdom 690; France 323.
Pyrite, roasted		36,845	58,669	—	Denmark 24,715; Germany 18,967; Netherlands 11,627.
Metal:					
Scrap		11,916	15,662	10	France 4,203; Italy 3,573; Germany 3,132.
Pig iron, cast iron, related materials		50,246	58,743	2,303	Spain 10,693; Germany 10,656; Belgium-Luxembourg 9,684.
Ferroalloys:					
Ferrochromium		55,126	85,645	23,625	Japan 16,654; Germany 13,755; Sweden 8,913.
Ferromanganese		173,374	145,128	6,000	Germany 27,851; France 18,210; Belgium-Luxembourg 17,182.
Ferronickel		17	—		
Ferrosilicochromium		25	—		
Ferrosilicomanganese		197,615	205,186	16,657	Germany 53,009; Belgium-Luxembourg 27,121; France 24,723.
Ferrosilicon	value, thousands	$283,692	$249,939	$25,091	Germany $59,904; Japan $50,133; United Kingdom $28,783.

See footnotes at end of table.

TABLE 2—Continued

NORWAY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Ferroalloys—Continued:					
Silicon metal[2]		73,842	60,827	870	Germany 22,659; Japan 11,769; Italy 6,157.
Unspecified		14,556	12,559	50	Italy 3,167; Germany 2,158; United Kingdom 1,812.
Steel, primary forms		10,186	22,781	8	Jordan 14,935; Republic of Korea 5,231; Italy 1,628.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		50,377	42,895	14	Sweden 19,392; Denmark 13,463; United Kingdom 3,336.
Clad, plated, coated		118,988	121,556	19,329	United Kingdom 40,028; Denmark 19,601; Poland 7,810.
Of alloy steel		1,978	1,822	1	Sweden 377; Denmark 279; Finland 226.
Bars, rods, angles, shapes, sections		301,466	328,569	2	Germany 95,106; United Kingdom 65,152; Denmark 44,526.
Rails and accessories		623	1,650	—	Belgium-Luxembourg 1,405; Netherlands 149; Sweden 59.
Wire		10,885	6,687	—	Sweden 2,129; Denmark 917; Iran 639.
Tubes, pipes, fittings		69,657	66,589	58	Sweden 27,322; Denmark 10,176; United Kingdom 8,434.
Lead:					
Ore and concentrate		6,567	7,367	—	All to Germany.
Oxides		6	12	—	Sweden 5; Egypt 4; Oman 3.
Metal including alloys:					
Scrap		9,797	10,054	—	Sweden 9,190; Ireland 305; Denmark 259.
Unwrought		198	302	—	All to Sweden.
Semimanufactures		244	305	—	Denmark 303; Sweden 1.
Magnesium: Metal including alloys:					
Scrap		60	11	—	All to United Kingdom.
Unwrought	value, thousands	$128,557	$81,689	NA	NA.
Semimanufactures	do.	$1,080	$1,304	6	Sweden $1,271; Netherlands $10; Germany $7.
Manganese:					
Ore and concentrate, metallurgical-grade		31,027	27,772	27,772	
Oxides		190	43	20	Denmark 23.
Metal including alloys, all forms		2	9	—	All to Sweden.
Mercury		259	8	—	All to United Kingdom.
Molybdenum: Metal including alloys, unwrought including waste and scrap		—	1	—	All to Germany.
Nickel:					
Ore and concentrate		21,578	23,452	—	All to Finland.
Matte and speiss		1	—		
Metal including alloys:					
Scrap		85	53	38	United Kingdom 15.
Unwrought		58,608	56,700	21,618	Netherlands 16,909; Japan 6,790; Hong Kong 2,887.
Semimanufactures		23	30	—	Sweden 29; Nigeria 1.
Platinum-group metals:					
Waste and sweepings	value, thousands	$5,712	$3,419	$32	United Kingdom $1,731; France $1,144; Germany $510.
Metals including alloys, unwrought and partly wrought:					
Platinum	do.	$14,208	$9,925	$4,242	United Kingdom $1,691; Japan $1,507; Germany $1,221.

See footnotes at end of table.

TABLE 2—Continued

NORWAY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals—Continued:					
Metals including alloys, unwrought and partly wrought—Continued:					
Unspecified	value, thousand	$11,393	$14,603	$5,276	Japan $4,861; Germany $1,892; United Kingdom $1,880.
Silver:					
Ore and concentrate	kilograms	71,900	—		
Waste and sweepings[3]	value, thousands	$2,611	$595	$10	Denmark $339; Switzerland $144; Sweden $86.
Metal including alloys, unwrought and partly wrought	do.	$5,512	$4,461	—	Sweden $2,820; Finland $683; Turkey $215.
Tin: Metal including alloys:					
Scrap		69	101	—	Netherlands 47; Germany 42; Sweden 12.
Unwrought	value, thousands	$20	$17	—	United Kingdom $9; United Arab Emirates $6; Iceland $2.
Semimanufactures		655	33	—	Netherlands 20; Germany 7; Sweden 3.
Titanium:					
Ore and concentrate		576,419	387,682	NA	NA.
Oxides		670	5,277	3,839	Venezuela 610; Sweden 372; Germany 305.
Metal including alloys:					
Unwrought including waste and scrap		8	9	9	
Semimanufactures	value, thousands	$97	$106	—	Sweden $73; Italy $16; Denmark $15.
Tungsten: Metal including alloys:					
Ore and concentrate		—	43	—	All to Spain.
Metal including alloys:					
Unwrought including waste and scrap	value, thousands	$7	—		
Semimanufactures	do.	$2	$1	—	Sweden;[4] United Kingdom.[4]
Zinc:					
Ore and concentrate		5,708	5,561	—	All to Germany.
Oxides		3,348	3,139	—	United Kingdom 1,696; Germany 1,013; Singapore 112.
Blue powder		8,300	10,099	17	Unspecified 10,082.
Metal including alloys:					
Scrap		1,279	2,675	—	Republic of Korea 997; Belgium-Luxembourg 832; India 375.
Unwrought		114,020	113,260	5,701	Germany 38,886; United Kingdom 25,479; Sweden 16,897.
Semimanufactures		108	152	—	Denmark 75; United Kingdom 23; Sweden 21.
Zirconium: Metal including alloys, semimanufactures		1	1	—	All to Sweden.
Other:					
Ores and concentrates:					
Of base metals		60	—		
Of precious metals, n.e.s.	kilograms	113,100	—		
Oxides and hydroxides		3,679	4,890	NA	Oman 1; unspecified 4,889.
Ashes and residues		12,373	14,373	103	Sweden 6,011; Republic of Korea 2,264; United Kingdom 964.
Base metals including alloys,	value, thousands	$25	—		
Metalloids[5]	do.	$268	—		
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.	value, thousands	$11	$9	—	Sweden $4; Iceland $3; Germany $2.

See footnotes at end of table.

TABLE 2—Continued

NORWAY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Abrasives, n.e.s.—Continued:					
Artificial: Corundum	value, thousand	$3	$4	—	Denmark $3; Sweden $1.
Dust and powder of precious and semiprecious stones including diamond	do.	$1	—		
Grinding and polishing wheels and stones		560	516	102	Finland 149; Sweden 94; Japan 37.
Barite and witherite		16,563	8,047	—	Denmark 7,822; Sweden 225.
Boron materials: Oxides and acids		14	33	—	All to Denmark.
Cement	value, thousands	$3,608	$5,943	NA	NA.
Chalk		7	8	—	Mainly to Iceland.
Clays, crude:					
Bentonite		13	118	—	Sweden 90; Denmark 17; Egypt 8.
Kaolin		21	65	—	Sweden 37; Singapore 13; Malaysia 6.
Unspecified		139	43	—	Sweden 32; Belgium-Luxembourg 10.
Cryolite and chiolite		320	880	—	Sweden 469; United Kingdom 411.
Diamond: Natural:					
Gem, not set or strung	value, thousands	$184	$145	—	Belgium-Luxembourg $84; United Kingdom $35; Netherlands $24.
Industrial stones	do.	$31	$15	—	Mainly to Netherlands.
Diatomite and other infusorial earth		56	—		
Feldspar, fluorspar, related materials:					
Feldspar		386,157	364,760	—	Germany 97,867; Netherlands 66,840; United Kingdom 64,410.
Fluorspar		15	25	—	All to Sweden.
Fertilizer materials:					
Crude, n.e.s.		397	515	27	United Kingdom 208; France 56; Japan 24.
Manufactured:					
Nitrogenous	value, thousands	$94,165	$80,398	—	Nicaragua $47; Sweden $5; unspecified $80,346.
Potassic	do.	$1	—		
Unspecified	do.	$290,998	$289,814	—	Netherlands $275; unspecified $289,539.
Graphite, natural		6,685	—		
Gypsum and plaster		3,058	22	—	Mainly to Sweden.
Lime		20,737	3,559	—	Sweden 3,551; Congo 8.
Magnesium compounds:					
Magnesite, crude		—	78	NA	NA.
Oxides and hydroxides		4,074	3,297	NA	NA.
Mica:					
Crude including splittings and waste		2,419	2,077	—	Netherlands 856; Germany 465; United Kingdom 243.
Worked including agglomerated splittings	value, thousands	$74	$6	—	Finland $5; Iceland $1.
Nitrates, crude		—	26	—	Denmark 20; Greece 6.
Phosphates, crude		—	11,751	—	Israel 11,651; Denmark 100.
Pigments, mineral: Iron oxides and hydroxides, processed		558	2,288	—	Germany 2,253; Thailand 12; United Arab Emirates 8.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$480	$43	—	Sweden $15; Denmark $12; Germany $9.
Synthetic	do.	$2	—		

See footnotes at end of table.

TABLE 2—Continued

NORWAY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Pyrite, unroasted	48,565	69,528	—	Germany 40,671; Netherlands 28,857.
Salt and brine	2,308	2,027	—	Sweden 1,807; Finland 193; Iceland 11.
Sodium compounds, n.e.s.:				
Soda ash, manufactured	25	2	—	All to Sweden.
Sulfate, manufactured	62,449	1,606	—	Do.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	194,752	213,629	1,831	Italy 75,751; United Kingdom 46,965; Spain 25,766.
Worked	19,608	15,768	112	Netherlands 10,583; Sweden 3,122; Denmark 795.
Dolomite, chiefly refractory-grade	217,373	175,135	NA	NA.
Gravel and crushed rock thousand tons	6,280	7,740	92	Germany 3,497; Denmark 1,396; United Kingdom 935.
Limestone other than dimension	49,885	128,850	—	Sweden 42,601; Finland 32,554; Netherlands 31,327.
Quartz and quartzite	111	9,089	1	Iceland 5,940; Germany 3,054; Sweden 93.
Sand other than metal-bearing	1,270	344	—	Spain 195; Sweden 113; Denmark 26.
Sulfur:				
Elemental:				
Crude including native and byproduct value, thousands	$20	$108	—	Switzerland $97; United Kingdom $11.
Colloidal, precipitated, sublimed	3,664	5,865	—	United Kingdom 4,792; Switzerland 1,073.
Dioxide	—	1	—	All to Finland.
Sulfuric acid value, thousands	$11,220	$5,815	NA	NA.
Talc, steatite, soapstone, pyrophyllite	43,570	33,926	14	Netherlands 8,350; Germany 7,281; United Kingdom 7,229.
Vermiculite including perlite	548	15	—	All to Sweden.
Other:				
Crude	210	3,520	—	Sweden 3,500; United Kingdom 19; Oman 1.
Slag and dross, not metal-bearing	140,012	157,181	5,257	U.S.S.R. 47,928; France 38,500; Japan 17,646.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	358	61	—	Canada 40; Sweden 21.
Carbon black	5	16	—	Sweden 12; Oman 1; Turkey 1.
Coal:				
Anthracite and bituminous	254,286	270,980	—	Germany 179,822; France 69,750; United Kingdom 18,262.
Briquets of anthracite and bituminous coal value, thousands	$3	$16	$14	Sweden $2.
Gas, natural:				
Gaseous million cubic meters	21,036	20,923	—	Germany 6,753; United Kingdom 5,581; France 4,472.
Liquefied cubic meters	33,600	—		
Peat including briquets and litter	2,363	7,419	—	Netherlands 7,129; Sweden 287.
Petroleum:				
Crude thousand 42-gallon barrels	510,472	611,867	21,917	Netherlands 63,665; France 40,202; Canada 39,267.
Refinery products:				
Liquefied petroleum gas do.	14,067	11,972	77	Netherlands 4,076; Sweden 2,847; Germany 1,526.
Gasoline:				
Aviation do.	54,426	—		
Motor do.	21,371	17,843	1,051	United Kingdom 4,072; Sweden 3,586; Netherlands 2,742.
Mineral jelly and wax do.	37	41	(e)	Sweden 35; Denmark 5.

See footnotes at end of table.

TABLE 2—Continued

NORWAY: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum—Continued:					
Refinery products—Continued:					
Kerosene and jet fuel	thousand 42-gallon barrels	2,836	2,444	—	Denmark 961; Sweden 541; Iceland 294.
Distillate fuel oil	do.	25,807	23,456	774	France 6,695; Germany 5,685; Denmark 3,214.
Lubricants	do.	97,300	42,489	48	Sweden 29,953; United Kingdom 8,652; Denmark 1,553.
Residual fuel oil	do.	8,870	7,500	993	United Kingdom 2,065; Italy 2,011; Netherlands 931.
Bitumen and other residues	do.	59	32	—	Denmark 31; Netherlands 1.
Bituminous mixtures	do.	2	2	—	Iceland 1; Sweden 1.
Petroleum coke	do.	628	481	—	Netherlands 425; United Kingdom 48; Germany 8.

NA Not available.
[1]Table prepared by Douglas Rhoten, International Data Section.
[2]May include high-purity silicon.
[3]May include other precious metals.
[4]Less than 1/2 unit.
[5]Reported under SITC item number as "selenium, phosphorus, etc."

TABLE 3

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals:					
Alkali metals		3	15	(4)	Belgium-Luxembourg 13; United Kingdom 1.
Alkaline-earth metals		665	243	1	China 149; Hong Kong 64; Austria 16.
Aluminum:					
Ore and concentrate		14,185	19,010	—	Greece 14,649; Sweden 3,601; Guyana 509.
Oxides and hydroxides	thousand tons	1,898	1,731	35	Suriname 576; Jamaica 487; Ireland 239.
Metal including alloys:					
Scrap		23,732	28,246	764	U.S.S.R. 8,361; Germany 5,673; Sweden 2,251.
Unwrought		80,858	81,038	890	U.S.S.R. 42,876; Canada 9,189; Brazil 7,873.
Semimanufactures		29,437	30,135	255	Sweden 7,639; Germany 2,885; United Kingdom 2,186.
Antimony: Metal including alloys, all forms		45	40	—	Belgium-Luxembourg 23; China 15; Germany 2.
Beryllium: Metal including alloys, semimanufactures	value, thousands	$17	$27	$2	Japan $24; United Kingdom $1.
Bismuth: Metal including alloys, all forms	do.	$23	$39	—	Germany $19; United Kingdom $18; Switzerland $2.
Cadmium: Metal including alloys:					
Unwrought including waste and scrap	do.	—	$1	—	All from United Kingdom.
Semimanufactures	do.	$34	$26	$2	Japan $21; Germany $3.
Chromium:					
Ore and concentrate		159,457	338,719	—	Turkey 187,965; India 68,005; U.S.S.R. 50,767.
Oxides and hydroxides		131	74	—	Germany 68; Spain 2.
Metal including alloys, all forms	value, thousands	$60	$42	$10	Sweden $27; Denmark $4.

See footnotes at end of table.

TABLE 3—Continued

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Cobalt:					
Oxides and hydroxides		2	41	—	Sweden 25; Germany 15.
Metal including alloys:					
Unwrought including waste and scrap		2	13	1	Belgium-Luxembourg 8; Sweden 3; Germany 1.
Semimanufactures	value, thousands	$11	$16	—	Netherlands $7; Germany $4.
Columbium and tantalum: Tantalum metal including alloys, all forms	do.	$13	$13	$1	United Kingdom $6; Germany $3; Switzerland $3.
Copper:					
Ore and concentrate		—	131	—	All from Denmark.
Matte and speiss including cement copper	value, thousands	$5	$22	—	Italy $14; Austria $4; Germany $3.
Metal including alloys:					
Scrap		1,578	4,908	301	Poland 3,018; Sweden 818; United Kingdom 599.
Unwrought		3,135	3,135	(2)	Sweden 1,553; United Kingdom 934; Poland 480.
Semimanufactures		23,000	21,820	58	Sweden 9,402; Germany 4,674; France 3,062.
Germanium: Metal including alloys, all forms	value, thousands	$1	—		
Gold:					
Waste and sweepings	do.	$3,517	$5,854	—	Sweden $4,649; United Kingdom $924; Finland $247.
Metal including alloys, unwrought and partly wrought		2,344	856	56	Germany 452; Sweden 135; Denmark 95.
Iron and steel:					
Iron ore and concentrate, excluding roasted pyrite		12,324	27,037	—	U.S.S.R. 19,901; Sweden 7,099; Germany 31.
Pyrite, roasted		—	1,900	—	All from Sweden.
Metal:					
Scrap		22,604	95,326	—	Germany 91,757; Denmark 1,799; Sweden 1,403.
Pig iron, cast iron, related materials		8,463	26,320	3	U.S.S.R. 18,883; Sweden 4,619; United Kingdom 1,131.
Ferroalloys:					
Ferrochromium		854	640	(2)	Sweden 596; Germany 26; Zimbabwe 10.
Ferromanganese		3,704	9,464	—	Switzerland 4,711; Canada 2,526; Germany 2,207.
Ferronickel	value, thousands	$3	—		
Ferrosilicochromium		21	—		
Ferrosilicomanganese		309	2,643	—	Canada 1,919; Germany 575; Netherlands 148.
Ferrosilicon	value, thousands	$1,290	$2,837	$2	Iceland $1,184; Australia $543; Canada $268.
Silicon metal[3]		352	576	5	Brazil 278; Germany 135; France 27.
Unspecified		557	976	19	Netherlands 418; Germany 186; Sweden 178.
Steel, primary forms		170,550	135,534	1	France 101,148; United Kingdom 29,198; Poland 2,367.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		510,019	472,870	809	Sweden 85,528; Germany 82,664; Netherlands 77,738.
Clad, plated, coated		107,711	85,858	149	Sweden 34,194; Belgium-Luxembourg 10,783; Germany 6,980.
Of alloy steel		37,046	32,003	699	Sweden 10,755; Germany 7,592; Finland 3,057.

See footnotes at end of table.

TABLE 3—Continued

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Semimanufactures—Continued:					
Bars, rods, angles, shapes, sections		245,121	239,386	268	Sweden 60,537; Germany 49,208; Finland 30,132.
Rails and accessories		6,959	10,647	(2)	Austria 7,650; Sweden 1,129; Germany 1,098.
Wire		19,524	16,880	8	Belgium-Luxembourg 8,362; Sweden 3,506; Germany 1,923.
Tubes, pipes, fittings	value, thousands	$392,929	$377,504	$12,993	Germany $92,673; Japan $67,012; United Kingdom $53,463.
Lead:					
Oxides		538	407	—	Germany 371; Hong Kong 23; France 11.
Metal including alloys:					
Scrap		30	172	—	Poland 102; U.S.S.R. 38; Germany 22.
Unwrought		6,423	2,368	—	Sweden 1,731; United Kingdom 502; Netherlands 135.
Semimanufactures		983	771	(2)	Germany 381; Netherlands 346; Sweden 36.
Magnesium: Metal including alloys:					
Scrap		175	26	—	Sweden 17; Germany 7; Belgium-Luxembourg 1.
Unwrought	value, thousands	$8,080	$3,637	$3,299	Netherlands $175; Canada $104; Yugoslavia $50.
Semimanufactures		23	23	2	Sweden 6; Belgium-Luxembourg 3; Netherlands 3.
Manganese:					
Ore and concentrate, metallurgical-grade		726,337	498,782	17	Republic of South Africa 217,893; Ghana 112,809; Gabon 110,431.
Oxides		867	745	—	France 327; Netherlands 257; United Kingdom 105.
Metal including alloys, all forms		1,294	1,288	618	Belgium-Luxembourg 473; United Kingdom 90; Germany 50.
Mercury	value, thousands	$10	$21	—	Sweden $18; Germany $3.
Molybdenum:					
Ore and concentrate:					
Roasted		6	—		
Unroasted		2	—		
Metal including alloys:					
Unwrought including waste and scrap	value, thousands	$35	$3	—	All from Netherlands.
Semimanufactures	do.	$130	$87	$1	Austria $36; France $24; United Kingdom $20.
Nickel:					
Ore and concentrate		1,153	902	—	All from Netherlands.
Matte and speiss		128,467	133,193	—	Canada 84,645; Republic of South Africa 34,390; U.S.S.R. 13,055.
Metal including alloys:					
Scrap		2	1	—	All from United Kingdom.
Unwrought		51	52	(2)	Belgium-Luxembourg 29; Netherlands 6; Finland 4.
Semimanufactures		785	168	13	Germany 67; United Kingdom 51; Netherlands 18.
Platinum-group metals:					
Waste and sweepings	value, thousands	$8,323	$10,162	—	Netherlands $3,228; Sweden $2,665; France $2,209.

See footnotes at end of table.

TABLE 3—Continued

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals—Continued:					
Metals including alloys, unwrought and partly wrought:					
Platinum	value, thousand	$920	$1,295	$798	Germany $209; France $137; Sweden $51.
Unspecified	do.	$3,049	$5,526	$76	United Kingdom $2,099; Germany $1,184; Switzerland $1,178.
Silver:					
Ore and concentrate	kilograms	—	17,800	—	All from Sweden.
Waste and sweepings[4]	value, thousands	$3,336	$3,974	—	Sweden $2,592; Germany $320; Malaysia $253.
Metal including alloys, unwrought and partly wrought	do.	$12,351	$6,575	$6	Germany $3,232; Sweden $2,435; United Kingdom $432.
Tin: Metal including alloys:					
Ore and concentrate		—	32	—	All from Denmark.
Metal including alloys:					
Scrap		—	1	—	All from Singapore.
Unwrought		522	513	—	Netherlands 243; United Kingdom 126; Sweden 57.
Semimanufactures		102	116	(2)	Sweden 41; United Kingdom 37; Germany 21.
Titanium:					
Ore and concentrate		234	265	161	Australia 47; Netherlands 34; Germany 23.
Oxides		2,724	1,210	1	Germany 709; Belgium-Luxembourg 223; Czechoslovakia 33.
Metal including alloys:					
Unwrought including waste and scrap	value, thousands	$46	$102	$20	Germany $72; Sweden $4; Japan $3.
Semimanufactures		122	147	17	Netherlands 32; Germany 28; Sweden 21.
Tungsten:					
Ore and concentrate	value, thousands	$2	—		
Metal including alloys:					
Unwrought including waste and scrap	do.	$112	$94	$3	Austria $65; Germany $19; Sweden $7.
Semimanufactures	do.	$754	$1,189	$3	United Kingdom $723; Germany $223; Belgium-Luxembourg $114.
Uranium and thorium:					
Ore and concentrate	do.	—	$5	—	All from Germany.
Oxides and other compounds	do.	$254	$512	$9	France $322; Sweden $174; Germany $4.
Metal including alloys, all forms	do.	$76	—		
Vanadium: Metal including alloys, all forms		3	2	—	All from Germany.
Zinc:					
Ore and concentrate		154,204	160,116	—	Sweden 91,713; Canada 33,416; Ireland 12,924.
Oxides		2,967	1,980	(2)	Germany 909; China 643; Switzerland 268.
Blue powder		233	162	—	Denmark 93; Sweden 39; Belgium-Luxembourg 20.
Metal including alloys:					
Scrap		1,607	5,619	—	Canada 2,755; Denmark 1,878; Sweden 457.
Unwrought		935	435	—	Poland 301; Sweden 86; Denmark 26.
Semimanufactures		938	916	(2)	France 203; Poland 200; U.S.S.R. 156.

See footnotes at end of table.

TABLE 3—Continued

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Zirconium:				
Ore and concentrate	5	3	1	United Kingdom 2.
Metal including alloys:				
Unwrought including waste and scrap	2	17	10	Australia 6; Portugal 1.
Semimanufactures value, thousands	$115	$79	$7	United Kingdom $51; France $20; Germany $2.
Other:				
Ores and concentrates	51	2,400	(2)	Mainly from Sweden.
Oxides and hydroxides	894	749	63	United Kingdom 232; Germany 229; France 68.
Ashes and residues	474,126	415,941	—	Germany 264,055; Denmark 70,032; Sweden 35,721.
Base metals including alloys, all forms value, thousands	$214	$100	$8	U.S.S.R. $57; China $23; Germany $9.
Metalloids[5] do.	$78	$85	—	Sweden $54; Israel $23; Germany $4.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	$736	$441	$23	Iceland $243; Germany $55; France $35.
Artificial: Corundum	870	882	2	Germany 504; United Kingdom 141; France 112.
Dust and powder of precious and semiprecious stones including diamond value, thousands	$172	$231	$136	Ireland $58; Switzerland $15; France $13.
Grinding and polishing wheels and stones	992	839	49	Germany 155; Austria 142; Netherlands 130.
Asbestos, crude	—	11	11	
Barite and witherite	194,465	216,697	3,053	Morocco 159,719; Ireland 48,329; Greece 4,300.
Boron materials:				
Crude natural borates	239	11	—	Sweden 9; Netherlands 2.
Oxides and acids	152	357	NA	NA.
Cement value, thousands	$5,879	$5,059	$22	United Kingdom $3,687; Denmark $472; Germany $192.
Chalk	6,810	6,629	1	Denmark 4,093; Sweden 1,778; Belgium-Luxembourg 239.
Clays, crude:				
Bentonite	16,616	16,525	4,663	Greece 9,655; Sweden 1,210; United Kingdom 595.
Kaolin	106,511	102,280	1,496	United Kingdom 95,431; Czechoslovakia 4,268; Brazil 222.
Unspecified and mixed	11,122	9,778	369	France 3,346; Czechoslovakia 2,668; United Kingdom 2,073.
Cryolite and chiolite	726	393	—	Greenland 327; Czechoslovakia 32; Sweden 32.
Diamond: Natural:				
Gem, not set or strung value, thousands	$3,355	$2,904	$79	Belgium-Luxembourg $2,098; United Kingdom $320; Germany $126.
Industrial stones do.	$287	$124	$46	Belgium-Luxembourg $54; Israel $11; Germany $6.
Diatomite and other infusorial earth	1,922	1,602	190	Iceland 851; Denmark 210; United Kingdom 152.
Feldspar, fluorspar, related materials:				
Feldspar	259	333	—	Sweden 265; Canada 27; Belgium-Luxembourg 15.
Fluorspar	47,071	56,995	—	Morocco 34,464; China 10,307; Spain 8,465.
Fertilizer materials:				
Crude, n.e.s.	2,092	2,941	—	United Kingdom 1,544; Sweden 826; Denmark 513.
Manufactured:				
Ammonia	207,614	226,812	39,440	U.S.S.R. 124,910; Germany 40,273; Netherlands 11,679.

See footnotes at end of table.

TABLE 3—Continued

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued:					
Manufactured—Continued:					
Nitrogenous[6]		88,401	106,757	28	Sweden 69,129; Germany 16,494; Poland 15,641.
Phosphatic		1,932	1,133	6	Sweden 1,004; Netherlands 110; Denmark 13.
Potassic		444,767	470,557	50	Germany 117,227; U.S.S.R. 89,373; France 76,815.
Unspecified and mixed	value, thousands	$16,109	$15,838	$4	Sweden $5,524; Belgium-Luxembourg $3,567; Germany $2,942.
Graphite, natural		181	626	3	Poland 435; Sweden 83; China 50.
Gypsum and plaster		291,484	309,757	29	Spain 213,750; Germany 75,861; Sweden 9,729.
Lime		34,951	23,920	3	Denmark 18,513; Sweden 4,386; United Kingdom 827.
Magnesium compounds:					
Magnesite, crude		2,358	1,642	—	Austria 1,011; China 535; Sweden 83.
Oxides and hydroxides		1,870	3,584	51	North Korea 3,270; Germany 99; United Kingdom 75.
Mica:					
Crude including splittings and waste		4,681	2,989	—	India 2,907; Netherlands 35; Sweden 18.
Worked including agglomerated splittings		58	67	(2)	Switzerland 48; France 12; Belgium-Luxembourg 3.
Nitrates, crude		520	258	—	Germany 192; Poland 41; Sweden 26.
Phosphates, crude		620,089	697,599	—	U.S.S.R. 442,822; Israel 148,320; Morocco 106,377.
Pigments, mineral: Iron oxides and hydroxides, processed		2,465	2,336	—	Germany 2,118; United Kingdom 55; Spain 52.
Potassium salts, crude		1,432	190	—	All from United Kingdom.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$528	$1,144	$354	Netherlands $221; United Kingdom $218; Germany $167.
Synthetic	do.	$81	$110	$1	Germany $49; Hong Kong $41; Thailand $8.
Pyrite, unroasted		19,340	30	—	All from Sweden.
Quartz crystal, piezoelectric	value, thousands	$4	$6	$2	Germany $3; United Kingdom $1.
Salt and brine		511,753	557,491	5	Netherlands 239,793; Tunisia 111,054; Denmark 89,991.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		45,169	48,055	528	Netherlands 18,267; Poland 16,726; Germany 6,079.
Sulfate, manufactured		2,716	6,592	—	Spain 4,499; Sweden 687; Belgium-Luxembourg 334.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		11,148	7,618	2	Sweden 4,769; Finland 1,034; Portugal 638.
Worked		24,888	23,141	(2)	Portugal 14,460; Sweden 4,148; Denmark 2,265.
Dolomite, chiefly refractory-grade		14,503	12,048	—	Sweden 7,294; United Kingdom 2,741; Belgium-Luxembourg 1,312.
Gravel and crushed rock		70,992	64,259	17	Sweden 60,334; United Kingdom 1,247; Finland 1,190.
Limestone other than dimension		235,869	206,967	—	France 109,099; United Kingdom 87,882; Denmark 9,855.
Quartz and quartzite		662,507	455,624	20	Sweden 244,147; Belgium-Luxembourg 5,814; Denmark 43.
Sand other than metal-bearing		208,395	175,753	150	Belgium-Luxembourg 104,035; Sweden 45,909; United Kingdom 12,450.
Sulfur:					
Elemental:					
Crude including native and byproduct		3,625	2,981	66	Sweden 2,555; Germany 245; Spain 111.

See footnotes at end of table.

TABLE 3—Continued

NORWAY: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur—Continued:					
Elemental—Continued:					
Colloidal, precipitated, sublimed		106	485	—	All from Sweden.
Dioxide		17,114	13,623	—	Sweden 13,622; Germany 1.
Sulfuric acid		110	146	—	Sweden 128; Netherlands 6; Germany 5.
Talc, steatite, soapstone, pyrophyllite		9,462	13,051	81	China 6,208; Sweden 3,069; Finland 2,578.
Vermiculite including perlite		1,908	1,857	—	Greece 1,200; Denmark 447; U.S.S.R. 200.
Other:					
Crude		63,808	46,594	1	Germany 35,919; France 6,203; Spain 2,322.
Slag and dross, not metal-bearing		42,646	132,754	—	Canada 39,245; France 25,491; Belgium-Luxembourg 25,444.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		21	—		
Carbon black		6,203	6,391	29	Sweden 2,035; Netherlands 1,580; Switzerland 1,574.
Coal:					
Anthracite		120,549	114,801	30,510	Germany 40,534; United Kingdom 27,871; Belgium-Luxembourg 13,741.
Bituminous		577,096	475,405	147,322	Poland 80,787; France 75,132; United Kingdom 72,144.
Briquets of anthracite and bituminous coal		7,262	3,124	14	Australia 2,119; United Kingdom 878; France 52.
Lignite including briquets		8,240	7,562	—	Venezuela 3,027; Australia 2,550; Indonesia 1,985.
Coke and semicoke		533,713	485,067	14,835	United Kingdom 188,585; Germany 117,973; France 72,942.
Gas, natural: Liquefied	thousand cubic meters	3,448	11,033	—	United Kingdom 10,982; Germany 49; Belgium-Luxembourg 3.
Peat including briquets and litter		19,369	18,279	—	Sweden 15,376; Poland 2,196; Denmark 290.
Petroleum:					
Crude	thousand 42-gallon barrels	11,175	12,400	—	Denmark 4,709; Saudi Arabia 3,089; United Kingdom 2,078.
Refinery products:					
Liquefied petroleum gas	do.	9,203	9,174	(2)	Denmark 2; unspecified 9,171.
Gasoline, motor	do.	5,508	4,120	1	Sweden 2,923; Netherlands 398; Belgium-Luxembourg 221.
Mineral jelly and wax	do.	63	53	(2)	Germany 21; U.S.S.R. 11; China 9.
Kerosene and jet fuel	do.	807	1,193	151	Malta 221; Netherlands 205; United Kingdom 127.
Distillate fuel oil	do.	6,499	5,707	154	Sweden 3,250; United Kingdom 1,219; Denmark 483.
Lubricants	do.	713,811	734,230	4,517	Sweden 320,173; United Kingdom 145,572; Germany 69,602.
Residual fuel oil	do.	4,214	3,636	7	United Kingdom 1,290; Sweden 1,035; Netherlands 694.
Bitumen and other residues	do.	1,375	1,434	1	Sweden 960; Netherlands 289; France 178.
Bituminous mixtures	do.	4	132	(2)	Sweden 125; Germany 3; United Kingdom 2.
Petroleum coke	do.	2,018	1,889	1,288	United Kingdom 401; Germany 75; Belgium-Luxembourg 37.

NA Not available.
[1]Table prepared by Douglas Rhoten, International Data Section.
[2]Less than 1/2 unit.
[3]May include high-purity silicon.
[4]May include other precious metals.
[5]Reported under SITC item number as "selenium, phosphorus, etc."
[6]Excludes unreported quantity of urea valued at $6,845,000 in 1990 and $5,106,000 in 1991.

TABLE 4

NORWAY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Hydro Aluminium A/S (Norsk Hydro A/S 70%)	Smelters at Ardal, Hoyanger, Karmoy, and Sunndalsora	640
Do.	Elkem Aluminium Mosjoen (Elkem A/S 55%)	Smelter at Mosjoen	115
Do.	Elkem Aluminium Lista (Elkem A/S 55%)	Smelter at Farsund	90
Do.	Sor-Norge Aluminium A/S (Alusuisse 67%)	Smelter at Husnes	72
Cadmium, tons	Det Norske Zinkkompani A/S (Boliden AB)	Smelter at Odda	150
Cement	Norcem A/S	Plants at Brevik and Kjopsvik	1,555
Coal	Store Norske Spitsbergen Kulkompani A/S	Mines at Longyearbyen and Svea	500
Cobalt	Nikkelverk A/S (Falconbridge Nickel Mines Ltd.)	Smelter at Kristiansand	2
Copper:			
Ore, Cu content	Grong Gruber A/S (Nursulfid A/S)	Mine at Royrvik	7
Do.	Folldal Verk A/S (Nursulfid A/S)	Mine at Hjerkinn	6
Do.	Orkla Industrier A/S	Mine at Meldal	6
Do.	Skorovas Gruber	Mine at Namsskogan	3
Do.	A/S Bidjovagge Gruber (Outokumpu Oy)	Mine at Bidjovage	3
Metal	Nikkelverk A/S (Falconbridge Nickel Mines Ltd.)	Smelter at Kristiansand	30
Do.	Sulitjelma Gruber A/S (Elkem A/S, 96%)	Smelter at Sulitjelma	9
Dolomite	Franzefoss Bruk A/S	Mine at Ballangen	2,000
Do.	Norwegian Holding A/S (Ernstrom Group)	Hammerfall, Logavlen, and Kvitblikk	1,500
Feldspar	Franzefoss Bruk A/S	Mine at Lillesand	100
Ferroalloys	Elkem Rana (Elkem A/S)	Ferrochromium plant at Mo i Rana	140
Do.	Elkem Sauda (Elkem A/S)	Ferromanganese plant at Sauda	250
Do.	Elkem PEA (Elkem A/S)	Ferromanganese plant at Porsgrunn	200
Do.	Elkem Salten (Elkem A/S)	Ferrosilicon plant at Straumen	85
Do.	Elkem Bjolvefossen (Elkem A/S)	Ferrosilicon plant at Alvik	60
Do.	Elkem Thamshavn (Elkem A/S)	Ferrosilicon plant at Orkanger	45
Do.	Finnfjord Smelterverk, Rana Metal (Fesil)	Ferrosilicon plant at Mo i Rana	140
Do.	A/S Hafslung Metal (Fesil)	Ferrosilicon plant at Sarpsborg	75
Do.	Ila og Lilleby Smelterverk (Fesil)	Ferrosilicon plant at Finnsnes	60
Do.	Oye Smelterverk (Tinfos Jernverk A/S)	Silicomanganese plant at Kvinesdal	135
Graphite	Elkem Skaland (Elkem A/S)	Skaland mine on Senja Island	10
Iron, metal	Ulstein Jernstoperi A/S	Hordvikneset	10
Iron ore	Rana Gruber A/S (Norsk Jernverk Holding A/S)	Mine at Mo i Rana	2,000
Do.	A/S Sydvaranger (Government 87.45%)	Bjornevatn Mine at Kirkenes	1,500
Lead ore, Pb content	A/S Bleikvassli Gruber (A/S Sydvaranger)	Mine at Bleikvassli	4
Do.	Bergverkselskapet Nord-Norge A/S (A/S Sydvaranger)	Mine at Mo i Rana	1
Lime	Hylla Kalkverk (Nikolai Bruch A/S)	Verdal/Trondheim	100
Do.	A/S Norsk Jernverk	Plant at Mo i Rana	48
Do.	Ardal og Sunndal Verk A/S	More og Romsdal mine at Surnadal	20
Do.	Breivik Kalkverk A/S	Alesund Mine at Larsnes	20
Do.	Mjoendalen Kalkfabrik	Plant at Asen/Drammen	7
Limestone	Norcem A/S	Dalen, Bjorntvedt, and Kjopsvik mines	1,600
Do.	Verdalskalk A/S (Franzefoss Bruk A/S)	Sandvika mine	800
Do.	Breivik Kalkverk A/S	Visnes and Glaerum mines	500

TABLE 4—Continued

NORWAY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Magnesium		Norsk Hydro A/S	Plant at Porsgrunn	50
Natural gas	billion cubic feet	Phillips Petroleum C. Norway	Ekofisk area (fields: Albukjell, Edda, Ekofisk, Eldfisk, Hod, Valhall, and Tor)	350
Do.		Amoco Norway Oil Company	Valhall and Hod Fields	100
Do.		Den Norske Stats Oljeselskap A/S	Gullfaks, Statfjord, Tommeliten, and Veslefrikk Fields	250
Do.		Elf Aquitaine Norge A/S	Frigg and Heimdal Fields	300
Do.		Esso Norge A/S	Odin Field	100
Do.		Norsk Hydro A/S	Oseberg and Troll Fields	100
Nepheline syenite		North Cape Nefelin A/S (Unimin Corp.)	Mine at Stjernoy	350
Nickel:				
Ore, Ni content		Titanco A/S	Titania Mine at Hauge i Dalane	1
Metal		Nikkelverk A/S (Falconbridge Nickel Mines)	Smelter at Kristiansand	50
Olivine		A/S Olivin	Aheim Mine at Sunnmore	2,500
Do.		Franzefoss Bruk A/S	Lefdal Mine at Bryggja	500
Do.		Industrimineraler A/S	Stranda Mine at Nordfjord	300
Petroleum	barrels per day	Phillips Petroleum C. Norway	Ekofisk area (fields: Albukjell, Edda, Ekofisk, Eldfisk, Hod, Valhall, and Tor)	208,000
Do.		Den Norske Stats Oljeselskap A/S	Gullfaks, Statfjord, Tommeliten, and Veslefrikk Fields	430,000
Do.		BP Petroleum Development of Norway A/S	Gyda and Ula Fields	165,000
Do.		Conoco Ltd.	Murchinson Field	9,000
Do.		Norsk Hydro A/S	Oseberg and Troll Fields	320,000
Pyrite		Folldal Verk A/S (Nursulfid A/S)	Mine at Hjerkinn	350
Quartzite		Elkem Tana (Elkem A/S)	Mine at Tana	550
Do.		Elkem Marnes (Elkem A/S)	Mine at Sandhornoy	200
Do.		Vatnet Kvarts A/S	Mine at Nordland	150
Do.		Snekkevik Kvartsbrudd	Mine at Kragero	110
Steel		Fundia (Fundia AB, Norsk Jenverk, Rautaruukki)	Plants in Christiania Spigerverk, Mandal Stal, and Mo i Rana	640
Talc		A/S Norwegian Talc (Ernstrom Group)	Mine/plant at Altermark/Knarrevik and mine/plant at Framfjord	90
Do.		Kvam Minerals A/S	Mine/plant at Kvam	6
Titanium		Titania A/S (Kronos Norge A/S)	Mine at Tellnes	850
Do.		K/S Ilmenittsmelverk A/S	Titanium dioxide plant at Tyssedal	200
Zinc:				
Ore, Zn content		Folldal Verk A/S (Nursulfid A/S)	Mine at Hjerkinn	6
Do.		Skorovas Gruber	Mine at Namsskogan	6
Do.		Grong Gruber A/S (Nursulfid A/S)	Mine at Royrvik	6
Do.		A/S Bleikvassli Gruber (A/S Sydvaranger)	Mine at Bleikvassli	5
Do.		Orkla Industrier A/S	Mine at Meldal	5
Do.		Bergverkselskapet Nord-Norge A/S (Sydvaranger A/S)	Mine at Fauske	5
Metal		Norzik A/S (Boliden Mineral AB, 50%)	Eitrheim smelter at Odda	137

TABLE 5

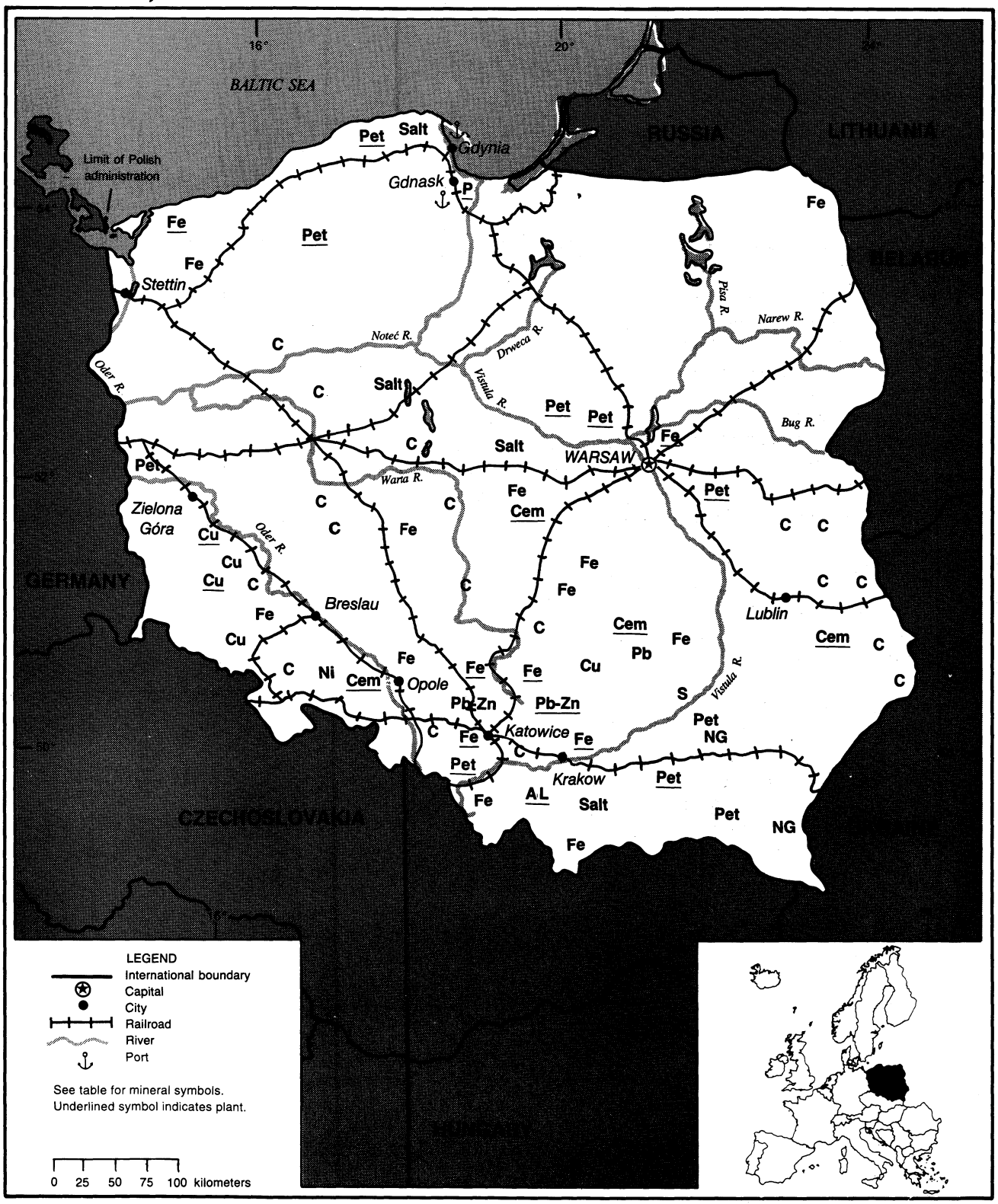
NORWAY: RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

(Million metric tons unless otherwise specified)

Commodity		Reserves
Copper-zinc ore		27
Iron ore		935
Natural gas	billion cubic meters	7,280
Nepheline syenite		300
Olivine		2,000
Petroleum	billion barrels	35

POLAND

AREA 312,000 km² **POPULATION 38 million**



THE MINERAL INDUSTRY OF

POLAND

By Walter G. Steblez

Despite the structural changes that have occurred within the country's economy, Poland remained a significant producer of major nonfuel minerals and fuels by both world and European standards. In 1992, excluding the former U.S.S.R., Poland was the largest producer of copper in Europe and was ranked among the top 10 world producers in terms of mine output and refined metal production. Similarly, the country was the 3d largest European mine producer of zinc and ranked as the 11th largest world mine zinc producer. Poland was also among the top 10 mine producer of silver in the world and was the largest producer in Europe, excluding the former U.S.S.R. Among Europe's producers of industrial minerals, Poland ranked third in the production of lime and nitrogen (in ammonia), second in salt, and was the largest European producer of sulfur, ranking among the top six producers in world output. Poland was also the largest European producer of bituminous coal and was the seventh largest hard coal producer in the world.

In 1992, the sharp downward shift in industrial production, including the production of minerals, was stopped. Although, reportedly, total industrial output for 1992 increased by 4.2% compared with that of 1991, the continuing structural shift of the economy toward a market-based system resulted in a further rise in both the rate of inflation and unemployment during the year. In 1992, strikes were widespread in the country's minerals industry, chiefly owing to miners' demands for increased wages and greater rationalization within the mining sector.

GOVERNMENT POLICIES AND PROGRAMS

The Government of Poland continued to promote structural changes in the country's economy to develop a market-based system. The denationalization of the country's state-owned enterprises remained the Government's main instrument to achieve this. In 1992, reportedly, 477 enterprises were "commercialized," or transferred to the Treasury for preparation for private ownership. At yearend, Government officials anticipated that in 1993 about 1,000 state-owned enterprises would be similarly commercialized. Additionally, there would be a stock offering by about 10 large state-owned enterprises on the Warsaw stock exchange in 1993. Reportedly, the Government's Agency for Ownership Transformation during the year indicated that a possible approach to denationalize Poland's large copper mining, beneficiation, and refining complex, Kombinat Gorniczo Hutniczy Miedzi (KGHM), initially could involve "commercializing" and selling KGHM's auxiliary operations that were not directly involved with mining, beneficiation, smelting, and refining.

The Government of Poland continued to monitor industry generated pollution and strictly enforce compliance by mineral producing enterprises and other heavy industries with environmental legislation that was adopted in recent years. The latest available data published by the Government on environmentally polluting wastes generated by the country's minerals industries suggested some improvement concerning this issue in 1991 compared with that of 1990.

Total wastes generated by the minerals industry in 1991 amounted to 128.3 Mmt compared with 143.8 Mmt in 1990, representing a reduction of about 11%. However, the reduction of waste from minerals industry point sources during this period was more likely the result of a general decline in output in the industry rather than rapid assimilation of pollution abatement technology. About 51.1% of the total waste in 1991 was commercially reprocessed, 4% was neutralized, and 48.5% was stored. Of the total waste produced by the minerals industry in 1991 (128.3 Mmt), 58.6 Mmt was generated by the mining, quarrying, and processing sector; 28.2 Mmt by the barite, coal, copper, lead and zinc, and sulfur washing and beneficiation operations; and 24.1 Mmt consisted of mineral dust and fly ash and slag generated by the electric power generating sector. Compared with that of 1990, the amount of waste generated by these categories of activity in 1991 represented declines of about 10%, 5%, and 11%, respectively.

PRODUCTION

The sharply declining trend of output in Poland's mineral industry in 1989, 1990, and 1991 appeared to have leveled off in 1992. Actual recoveries during the year appeared in copper and lead and zinc production. The decline in production in recent years was wholly consistent with the change in the country's economic priorities. With central economic planning no longer in force, producers were no longer obliged to increase or maintain mineral output levels at all costs and were free to plan closures of economically unsustainable operations.

Producers of military equipment for the former Warsaw Pact military alliance, the former "metal eaters" in Poland and

other centrally planned economies, had significantly curtailed the production of military equipment. The conversion of these facilities to civilian production has been slow and uneven, which forced the country's metal producers to rationalize production and seek new domestic and foreign markets. *(See table 1.)*

TRADE

The latest trade data available were for 1991. In 1991, Poland's foreign commercial activity continued to grow with EC countries and diminish with former fellow members of the CMEA. The value of Poland's total exports to the EC rose by 14.6%, while imports from the EC grew by 62.8% compared with those of 1990. On the other hand, the value of Poland's total exports and imports with former CMEA countries declined by 41.5% and 39.1%, respectively. Trade in metals, both exports and imports, with the EC grew substantially during the year, with Poland obtaining a trade surplus in this sector. Imports of fuel and energy from the EC during this period rose by more than 25%, while it declined sharply with former CMEA countries. To meet its energy needs while at the same time decreasing hard currency expenditures for imported natural gas and petroleum, Poland substantially reduced imports of natural gas, petroleum, and refinery products and exports of bituminous coal, coke, and lignite, which increased the apparent consumption of domestically produced fuels. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

The information provided in table 4 lists the names of administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1991. *(See table 4.)*

COMMODITY REVIEW

Metals

Copper.—Faced with declining wages and the prospect of redundancy following planned restructuring, workers at KGHM, Poland's state-owned vertically integrated copper mining, smelting, and refining monopoly, went on strike several times during the second half of the year. Although the results of the strike were inconclusive from the standpoint of the miners' wage increase demands, KGHM's management, reportedly, assuaged the workers' fears of layoffs by indicating that the restructuring plans for the company in 1993 would not result in worker redundancy. The company's restructuring plan for 1993 was to include the conversion of 10 of the company's 20 units into holding companies as the first stage of privatization.

Iron and Steel.—According to officials at Poland's Metallurgical Chamber for Production and Trade, the restructuring of the country's steel industry would involve the merger of the Huta Sendzimir and Huta Katowice steelworks. By the year 2000, smelting operations would be carried out exclusively at the Katowice facility.

Reportedly, the steel industry's restructuring plans also were to include the merger of several smaller steel mills and the closure of 11 open-hearth furnaces, 12 rolling mills, 6 tube mills, and 3 forging units at a number of locations throughout the country. By the year 2000, the output of crude steel was expected to stabilize at 9 Mmt/a, with a proportion of continuously cast steel reaching 85% of the total. The Metallurgical Chamber's spokesperson also indicated that the cost of restructuring the country's steel industry would amount to about $1 billion and involve a reduction of the work force of 130,000 workers by 80,000 personnel.

Lead and Zinc.—Lead and zinc ore was mined in the southeastern part of the country at three underground mines. The Boleslaw mining, concentrating, and zinc refining complex at Bukowino produced ore grading about 0.6% lead and 3.4% zinc. The Olkuz-Pomorzany Mine, near Olkusz, part of the Boleslaw operation, produced ore grading about 1.2% lead and 3.5% zinc, and the Trzebinia Mine and concentrator, at Trzebinia, near Chrzanow, produced ore grading 3.7% lead and 2% zinc. In 1992, MIM Holding Ltd. of Australia reportedly sold 10,000 tons of zinc concentrate to Poland's Impexmetal for smelting at the country's smelting and refining facilities. Reportedly, the shipment of the zinc concentrate was seen as a test lot for possible similar shipments in the future by MIM Holding Ltd. to Poland.

Industrial Minerals

Cement.—Poland's production of cement continued to decline from slightly more than 17 Mmt in 1989 to 12.6 Mmt in 1990 and 11.9 Mmt in 1992. As in 1991, the continued decline of cement output in 1992 corresponded to the decline in the country's capital construction activity during the year. As market demand began to assume a more dominant position in Poland's economy, large-scale state-subsidized construction projects in heavy industry were all but abolished for the short term.

Silica.—The construction of Poland's first float glass plant started in 1992, following an agreement signed in 1991 between Pilkerton PLC of the United Kingdom and HSO Sandomierz, Poland's chief producer of sheet glass. Pilkerton PLC's agreement with HSO Sandomierz involved Pilkerton's ownership of 40% of the equity in the venture, with the balance owned by the State Treasury of Poland (30%), International Finance Corp. (15%), and the European Bank for Reconstruction and Development (15%). The cost of the plant was to be $171.5 million. Additionally, during the year, Pilkerton PLC reportedly agreed to purchase a 45% share of International Glass Poland SA (IGS), a major processor, wholesaler, and distributor of

glass products in Poland. With an established network throughout the country, IGS would serve as a conduit of float glass imports into Poland while the domestic plant is under construction.

Sulfur.—Poland remained among the largest producers of sulfur in the world. Approximately 87% of Poland's total sulfur production was generated at the Jeziorko and Grzybow borehole mines in the Tarnobrzeg region using a modified Frasch process. Approximately 13% was produced at the Machow open pit mine. As in other branches of the mineral industry, sulfur mining has been a serious source of both air and water pollution.

Mineral Fuels

Coal.—In terms of output, consumption, and export trade, coal remained the country's chief mined product. Poland's resources of bituminous and anthracite coal were in Upper and Lower Silesia and in the Lublin district. At yearend, Poland's coal miners went on strike for higher wages and job security. The miners demanded wage increases, claiming that their wages had been seriously eroded by inflation. Additionally, the miners' unions also demanded that the Government rescind its plan for the closure of unprofitable coal mines that reportedly could eliminate up to 53% of the 340,000 jobs in the coal mining industry. These issues were not resolved by yearend, and the coal miners' strike continued into the following year.

Natural Gas and Petroleum.—Reportedly, following lengthy negotiations with its former partners, the former U.S.S.R. and the former German Democratic Republic, Poland became the sole owner of the Petrobaltic Enterprise for Exploration and Extraction of Oil and Gas Deposits (Petrobaltic) in 1990. Poland also retained the bulk of the former joint-venture's equipment and professional staff. Petrobaltic, an enterprise involved in offshore exploration, development, and exploitation of natural gas and petroleum, indicated that in January 1992 the company became the sole legal owner of a deposit of natural gas and petroleum deposits about 100 kilometers (km) offshore. An oilfield in this area was reported to be 10 km in length and 3 km in width with a potential yield of about 500,000 tons of petroleum annually. A nearby deposit of natural gas also was described as substantial, containing sulfur-free high-quality gas. Company officials indicated that foreign partners were sought to assist in the development of these deposits.

Reserves

Taking into account Poland's efforts at transition to a market economy, the country's mineral reserves would have to be reevaluated from a market economy perspective. As defined in market economy countries, reserves are those mineral deposits that can be mined at a profit under existing conditions with existing technology. In CMEA countries, including Poland, the prior policies for centrally planned industrial development often had more to do with political than economic considerations. Centrally planned economic directives to discover exploitable resources may have resulted in possible overestimates and other distortions of collected field data. Consequently, it will probably take Poland a number of years to establish its real mineral reserves from a market economy standpoint. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether the deposit was suitable for exploitation, given the current technological capability and industrial need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade.

In category A, the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known, and the types and industrial grades of ore are ascertained but without details their of distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of minerals cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of $A+B+C_1$ categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes. Taking this system into account, Poland's mineral resources in categories $A+B+C_1$ are given in table 5. *(See table 5.)*

INFRASTRUCTURE

Poland's inland transportation system consisted of 331,129 km of railroads, highways, and waterways. The railroad system consisted of 24,287 km of 1.435-m standard-gauge, 397 km of 1.524-m broad-gauge, and 2,357 km of narrow-gauge track. Of the total railroad system, 8,987 km was double-tracked and 11,016 km electrified track. The highway system consisted of 130,000 km of improved hard-surface roads, 24,000 km of unimproved hard-surface roads (crushed stone, gravel), 100,000 km of earth roads, and 45,887 km of various urban roads. Poland had 3,997 km of navigable rivers and canals, with ports at Gliwice on Kanal Gliwice, Wroclaw on the Oder, and Warsaw on the Vistula. By yearend, the country's merchant fleet consisted of 222 ships totaling 4,019,531 dwt. Maritime ports (Gdansk, Gdynia, Szczecin, and Swinoujscie) handled 44.2 Mmt of cargo in 1990. In 1990, Poland had 4,500 km of pipeline for natural gas, 1,986 km of pipeline for crude petroleum, and 360 km of pipeline for refined products.

OUTLOOK

To ensure maximum interim employment during the country's economic transition to a market economy, near-term Government policies probably will continue to direct subsidies to some state-owned heavy industries such as coal mining and steel production. Crude steel production should continue to decline in 1993, owing to continued rationalization (including environmental factors) of the industry and the decline in domestic demand. The steel industry's production profile in the longer term should tend toward the output of higher value specialty steels. Poland's coal, copper, lead, sulfur, and zinc industries, because of their developed infrastructures and operations and relatively well-assured mineral resources, should continue their mining and processing activities (with improved pollution controls) for at least another 10 to 15 years.

OTHER SOURCES OF INFORMATION

Agencies

Ministry of Industry
Warsaw, Poland
Ministry of the Environment, Forestry, and Natural Resources
Warsaw, Poland
Kombinat Gorniczo Hutniczy Miedzi
Lubin, Poland

Publications

Przeglad Gorniczy (Mining Review), Warsaw, annually.
Przeglad Geologiczny (Geology Review), Warsaw, annually.
Rocznik Statystyczny Przemyslu (Statistical Handbook for Industry) Glowny Urzad Statystyczny (Main Statistical Directorate), Warsaw, annually.
Rocznik Statystyczny (Statistical Abstract) Glowny Urzad Statystyczny (Main Statistical Directorate), Warsaw, annually.

TABLE 1

POLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum metal, primary		47,700	47,800	45,974	45,800	43,600
Cadmium metal, primary		642	485	373	r e450	450
Copper:						
Mine output, Cu content, recoverable[e]		437,000	384,000	r329,300	r320,300	350,000
Metal:						
Smelter, including secondary		469,560	460,519	346,000	e380,000	380,000
Refined, including secondary		400,560	390,268	r346,000	378,000	3387,000
Gold:[e]						
Mine output, Au content, recoverable	thousand kilograms	30	30	30	30	30
Metal, smelter[4]	kilograms	177	175	175	175	175
Iron and steel:						—
Iron ore and concentrate, gross weight		6,300	7,400	2,400	r(5)	
Metal:						
Pig iron	thousand tons	10,264	9,488	8,658	6,355	36,351
Ferroalloys:[e]						
Blast furnace	do.	80	75	75	70	65
Electric furnace	do.	175	175	140	140	124
Steel:						
Crude	do.	16,873	15,094	13,625	10,439	39,867
Semimanufactures:						
Rolled excluding pipe	do.	12,424	11,272	9,836	r8,036	37,510
Pipe	do.	1,053	971	567	r519	550
Lead:						
Mine output, Pb content, recoverable		64,000	66,000	61,344	e49,000	51,000
Metal, smelter		90,700	78,200	64,812	50,800	354,800
Silver, mine output, Ag content, recoverable	thousand kilograms	1,063	1,003	832	899	3798
Zinc:						
Mine output, Zn content[e]		184,000	179,000	178,000	175,000	145,000
Metal, refined, including secondary		174,000	163,727	132,100	125,000	3134,600
INDUSTRIAL MINERALS						
Barite		63,100	57,900	25,316	r18,300	18,000
Cement, hydraulic	thousand tons	16,984	17,125	r12,518	12,030	311,888
Clays and clay products:						
Crude:						
Bentonite	do.	83	80	e70	e70	65
Fire clay	do.	1,032	856	523	r443	450
Kaolin[e]	do.	59	50	348	45	45
Products[e]	do.	600	550	300	300	300
Feldspar[e]		50,000	50,000	45,000	40,000	45,000
Gypsum and anhydrite, crude[6]	thousand tons	1,097	1,133	755	r688	700
Lime, hydrated and quicklime	do.	4,430	4,421	r3,200	r2,413	2,500
Magnesite, crude		23,900	24,100	r23,300	r8,100	10,000

See footnotes at end of table.

TABLE 1—Continued

POLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
INDUSTRIAL MINERALS—Continued						
Nitrogen: N content of ammonia	thousand tons	2,338	2,360	r1,962	r1,531	1,600
Salt:						
Rock	do.	1,247	995	556	r556	500
Other	do.	4,932	3,675	3,499	r3,284	3,200
Total	do.	6,179	4,670	4,055	3,840	3,700
Sodium compounds, n.e.s.:						
Carbonate (soda ash)	do.	956	1,005	968	r962	950
Caustic soda (96% NaOH)	do.	463	452	404	324	350
Stone:						
Dolomite	do.	3,422	4,000	4,989	e4,500	4,500
Limestone	do.	13,263	12,788	8,631	7,624	7,500
Sulfur:						
Native:						
Frasch	do.	4,411	4,276	4,027	r3,302	2,300
Other than Frasch	do.	589	588	637	r633	617
Total	do.	5,000	4,864	4,664	r3,935	e2,917
Byproduct:[e]						
From metallurgy	do.	150	150	140	140	140
From petroleum	do.	30	20	20	20	20
Total	do.	180	170	160	160	160
From gypsum[e]	do.	20	20	10	10	10
Total sulfur[e]	do.	5,200	5,054	4,834	r4,105	3,087
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	do.	193,015	177,628	147,624	140,269	e131,523
Lignite and brown	do.	73,489	71,816	67,584	69,350	e66,852
Total	do.	266,504	249,444	215,208	209,619	e198,375
Coke:						
Coke oven	do.	17,071	16,584	13,713	11,428	10,000
Gashouse[e]	do.	350	350	350	300	300
Total[e]	do.	17,421	16,934	14,063	11,728	10,300
Fuel briquets, all grades	do.	1,460	632	199	190	190
Gas:						
Manufactured:						
Town gas	million cubic meters	133	109	122	120	120
Coke oven gas	do.	6,593	6,456	5,475	e5,000	5,000
Natural, marketed	do.	5,713	5,368	3,866	4,134	4,015
Natural gas liquids:[e]						
Natural gas	thousand 42-gallon barrels	50	50	30	30	30
Propane and butane	do.	40	30	30	30	30
Peat: Fuel and agricultural[e]	thousand tons	60	50	50	50	50

See footnotes at end of table.

TABLE 1—Continued

POLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude:						
As reported	thousand tons	163	159	163	158	[3]150
Converted	thousand 42-gallon barrels	1,209	1,180	1,209	1,172	[3]1,113
Refinery products[7]	do.	94,397	95,844	80,874	[r]85,658	85,000

[e]Estimated. [r]Revised.

[1]Table includes data available through June 1993.

[2]In addition to the commodities listed, antimony, cobalt, germanium, a variety of crude nonmetallic construction materials, and carbon black also are produced, but available information is inadequate to make reliable estimates of output levels. Poland also may produce alumina in small quantities, but details of such an operation, if it exists, are not available.

[3]Reported figure.

[4]Based on official Polish estimates.

[5]Less than 1/2 unit.

[6]Includes building gypsum, as well as an estimate for gypsum used in production of cement.

[7]Includes virtually all major products; excludes some minor products as well as refinery fuel and losses.

TABLE 2

POLAND: EXPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise indicated)

Commodity		1990	1991
METALS			
Aluminum:			
Unwrought metal		16.3	14.5
Copper:			
Unwrought metal and semimanufactures		198.9	245.3
Iron and steel:			
Scrap:			
Iron		32.3	14.2
Steel		392.3	159.1
Ferroalloys		28.1	18.3
Semimanufactures		515.5	1,236.0
Lead:			
Unwrought metal		6.0	9.9
Silver	tons	678.0	931.0
Zinc:			
Unwrought metal, alloys and semimanufactures		33.6	27.9
Unwrought only		31.3	25.9
INDUSTRIAL MINERALS			
Cement		903.1	1,178.4
Fertilizer materials:			
Manufactured:			
Nitrogenous		511.9	385.2
Phosphate		41.6	26.9
Lime		75.9	93.1
Sodium compounds:			
Calcined soda		516.7	461.6
Caustic soda		117.9	80.7
Sulfur		3,815.2	2,812.1

See footnotes at end of table.

TABLE 2—Continued

POLAND: EXPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise indicated)

Commodity	1990	1991
MINERAL FUELS		
Coal:		
Anthracite	40.0	156.0
Bituminous	28,026.0	19,139.0
Lignite	28,348.7	1,196.0
Coke and semicoke	3,661.0	2,022.0
Refined petroleum products	1,655.4	1,662.6

NA Not available.

Sources: Selected mineral export data compiled from Handel Zagraniczny, Warsaw, 1992, and Maly Rocznik Statystyczny, Warsaw, 1991.

TABLE 3

POLAND: IMPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise indicated)

Commodity		1990	1991
METALS			
Aluminum:			
Oxides hydroxides:			
Alumina, calcined		130.0	112.5
Metal:			
Unwrought and semimanufactures		58.1	32.8
Antimony, metal	tons	838.0	14.6
Chromite		147.4	6.8
Cobalt:			
Metal, ingot and powder	tons	77.0	22.0
Gold and platinum-group metals	kilograms	9.0	56.0
Iron and steel:			
Ore and concentrate		12,066.3	8,580.6
Metal:			
Scrap		8.4	.8
Pig iron		1,283.5	102.2
Ferroalloys		44.6	26.6
Rolled steel		728.5	32.6
Lead, metal		2.5	7.8
Magnesium, metal	tons	300.0	200.0
Manganese:			
Ore and concentrate		103.2	151.8
Metal	tons	384.0	156.0
Mercury, metal	do.	33.0	2.0
Molybdenum, ore and concentrate	do.	617.0	21.0
Nickel, metal		3.6	.6
Silicon, metal		1.7	767.0
Tin, metal	tons	890.0	29.8

See footnotes at end of table.

TABLE 3—Continued

POLAND: IMPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise indicated)

Commodity		1990	1991
METALS			
Titanium:			
Ore and concentrate:			
Ilmenite		54.7	42.5
Rutile		1.9	1.5
INDUSTRIAL MINERALS			
Asbestos	tons	65.6	700.0
Boron, ore and concentrate		3.1	3.0
Cement		35.1	1.7
Fertilizer materials:			
Manufactured:			
Potassic		592.1	84.3
Kaolin		102.8	59.8
Magnesite, calcined		178.1	64.9
Phosphates, crude		506.4	214.6
MINERAL FUELS			
Coal:			
Anthracite		20.0	8.0
Bituminous		540.0	NA
Natural gas	million cubic meters	8,410.0	7,317.0
Petroleum:			
Crude		13,008.0	11,576.2
Refined:			
For consumption		2,365.2	797.1
For reexport		3.1	3.6

NA Not available.

Sources: Selected mineral export data compiled from Handel Zagraniczny, Warsaw, Mar. 1992, and Maly Rocznik Statytyczny, Warsaw, 1991.

TABLE 4

POLAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies (all state-owned)	Location of main facilities	Annual capacity
Aluminum:			
Primary	Huta Aluminium	Konin	50.
Secondary	do.	do.	20.
Coal:			
Bituminous	Hard Coal Association in Liquidation State Coal Agency	71 mines at Upper Silesian Basin, Lower Silesian Basin, and Lublin Basin	200,000.
Lignite	State Coal Agency	4 open pit mines at Turow, Belchatow, Konon, and Adamow	75,000.

TABLE 4—Continued

POLAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies (all state-owned)	Location of main facilities	Annual capacity
Copper:			
Concentrate (gross weight)	Kombinat Gorniczo Hutniczy Miedzi (KGHM)	Mines and concentrators at Konrad, Lubin, Polkowice, Rudna, and Sieroszowice	1,900.
Metal, refined	do.	Refineries at Glogow I, Glogow II, and Legnica	430.
Ferroalloys	Ministry of Industry	Plants at Laziska, Bobrek, Siecznice, and Pokoj producing FeMn, FeSiMn, FeSi, FeCr, FeW	270.
Lead-zinc:			
Concentrate	do.	Nonferrous Metals Association (Mines and concentrators at Bolelaw, Olkuz-Pomorzany, and Trzebionka)	125 Pb., 225 Zn.
Metal:			
Pb, refined	do.	Smelters and refineries at Miasteczko Slaskie, Szopienice, and Orzel Bialy	115.
Zn, refined	do.	Smelters and refineries at Boleslaw, Silesia, and Szopienice	145.
Natural gas million cubic meters	Ministry of Mining and Energy	Gasfields at pre-Carpathian foothills, Carpathian Mountains Lowlands, near Ostrow Wielko-polski, Poznan, and Trzebnica, north of Wroclaw	6,000.
Petroleum:			
Crude million barrels	do.	Oilfields in northern lowlands, near the Baltic Sea; sub-Carpathian and Carpathian Mountains	1.4.
Refined	do.	Refineries at Glinik, Mariampolski, Jasto, Jealicze, Warinsky, Czechowice, Gdansk, etc.	125.
Salt, all types	Ministry of the Chemical Industry	Main mines at Inowroclaw, Klodowa, and Wapno in central Poland	6,500.
Silver	Zaklady Metalurgiczne Trzebinia	Refined from doré produced by the Szopienice Pn-Zn smelter-refinery largely from KGHM supplied slimes	1.
Steel	Ministry of Metallurgy	Main facilities include integrated ironworks and steelworks at Krakow, Katowice, and Warsaw	18,000.
Sulfur	Ministry of the Chemical Industry	Kopalne i Zaklady Przetworcze Siarki im. M. Howotki "Siarkopol" at Tarnobrzeg operates the Grzybow Jeziorko and Machow mines	5,700.

TABLE 5

POLAND: APPARENT RESOURCES OF MAJOR MINERAL COMMODITIES FOR 1992

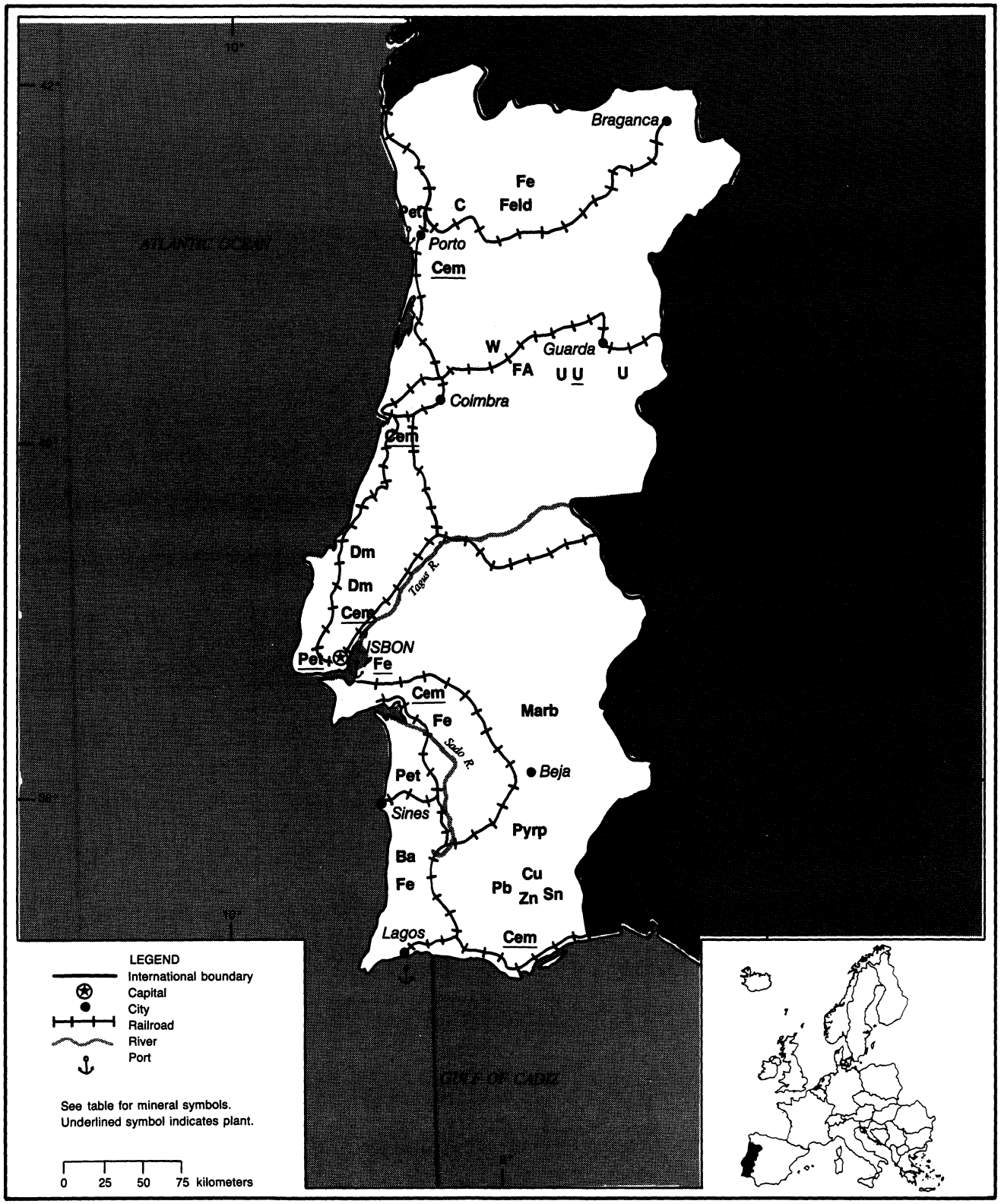
(Thousand metric tons)

Commodity	Resources
Barite	5,061
Clay, refractory	69,000
Coal:	
Bituminous	65,510,000
Lignite	12,864,000
Copper, contained in ore	34,000
Dolomite	603,000
Gas, natural million cubic meters	126,391
Gypsum and anhydrite	303,000
Iron, contained in ore	600,000
Lead, contained in ore	5,900
Limestone and marls	16,951
Nickel, contained in ore	117
Petroleum, crude	5,000
Quartz sand	723,000
Rock salt	83,085,000
Silver, contained in Cu/Pb-Zn ores	196
Sulfur	885,000
Zinc, contained in ore	13,000

Source: Bilans Zasobow Kopalin i Wod Podziemnych w Polsce, Warsaw, 1990. (Official Polish data, valid for Dec. 1989). Maty Rocznik Statystyczny (Concise Statistical Yearbook of Poland) Warsaw, 1992.

PORTUGAL

AREA 91,640 km² **POPULATION 10.5 million**



THE MINERAL INDUSTRY OF

PORTUGAL

By Harold R. Newman

Portugal, whose land area includes a portion of the Iberian peninsula, is in one of the most mineralized areas of western Europe. The area is geologically very complex, which increases its potential with regard to mineral resources. 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 is also a significant tungsten producer.

Portugal posted a real gross domestic product GDP growth of 1.7% in 1992, with investment continuing to expand as a result of fiscal incentives and foreign interest in the country. Portugal has managed to provide an economic environment more conducive to foreign investment since its accession into the European Community (EC) in 1986. Foreign investors were availing themselves of Portugal's continuing labor-cost advantage and favorable tax treatment.[1] Investment growth averaged 9.9% annually from 1986 to 1991.

The annual inflation rate was about 9%. The unemployment rate was 4%, one of the lowest in the Organization for Economic Cooperation and Development (OECD). Portugal has been one of the fastest growing economies in the EC over the past 5 years and was expected to continue growing at a rate above the average for the EC. This growth was due, in no small part, to a massive modernization program backed by EC structural funds. These funds were designed to overcome Portugal's long-standing problems in transportation, communications, technology, and health care.

GOVERNMENT POLICIES AND PROGRAMS

The Government continued with legislation that would privatize many public companies. Petroleos de Portugal, S.A. (Petrogal), the state oil group, was being considered for privatization along with Siderugia Nacional, E.P., the state steel company. The planned privatization of Cimentos de Portugal, E.P. (Cimpor) and Cia. Geral de Cal e Cimento, S.A. (Secil), the country's two cement producers, continued to be delayed until sometime in the future. The privatization issue is part of a broader program to reduce the role of the state and restructure the Portuguese economy from one that is state-controlled to one that is market-driven. On the revenue side, income from the privatizations would help pay some of the Government debt.

PRODUCTION

Sociedade Mineira de Neves-Corvo S.A.R.L. (Somincor) continued to produce copper and tin at the Neves-Corvo Mine. Piritas Alentejas S.A.R.L. was the largest producer of pyrite; Siderúrgia Nacional, E.P. produced iron and steel; Beralt Tin and Wolfram Ltd. continued tungsten production; and Cimentos de Portugal, S.A. was an important producer of cement. Minas de Jalles S.A. suspended its gold operation in 1992 because of low gold prices and lack of sufficient reserves. 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.

The value of the production of the metallic mining sector was about $328 million,[2] and the value of production of the nonmetallic and construction sector was about $295 million. *(See table 1.)*

TRADE

In 1991, 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. *(See tables 2 and 3).*

Table 4 shows the impact of selected classes of mineral commodities on Portugal's balance of payments position in relation to the EC and the world.

STRUCTURE OF THE MINERAL INDUSTRY

By world standards, the mineral industry of Portugal is 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 are owned or controlled by the Government, although there are some privately owned operations. The Government was engaged in efforts to privatize some state-owned industries, which included mineral resource companies.

Ownership of minerals is vested in the Government by the Constitution. Any person, Portuguese or foreigner, may explore for and, if a mineral deposit is found, apply for a concession. Deposits are divided into two groups: concessionable deposits that are the "minerals" and nonconcessionable deposits that are sand, gravel, and clays. Nonconcessionable deposits are considered the property of the land owner, and concessionable deposits are the property of the State. The Government collects 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) is the central department of the Ministry of Industry and Energy and regulates the mineral industry, collects statistics, and grants exploration licenses and mining concessions. About 35,000 people are employed by the mineral industry, including mining and processing. *(See table 5.)*

COMMODITY REVIEW

Metals

Copper.—The Neves-Corvo Mine, which started operations in 1989, was operating at about 96% capacity at the end of 1992. Somincor, the operating company, is 51% Government-owned through the Portuguese Mineral Development Agency (EDM). The minority partner is RTZ Corp., a United Kingdom company that owns 49% of the joint venture.

The mine is designed to produce 1.3 Mmt/a of raw ore, which was expected to yield 500,000 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.

The Neves-Corvo complex consists of four proven ore bodies: Graca, reported 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 is 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.R.L.'s metals concentrate plant at Aljustrel came on-stream in late 1991. 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, technical problems affected the plant operation so that 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, E.P. (SN). The main goal of SN is to ensure its viability beyond the transition period of 1992, as mentioned in Portugal's Act of Accession to the EC.

SN had completed its restructuring and modernization program at yearend. Extensive modernization has taken place at both the Seixal and Maia plants at an estimated cost of about $278 million. The program was intended to improve product quality, reduce production costs, increase energy efficiency, and implement a 40% rationalization of personnel.

The Government changed SN into a public limited company as a major step toward privatization. The Government was intending to sell 80% of SN to a single buyer, while reserving 10% for the work force and 10% for the Government under a "golden share" option.

Lusosider, a joint-venture company consisting of Usinor Sacilor of France and Cia Espanola de Laminacion of Spain, was expected to be a major bidder to acquire the 80% majority shareholding.

Tin.—Somincor's tin concentrator was inaugurated in May 1990. The facility includes three stages of crushing, grinding, tabling, flotation, and filtration. The project also included related infrastructure, utilities, a loadout facility, and a 5-km-long tailings pipeline. The plant was considered to be unique in that it was designed to process two types of ore. One ore type is a shale and the other ore type is a sulfide. The process will produce three grades of tin concentrate ranging from 25% to 55% metal content. Plant capacity is 5,000 mt/a of tin in concentrate, which should make Portugal one of the world's top 10 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 S.A. was the only producer of tungsten in 1992. However, Beralt was reducing production substantially because of market conditions for wolframite. This decision was the result of a depressed market and almost a 50% reduction in prices in 1992.

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 is 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 is the most valuable of the stone products and accounts 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 accounts for about 4% of total energy consumption. Most coal is imported, although there are some domestic reserves. Empresa Carbonifera do Douro S.A., a state-owned company, operates the Germunde Mine at Castelo de Paiva. The mine produces 200,000 mt/a of anthracite coal. However, the Government was planning on closing the mine at the end of 1994 because of high production costs and difficult mining conditions.

There is a growing demand for coal because the electricity sector is switching away from oil. There are no gas reserves and no nuclear powerplants in Portugal. Hydropower accounts for about 45% of electricity generation. The Government was seeking to diversify its energy sources and increase electrical power capacity to meet consumption growth. To that end, the Government was considering major energy projects. One was the construction of a liquefied natural gas pipeline, originating in Setubal, 50 km south of Lisbon, and going north 300 km to Oporto. A gas-fired electric generating plant would be linked to the pipeline.

The total project cost was estimated to be about $750 million. A four-unit, 1,200-MW coal-fired station is to be built at Pego. The first unit, generating 300 MW, was scheduled to be on-line in 1993 and the total project completed by mid-1995.

The Administracao do Porto de Sines (APS) has 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 use coal as a major fuel source.

INFRASTRUCTURE

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

It has been calculated that almost $22,350 million will be invested in infrastructure improvements over the next few years. The main thrust will be the modernization of the country's ports. Major seaports are Lisbon, Porto, and Sines. These ports are considered very important in a country where the main movement of goods is by sea. Other areas include improving the highways and bridges of the national motorway network. Portugal has about 74,000 km of usable highways, of which 84% is paved.

OUTLOOK

The present structure of the mineral industry could change in the near future as there is significant mining exploration in progress by several foreign companies. Copper, gold, kaolin, lead, lithium, pyrites, and tin are 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, is a prime area for this exploration activity.

Tax incentives and other stimuli should encourage further interest by mineral resource companies, which in turn should cause discovery and development of other mineral resources and modernization of existing industries. In the short term, however, Portugal is expected to remain a net importer of mineral-related products, especially mineral fuels.

[1]Organization for Economic Cooperation and Development, OECD Economic Survey, Portugal, 1991/1992, p. 13.

[2]Where necessary, values have been converted from Portuguese escudos (Esc) to U.S. dollars at the rate of Esc135=US$1.00, the average exchange rate for 1992.

OTHER SOURCES OF INFORMATION

Agencies

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

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]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
METALS						
Arsenic, white		214	199	e200	e200	150
Beryl concentrate, gross weight[e]		2r4	4	4	4	4
Copper:						
Concentrate:						
Gross weight		42,483	411,836	651,750	654,129	587,000
Cu content		3,739	103,718	162,938	164,768	150,500
Metal:[e]						
Smelter:						
Primary		2,500	688	1,000	1,000	1,000
Secondary		2,000	2,000	2,000	2,000	2,000
Total		4,500	2,688	3,000	3,000	3,000
Refined, primary		r5,400	6,000	r1,000	r3,000	3,000
Gold, mine output, Au content[e]	kilograms	2r267	295	350	360	350
Iron and steel:						
Iron ore and concentrate:						
Gross weight:						
Hematite and magnetite		3,450	—	—	—	—
Manganiferous		23,300	13,178	12,480	e11,600	10,000
Total		e26,750	13,178	12,480	e11,600	10,000
Fe content:						
Hematite and magnetite		8,296	e1,106	—	—	—
Manganiferous		1,957	4,689	e4,443	4,376	2,000
Total		10,253	e5,795	e4,443	4,376	2,000
Metal:						
Pig iron	thousand tons	445	e377	339	r251	2r402
Ferroalloys:[e]						
Ferromanganese		10,000	2r13,170	12,480	12,000	10,000
Silicomanganese		5,000	—	—	—	—
Silicon metal		2,500	—	—	—	—
Total		17,500	2r13,170	12,480	12,000	10,000
Crude steel	thousand tons	802	762	r744	r541	2r749
Lead: Refined, secondary[e]		6,500	7,000	6,000	6,800	5,000
Manganese: Mn content of iron ore[e]		2r1,782	1,800	1,200	1,200	500
Silver, mine output, Ag content	kilograms	877	19,300	42,200	e42,600	43,000
Tin:						
Mine output, Sn content		81	63	4,680	10,360	10,500
Metal, primary and secondary		58	e62	1,404	r e2,000	2,000
Titanium, concentrates:[e]						
Gross weight		2r59	111	45	40	30
Content of TiO_2		2r30	55	22	20	18
Tungsten, mine output, W content		1,382	1,376	e1,400	e1,400	1,200
Uranium concentrate: U content		189	124	e130	e125	125
Zinc: Smelter, primary		5,500	5,000	e5,500	e5,500	5,500
INDUSTRIAL MINERALS						
Barite		1,740	1,729	e1,220	e1,400	1,200
Cement, hydraulic[e]	thousand tons	2r5,900	6,000	6,000	6,000	6,000

See footnotes at end of table.

TABLE 1—Continued

PORTUGAL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
INDUSTSRIAL MINERALS—Continued						
Clays:						
Kaolin[3]		71,200	58,297	73,849	e74,000	70,000
Refractory e		250,253	50,000	50,000	50,000	50,000
Diatomite e		22,070	2,990	2,190	2,200	2,100
Feldspar		51,093	65,854	43,954	e45,000	40,000
Gypsum and anhydrite e		2338,029	300,000	300,000	300,000	300,000
Lime, hydrated and quicklime e		200,000	200,000	200,000	200,000	200,000
Lithium minerals: Lepidolite		212	274	159	e140	125
Nitrogen: N content of ammonia e		2190,500	151,000	198,200	r198,300	100,300
Pyrite and pyrrhotite (including cuprous), gross weight		244,175	199,018	144,190	138,760	140,000
Salt: e						
Rock		2535,942	583,670	523,300	524,800	525,000
Marine		2138,784	150,000	125,000	125,000	125,000
Total		2674,726	733,670	648,300	649,800	650,000
Sand e		5,000	5,000	5,000	5,000	5,000
Sodium compounds, n.e.s.: e						
Soda ash		155,000	155,000	150,000	150,000	150,000
Sulfate		52,000	55,000	50,000	50,000	50,000
Stone: e						
Basalt	thousand tons	287	286	85	80	80
Calcareous:						
Dolomite	do.	2105	100	100	100	100
Limestone, marl, calcite	do.	215,418	15,000	14,000	15,000	15,000
Marble	do.	2672	700	650	700	800
Diorite	do.	1,600	1,500	1,500	1,500	1,200
Gabbro	do.	50	50	50	50	50
Granite	do.	27,071	26,752	6,800	6,800	6,700
Graywacke	do.	228	18	20	18	20
Ophite	do.	264	58	60	60	50
Quartz	do.	211	10	10	10	10
Quartzite	do.	2568	600	575	600	500
Schist	do.	2105	100	100	100	100
Slate	do.	227	32	30	30	30
Syenite	do.	223	25	25	25	25
Sulfur:						
Content of pyrites		111,344	90,752	e95,000	e96,000	95,000
Byproduct, all sources e		3,000	3,000	3,000	4,000	4,000
Total e		114,344	93,752	98,000	100,000	99,000
Talc		7,187	8,063	7,926	e8,000	8,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, anthracite e	thousand tons	2241	e258	276	237	235
Coke, metallurgical e	do.	160	160	160	160	150
Gas, manufactured e	million cubic meters	136	136	136	136	130

See footnotes at end of table.

TABLE 1—Continued

PORTUGAL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum refinery products:[e]						
Liquefied petroleum gas	thousand 42-gallon barrels	3,600	[2]4,338	[2]4,628	4,500	4,600
Gasoline	do.	8,900	[2]14,646	[2]14,646	10,000	12,000
Jet fuel	do.	4,700	[2]5,791	[2]5,158	5,000	5,200
Kerosene	do.	230	225	230	225	230
Distillate fuel oil	do.	17,500	[2]21,365	[2]21,440	22,000	21,000
Residual fuel oil	do.	16,200	[2]22,637	[2]22,810	21,000	20,000
All other products	do.	9,300	9,000	8,800	9,000	8,600
Refinery fuel and losses	do.	4,100	4,000	3,600	3,800	3,400
Total	do.	64,530	82,002	81,312	75,525	75,030

[e]Estimated. [r]Revised.

[1]Table includes data available through May 1993.

[2]Reported figure.

[3]Includes washed and unwashed kaolin.

TABLE 2

PORTUGAL: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides	10	3	—	Argentina 2; Germany 1.
Ash and residue containing aluminum	150	NA		
Metal including alloys:				
Scrap	5,378	5,529	—	Spain 4,322; Netherlands 582; Belgium-Luxembourg 352.
Unwrought	477	2,474	—	Spain 2,310; France 68; Japan 40.
Semimanufactures	1,716	5,813	—	Spain 3,033; France 2,078; Angola 177.
Arsenic: Oxides and acids	102	NA		
Beryllium: Metal including alloys, all forms	(2)	1	—	Mainly to Finland.
Chromium: Metal including alloys, all forms	80	226	—	All to United Kingdom.
Cobalt:				
Oxides and hydroxides	—	2	—	All to Belgium-Luxembourg.
Metal including alloys, all forms	(2)	—		
Columbium and tantalum: Metal including alloys, all forms, tantalum	—	(2)	—	All to United Kingdom.
Copper:				
Ore and concentrate	706,115	702,626	16,000	Germany 170,373; Spain 130,000; Finland 119,115.
Matte and speiss including cement copper	68	45	—	All to Spain.

See footnotes at end of table.

TABLE 2—Continued

PORTUGAL: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Copper—Continued:				
Sulfate	24	NA		
Ash and residue containing copper	20	NA		
Metal including alloys:				
Scrap	6,304	10,989	—	Spain 5,683; Sweden 1,252; Netherlands 1,160.
Unwrought	340	11	—	All to Spain.
Semimanufactures	9,198	7,926	89	Spain 5,113; United Kingdom 1,737; France 943.
Gold: Metal including alloys, unwrought and partly wrought kilograms	135	51	—	Netherlands 26; Singapore 16; Spain 9.
Iron and steel:				
Pyrite, roasted	—	14,393	—	Spain 12,350; Mozambique 2,018.
Metal:				
Scrap	14,776	32,957	—	Spain 30,851; Netherlands 1,075; United Kingdom 855.
Pig iron, cast iron, related materials	169	262	—	Spain 179; Sweeden 82.
Ferroalloys:				
Ferrochromium	—	3	—	NA.
Ferromanganese	477	NA		
Ferrosilicon	8,139	3,917	67	Spain 2,562; France 1,271.
Unspecified	348	NA		
Steel, primary forms	747	32	—	Mainly to Spain.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	2,720	2,500	—	Italy 1,001; Spain 553; Angola 287.
Clad, plated, coated	82,723	80,426	20,897	Spain 22,461; United Kingdom 15,128.
Of alloy steel	393	300	—	Germany 82; Spain 77; Brazil 33.
Bars, rods, angles, shapes, sections	69,632	54,986	2	Spain 48,482; Angola 1,019; Sweden 794.
Rails and accessories	1,463	597	—	United Kingdom 215; France 131; Sweden 64.
Wire	16,238	6,158	—	Spain 3,990; Algeria 1,200; Angola 854.
Tubes, pipes, fittings	8,345	7,231	—	Angola 1,201; Spain 1,147; France 970.
Lead:				
Ore and concentrate	1,140	1,730	—	All to Belgium-Luxembourg.
Oxides	703	1,446	—	Spain 1,403; Australia 41; Angola 2.
Ash and residue containing lead	1	NA		
Metal including alloys:				
Scrap	1,917	2,677	—	Spain 1,869; Thailand 628; Belgium-Luxembourg 180.
Unwrought	231	85	—	Angola 60; Spain 19; Sweden 6.
Semimanufactures	155	106	—	Angola 60; Morocco 24; Spain 17.
Manganese: Ore and concentrate, metallurgical-grade	8,348	8,226	—	All to Italy.
Mercury	—	5	—	All to Spain.
Nickel:				
Ash and residue	6	NA		

See footnotes at end of table.

TABLE 2—Continued

PORTUGAL: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Nickel—Continued:				
Metal including alloys:				
Scrap	74	25	—	Spain 15; Netherlands 10.
Semimanufactures value, thousands	$33	$19	—	Sweden $10; Angola $9.
Platinum-group metals: Waste and sweepings do.	$26	NA		
Silver: Waste and sweepings[3] do.	$498	$278	—	France $226; Belgium-Luxembourg $51; Germany $1.
Tin:				
Ores and concentrate	5,231	9,461	—	Malaysia 5,223; United Kingdom 625; Netherlands 442.
Ash and residue containing tin	93	NA		
Metal including alloys:				
Scrap	98	113	—	Netherlands 100; Germany 13.
Unwrought	(2)	10	—	United Kingdom 7; Angola 2; Spain 1.
Semimanufactures	63	15	—	France 11; Angola 2; Spain 1.
Titanium:				
Oxides	61	270	—	Spain 221; Angola 35; United Kingdom 11.
Metal including alloys, all forms	12	32	(2)	Belgium-Luxembourg 24; Italy 6; Netherlands 2.
Tungsten:				
Ore and concentrate	2,216	2,878	1,716	Netherlands 600; Japan 470.
Metal including alloys, all forms	68	(2)	—	All to Germany.
Uranium and thorium: Ore and concentrate value, thousands	$9,003	NA		
Zinc:				
Ore and concentrate	—	42	—	All to United Kingdom.
Oxides	3,469	3,973	—	Spain 1,379; Italy 838; France 516.
Blue powder	—	1	—	All to Angola.
Ash and residue containing zinc	21	NA		
Metal including alloys:				
Scrap	1,904	72	—	All to Netherlands.
Unwrought	263	1,908	—	Germany 1,851; unspecified 57.
Semimanufactures	221	119	—	Italy 46; Spain 39; Sao Tome 16.
Other:				
Oxides and hydroxides	20	NA		
Ashes and residues	4	337	—	Spain 149; Belgium-Luxembourg 86; Turkey 60.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	10	18	—	Mainly to Spain.
Dust and powder of precious and semi-precious stones including diamond value, thousands	$66	—		
Grinding and polishing wheels and stones	72	119	—	Italy 54; Cape Verde 30; France 15.
Asbestos, crude	—	4	—	All to United Kingdom.

See footnotes at end of table.

TABLE 2—Continued

PORTUGAL: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Barite and witherite	34	47	—	All to Italy.
Boron materials:				
Crude natural borates	(2)	—		
Elemental	—	NA		
Oxides and acids	1	NA		
Cement	131,234	84,239	—	Guinea Bissau 20,247; Mozambique 16,998; Germany 13,180.
Chalk	1,793	1,205	—	Spain 1,054; Cape Verde 122; Angola 27.
Clays, crude:				
Bentonite	12	2	—	All to Angola.
Chamotte earth	817	NA		
Kaolin	171	52	—	Italy 26; Spain 24.
Unspecified	49	675	—	Spain 645; Angola 18; United Kingdom 6.
Diamond:				
Gem, not set or strung carats	68,099	NA		
Industrial stones do.	16,500	NA		
Diatomite and other infusorial earth	32	58	—	Morocco 36; Venezuela 18; Mozambique 4.
Feldspar, fluorspar, related materials	6,999	3,427	—	France 3,346; Spain 81.
Fertilizer materials:				
Crude, n.e.s.	87	373	—	Spain 229; Germany 72; Switzerland 71.
Manufactured:				
Ammonia	33,117	59,052	—	Spain 46,934; Morocco 6,200; Norway 5,916.
Nitrogenous	128,740	95,065	—	Germany 55,875; United Kingdom 12,769; Spain 10,376.
Phosphatic	51,952	31,360	—	Brazil 14,975; United Kingdom 6,430; Spain 5,005.
Potassic	10,104	1,104	—	All to Spain.
Unspecified and mixed	1,732	20,387	—	Angola 10,459; Spain 3,258; Germany 3,000.
Gypsum and plaster	270	255	—	Angola 76; Spain 38; United Kingdom 5.
Iodine	(2)	NA		
Lime	2,161	1,704	—	Spain 1,240; Cape Verde 177; Angola 137.
Magnesium compounds: Oxides and hydroxides value, thousands	—	$1	—	All to United Kingdom.
Mica: Worked including agglomerated splittings	9	—		
Phosphates, crude	496	217	—	Spain 216; Angola 1.
Pigments, mineral:				
Natural, crude	2,200	NA		
Iron oxides and hydroxides, processed	25	45	—	France 17; Cape Verde 10; Angola 8.
Precious and semiprecious stones other than diamond, natural value, thousands	$25	$48	—	Italy $20; Switzerland $19; Spain $6.
Salt and brine	28,454	18,429	—	Nigeria 14,382; France 933; unspecified 1,457.
Sodium compounds, n.e.s.:				
Soda ash	2,593	9,769	—	Morocco 9,677; Sao Tome and Principe 52; Germany 40.
Sulfate	4,206	—		
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	271,040	299,066	14,987	Spain 114,117; Japan 61,970; Italy 56,850.

See footnotes at end of table.

TABLE 2—Continued

PORTUGAL: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Stone, sand and gravel—Continued:				
Dimension stone—Continued:				
Worked	680,203	706,159	22,121	Germany 343,116; France 65,134; Spain 58,106.
Gravel and crushed rock	16,295	15,874	—	France 8,264; Spain 5,566; Italy 1,864.
Limestone other than dimension	—	8	—	All to Angola.
Quartz and quartzite	6,547	1,520	—	Ireland 615; France 528; United Kingdom 331.
Sand other than metal-bearing	172,388	196,694	—	Spain 164,568; Italy 29,210; Morocco 2,800.
Sulfur:				
Elemental:				
Crude including native and byproduct	144	168	—	Spain 149; Tanzania 18.
Colloidal, precipitated, sublimed	25	73	—	Mainly to Spain.
Dioxide	—	22	—	All to Spain.
Sulfuric acid	182	170	—	Spain 61; Cape Verde 37; Angola 16.
Talc, steatite, soapstone, pyrophyllite	92	121	—	Angola 116; Netherlands 5.
Other:				
Crude	3,617	NA		
Slag and dross, not metal-bearing	4,110	25	—	Mainly to Spain.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	9,654	27	—	Zaire 15; Spain 6; unspecified 3.
Carbon:				
Carbon black	10,585	11,873	—	Spain 3,206; Turkey 2,651; Kenya 2,280.
Gas carbon	2	NA		
Coal:				
Anthracite	3	—		
Bituminous	—	2,629	—	Mainly to Spain.
Briquets of anthracite and bituminous coal	—	161	—	Germany 144; Spain 17.
Coke and semicoke	11,232	NA		
Gas, natural:				
Gaseous	—	14,940	—	All to Spain.
Liquefied	(2)	—		
Peat including briquets and litter	—	17	—	Do.
Petroleum:				
Crude thousand 42-gallon barrels	15	7	—	NA.
Refinery products:				
Liquefied petroleum gas do.	14	97	—	Cape Verde 55; Netherlands Antilles 25; France 16.
Gasoline do.	3,082	1,732	—	France 662; Spain 509; Netherlands 459.
Mineral jelly and wax do.	11	5	(2)	Spain 3; Italy 2.
Kerosene and jet fuel do.	4,324	3,996	14	France 984; United Kingdom 258; unspecified 2,151.
Distillate fuel oil do.	2,994	1,483	—	Spain 548; France 157; unspecified 725.
Lubricants do.	548	463	(2)	France 125; Nigeria 81; Angola 75.
Residual fuel oil do.	8,576	9,193	1,612	Netherlands 3,062; United Kingdom 1,523.
Bitumen and other residues do.	25	16	—	Mainly to Spain.
Bituminous mixtures do.	3	4	—	Spain 2; Angola 1.

NA Not available.
[1]Table prepared by Theodore T. Spittal.
[2]Less than 1/2 unit.
[3]May include other precious metals.

TABLE 3

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	(2)	(2)	—	NA.
Alkaline-earth metals	(2)	(2)	(2)	NA.
Aluminum:				
Ore and concentrate	1,786	1,971	—	Netherlands 1,318; Spain 510; United Kingdom 80.
Oxides and hydroxides	7,943	7,606	9	United Kingdom 3,273; France 2,175; Germany 1,081.
Ash and residue containing aluminum	2,487	NA		
Metal including alloys:				
Scrap	192	711	40	Spain 273; Netherlands 192; Belgium-Luxembourg 74.
Unwrought	49,477	50,027	192	Norway 17,023; Spain 7,433; Canada 6,283.
Semimanufactures	22,316	24,194	11	Spain 7,456; Germany 5,492; France 2,880.
Antimony:				
Ore and concentrate	5	NA		
Oxides	134	NA		
Metal including alloys, all forms	98	107	—	China 48; Netherlands 45; Belgium-Luxembourg 13.
Arsenic: Oxides and acids	64	NA		
Beryllium: Metal including alloys, all forms	1	(2)	—	Mainly from Norway.
Bismuth: Metal including alloys, all forms	5	5	—	United Kingdom 3; Germany 2.
Cadmium: Metal including alloys, all forms value, thousands	$28	$7	$3	Germany $2; United Kingdom $2.
Chromium:				
Ore and concentrate	1,571	1,922	—	Republic of South Africa 1,053; Netherlands 747; Belgium-Luxembourg 86.
Oxides and hydroxides	182	137	(2)	Germany 77; Netherlands 28; Italy 20.
Metal including alloys, all forms	9	22	(2)	Republic of South Africa 20; France 1; United Kingdom 1.
Cobalt:				
Oxides and hydroxides	21	13	—	Belgium-Luxembourg 9; Spain 3; Netherlands 1.
Metal including alloys, all forms	17	20	—	Belgium-Luxembourg 12; France 4; Germany 2.
Columbium and tantalum: Metal including alloys, all forms, tantalum value, thousands	$177	$114	$112	Switzerland $2.
Copper:				
Ore and concentrate	(2)	5,500	—	All from Iran.
Matte and speiss including cement copper	6	1	—	All from Spain.
Oxides and hydroxides	265	NA		
Sulfate	2,879	NA		
Ash and residue containing copper	61	NA		
Metal including alloys:				
Scrap	939	396	—	Spain 129; United Kingdom 83; unspecified 111.
Unwrought	25,830	27,304	(2)	Chile 9,698; Spain 8,824; Peru 4,297.
Semimanufactures	21,435	24,707	72	Germany 8,535; Italy 5,903; Spain 3,502.
Germanium: Metal including alloys, all forms	(2)	—		

See footnotes at end of table.

TABLE 3—Continued

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued:				
Gold:				
Waste and sweepings value, thousands	$51,833	—		
Metal including alloys, unwrought and partly wrought kilograms	6,128	7,806	—	Germany 7,210; France 164; Switzerland 160.
Iron and steel:				
Iron ore and concentrate, excluding roasted pyrite	449,480	466,501	—	Canada 251,560; Brazil 106,601; Republic of South Africa 86,918.
Metal:				
Scrap	82,389	63,766	191	United Kingdom 46,069; Netherlands 5,261; unspecified 7,384.
Pig iron, cast iron, related materials	17,064	19,639	—	Brazil 5,351; Canada 3,546; Spain 2,680.
Ferroalloys:				
Ferrochromium	531	693	—	Germany 300; Netherlands 253; Belgium-Luxembourg 88.
Ferromanganese	5,852	5,300	—	France 1,932; Republic of South Africa 1,642; Brazil 990.
Ferromolybdenum	29	NA		
Ferronickel	—	5	—	Austria 3; Germany 2.
Ferrosilicomanganese	3,058	56	—	France 31; Republic of South Africa 12; Netherlands 10.
Ferrosilicon	6,328	6,637	—	Brazil 3,212; Spain 1,655; Norway 637.
Silicon metal	235	NA		
Unspecified	1,622	678	—	France 193; Germany 136; Netherlands 112.
Steel, primary forms	14,449	6,397	2	Iceland 5,181; Spain 913; Germany 75.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	586,150	593,167	76	Germany 159,543; Belgium-Luxembourg 89,654; France 86,633.
Clad, plated, coated	81,313	104,677	—	Belgium-Luxembourg 20,535; Spain 20,286; Germany 16,140.
Of alloy steel	36,265	41,225	552	France 9,412; Spain 8,069; Germany 6,543.
Bars, rods, angles, shapes, sections	352,872	489,600	43	Spain 273,484; Italy 54,930; United Kingdom 53,639.
Rails and accessories	15,539	16,528	—	Spain 10,966; United Kingdom 2,113; Italy 1,377.
Wire	24,474	29,308	(2)	Spain 11,874; Belgium-Luxembourg 4,424; United Kingdom 4,021.
Tubes, pipes, fittings	58,469	68,552	2	Spain 23,134; Germany 16,263; France 12,418.
Lead:				
Oxides	1,295	1,282	—	Spain 725; Germany 500; France 24.
Metal including alloys:				
Scrap	5	91	—	Spain 68; United Kingdom 23.
Unwrought	22,991	25,720	—	Morocco 9,448; Spain 6,000; Netherlands 1,973.
Semimanufactures	120	58	(2)	United Kingdom 34; Germany 8; Netherlands 7.
Lithium: Oxides and hydroxides	14	NA		
Magnesium: Metal including alloys:				
Unwrought	17	24	—	France 16; Netherlands 8.

See footnotes at end of table.

TABLE 3—Conyinued

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Magnesium: Metal including alloys—Continued:				
Semimanufactures	6	4	(2)	Germany 2; Switzerland 1.
Manganese:				
Ore and concentrate, metallurical-grade	10,258	12,020	—	Ghana 8,560; Brazil 2,506; Netherlands 814.
Oxides	1,074	966	—	Republic of South Africa 394; Netherlands 300; Spain 231.
Metal including alloys, all forms	17	11	—	Netherlands 7; Spain 2; Republic of South Africa 1.
Mercury	42	14	—	Algeria 13; United Kingdom 1.
Molybdenum:				
Ore and concentrate:				
Roasted	4	1	—	All from Netherlands.
Unroasted	(2)	—		
Oxides and hydroxides	1	NA		
Metal including alloys:				
Unwrought[3]	45	(2)	—	NA.
Semimanufactures	(2)	2	(2)	Mainly from Austria.
Nickel:				
Ore and concentrate	—	24	—	All from Spain.
Oxides and hydroxides	7	NA		
Metal including alloys:				
Scrap	—	6	—	All from Spain.
Unwrought	286	230	—	Canada 75; Norway 54; Finland 41.
Semimanufactures	77	50	(2)	Germany 18; France 16; Austria 9.
Platinum-group metals:				
Ore and concentrate	—	9,000	—	All from Belgium-Luxembourg.
Waste and sweepings	309	2,015	—	Spain 2,010.
Metals including alloys, unwrought and partly wrought value, thousands	$1,758	$267	—	Germany $121; Spain $68; France $47.
Selenium, elemental	12	50	—	Spain 21; Germany 18; Netherlands 6.
Silicon, high-purity	—	221	—	Spain 144; France 75; Germany 1.
Silver:				
Waste and sweepings value, thousands	$996	$1,498	—	France $1,476; Spain $22.
Metal including alloys, unwrought and partly wrought do.	$14,391	$12,030	—	Germany $8,683; Spain $2,454; United Kingdom $416.
Tin:				
Ore and concentrate	92	—		
Oxides	98	NA		
Metal including alloys:				
Scrap	75	—		
Unwrought	536	748	2	Netherlands 604; Belgium-Luxembourg 60; Malaysia 40.
Semimanufactures	175	58	(2)	United Kingdom 35; Germany 19; France 2.
Titanium:				
Ore and concentrate	725	968	454	Netherlands 240; Republic of South Africa 220.
Oxides	5,099	4,824	101	Finland 1,802; Germany 1,070; United Kingdom 945.

See footnotes at end of table.

TABLE 3—Continued

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Titanium—Continued:				
Metal including alloys—Continued:				
Unwrought[3]	(2)	1	—	Mainly from United Kingdom.
Semimanufactures	78	27	(2)	Italy 11; Belgium-Luxembourg 8; Germany 7.
Tungsten:				
Ore and concentrate	(2)	(2)	—	All from Germany.
Oxides	12	NA		
Metal including alloys:				
Unwrought[3]	1	(2)	—	All from France.
Semimanufactures	1	1	(2)	NA.
Vanadium:				
Ash and residue containing vanadium	20	NA		
Metal including alloys, all forms	25	10	—	All from Republic of South Africa.
Zinc:				
Ore and concentrate	—	26	—	Austria 22; Netherlands 4.
Oxides	545	821	—	Spain 195; France 148; Netherlands 137.
Ash and residue containing zinc	4,128	NA		
Metal including alloys:				
Scrap	2,418	2,240	—	Brazil 1,000; Norway 782; Sweden 103.
Unwrought	17,654	17,375	(2)	Belgium-Luxembourg 5,676; Spain 3,964; United Kingdom 2,673.
Semimanufactures	2,359	2,597	—	Republic of South Africa 738; Belgium-Luxembourg 574; France 377.
Zirconium:				
Ore and concentrate	1,795	1,828	—	United Kingdom 477; Netherlands 425; Italy 382.
Oxides	1	NA		
Ash and residue containing zirconium	38	NA		
Metal including alloys, semimanufactures	1	—		
Other:				
Ores and concentrates	30	26	—	France 24; Spain 2.
Oxides and hydroxides	44	765	40	Norway 262; Spain 242; United Kingdom 99.
Ashes and residues	85	8,162	1,062	Switzerland 2,295; Belgium-Luxembourg 1,851; Italy 1,745.
Base metals including alloys, all forms	—	(2)	—	All from Germany.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	3,164	4,062	5	Turkey 3,113; Italy 230; Greece 122.
Artificial:				
Corundum	2,179	1,913	2	Germany 806; Brazil 347; Austria 249.
Silicon carbide	1,313	NA		
Dust and powder of precious and semi-precious stones including diamond value, thousands	$5,396	$7,120	—	Ireland $3,944; Germany $2,068; Switzerland $934.
Grinding and polishing wheels and stones	2,226	2,814	4	Italy 1,490; Spain 758; Germany 128.

See footnotes at end of table.

TABLE 3—Continued

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Asbestos, crude	12,284	10,550	—	Canada 7,574; Republic of South Africa 1,675;
Barite and witherite	1,043	2,704	—	Morocco 1,550; France 452; Netherlands 290.
Boron materials:				
Crude natural borates	8,634	4,729	—	Turkey 3,300; Spain 1,127; Belgium-Luxembourg 240.
Oxides and acids	142	216	—	Italy 106; Netherlands 49; Belgium-Luxembourg 36.
Cement	4,193	10,097	1	Ireland 3,702; France 3,293; Tunisia 2,000.
Chalk	5,392	23,876	—	Denmark 18,761; United Kingdom 2,322; France 1,527.
Clays, crude:				
Bentonite	12,237	9,712	203	Spain 4,021; France 3,176; Morocco 1,100.
Chamotte earth	1,631	NA		
Fire clay	410	NA		
Fuller's earth	5,428	NA		
Kaolin	47,342	56,696	97	United Kingdom 32,355; Spain 10,990; France 8,075.
Unspecified	6,124	7,542	100	Spain 5,444; France 943; United Kingdom 733.
Cryolite and chiolite	28	2	—	France 1; United Kingdom 1.
Diamond:				
Gem, not set or strung value, thousands	$65,403	$49,140	$101	Belgium-Luxembourg $22,685; Switzerland $22,191; Spain $1,477.
Industrial stones do.	$68	$40	—	Belgium-Luxembourg $34; Netherlands $6.
Diatomite and other infusorial earth	4,528	3,389	1,489	Spain 1,166; France 562.
Feldspar, fluorspar, related materials:				
Feldspar	10,077	13,041	—	Spain 8,126; Norway 2,601; France 1,259.
Fluorspar	1,963	603	—	France 323; Spain 238; Switzerland 19.
Fertilizer materials:				
Crude, n.e.s.	1,132	3,535	7	Israel 1,453; Netherlands 865; Belgium-Luxembourg 700.
Manufactured:				
Ammonia	17,175	27	—	Spain 23; Germany 4.
Nitrogenous	162,390	139,916	—	Italy 42,198; Netherlands 35,152; Belgium-Luxembourg 19,732.
Phosphatic	1,011	—		
Potassic	66,751	70,023	—	Spain 26,954; Germany 18,597; U.S.S.R. 8,620.
Unspecified and mixed	108,126	132,331	17,732	Morocco 46,144; U.S.S.R. 15,352.
Graphite, natural	202	356	—	Spain 205; Netherlands 99; Germany 40.
Gypsum and plaster	85,763	97,580	17	Spain 88,630; France 3,387; Germany 3,382.
Iodine[4]	24	19	—	Chile 18; Germany 1.
Kyanite and related materials	188	NA		
Lime	640	726	—	Spain 695; United Kingdom 21; France 10.
Magnesium compounds:				
Magnesite, crude	1,467	1,589	—	Spain 1,152; Italy 266; Netherlands 68.
Oxides and hydroxides	1,995	2,606	13	Netherlands 1,173; United Kingdom 637; Spain 583.
Mica:				
Crude including splittings and waste	216	95	—	United Kingdom 47; France 38; Norway 6.
Worked including agglomerated splittings	17	26	1	Belgium-Luxembourg 6; Spain 5; France 4.
Nitrates, crude	1,332	251	—	Belgium-Luxembourg 200; Bulgaria 51.

See footnotes at end of table.

TABLE 3—Continued

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Phosphates, crude	169,350	148,900	—	Morocco 85,047; Syria 57,379; Tunisia 6,450.
Phosphorus, elemental	28	NA		
Pigments, mineral:				
Natural, crude	349	NA		
Iron oxides and hydroxides, processed	28	1,825	—	Germany 890; Spain 503; Italy 136.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$1,856	$2,363	$23	Germany $829; Brazil $329; United Kingdom $253.
Synthetic do.	$663	$1,170	—	Switzerland $917; Austria $133; Thailand $74.
Pyrite, unroasted	81	662	—	Spain 649; Germany 8; United Kingdom 5.
Salt and brine	104,417	75,937	2	France 62,822; Spain 11,142; Germany 807.
Sodium compounds, n.e.s.:				
Soda ash	3,720	43	—	Netherlands 39; Spain 2; Germany 1.
Sulfate	38,469	47,748	—	Spain 47,349; United Kingdom 239; France 82.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	33,746	30,668	370	Spain 9,747; Brazil 8,778; Finland 1,438.
Worked	1,961	2,109	48	Spain 1,118; Italy 234; France 215.
Dolomite, chiefly refractory-grade	7,010	6,418	—	Spain 1,929; France 1,381; Norway 1,376.
Gravel and crushed rock	18,017	14,986	20	Spain 13,160; France 1,525; Germany 255.
Limestone other than dimension	2,015	—		
Quartz and quartzite	328	465	—	Italy 185; Finland 86; Germany 77.
Sand other than metal-bearing	54,364	58,991	24	Spain 56,935; Belgium-Luxembourg 1,913; France 40.
Sulfur:				
Elemental:				
Crude including native and byproduct	14,830	16,590	—	Spain 11,248; France 5,300; United Kingdom 3.
Colloidal, precipitated, sublimed	95	60	—	Germany 24; United Kingdom 19; Poland 18.
Dioxide	4,268	3,793	(2)	Spain 2,813; Netherlands 875; Germany 103.
Sulfuric acid	68,869	116,671	—	Spain 73,187; Italy 32,990; Algeria 10,345.
Talc, steatite, soapstone, pyrophyllite	11,952	10,823	427	France 4,539; Spain 2,023; Belgium-Luxembourg 1,860.
Vermiculite	667	618	—	Republic of South Africa 218; France 169; Spain 160.
Other:				
Crude	27,262	24,200	19	Spain 19,721; Netherlands 1,980; Germany 410.
Slag and dross, not metal-bearing	19,196	93,903	—	Spain 87,779; Belgium-Luxembourg 6,033; Germany 67.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	4,139	3,809	19	Spain 3,663; Belgium-Luxembourg 42; United Kingdom 42.
Carbon:				
Carbon black	2,169	3,132	1,141	Spain 626; Germany 580.
Gas carbon	2	NA		
Coal:				
Anthracite	592,666	595,004	—	Republic of South Africa 592,741; Netherlands 1,672; Spain 576.

See footnotes at end of table.

TABLE 3—Continued

PORTUGAL: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal—Continued:					
Bituminous		3,962,620	3,553,739	1,542,577	Republic of South Africa 1,192,596; Colombia 405,227.
Lignite including briquets		—	78	—	All from Spain.
Coke and semicoke		13,505	NA		
Gas, natural:					
Gaseous	cubic meters	[2]	—		
Liquefied	do.	—	[2]	NA	NA.
Peat including briquets and litter		7,085	9,680	[2]	Germany 4,102; Ireland 2,191; Netherlands 1,268.
Petroleum:					
Crude	thousand 42-gallon barrels	78,349	69,819	—	Nigeria 14,141; Iran 10,876; Saudi Arabia 9,742.
Refinery products:					
Liquefied petroleum gas	do.	4,825	6,159	16	United Kingdom 3,482; Netherlands 835; Algeria 804.
Gasoline	do.	9,850	8,987	438	Algeria 3,412; Spain 2,127; Italy 1,170.
Mineral jelly and wax	do.	47	35	[2]	Spain 26; Germany 4; Netherlands 2.
Kerosene and jet fuel	do.	4	3	—	Mainly from Netherlands.
Distillate fuel oil	do.	164	3,043	[2]	Algeria 1,114; Italy 963; United Kingdom 524.
Lubricants	do.	369	380	2	Netherlands 141; United Kingdom 56; Spain 42.
Residual fuel oil	do.	12,161	14,907	296	Spain 7,795; Italy 4,742; Saudi Arabia 730.
Bitumen and other residues	do.	1,027	1,752	—	Spain 1,695; France 56.
Bituminous mixtures	do.	45	38	[2]	Spain 32; United Kingdom 4; Belgium-Luxembourg 1.
Petroleum coke	do.	8	12	4	Spain 6; United Kingdom 1.

NA Not available.

[1]Table prepared by Theodore T. Spittal.

[2]Less than 1/2 unit.

[3]May include scrap.

[4]May include bromine and fluorine.

TABLE 4

PORTUGAL: 1991 BALANCE OF PAYMENTS, SELECTED MINERAL COMMODITIES[1]

(Thousand dollars)

Mineral commodity	Exports to EC	Imports from EC	Net gain or (loss)	Exports to the world	Imports from the world	Net gain or (loss)
Crude industrial minerals:						
Feldspar	$255	$1,925	($1,670)	$255	$2,294	($2,039)
Magnesite	—	480	(480)	—	513	(513)
Slate	586	76	510	778	76	702
Other	43,472	51,554	(8,082)	64,293	77,780	(13,487)
Total	44,313	54,035	(9,722)	65,326	80,663	(15,337)
Metalliferous ores:						
Copper	101,879	6	101,873	232,324	370	231,954
Lead	3,743	—	3,743	3,743	—	3,743
Tin	629	—	629	12,344	—	12,344
Zinc	37	1	36	37	38	(r)
Other (including waste and scrap)	39,540	15,368	24,172	51,703	37,333	14,370
Total	145,828	15,375	130,453	300,151	37,741	262,410
Nonmetallic mineral manufactures	163,922	43,990	119,932	267,740	72,801	194,939
Metals:						
Iron and steel	70,885	708,474	(637,589)	96,790	810,769	(713,979)
Mercury	19	—	19	19	—	19
Other nonferrous metals	44,768	273,228	(228,460)	47,675	410,677	(363,002)
Total	115,672	981,702	(866,030)	144,484	1,221,446	(1,076,962)
Mineral fuels	251,099	575,239	(324,140)	429,584	2,378,783	(1,949,199)

[1]Table prepared by Harold Willis, Section of International Data.

TABLE 5

PORTUGAL: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main 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.S.L. (Government, 100%)	Germunde Mine at Castello de Paiva	250
Copper	Sociedade Minera de Neves-Corvo S.A.R.L. (Somicor) (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	Piritas Alenejanas S.A.R.L. (Government, 82%; Boliden AB, 10%; others, 8%)	Mines at Aljustrel	500
Steel, crude	Siderúrgia Nacional S.A.R.L. (Government, 100%)	Ironworks and steelworks at Seixal and Maia	1,000
Tin	Sociedade Minerera de Neves-Corvo S.A.R.L. (Somicor) (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 metric tons	Empresa Nacional de Uranio (ENU) (Government, 100%)	Mines and plant at Guarda	170
Zinc, refined	Quimigel E.P. (Government, 100%)	Electrolytic plant at Barreiro	11

TABLE 6
PORTUGAL: RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

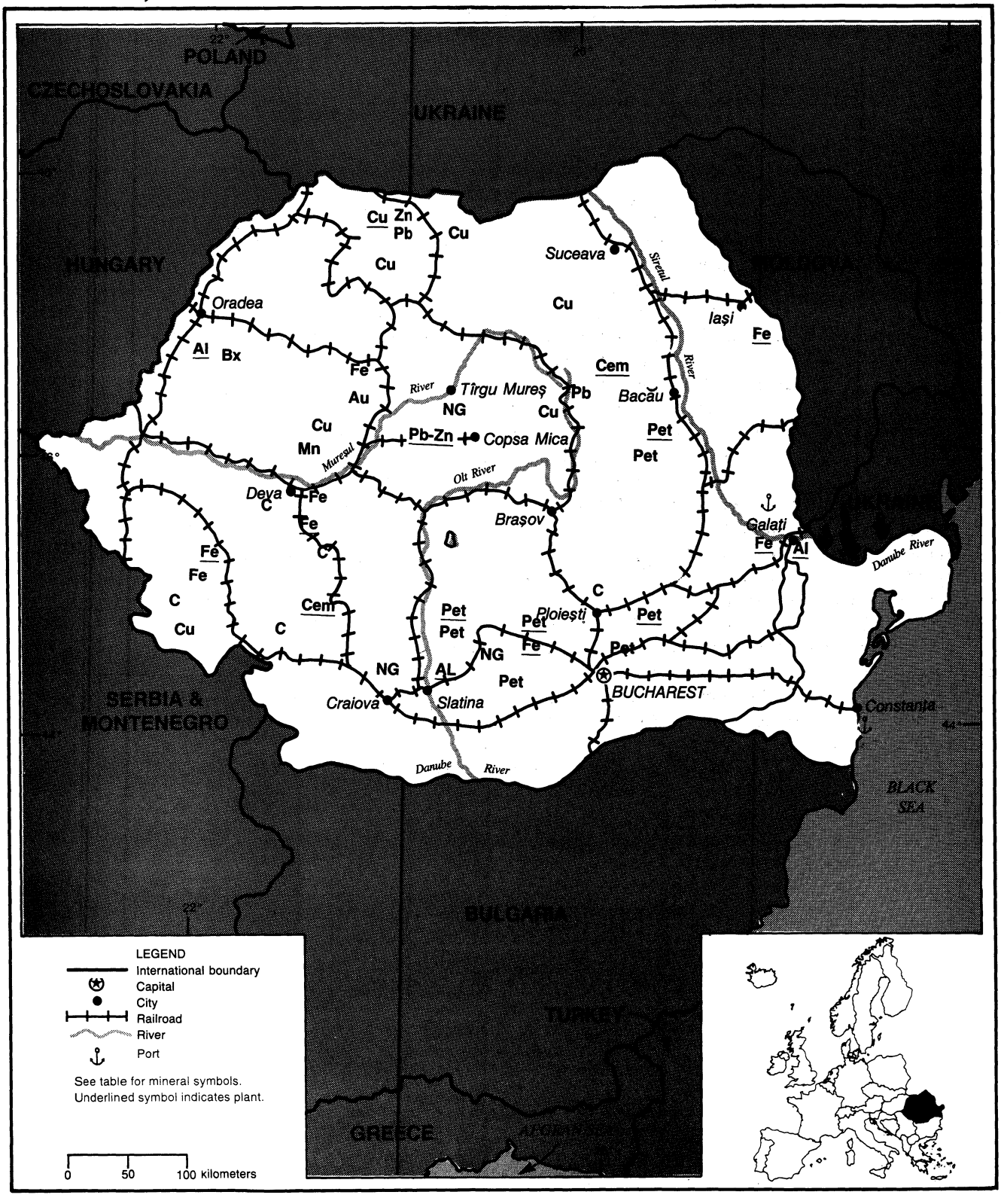
(Million metric tons ore)

Commodity	Quantity[e]
Copper	32.5
Lead	5.0
Tin	3.0
Zinc	3.5

[e]Estimated.

ROMANIA

AREA 238,000 km² **POPULATION 23.4 million**



THE MINERAL INDUSTRY OF

ROMANIA

By Walter G. Steblez

Romania continued to produce modest amounts of bauxite, copper, iron, lead-zinc, and manganese during 1992. The country's output of petroleum was substantial by European standards despite a continuing decline caused by both depletion and a lack of technology needed for increasing the recovery of petroleum. In 1992, Romania's development of a market economy system remained the major activity within the country. The gradual dismantlement of the country's centrally planned economy from 1990 to 1992 resulted in a rapid decline of industrial production. Also, the country's transition to a market-based economic system forced sharp reductions of Government subsidies to large sectors of industry, including those involving the minerals sector. In 1992, the rapid decline in industrial output, brought about by the structural changes in the economy, for the most part, was stopped. However, the rate of inflation and unemployment during this period continued to increase rapidly. Romania's minerals industry continued to contract during 1992.

GOVERNMENT POLICIES AND PROGRAMS

The Government of Romania continued to decentralize and denationalize the country's economy. The sale of state-owned enterprises was handled by Romania's National Agency for the Privatization and Development of Small and Medium Sized Enterprises. Formerly centralized state-owned enterprises were grouped in 1992 into state commercial companies (7,200), joint venture enterprises with foreign participation (338), and the so-called "Regies autonomes" (320). The designation state commercial company indicates small- to midsized enterprises that were to be in the process of denationalization. The "Regies autonomes" included utilities such as telecommunications, electric power industry, postal services, and mass transportation; military industries; and mining and mineral industries. "Regies autonomes" were to continue to be owned and operated by the Government but could lease or sell some assets to increase their profitability.

PRODUCTION

In 1992, Romania's overall trend of mineral production continued to decline. Factors such as shortages of foreign exchange required for imports of raw materials (largely natural gas and petroleum), the relatively slow pace of transition to a market economy system, as well as the loss of the Council for Mutual Economic Assistance (CMEA)-based mineral commodity trade continued to adversely affect Romania's heavy industries. In 1992, Romania's entire mineral industry continued to be owned and operated by the state. *(See table 1.)*

TRADE

Detailed statistics for Romania's foreign trade for 1992 were unavailable. However, preliminary results for 1992 indicated the country has remained a net exporter of metals and a net importer of ores and concentrates. Additionally, imports of mineral fuels (coal, natural gas, and petroleum) reportedly remained high, constituting more than 30% of the value of Romania's total imports. The country's gradually declining petroleum output, coupled with large domestic petroleum refining capacities, have necessitated substantial imports of petroleum during the year, as in the past. However, unlike other former CMEA countries that were heavily dependent on the former U.S.S.R. for deliveries of natural gas and petroleum, most of Romania's imports of natural gas and petroleum originated in areas outside the former CMEA.

In 1992, Romania's imports of mineral and related products from the United States amounted to more than $43 million. Imports of bituminous coal from the United States declined in value from about $54 million in 1991 to $32 million in 1992. However, Romania's imports of petroleum refinery products from the United States rose substantially in 1992 compared with those in 1991, from $120,000 to about $9 million. Similarly, U.S. exports of oilfield equipment to Romania increased from $139,000 in 1991 to about $2.4 million in 1992.

Romania's exports of mineral and related products to the United States in 1992 rose sharply, owing to a major increase in exports of refined petroleum products to the U.S. market. In 1992, Romania's exports of refined petroleum to the U.S. market were valued at $30 million, compared with $523,000 in 1991. Also, exports of industrial diamonds to the United States rose to about $1.4 million in 1992, compared with $826,000 in 1991. Romania's exports to the United States of nonalloyed flat-rolled steel products declined from about $5.5 million in 1991 to $4.2 million in 1992. Trade for 1989 and 1990 was compiled from the available trade returns of Romania's trading partners. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

The information provided in table 4 lists the names of administrative bodies as well as subordinate production units of the chief branches of the country's mineral industry. *(See table 4.)*

COMMODITY REVIEW

Metals

Aluminum and Bauxite.—In 1992, Romania continued to operate both open pit and underground bauxite mines at Dobresti-Oradea. In previous years, domestic bauxite has been blended with small quantities of bauxite imported from Yugoslavia to be used as a feedstock at the Oradea alumina refinery. Imported feedstock was used exclusively at the Tulcea refinery. Bauxite traditionally imported from Greece for the Tulcea refinery in recent years reportedly was replaced largely by bauxite imported from Australia and Guinea.

The Tulcea refinery exclusively produced metallurgical-grade alumina, while the Oradea refinery produced a small quantity of hydrated alumina in addition to the metallurgical-grade product. Romania's only primary aluminum smelter was at Slatina in the southeastern part of the country. In April 1992, reportedly because of low aluminum prices caused by large-scale low-priced exports to Western Europe from the republics of the former U.S.S.R., Romania's exports of aluminum were terminated. Romania's aluminum industry officials indicated that two of the four potlines at Slatina were to be closed because domestic rolling capacity was limited to about 55,000 mt/a. The country's aluminum exports in previous years reportedly exceeded 50,000 mt/a.

To abate the serious pollution caused by the alumina refining and aluminum smelting operations, the industry planned to invest about $100 million to retrofit major facilities over a 3- to 5-year period. The work was to begin following the introduction of new accounting procedures and an independent audit of the enterprises' assets.

Copper.—Romania continued to mine copper largely in two districts: the northeastern part of the country that included mines at Baia Sprie, Cavnic, and Lesul Ursului, and in the southwestern part of the country, with major mines at Moldova Noua, Rosia Poieni, and Rosia Montana. Generally, the grade of ore has been low, with major producing mines (Moldova Noua and Rosia Poieni) hoisting ore grading about 0.35% Cu or less. Concentrates from these areas have been smelted and refined at Baia Mare and Zlatna.

Iron and Steel.—Despite showing increases in 1988 and 1989, the output of iron ore from the country's two operating mines at Hunedoara and Cluj Napoca generally has been declining since 1970. Moreover, domestically produced ore and concentrate did not significantly contribute to the feedstock requirements of the country's steel industry. Slightly more than 2 Mmt of low-grade ore (26% Fe) annually has been washed and concentrated to produce about 400,000 metric tons of concentrate, grading 50% Fe. More than 95% of the iron and steel industry's iron ore requirement was met through imports. The U.S.S.R. traditionally has been Romania's chief supplier of iron ore, accounting for more than 50% of total imports of iron ore. In 1992, production of crude steel continued to drop as the country's steel industry adjusted to market-based economic conditions. The output of crude steel has declined from 14.4 Mmt in 1989 to 7.1 Mmt in 1991 to slightly more than 5 Mmt in 1992. The scaling down of the country's steel industry resulted in discontent and public demonstrations by the country's steelworkers during the year. The chief issues were salary increases and greater investment to modernize the industry.

At yearend, Petrotub, Romania's main seamless pipe producer, reportedly announced plans to acquire an 80-ton electric furnace and continuous caster. The proposed new facilities would meet the needs of the enterprise to produce 360,000 mt/a of pipe and end its reliance on supplies from domestic producers of billets. Kinglor of Switzerland was contracted to conduct financial and technical feasibility studies of the project.

Gold.—Romania's reported gold production of 2 mt/a was primarily a byproduct of the country's copper and lead and zinc mining and refining operations. Small amounts of alluvial placer gold also have been produced. In 1992, gold production reportedly reached 3.7 mt, possibly from increased placer operations.

Lead and Zinc.—Low-grade ore was produced at underground mines in the Baia Mare, Borsa, Certej, and Rodna districts, grading from 0.4% Pb and 0.6% Zn to 1.0% Pb and 1.2% Zn. Moreover, Romania's lead and zinc ores also contained copper (0.35%), as well as associated antimony, bismuth, cadmium, gold, and silver. Owing to the complex mineralogy of the lead and zinc ores, concentrates produced from these ores were of uneven quality. Lead and zinc recovery in concentrate reportedly ranged between 50% and 75% Pb and Zn. Serious environmental pollution was associated with the country's lead and zinc industry. At Baia Mare, the Romplumb and Phoenix enterprises reportedly exceeded legal atmospheric emission standards for lead and sulfur dioxide by between 100% and 200%. Similarly, Copsa Mica's smelting and refining facilities were significant point sources for both the area's atmospheric and ground contamination.

Industrial Minerals

Romania's extensive output of industrial minerals apparently was sufficient to meet most domestic needs. Barite, bentonite, diatomite, feldspar, graphite, gypsum, kaolin, and limestone, among others, were mined at about 60 deposits throughout the country.

Industrial minerals should play an increasingly more important role in the country's economy. The need to modernize the country's economy and infrastructure will increase demand for asbestos, cement, clays, dimension stone, and other industrial minerals.

Mineral Fuels

Nuclear Energy.—Construction of Romania's Cernavoda nuclear powerplant continued in 1992. The first 685-MW Candu reactor unit was scheduled to begin operation in 1995. When the subsequent four 685-MW reactor blocks are completed, the Cernavoda power station would account for about one-third of the country's generated electric power. According to representatives of Romania's national electric company, approximately 250 domestic enterprises had contributed to the country's nuclear program. Both nuclear fuel and heavy water would be manufactured in Romania. Also, the country's uranium resources were reported to be sufficient to operate the Cernavoda nuclear powerplant for 30 years.

Petroleum.—According to industry spokespersons, total recoverable reserves at deposits currently under exploitation in Romania amounted to about 206 Mmt, which would be sufficient to last more than 30 years at a production rate of 6.5 Mmt/a. It was believed that additional significant resources of both natural gas and petroleum could be found in structures at depths greater than 3,000 meters. In 1992, the Amoco Corp. of the United States signed an agreement with Rompetrol that would permit Amoco to drill several exploratory wells in a 185,000-acre block in the Carpathian Mountains, about 37 miles northeast of Bucharest. The agreement allowed Rompetrol to acquire up to a 20% interest in the development of potential natural gas and petroleum resources in the area. The initial cost to Amoco for the exploration program reportedly would amount to about $20 million.

Reserves

In view of Romania's efforts to orient its economy to a market-based system, the country's mineral resources will have to be reevaluated from a market economy perspective. Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other nonmarket economy countries, such as Romania, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade.

The first system determined whether the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ.

The second classification scheme designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade. In category A the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known, and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of minerals cannot be determined even by a dense exploratory grid.

The quality, types, and industrial grades of mineral and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of $A+B+C_1$ categories, as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes. Taking this system into account, Romania's mineral resources in categories $A+B+C_1$ are given in table 5. *(See table 5.)*

INFRASTRUCTURE

Romania's inland transportation system consisted of 85,798 km of railroads, highways, and inland waterways. The railroad system included 10,860 km of 1.435-m-gauge track and 45 km of broad-gauge track; 3,411 km of track was electrified and 3,060 km was double track. The highway and road system consisted of 35,970 km of paved roads, 27,729 km of roads surfaced with gravel and crushed stone, and 9,100 km of unsurfaced roads. The country's inland waterways (Danube River) consisted of 1,724 km with riverine ports at Giurgiu, Drobeta-Turnu Severin, and Orsova.

Seaports on the Black Sea coast were Constanta, Galati, Braila, and Mangalia. Romania's merchant fleet consisted of 262 ships with a total weight of 5,207,580 dwt. Additionally, crude petroleum was carried in 2,800 km of pipeline, refined petroleum products in 1,429 km of pipeline, and natural gas in 6,400 km of pipeline.

OUTLOOK

Low ore grades; severe environmental damage caused by the country's metals mining, processing, and smelting industries; and large-scale investments needed to modernize them have posed long-term problems for this sector of the country's mineral industry. However, the rationalization of the country's existing economic structure would include the modernization of its infrastructure, giving added value and importance to the country's industrial minerals sector as well as an impetus to develop a more efficient steel industry.

OTHER SOURCES OF INFORMATION

Agencies

Ministerul Industriei Metalurgice (Ministry of Metallurgy)
Bucharest, Romania
Ministerul Minelor (Ministry of Mines)
Bucharest, Romania
Ministerul Geologiei (Ministry of Geology)
Bucharest, Romania
Ministerul Petrolului (Ministry of Petroleum)
Bucharest, Romania

Publications

Annuarul Statistic al Romaniei (Statistical Abstract of Romania).
Revista de Statistica (Statistical Review, monthly).

TABLE 1
ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Bauxite, gross weight		500,000	313,000	204,000	200,400	[3]175,120
Alumina, calcined, gross weight		620,000	611,000	440,000	413,000	[3]279,667
Ingot including alloys:						
Primary		265,600	269,100	168,000	158,200	[3]111,992
Secondary[e]		13,400	12,900	10,000	9,300	[3]6,706
Total		279,000	282,000	178,000	167,500	[3]118,698
Bismuth, mine output, Bi content[e]		65	65	40	50	50
Cadmium metal, smelter[e]		[r]24	[r]186	40	[r]40	55
Copper:[e]						
Mine output, Cu content		40,000	[3]42,912	[3]24,700	27,000	25,000
Metal:						
Smelter:						
Primary		40,000	42,900	[3]28,325	[r]27,800	[3]24,436
Secondary		1,000	1,500	1,000	1,000	1,000
Total		41,000	44,400	29,325	[r]28,800	25,436
Refined:						
Primary		40,000	42,900	24,700	24,500	[3]26,900
Secondary		3,000	5,100	3,000	3,000	3,000
Total		43,000	48,000	27,700	27,500	29,900
Gold, mine output, Au content[e]	kilograms	1,870	2,020	2,000	2,000	[3]3,700
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	[e]2,400	2,482	2,002	[e]2,000	2,000
Content (26% Fe)[e]	do.	624	[3]645	580	500	500
Metal:						
Pig iron	do.	8,941	9,052	6,355	[e]4,500	[3]3,111
Ferroalloys:[e]						
Ferrochromium		42,000	42,000	30,000	30,000	[3]6,977
Ferrosilicon		50,000	50,000	40,000	40,000	[3]23,318
Ferromanganese		80,000	80,000	60,000	60,000	[3]27,130
Silicomanganese		40,500	40,000	30,000	30,000	[3]28,159
Silicon metal		4,500	4,400	4,000	4,000	2,000
Steel:						
Crude	thousand tons	14,314	14,411	9,761	7,092	[3]5,030
Semimanufactures:						
Castings and forgings, finished[e]	do.	1,300	1,300	1,000	1,000	[3]370
Pipes and tubes	do.	1,569	1,360	1,041	[e]800	800
Rolled products	do.	10,355	10,263	6,787	[e]5,000	[3]4,800
Lead:						
Mine output, Pb content[e]		20,500	17,400	24,700	16,200	16,800
Smelter, primary		27,205	24,908	12,549	10,400	[3]13,944
Refined:[e]						
Primary		33,000	30,000	13,000	11,000	8,600
Secondary		6,000	6,000	5,000	6,000	7,600
Total		39,000	36,000	18,000	17,000	[3]16,200

See footnotes at end of table.

TABLE 1—Continued

ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS—Continued						
Manganese:[4]						
Ore, gross weight[e]	thousand tons	235	219	200	200	200
Concentrate:						
Gross weight	do.	60	48	40	[e]40	40
Mn content[e]	do.	17	12	10	10	10
Silver, mine output, Ag content[e]		23	26	20	17	[3]73
Zinc:						
Mine output, Zn content[e]		[r]58,000	[3]54,467	15,000	25,900	[3]29,400
Metal, smelter, primary and secondary		39,631	29,849	11,464	8,700	[3]11,600
INDUSTRIAL MINERALS						
Barite[e]		25,000	[3]25,250	15,000	20,000	[3]118,100
Cement, hydraulic	thousand tons	14,447	13,265	10,838	7,300	[3]6,900
Clays:[e]						
Bentonite		180,000	180,000	150,000	150,000	120,000
Kaolin		400,000	400,000	250,000	250,000	200,000
Diamonds, synthetic industrial[e]	thousand carats	5,000	5,000	3,000	3,000	[3]—
Diatomite[e]		55,000	[3]49,975	39,000	40,000	[3]14,530
Feldspar[e]		65,000	[3]59,960	45,000	50,000	[3]27,715
Fluorspar[e]		18,000	18,000	12,000	12,000	15,000
Graphite[e]		12,000	[3]10,000	6,000	6,000	[3]2,300
Gypsum[e]	thousand tons	1,600	1,400	800	800	[3]89
Lime	do.	4,046	3,983	3,028	[e]3,000	2,500
Nitrogen: N content of ammonia	do.	2,795	2,736	1,786	[e]1,800	1,100
Pyrites, gross weight[e]	do.	930	[3]897	400	[r]600	[3]965
Salt:						
Rock salt[e]	do.	2,000	2,000	2,000	2,000	[3]900
Other	do.	3,153	3,038	2,262	[e]2,500	[3]1,590
Total	do.	5,153	5,038	4,262	[e]4,500	[3]2,490
Sand[e]	do.	2,450	2,400	2,000	4,000	4,000
Sodium compounds, n.e.s.:						
Caustic soda	do.	821	763	552	[e]500	500
Soda ash, manufactured, 100% Na_2CO_3 basis	do.	918	889	632	600	700
Sulfur:						
S content of pyrites[e]	do.	370	[3]359	150	150	150
Byproduct, all sources[e]	do.	380	[3]375	200	200	200
Total[e]	do.	750	[3]734	350	350	350
Sulfuric acid	do.	1,825	1,687	1,111	[e]1,100	1,000
Talc[e]		50,000	[3]45,638	35,000	35,000	[3]6,330
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		102,000	77,000	58,000	[e]60,000	60,000
Coal:						
Run-of-mine:						
Anthracite and bituminous	thousand tons	11,568	11,583	5,950	[e]5,500	5,000
Brown	do.	910	899	677	[e]500	500

See footnotes at end of table.

TABLE 1—Continued

ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Coal—Continued:						
Run-of-mine—Continued:						
Lignite	thousand tons	50,439	53,980	34,220	e34,000	34,000
Total	do.	62,917	66,462	40,847	e40,000	39,500
Washed (produced from above):						
Anthracite and bituminous:						
For coke and semicoke production	do.	3,410	3,218	1,351	e1,500	1,500
For other uses	do.	5,732	5,082	3,096	e3,000	3,000
Brown	do.	861	843	640	e500	540
Lignite	do.	48,751	52,200	33,097	e32,400	3,33,700
Total	do.	58,754	61,343	38,184	37,400	38,740
Coke:						
Metallurgical	do.	5,228	5,322	3,700	3,100	3,2,642
Other	do.	523	548	278	e300	300
Total	do.	5,751	5,870	3,978	e3,400	2,942
Fuel briquets (from brown coal)[e]	do.	750	750	500	450	400
Gas, natural:						
Gross:						
Associated	million cubic meters	11,609	10,729	9,182	e9,000	9,000
Nonassociated	do.	25,195	22,222	19,154	e15,400	13,100
Total	do.	36,804	32,951	28,336	24,400	3,22,100
Marketed[e]	do.	29,400	29,500	21,000	23,000	20,000
Petroleum:						
Crude:						
As reported	thousand tons	9,389	9,173	7,928	6,800	3,6,600
Converted	thousand 42-gallon barrels	70,474	69,852	59,508	51,041	49,500
Refinery products	do.	201,330	195,939	154,055	e110,000	110,000

[e]Estimated. [r]Revised.

[1]Includes data available through June 1993.

[2]In addition to the commodities listed, antimony, asbestos, and a variety of crude construction materials are produced, and molybdenum may have been produced as a byproduct of copper from 1988 on, but output is not reported quantitatively, and available information is inadequate to make reliable estimates of output levels.

[3]Reported figure.

[4]Estimated series were based on published data on concentrate production.

TABLE 2

ROMANIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1989	1990[p]	Destinations, 1990	
			United States	Other (principal)
METALS				
Alkaline-earth metals	200	—		
Aluminum:				
Oxides and hydroxides	—	1,500	—	All to France.
Metal including alloys:				
Scrap	3,199	685	—	Norway 549; Canada 116; West Germany 20.
Unwrought	73,358	41,277	—	France 10,719; Netherlands 6,481; Turkey 5,964.
Semimanufactures	9,703	7,154	—	Japan 4,819; Canada 669; Indonesia 544.
Chromium: Oxides and hydroxides	376	534	95	Belgium-Luxembourg 244; Japan 76; Greece 38.
Copper:				
Sulfate	1,071	632	—	Greece 324; West Germany 290; United Kingdom 18.
Metal including alloys:				
Scrap	154	—		
Semimanufactures	63	[2]19	—	Sweden 14; Canada 5.
Gold: Metal including alloys, unwrought and partly wrought kilograms	—	5	—	All to Switzerland.
Iron and steel:				
Metal:				
Scrap	167	231	—	Yugoslavia 146; West Germany 67; Jordan 18.
Pig iron, cast iron, related materials	802	—		
Ferroalloys:				
Ferrochromium	5	—		
Ferrophosphorus	9	6	—	All to West Germany.
Ferrosilicochromium	14	—		
Steel, primary forms	—	5,876	—	Turkey 5,776; Jordan 100.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	630,553	[3]401,038	16,055	Japan 181,761; West Germany 38,418; Singapore 35,946.
Clad, plated, coated	4,558	20,903	—	Philippines 13,019; Hong Kong 6,842; Singapore 292.
Of alloy steel	11,667	35,524	—	Singapore 34,357; Turkey 1,162; Greece 5.
Bars, rods, angles, shapes, sections	947,265	[4]285,286	—	China 106,835; Turkey 57,079; West Germany 27,146.
Rails and accessories	16,060	—		
Wire	5,702	[5]4,451	—	West Germany 1,802; Thailand 1,253; Spain 980.
Tubes, pipes, fittings	61,625	[6]1,151,704	14,715	Greece 1,097,000; China 13,821; Canada 5,759.
Castings and forgings, rough	3,686	—		
Universals, plates, sheets	65,174	18,685	—	China 9,322; unspecified 9,262.
Lead: Metal including alloys:				
Scrap	—	185	—	All to West Germany.
Unwrought	19	—		

See footnotes at end of table.

TABLE 2—Continued

ROMANIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1989	1990[p]	Destinations, 1990	
			United States	Other (principal)
METALS—Continued				
Magnesium: Metal including alloys:				
Semimanufacturers value thousands	—	$4	—	All to Greece.
Manganese: Metal including alloys, all forms	—	20	—	All to France.
Mercury value, thousands	$4	—		
Silver: Metal including alloys, unwrought and partly wrought kilograms	—	[7]6	—	All to West Germany.
Tin: Metal including alloys, unwrought	75	75	—	All to United Kingdom.
Titanium:				
Ore and concentrate	—	10	—	All to Greece.
Metal including alloys, semimanufactures	34	—		
Tungsten: Metal including alloys, unwrought	5	4	—	All to West Germany.
Zirconium: Ore and concentrate	—	3	—	All to Greece.
Other: Metalloids[8]	—	201	—	All to Philippines.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Artificial: Corundum	163	—		
Grinding and polishing wheels and stones	—	[9]14	—	Turkey 11; West Germany 2; Sweden 1.
Barite and witherite	10	—		
Cement	539,077	[10]913,198	35,015	Spain 508,465; Turkey 303,886; West Germany 65,817.
Clays, crude:				
Kaolin	23	—		
Unspecified kilograms	—	150	—	All to China.
Diamond:				
Natural:				
Gem, not set or strung carats	[11]30	100	—	All to Spain.
Industrial stones do.	29,937	([12])		
Dust and powder do.	[13]473,098	15,000	—	All to France.
Synthetic: Dust and powder do.	2,336,000	2,164,000	2,164,000	
Feldspar, fluorspar, related materials:				
Fluorspar	—	18	—	All to Greece.
Fertilizer materials:				
Crude, n.e.s.	43	—		
Manufactured:				
Ammonia	748	—		
Nitrogenous	1,891,836	777,625	19,926	Turkey 317,547; China 301,167; West Germany 70,812.
Phosphatic	119,975	5,945	—	Yugoslavia 5,245; Ireland 700.
Potassic	38,222	23,727	—	United Kingdom 13,566; Yugoslavia 7,836; West Germany 2,323.
Unspecified and mixed	310,188	191,544	—	Thailand 66,500; China 51,419; Turkey 29,969.
Gypsum and plaster	—	1,082	—	All to Yugoslavia.
Lime	23	19		Do.
Mica: Crude including splittings and waste	—	1	—	All to Greece.
Phosphorus, elemental	250	—		

See footnotes at end of table.

TABLE 2—Continued

ROMANIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Destinations, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Pigments, mineral: Iron oxides and hydroxides, processed		3	—		
Precious and semiprecious stones other than diamond:					
Natural	carats	—	[14]1,500	—	All to Spain.
Synthetic	do.	20,250	([15])		
Salt and brine		215,622	203,095	—	Yugoslavia 203,035; Greece 60.
Sodium compounds, n.e.s.: Soda ash, natural and manufactured		263,563	144,137	—	Yugoslavia 39,052; China 37,445; Czechoslovakia 25,000; Argentina 21,838.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		—	7	—	All to West Germany.
Worked		12,473	7,999	—	West Germany 7,526; Switzerland 462; United Kingdom 11.
Gravel and crushed rock		—	20	—	Greece 17; Yugoslavia 3.
Sand other than metal-bearing		—	16	—	All to Yugoslavia.
Quartz and quartzite		—	16	13	Greece 3.
Sulfur: Elemental: Crude including native and byproduct		—	18	—	All to Turkey.
Other: Crude	kilograms	—	7	7	
MINERAL FUELS AND RELATED MATERIALS					
Carbon black		62	83	—	All to Greece.
Peat including briquets and litter		19	—		
Petroleum refinery products:					
Gasoline	42 gallon barrels	17,144,413	19,312,869	3,796,056	Greece 14,290,260; United Kingdom 333,931; Turkey 283,985; unspecified 313,956.
Naphtha	do.	—	577,794	577,794	
Kerosene and jet fuel	do.	—	18,515	—	All to West Germany.
Mineral jelly and wax	do.	24	—		
Distillate fuel oil	do.	16,119,023	45,000	—	All to West Germany.
Lubricants	do.	454,837	55,034	—	West Germany 54,068; Thailand 966.
Residual fuel oil	do.	14,286,053	—		
Petroleum coke	do.	399,669	352,231	—	All to Turkey.
Unspecified	do.	—	895,799	895,799	

[p]Preliminary.

[1]Table prepared by Ronald L. Hatch and Jeremy Tidwell. Owing to a lack of official trade data published by Romania, this table should not be taken as a complete presentation of this country's mineral exports. These data have been compiled from United Nations information and data published by the partner trade countries.

[2]Excludes unreported quantity valued at $6,000 imported by France ($4,000) and West Germany ($2,000).

[3]Excludes unreported quantity valued at $72,000 imported by Sri Lanka.

[4]Excludes unreported quantity valued at $187,000 imported by Sri Lanka.

[5]Excludes unreported quantity valued at $56,000 imported by Sri Lanka.

[6]Excludes unreported quantity valued at $12,000 imported by Norway.

[7]Excludes unreported quantity valued at $96,000 imported by Turkey.

[8]Reported under SITC item 522.120 as "selenium, phosphorus, arsenic, etc."

[9]Excludes unreported quantity valued at $8,000 imported by West Germany.

[10]Excludes unreported quantity valued at $3,931,000 imported by Sri Lanka.

[11]Excludes unreported quantity valued at $26,000 imported by Belgium-Luxembourg.

[12]Unreported quantity valued at $975,000 imported by Belgium-Luxembourg.

[13]Excludes unreported quantity valued at $998,000 imported by Belgium-Luxembourg ($970,000) and France ($28,000).

[14]Excludes unreported quantity valued at $47,000 imported by West Germany.

[15]Unreported quantity valued at $24,000 imported by Belgium-Luxembourg.

TABLE 3

ROMANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1989	1990[p]	Sources, 1990	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	464,736	398,193	—	Greece 342,562; Yugoslavia 55,631.
Oxides and hydroxides	38,295	28,214	—	China 19,680; West Germany 8,534.
Metal including alloys, semimanufactures	51	[2]1,614	14	Yugoslavia 1,363; United Kingdom 82; Switzerland 68.
Arsenic: Oxides and acids	—	89	—	All from China.
Bismuth: Metal including alloys, all forms value, thousands	—	$15	—	All from West Germany.
Cadmium: Metal including alloys, all forms	15	—		
Chromium:				
Ore and concentrate	73,624	91,665	—	Turkey 91,615; West Germany 50.
Metal including alloys, all forms	18	[3]		
Cobalt:				
Oxides and hydroxides	103	[4]17	—	All from United Kingdom.
Metal including alloys, all forms	[5]37	30	—	United Kingdom 28; France 2.
Columbium and tantalum: Tantalum metal including alloys, all forms value, thousands	—	$47	—	All from West Germany.
Copper:				
Oxides and hydroxides do.	$2	—		
Metal including alloys:				
Unwrought	—	2,292	—	Belgium-Luxembourg 1,202; Turkey 1,090.
Semimanufactures	139	[6]1,123	1	Yugoslavia 752; West Germany 147; France 111.
Gold: Metal including alloys, unwrought and partly wrought kilograms	[7]	10	—	All from Switzerland.
Iron and steel:				
Iron ore and concentrate, excluding roasted pyrite	—	379,030	—	All from Spain.
Metal:				
Scrap	—	197	—	All from Canada.
Pig iron, cast iron, related materials	1,119	1,737	—	France 1,727; United Kingdom 10.
Ferroalloys:				
Ferrochromium	1,449	50,577	—	Yugoslavia 50,014; Turkey 535.
Ferromanganese	—	944	—	Belgium-Luxembourg 900; Spain 44.
Ferronickel value, thousands	$4	—		
Ferrophosphorus	90	—		
Ferrovanadium	15	50	—	All from West Germany.
Unspecified	1,328	310	—	France 300; United Kingdom 10.
Steel, primary forms	9	700	—	West Germany 613; France 63; Sweden 24.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	[8]2,041	3,251	—	West Germany 2,798; Sweden 201; Turkey 99.
Clad, plated, coated	8,159	7,714	315	Spain 5,454; Greece 615; France 428.
Of alloy steel	[9]6,704	5,353	—	West Germany 4,607; Japan 536; Finland 111.

See footnotes at end of table.

TABLE 3—Continued

ROMANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Semimanufactures—Continued:					
Bars, rods, angles, shapes, sections		1,004	3,280	—	Turkey 1,752; West Germany 958; Brazil 382.
Rails and accessories		3,042	—		
Wire[10]		761	1,342	573	West Germany 408; Sweden 190; Belgium-Luxembourg 149.
Tubes, pipes, fittings		1,121	5,607	9	Japan 2,800; West Germany 1,249; United Kingdom 727.
Unspecified		8,000	5,000	—	All from Czechoslovakia.
Lead:					
Oxides		11	420	—	Hong Kong 280; West Germany 108; United Kingdom 32.
Metal including alloys, unwrought		—	4,069	—	Morocco 2,001; Yugoslavia 1,967; Belgium-Luxembourg 101.
Magnesium: Metal including alloys:					
Scrap		—	1	—	All from Yugoslavia.
Unwrought		103	—		
Semimanufactures		42	11	—	All from West Germany.
Manganese:					
Ore and concentrate: Metallurgical-grade		272	58,597	—	All from Brazil.
Oxides	value, thousands	$4,517	$3	—	All from West Germany.
Metal including alloys, all forms		126	(6)		
Mercury	kilograms	4,000	2	—	All from Canada.
Molybdenum:					
Oxides and hydroxides	value, thousands	$3,307	—		
Metal including alloys, all forms		[11]2	[2]2	(7)	Mainly from Japan.
Nickel: Metal including alloys:					
Unwrought		—	14	—	All from United Kingdom.
Semimanufactures		[12]3	126	4	West Germany 65; United Kingdom 37; Japan 12.
Platinum-group metals:					
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	37	15	—	All from United Kingdom.
Platinum	do.	225	320	—	Do.
Rhodium	do.	25	21	—	Do.
Iridium, osmium, ruthenium	do.	1	—		
Rare-earth metals including alloys, all forms	value, thousands	$3,307	—		
Silicon, high-purity	kilograms	(7)	427	—	All from Taiwan.
Silver: Metal including alloys, unwrought and partly wrought	grams	[13]80	—		
Tin: Metal including alloys:					
Unwrought		—	16	—	All from Spain.
Semimanufactures		(6)	1	—	All from West Germany.

See footnotes at end of table.

TABLE 3—Continued

ROMANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
METALS—Continued					
Titanium:					
Ore and concentrate		8,216	—		
Oxides		419	3,559	2,959	France 360; West Germany 225; Sweden 15.
Metal including alloys, all forms	kilograms	[14]32	3,490	—	United Kingdom 3,000; Japan 490.
Tungsten:					
Oxides and hydroxides		—	40	—	All from China.
Metal including alloys:					
Unwrought		—	26	—	United Kingdom 20; France 6.
Semimanufactures		—	2	—	West Germany 1; United Kingdom 1.
Vanadium: Oxides and hydroxides		30	—		
Zinc:					
Oxides		525	1,375	—	China 626; France 399; Hong Kong 350.
Metal including alloys, unwrought		—	1,260	—	Yugoslavia 1,070; West Germany 80; Norway 70.
Zirconium:					
Ore and concentrate		942	—		
Metal including alloys, all forms		[15]18	12	—	All from Sweden.
Other:					
Ores and concentrates		473,184	223,044	—	All from Greece.
Oxides and hydroxides		—	20	—	All from Finland.
Base metals including alloys, all forms		—	7	—	All from China.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Artificial: Corundum		1,784	3,201	—	Yugoslavia 2,573; West Germany 622; United Kingdom 5.
Grinding and polishing wheels and stones		543	[16]163	—	West Germany 67; Belgium-Luxembourg 39; Yugoslavia 29.
Asbestos, crude		1,363	877	—	Canada 867; United Kingdom 10.
Barite and witherite		12,552	13,268	—	All from China.
Boron materials:					
Crude natural borates	value, thousands	$5,603	$1,344	—	All from Turkey.
Oxides and acids[17]		740	1,506	—	All from Chile.
Bromine		1	1	—	All from West Germany.
Cement		—	18	—	West Germany 16; United Kingdom 2.
Clays, crude:					
Bentonite		—	2	—	All from United Kingdom.
Chamotte earth		—	50	—	All from France.
Fire clay		72	72	—	All from West Germany.
Kaolin		4,782	6,462	—	United Kingdom 5,224; West Germany 988; France 250.
Unspecified		38,463	50,016	—	Turkey 49,405; West Germany 611.
Diamond:					
Natural:					
Gem, not set or strung	carats	5,673	13,500	—	All from United Kingdom.
Industrial stones	do.	585,759	295,833	—	Do.

See footnotes at end of table.

TABLE 3—Continued

ROMANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Diamond—Continued:					
Natural—Continued:					
Dust and powder	value, thousands	$6	$6	—	All from West Germany.
Synthetic	do.	$4,016	—		
Diatomite and other infusorial earth		383	780	—	France 770; West Germany 10.
Feldspar, fluorspar, related materials:					
Feldspar		30,550	1,000	—	All from China.
Fluorspar		—	17,182	—	Do.
Fertilizer materials:					
Manufactured:					
Nitrogenous		—	37	—	Belgium-Luxembourg 25; West Germany 12.
Phosphatic		—	23,026	—	All from Tunisia.
Potassic		1	15	—	West Germany 11; United Kingdom 4.
Unspecified and mixed			118	—	France 111; Germany 5; United Kingdom 2.
Graphite, natural		119	—		
Gypsum and plaster		38	107	—	All from West Germany.
Iodine		4	—		
Kyanite and related materials		—	1,512	—	All from United Kingdom.
Lime		—	2	—	All from West Germany.
Magnesium compounds:					
Magnesite, crude		22,140	33,562	—	Czechoslovakia 27,000; China 6,562.
Oxides and hydroxides		25,698	21,007	—	Turkey 17,000; Greece 4,000; France 7.
Mica:					
Crude including splittings and waste		—	3	—	All from West Germany.
Worked including agglomerated splittings		5	11	—	All from France.
Phosphates, crude		110,360	[18]576,605	—	All from Morocco.
Pigments, mineral: Iron oxides and hydroxides, processed		194	145	—	All from Japan.
Precious and semiprecious stones other than diamond:					
Synthetic	kilograms	5	—		
Sodium compounds, n.e.s.: Sulfate, manufactured		—	3	—	All from West Germany.
Stone, sand and gravel:					
Dimension stone: Worked		120	9	—	West Germany 6; France 3.
Gravel and crushed rock		1,425	138	—	All from France.
Sand other than metal-bearing		—	1,252	—	France 1,232; Netherlands 20.
Quartz and quartzite		30	—		
Sulfur:					
Elemental: Crude including native and byproduct		4,992	10,791	—	All from West Germany.
Sulfuric acid		50	—		
Talc, steatite, soapstone, pyrophyllite		262	549	—	Do.
Other:					
Crude		1,747	2,582	(7)	Mainly from West Germany.
Slag and dross, not metal-bearing		—	95	—	France 74; Greece 21.

See footnotes at end of table.

TABLE 3—Continued

ROMANIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1989	1990[p]	Sources, 1990	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		12	6	—	All from Turkey.
Carbon black		15	366	319	West Germany 47.
Coal:					
Anthracite		2,987	—		
Bituminous		1,675,773	1,556,110	—	Australia 1,533,110; Czechoslovakia 23,000.
Briquets of anthracite and bituminous coal		—	24	—	All from Belgium-Luxembourg.
Lignite including briquets		—	34,585	—	All from Yugoslavia.
Coke and semicoke		844,339	428,172	—	China 279,488; Czechoslovakia 145,000; Yugoslavia 3,684.
Petroleum:					
Crude	42-gallon barrels	2,690,941	—		
Refinery products:					
Gasoline	thousand 42-gallon barrels	14	568,292	—	Greece 568,285; Belgium-Luxembourg 7.
Mineral jelly and wax	42-gallon barrels	39	17	1	Mainly from Germany.
Kerosene and jet fuel	do.	403	194	—	Yugoslavia 140; Spain 54.
Distillate fuel oil	do.	512,927	1,470	—	France 1,231; West Germany 239.
Lubricants	do.	9,530	16,856	—	West Germany 14,553; Belgium-Luxembourg 812; France 693.
Residual fuel oil	do.	2,697	—		
Bitumen and other residues	do.	8,762	—		
Bituminous mixtures	do.	127	36	—	All from West Germany.

[p]Preliminary.

[1]Table prepared by Ronald L. Hatch and Jeremy Tidwell. Owing to a lack of official trade data published by Romania, this table should not be taken as a complete presentation of this country's mineral imports. These data have been compiled from United Nations information and data published by the partner trade countries.

[2]Excludes unreported quantity valued at $7,000 exported by France.

[3]Unreported quantity valued at $25,000 exported by West Germany.

[4]Excludes unreported quantity valued at $3,000 exported by West Germany.

[5]Excludes unreported quantity valued at $9,000 exported by West Germany.

[6]Excludes unreported quantity valued at $3,000 exported by Sweden.

[7]Less than 1/2 unit.

[8]Excludes unreported quantity valued at $4,000 exported by Japan.

[9]Excludes unreported quantity valued at $10,000 exported by Japan.

[10]Excludes unreported quantity valued at $36,000 in 1989, and $8,000 in 1990, exported by Japan.

[11]Excludes unreported quantity valued at $19,000 exported by France.

[12]Excludes unreported quantity valued at $12,000 exported by Japan.

[13]Excludes unreported quantity valued at $6,000 exported by Netherlands.

[14]Excludes unreported quantity valued at $25,000 exported by United Kingdom ($24,000) and West Germany ($1,000).

[15]Excludes unreported quantity valued at $29,000 exported by West Germany.

[16]Excludes unreported quantity valued at $796,000 exported by Sweden ($697,000), Canada ($49,000), France ($43,000), and China ($7,000).

[17]Excludes unreported quantity valued at $373,000 in 1989, exported by Turkey ($372,000) and United Kingdom ($1,000); and $417,000 in 1990, exported by Turkey.

[18]Excludes unreported quantity valued at $2,275,000 exported by Jordan.

TABLE 4

ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies (all state owned)	Location of main facilities	Annual capacity
Alumina	Ministry of Metallurgical Industry	Plant at Oradea, near Hungarian border	270
Do.	do.	Plant at Tulcea, Danube Delta	270
Aluminum, primary	do.	Slatina Aluminum Enterprise, 120 kilometers west of Bucharest	270
Barite	Ministry of Mines	Ortra mine, Rosia Montana, southwest of Cluj	100
Bauxite	do.	Oradea-Dobresti Mining Complex, near Hungarian border	350
Cement	Ministry of Industrial Construction	Tasca-Bicaz plant, near Piatra Neamt	3,000
Do.	do.	Cimpulung plant, about 60 kilometers north of Pitesti	2,000
Do.	do.	Medgidia plant, west of Constanta	1,000
Do.	do.	Pieni plant, 20 kilometers north of Tirgoviste	600
Coal:			
Bituminous	Ministry of Mines	Valea Jiului Mining Complex, near Hunedoara	10,400
Lignite	Ministry of Mines, Oltenia Mining Complex, including Rovinari Mining Enterprise	Jiu Valley, Oltenia County, north of Craiova	20,300
Do.	Ploesti Mining Complex	About 50 kilometers north of Bucharest	8,700
Copper:			
Ore (concentrate)	do.	Baia Mare, Baia Sprie, and Cavnic mines, northwest area near U.S.S.R. border; Rosia Montana, Noud, Borsa, Balan, and Lesul Ursului mines, in east-west arc along Carpathian range; Rosia Poieni mines; and Moldova Noua mines, southwest near Danubian border with Yugoslavia	180
Metal	Ministry of Metallurgical Industry Metallurgical Enterprise for Nonferrous Metals	Baia Mare, in northwest near U.S.S.R. and Hungarian borders	35
Do.	do.	Zlatna smelter, Apuseni, in northwest Romania	13
Ferroalloys	Ministry of Metallurgical Industry	Complex at Tulcea	280
Iron ore	Ministry of Mines	Mining complex at Hunedoara, in west-central Romania	1,320
Do.	do.	Resita Mining Complex, southwestern Romania, near Yugoslav border	660
Do.	do.	Napoca-Cluj Mining Complex, northwestern Romania on the Somesul River	990
Lead in ore	do.	Baia Mare Mine, near U.S.S.R. and Hungarian borders	24
Do.	do.	Balan Mine, 50 kilometers southwest of Piatra Neamt	10
Lead metal	Ministry of Metallurgical Industry, Uzina Chimica Metallurgica	Smelter at Copsa Mica, central Romania, on the Tirnava Mare River	42
Natural gas million cubic feet per year	Ministry of Petroleum and Gas	Tirgu Mures Field at Tirgu Mures, north-central Romania	996,000
Do. do.	do.	Ploesti Field, 50 kilometers north of Bucharest	249,000
Petroleum, crude barrels per day	do.	Ploesti-Teleajen, Pitesti, and Tirgoviste Fields, in Prahova Valley around Bucharest; Bacau Field at Bacau, east-central Romania near the Siretul River; and West Carpathian Field, southeast Carpathian range, between the west bank of the Olt River and Tirgu Jiu	250,000
Petroleum products do.	do.	Refineries at Brazi, Pitesti, Suplacu, Bacau, Borzesti, Brosov, Cimpina, Darmanesti, G. Gheorghiu Dej-Onesti, Ploesti, Telajen, and Navodari	533,000
Steel	Ministry of the Metallurgical Industry: Galati Steel Complex	Danube River, north of Braila, near the U.S.S.R. border	10,000
Do.	Hunedoara Steel Complex	West-central Romania, near Calan	4,000
Do.	Resita Steel Plant	Southwestern Romania, about 20 kilometers southwest of Caransebes	1,200
Do.	Calarasi Steel Plant	Near the Bulgarian border close to the Danube	600
Zinc in ore	Ministry of Mines, Baia Mare Mining Complex	Baia Mare, near the U.S.S.R. and Hungarian borders	60
Zinc metal	Ministry of Metallurgical Industry, Uzina Chimica Metallurgica	Imperial Smelter at Copsa Mica, Tirnava River, central Romania	66

TABLE 5
ROMANIA: APPARENT RESOURCES OF MAJOR MINERAL COMMODITIES FOR 1992

(Metric tons unless otherwise specified)

Commodity	Resources*
Bauxite	2,550,000
Coal:	
Anthracite	50,000,000
Bituminous	792,000,000
Lignite	2,752,000,000
Copper	1,462,500
Iron ore	15,300,000
Lead	585,000
Natural gas billion cubic meters	485
Petroleum	206,000,000
Zinc	1,440,000

*Estimated.

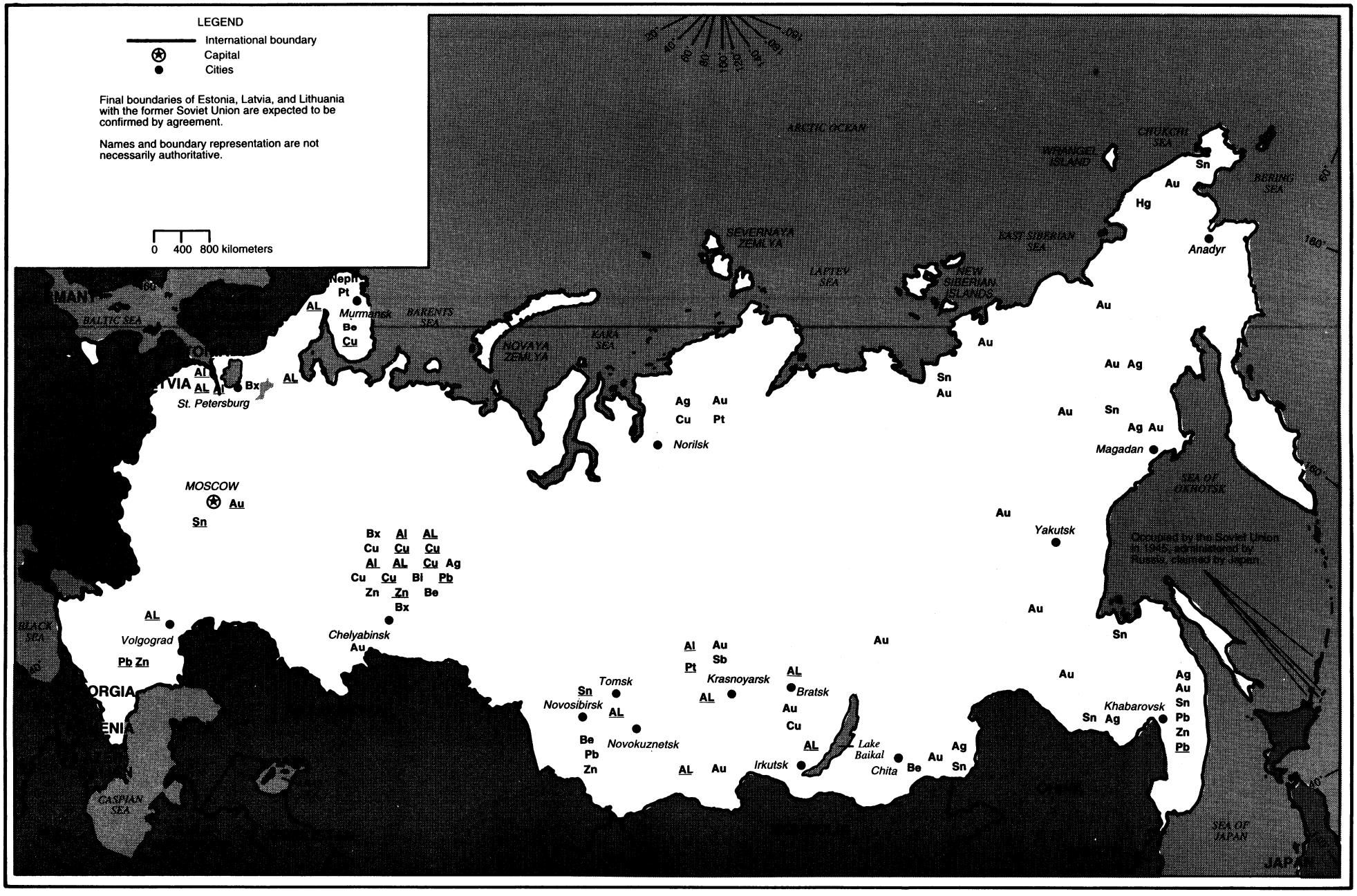
Source: Tribuna Economica, No. 10, Mar. 1992.

ADMINISTRATIVE DIVISIONS OF RUSSIA

AREA 17,075,200 km² **POPULATION 149.5 million**

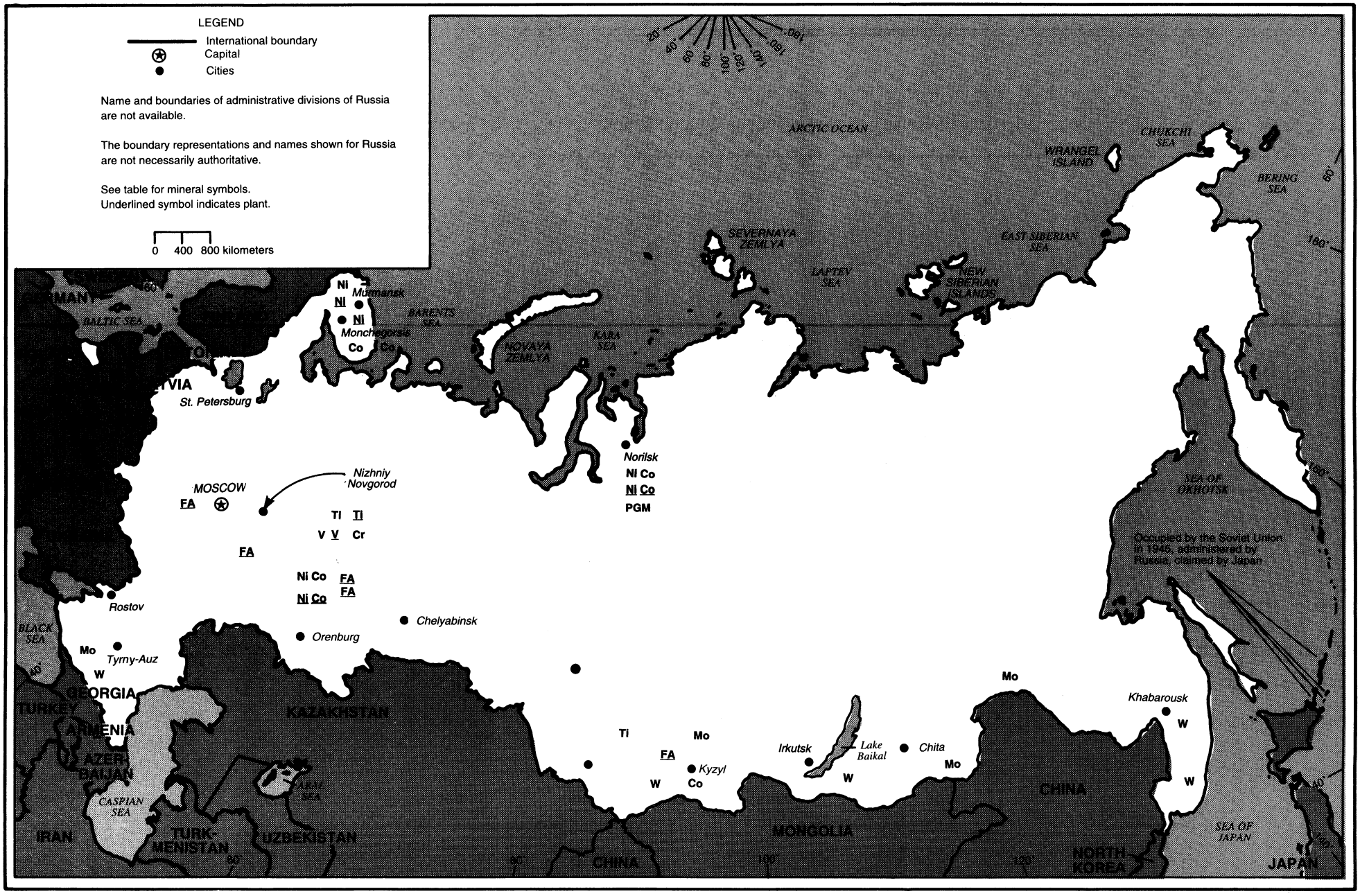
Names and boundary representation are not necessarily authoritative.

RUSSIA — NONFERROUS AND PRECIOUS METALS

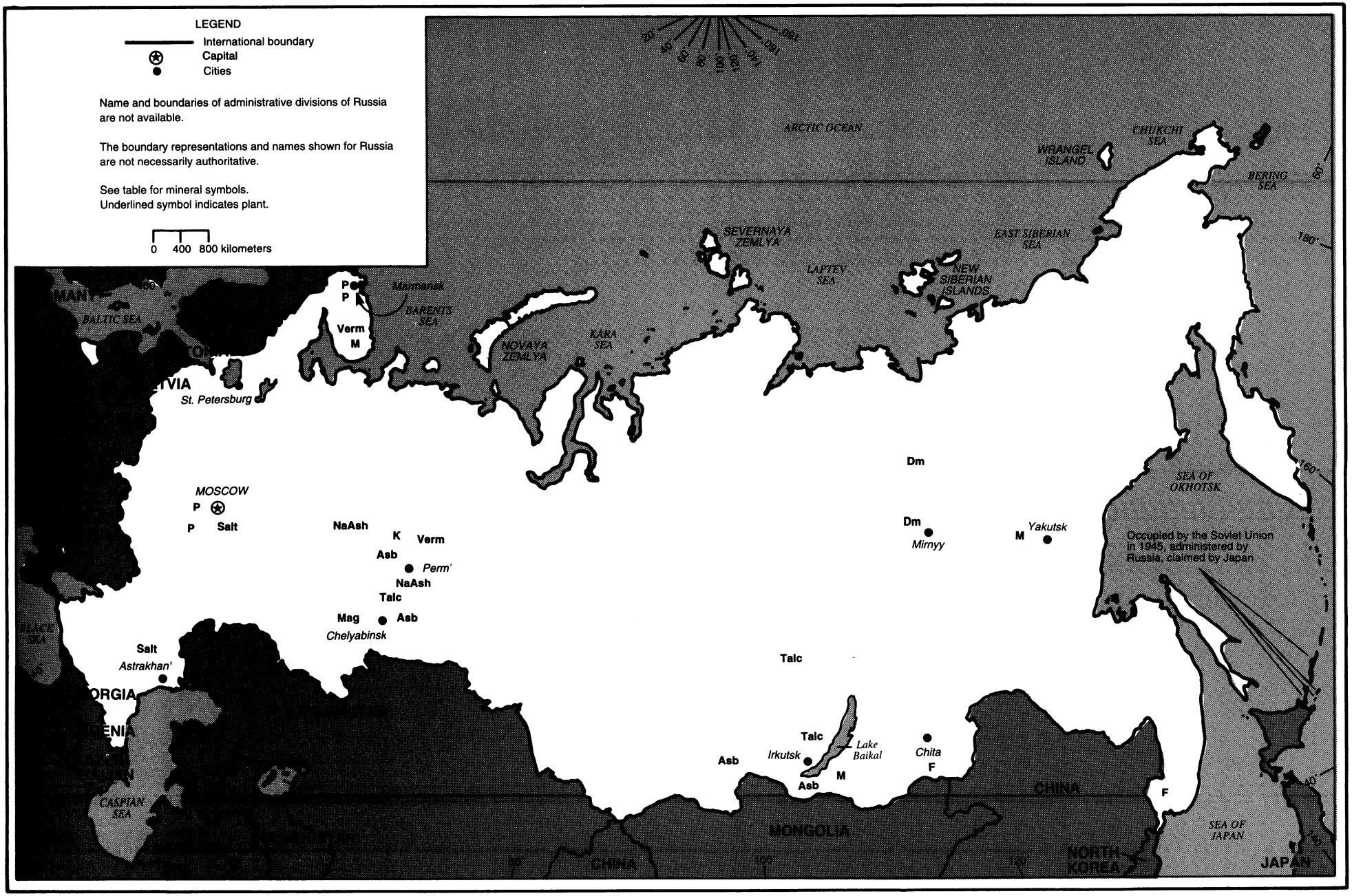


RUSSIA — IRON ORE AND STEEL

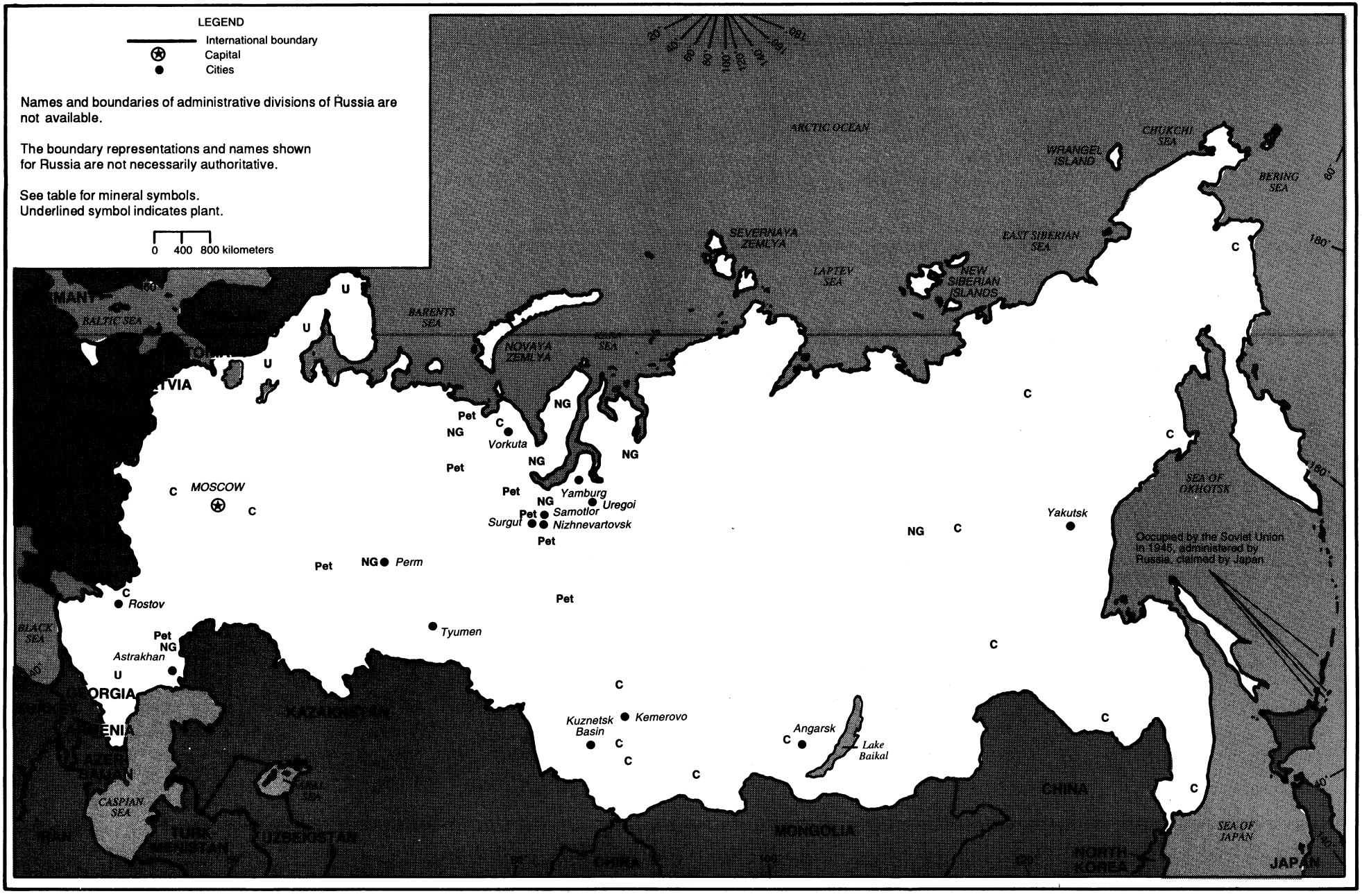
RUSSIA — FERROALLOY METALS



RUSSIA — INDUSTRIAL MINERALS



RUSSIA — MINERAL FUELS



THE MINERAL INDUSTRY OF

RUSSIA

By Richard M. Levine

In 1992 Russia's gross domestic product, reportedly, decreased by 15% and industrial production decreased by 18.8% compared with that of 1991. The country experienced a high rate of inflation along with decreasing production of industrial commodities. With the breakup of the former U.S.S.R. and the dismantlement of the central planning system, it was increasingly difficult for industrial enterprises to maintain former output levels. At the same time, however, new forms of industrial and business activity were emerging, privatization of enterprises was proceeding, prices for many goods were being freed, and a host of other economic changes were occurring that were altering the structure of the Russian economy. The pace of these changes and their effectiveness are difficult to assess as it is difficult to compare the statistics on the decrease in output with data that may indicate increased efficiency in the production, distribution, and consumption of output.

Russia occupies more than 75% of the territory of the former U.S.S.R., and accordingly is the inheritor of a large percentage of the mineral resources of the former U.S.S.R. Nevertheless, significant mineral deposits were located in other Republics. For certain minerals Russia was significantly or entirely dependent on the output of other Republics for its mineral supply, particularly metals from Soviet Central Asia, the Caucasus, and the Ukraine. The other Republics, in turn, were significantly dependent on Russia for a large percentage of their minerals, particularly oil and gas.

With the breakup of the U.S.S.R and the disruption of interrepublic trade, Russia experienced shortages of raw material inputs that had been supplied by other Republics, such as manganese from Georgia and Ukraine, alumina from Kazakhstan and Ukraine, copper concentrates from Armenia, Georgia, Kazakhstan, and Uzbekistan, and titanium concentrates from Ukraine. These breakdowns of supply contributed to the decrease in production of a number of mineral commodities.

PRODUCTION

In 1992, there was a decrease in production in the ferrous metallurgy sector. The reported decreases in output in comparison with 1991 were as follows: iron ore, 10.8%; pig iron, 6.5%; steel, 13.1%; rolled steel, 15.1%; steel pipes, 22.8%; and coke, 5.8%. In the nonferrous metallurgy sector there were even sharper decreases. In the industrial minerals sector production of synthetic ammonia, sulfuric acid, caustic soda, and sodium carbonate was reportedly between 84% and 90% of the 1991 production level while there was a reported 21% decrease in the production of mineral fertilizers; cement output, reportedly, was more than 18% below the 1991 production level. In the fuel sector, oil production decreased by 14.3%, natural gas production by 0.4%, and coal production by 5%. *(See tables 1 and 2.)*

TRADE

Again in 1992 large quantities of minerals were exported without the official permission of the Russian Government, which was attempting to halt sales through nongovernment-sanctioned channels. The Government hoped that by controlling exports of minerals, it could acquire needed revenues from these sales and also ensure that domestic consumers received needed raw materials. To this end the Russian Government issued permits by yearend to 243 specified trading companies allowing these companies to export specified minerals, including coal, ferrous and nonferrous metals, and rare and rare earth metals.

Russia also was concerned with the export of materials that could be used for nuclear purposes. The Russian President signed a decree regulating by special licenses the export of a number of materials, including high-quality aluminum, beryllium, high-purity bismuth, some calcium and boron alloys and compounds, some forms of tungsten, titanium and yttrium, zirconium and niobium alloys and compounds, enriched lithium, high-purity magnesium, several grades of hafnium alloys, radium 226 except in medical devices, and uranium isotopes.

Preliminary trade figures for 1992 show high levels of mineral exports. These figures do not include illegal exports, which also accounted for a substantial share of exports. Reportedly, crude oil exports increased by almost 17%, gas exports decreased by 0.8%, exports of ferrous metals and coal remained at the 1991 level, and exports of iron ore and concentrates, coke and semicoke, cast iron, ferroalloys, ammonia, and mineral fertilizers fell by more than 50% compared with that of 1991. Russia imported mainly steel pipes, but total exports and imports of steel products were roughly in balance. *(See table 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

Although further along than many of

the other former Soviet Republics in creating plans for and implementing privatization, in 1992 the major mineral-producing enterprises in Russia were still state owned. The concept for privatization of the Russian minerals industry has generally meant granting ownership of enterprises, either through the sale or free issuance of stock to employees and to various private and state groups with set percentages of the total stock initially allocated to these various interests. This method of privatization combines private and Government ownership in a form often termed a joint stock company. *(See table 4.)*

COMMODITY REVIEW

Metals

Aluminum.—The Russian aluminum industry is now part of the joint stock company, Aluminy, which has 33 member plants in Russia, Azerbaijan, Tajikistan, and Ukraine. The joint stock company combines Government and private ownership.

In 1992 Russia reportedly produced 2.7 million tons of aluminum, which was slightly below 1991 production. Alumina production increased by 1.5%, but Russia remained more than 50% dependent on imported bauxite and alumina for aluminum production, with the C.I.S. states importing 4.3 million tons of bauxite and 1.8 million tons of alumina. At certain aluminum smelters far from seaports, including the Krasnoyarsk, Urals, and Bogoslovsk smelters, a shortage of imported raw materials resulted in decreased production.

Russia was considering development of bauxite deposits to ease the raw material shortage. Consideration was being given to holding an international tender to develop the major Sredne-Timan deposit in Russia's Komi Republic as well as developing a number of smaller deposits in the Urals. The Sredne-Timan deposit, it was projected, could eventually produce 6.5 million tons per year of bauxite. Plans also call for the construction of an alumina refinery with a capacity of 1 million tons per year to process ore from the Sredne-Timan deposit. The Aluminy concern was also involved in increasing bauxite development in Guinea, which was the major bauxite supplier to the former U.S.S.R. and was interested in developing bauxite deposits in Greece.

Large Russian aluminum exports for several years had a major influence on world aluminum markets, and analysts were assessing the long-term impact on the world aluminum industry if Russia and the other countries of the former U.S.S.R. were to continue current levels of aluminum exports. In 1992 Russia reportedly increased aluminum exports by over 25% to 959,300 tons in comparison with exports of 763,400 tons in 1991.

Antimony.—More than 70% of the antimony in the former U.S.S.R. was mined in Russia, but Russia did not have any metallurgical plants to produce antimony. The only antimony plant was in Kyrgyzstan, which used to supply Russia with about 12,000 tons per year of antimony. Plans called for construction of a plant in the Moscow region for producing up to 10,000 tons per year of antimony; this project also entails the development of an antimony deposit in Yakut-Sakha capable of supplying the new plant with raw material for the production of 10,000 tons per year of antimony, of which 2,000 tons will be for export. Foreign investment was being solicited for this project.

Chrome.—More than 95% of the chromite production in the former U.S.S.R. came from the Donskoy complex in Kazakhstan. A small amount of chromite was produced at the Saranov complex in Russia in the Urals. In 1992 the Saranov complex reportedly produced 121,400 tons of chromite, which was below the 1991 level of 139,200 tons.

Copper.—With the breakup of the U.S.S.R., Russia, which used to receive a large percentage of its copper from Kazakhstan and other Republics, began experiencing copper shortages. To alleviate these shortages Russia proceeded with plans to develop copper deposits.

In an effort to develop a major copper deposit, in 1992 the Russian Government held an international tender for the rights to develop the Udokan copper deposit east of Lake Baikal in Chita Oblast. The Soviet Government for several decades had been seeking to develop this deposit and at times had tried to solicit the participation of foreign firms. The Soviets had encountered numerous difficulties in trying to develop this deposit, including technological problems in processing the ore. Despite these difficulties, a number of international firms participated in the tender. Development rights, however, were awarded to the Chita-based Udokan mining company, representing the Russian Industrial Consortium and also a number of foreign investors. The Udokan mining company planned to sell one-half of the copper output on the Russian market and had an agreement to sell an additional 200,000 tons of Udokan copper to China annually for a 25-year period at prevailing London Metals Exchange prices. Udokan is projected to produce approximately 400,000 tons per year of copper. The copper content of the ore is slightly greater than 1% Cu, and ore reserves are estimated at 1.2 billion tons. Plans also called for developing the Aleksandrinskoye and Podolskoye deposits in Chelyabinsk Oblast in the Urals; foreign investors were being solicited to participate in the development.

Many copper plants in the Urals were operating under capacity owing to a lack of raw material. In 1992 Russia engaged in toll smelting copper from Western countries. This both alleviated a smelter bottleneck in the West and allowed Russian smelters to use underutilized capacities caused by decreased raw material inputs from domestic mining enterprises and enterprises in the C.I.S.

In 1992 Russia reported exporting 145,000 tons of copper in comparison with 174,000 tons in 1991. In 1992 Russia imported 55,000 tons of copper in concentrate from the Erdenet complex in Mongolia, which had been developed by

the former U.S.S.R. Erdenet, in prior years, had supplied the former U.S.S.R. with almost all of its output of more than 120,000 tons per year of copper in concentrate. In 1992 the Mongolian Government allowed Erdenet to negotiate its own agreements with Russian buyers. In 1993, Erdenet is slated to supply Russia with 60,000 tons of copper in concentrate.

Gold.—Russian production in 1992 was reported by the Russian State Statistical Committee to be 130 tons. Reported gold production in 1991 was 142 tons. However, according to the chairman of the Russian Precious Metals Committee, Russian production in 1992 was 146 tons. The chairman attributed the discrepancy in the output figure to the fact that Russia now lacks a state statistical information system, and he stated that his figures were more reliable due to his departmental advantage. However, according to the chairman, the potential concealment of gold production data by the independent prospecting artels makes any figures unreliable as the amount of concealment by artels has been estimated to be as high as 40% of the gold they produce. Gold exports, according to the chairman, were 98 tons in 1992. Also, reportedly, gold reserves in the State Reserve of Precious Metals and Stones (Gosfond) and the Central Bank of Russia (CBR) were 308 tons as of January 1, 1993.

Russia's prospecting artels, which for many years existed as an anomaly under the former system as they are private entrepreneurial ventures that mined for profit, in 1992 produced 70.2 tons of gold. In 1992 there were 250 prospecting artels working in Russia.

In Russia's main gold-producing region, Magadan oblast in the Far East region, production in 1992 was reportedly 43.5 tons, which was 97.9% of Magadan's 1991 production total. It was hoped that new private structures that broke away from the major state gold-producing enterprise in the Magadan region, Severovostokzoloto, would augment production, but this did not occur. Instead, the remaining segment of Severovostokzoloto slightly increased production, and the newly formed enterprises experienced a decrease in production compared with that of the previous year when they were part of Severovostokzoloto. Prospecting artels in the Magadan region produced 20 tons of gold.

After Magadan, the main gold mining region in Russia was Yakut-Sakha, producing 30.515 tons. Prospecting artels in the Yakut-Sakha region reportedly produced 17.5 tons of gold.

One of the factors affecting output was the continuing low price for gold that the state was paying to the artels that mined more than one-half of the country's gold; the artels legally could only sell their gold to the state. With the rapid inflation besetting the country, many of these artels, being profit-seeking enterprises that had to cover production costs, were no longer profitable. The resolution of the problems of the artels, including issues of the pricing of gold, taxation, leasing of properties, and acquiring equipment, would do much to alleviate the current production problems.

Russia, in an attempt to reverse the downward trend in gold production, was trying to acquire foreign investment to develop its gold deposits. These efforts included considering holding an international tender to develop one of its largest gold deposits, the Sukhoy Log deposit in Irkutsk Oblast, East Siberia, and other large deposits. Other measures being undertaken by Russia to increase gold production include a new law, "On Concessions and Profit Sharing Agreements with Foreign Investors" passed by the Russian parliament in January 1993, which will help to provide a much-needed legal basis for foreign investment in the Russian gold industry. The lack of such a legal basis has handicapped investment in the gold industry as well as other mineral industries.

Iron Ore.—Russia reportedly extracted 97.3 million tons of iron ore and produced 86.7 million tons of concentrate in 1992. Russia's iron ore consumption requirements for 1993 are estimated at 96 million tons. A "National Program to Modernize Metallurgy in 1993-1995 and up to the Year 2000" calls for producing an additional 13 million tons per year of marketable iron ore. Plans call for production to be increased in the iron ore mining regions of the Kursk Magnetic Anomaly district and the Kotamushka district in the northwestern part of the country and for developing deposits in the Urals and Siberia.

Manganese.—All manganese production in the former U.S.S.R. occurred in the Republics of the Ukraine, Georgia, and Kazakhstan. There was no manganese mining in Russia, although Russia was the former U.S.S.R.'s largest producer of steel and ferroalloys.

With the dissolution of the U.S.S.R. and the subsequent disruption in former interrepublic trade, Russia began experiencing manganese shortages. To secure its manganese supply, Russia is now planning to develop its own manganese mining industry, beginning with the development of deposits in the northern Urals basin where there are eight deposits with reportedly more than 40 million tons of confirmed manganese reserves averaging 21% to 22% Mn. Other deposits slated for development include the Usin deposit in southwestern Siberia with total reserves of 150 million tons of ore.

Eighteen Russian mining and metallurgical companies have formed a consortium to develop these deposits. These firms include the Nizhniy Tagil, Cherepovets, Novolipetsk, and Chelyabinsk steel mills as well as several other metallurgical plants. Development has begun of the Ivdelskoye deposit in the Urals. This deposit was initially developed during World War Two, but has not been exploited since. The ore body is close to the surface and can be developed by open pit mining. Initial projected output is 2.5 million tons per year of ore, which will be beneficiated at the Serov metallurgical plant.

Mercury.—Russian mercury plants produced about 10% of the former

U.S.S.R.'s mercury production of between 800 and 850 tons of mercury per year in the mid-1980's. Kyrgyzstan produced 70% of the mercury and Ukraine the remaining 20%. Russia, however, apparently supplied Kyrgyzstan with some mercury raw materials from its mercury deposits in Krasnodar Kray in southern Russia and the Altay region in Siberia. As a result of the overall decline in production in Russia, its mercury requirements have fallen to about 450 to 500 tons per year. In 1993, Russia's domestic demand for mercury will be met primarily by imports from Kyrgyzstan and Ukraine.

Molybdenum.—The newly formed Tungsten-Molybdenum company, termed a closed, limited liability company, is comprised of 10 enterprises and will produce 100% of Russia's molybdenum and over three fourths of the molybdenum output of the C.I.S. with the curtailment of production in Armenia and production decreases in the other new countries. This company was formed in accordance with the Russian President's privatization decree.

The Priargunskiy uranium mining complex in 1992 began mining ore containing molybdenum at the Bugdaya deposit; production is planned to increase to 100,000 tons per year of ore. Besides molybdenum, this deposit contains tungsten, copper, and silver.

Nickel.—Russia's major nickel-producing association, Norilsk Nikel, which comprises mining and metallurgical enterprises in the Norilsk region of East Siberia and on the Kola Peninsula as well as a metallurgical plant at Krasnoyarsk in East Siberia that produces platinum-group metals, preliminarily reported producing 240,000 tons of nickel in 1992. Western and Russian analysts were skeptical of this number, citing production problems, and it is estimated that production for Norilsk was about 200,000 tons.

At yearend, Russia resumed a contract with Cuba whereby Russia would supply plant and equipment to develop Cuba's nickel industry in exchange for nickel-cobalt concentrate and unrefined sugar. This trade, which had practically been suspended in 1992, threatened the shutdown of the Yuzhuralnikel association in the Urals, which processed Cuban nickel.

In 1992 Russia reported exporting 112,000 tons of nickel compared with 112,500 tons in 1991.

Platinum-Group Metals.—Russia, in 1992, reportedly produced, almost 28 tons of platinum. However, the deposits in the Norilsk region where almost all of the platinum-group metals are produced have a much higher ratio of palladium versus platinum in the ore with the ratio ranging from 2:1 to 5:1 palladium versus platinum. Rhodium is third highest in concentration followed by iridium, ruthenium, and osmium. Platinum-group metals together with gold also are mined in small amounts at placer deposits in Yakut-Sakha and the Urals. Platinum exports in 1992 were about 16 tons; a much larger amount of palladium was exported. Russia also exported the other platinum-group metals.

Silver.—Russia, which has 38.3% of the former U.S.S.R.'s silver reserves and in 1991 produced 41.8% of the U.S.S.R.'s silver, expects a growing silver shortage as ties with Kazakhstan, the former U.S.S.R.'s largest silver producer, are diminished.

Russia was the former U.S.S.R.'s largest silver consumer. Russia has more than 200 deposits containing silver, of which 16 are solely silver; one-half of these are now under exploitation. A total of 102 deposits are producing silver. Three-fourths of Russia's silver was produced as a byproduct of polymetallic ores. The largest source of silver from polymetallic ores is East Siberia, which contains the Norilsk mining area; the second largest region is in the Urals.

Most growth in silver production should come from byproduct silver at copper, lead-zinc, and gold deposits. The main silver-producing areas now are the copper-nickel deposits in the Norilsk region in East Siberia; the Partizanskoye, Nikolaevskoye, and Sadovoye lead-zinc deposits in the Russian Far East; the tin deposits of Festivalnoye, Perevalnoye, and Solnechnoye in Khabarovsk Kray; and the gold ore deposits of Nezhdaninskoye, Shkolnoye, and Karamkenskoye in the Yakut-Sakha and Magadan regions.

A major increase in production could come from putting the second stage of the Dukat gold-silver mine in Magadan Oblast into operation. Dukat accounts for about 25% of the country's silver output. Another way to increase output would be to begin extracting or to increase extraction of byproduct silver from a number of ores now being mined. Processing extracted silver is now a problem for Russia as more than 40% of silver-bearing concentrates were processed outside Russia with 36% going to Ust-Kamenogorsk, Leninogorsk, Chimkent, and Balkhash in Kazakhstan; 3% going to Almalyk in Uzbekistan; and 1% going to the Ukrzink plant in the Ukraine.

Russia also faces an increased silver shortage as many of the silver-rich ores are being depleted; therefore, plans call for developing an additional 23 silver-bearing deposits. The most important measures to increase silver production along with putting into operation the second stage of the Dukat mine, include developing the Evenskoye gold deposit in Magadan oblast and the Khakandzhinskoye gold deposit in Khabarovsk Kray, which have a high silver content, and developing the Verkhneye Menkeche deposit in Yakut-Sakha, the Taezhoye deposit in the Maritime region, and the Zun-Ospinskoye deposit in the Buryat Republic. For a number of gold deposits containing silver, soliciting foreign investment is being considered. These deposits include the Mayskoye and Evenskoye in Magadan Oblast, the Nezhdaninskoye in Yakut-Sakha, the Pokrovskoye in the Amur River region, and the Talatuiskoye in the Chita region. Soliciting foreign investment is also being considered for the Sultanovskoye copper deposit in the Urals near Chelyabinsk and the Tarutinskoye complex ore deposit also

near Chelyabinsk.

Titanium.—After the breakup of the U.S.S.R., Russia began to suffer from a titanium shortage as all ore was mined in Ukraine and 40% of the sponge was produced in Kazakhstan, 40% in Russia, and 20% in Ukraine. Titanium alloys were produced in Ukraine and Tajikistan. Russia, however, consumed more than 70% of the titanium produced in the former U.S.S.R. Russia was the biggest consumer of titanium sponge in the former U.S.S.R,, consuming about 75,000 tons per year, or almost 75% of the former U.S.S.R's production total of more than 100,000 tons. It was intended to create a program to develop the titanium industry, stressing the development of titanium raw materials deposits and renovation of the Berezniki titanium-magnesium complex as well as the development of a network of scrap collection and processing enterprises. Russia also entered into a 5-year agreement with Kazakhstan to cooperate in supplying raw materials to the Ust-Kamenogorsk titanium-magnesium plant in Kazakhstan.

The Berezniki plant, which is Russia's only producer of titanium sponge, produces 35,000 tons per year, and capacity cannot be increased because of environmental considerations. Thus, plans also call for the construction of a new 40,000-ton-per-year capacity plant, and in conjunction developing a raw material supply by developing the Tarskoye, Tuganskoye, and Tulunskoye ilmenite deposits in West Siberia. The new titanium sponge plant is scheduled to begin producing 20,000 tons per year of sponge in the year 2000. Mine production from the new deposits is scheduled to begin in 1995. This development program, it is envisaged, will not only supply Russia's domestic needs, but may also permit Russia to export titanium.

Tungsten.—Russia's largest tungsten producers united to form the Tungsten-Molybdenum company. These producers include the Tyrny-Auz complex in the North Caucasus, which accounts for 60% of Russia's tungsten production. The firm will comprise 10 members. Production of tungsten concentrate had decreased by more than 40% in 1992 compared with that of 1991. During the first 10 months of 1992, the Tungsten-Molybdenum company reportedly produced 19,000 tons of tungsten-molybdenum concentrate.

Zinc.—With the breakup of the former U.S.S.R., Russia was experiencing a shortage of a number of minerals, including zinc, which were produced primarily or in large quantities in the other Republics. A project calls for developing the Aleksandrinskoye copper-zinc deposit in Chelyabinsk Oblast, which will increase Russia's zinc supply.

Zirconium.—The Zirkongeologiya company was formed to mine zircon in Russia. The company plans to develop the Tarsky deposit in the Omsk region of West Siberia. The deposit is estimated to contain 2 billion cubic meters of sand with an average zircon content of 10 to 15 kilograms per cubic meter. Production for 1993 is projected to be 3,000 tons and is projected to increase to 15,000 tons by 1995. Russia had been forced to buy zirconium from abroad, particularly Australia. The major source of zirconium production in the former U.S.S.R. was at the Malyshevsk deposit in Ukraine, which supplies the Verkhne-Dneprovsk metallurgical plant in Ukraine. Shipments from Ukraine had ceased in 1992. However, the Kovdor iron ore mining complex on the Kola Peninsula in Russia was producing baddeleyite concentrates.

Industrial Minerals

Diamonds.—In the Yakut-Sakha Republic of the Russian Federation, where almost all diamonds in Russia are mined, there was a reported 10% decrease in diamond extraction in 1992 compared with that of 1991 and a 25% decrease compared with that of 1990 when diamond production peaked. The Yakut-Sakha Government forecasts that diamond output will decrease an additional 14% in 1993 compared with 1992. Decreased production was attributed to deteriorating conditions at existing diamond mines as well as renovation being conducted at these mines. To offset production decreases, mine renovation and new mine development are under way to maintain production levels. Another factor said to be contributing to the decrease in diamond production was the exodus of skilled workers from Yakut-Sakha because of deteriorating economic conditions. The dispute over control of diamond sales appeared to reach a resolution when in December the Russian Government approved the decree transferring the exclusive rights to market uncut diamonds to Diamonds of Russia-Sakha.

Emeralds.—Russia's only emerald mines are the Malyshevsky mines in the Sverdlovsk district of the Urals. In September, there was a miners' strike, followed by another miners' strike in January 1993. The strikes were, in part, prompted by a controversy in which the Emural joint venture comprising the Malyshevsky Mining Union and the Israeli Vanico Group Inc. was accused of sending Israel high-quality emeralds at below world market prices. The miners were demanding the right to sell raw and cut emeralds on domestic and foreign markets and sought to privatize the emerald mines. The emerald mining enterprises requested to be privatized at the time of the strike in September, but had not received the permission of the Russian Government. The Sverdlovsk regional government, on whose territory more than 90% of the country's emeralds were mined, sought in conjunction with the strike to change the system whereby all emeralds were sent to the Russian central government's Committee on Precious Metals and Stones (Komdragmet). This issue of regional control over valuable mineral resources was a major area of contention in the new Russian Federation.

Magnesite.—The Satka group of deposits in Chelyabinsk Oblast, Russia, was the former U.S.S.R's principal source of domestic magnesite production, but reserves were being depleted and production at Satka was falling. Production reached a level of 4.6 million tons per year of crude magnesite in the late 1980's. Still, the former U.S.S.R. had been dependent on imported magnesite from North Korea for a significant percentage of its magnesite consumption. A joint stock company, Larit, which is a group of 22 Russian enterprises, is planning to develop the Larinskiy magnesite deposit in Chita Oblast in the Transbaikal region with proved reserves of 100 million tons and a resource base of 400 million tons. Foreign investment was being sought for this project.

Mica.—One of Russia's major mica producers, the Slyuda complex in Murmansk Oblast, reportedly was threatened with closure because of economic difficulties. The Slyuda mine, which formerly supplied a large percentage of its output to the aerospace industry, reported that production levels had fallen sharply.

Phosphate.—Russia's major source of phosphate raw material was apatite ore from the Kola Peninsula, which accounted for more than 70% of phosphate raw material output in the former U.S.S.R. Production on the Kola Peninsula had fallen far below capacity levels of 22 million tons per year of apatite concentrate to about 11 million tons in 1992. Exports to world markets were hampered by tieups at the Port of Murmansk.

In 1992, the Rasvumchor joint venture formed in 1991 by the Norwegian firm Norsk Hydro and the Russian Apatite complex began mining the Rasvumchor deposit on the Kola Peninsula. Plans call for the production of 500,000 tons of apatite concentrate per year, which will be sent to Norway for the production of phosphate fertilizer.

Sulfur.—Russia is now experiencing a 1.2-million-ton-per year shortage of sulfur owing to the fact that the former U.S.S.R.'s major sulfur deposits were in Ukraine and Turkmenistan. Byproduct sulfur production from natural gas at Orenburg, Astrakhan, and other deposits is not adequate to compensate for this loss of sulfur. Russia has large sulfur deposits in Samarskaya Oblast in the middle Volga Basin, on the Kamchatka Peninsula, and in the Kurile Islands in the Russian Far East. These deposits were previously considered uneconomic, but are now being recommended for development in light of both the current need and new technology and management techniques that could, reportedly, render the development of these deposits economic.

Mineral Fuels

Energy.—Russia, in the face of falling fuel production, has proposed a national energy policy that emphasizes conservation, price deregulation for fuels, and investment in the fuel and energy complex to increase production, particularly of oil. Russia also expressed a renewed commitment to develop nuclear power. Safety remained a major concern regarding nuclear power generation. Both owing to inflation and a policy of bringing fuel and energy prices in line with free market prices, in 1992 fuel and energy prices increased by 80 times while wholesale prices in other industries rose an average of 34 times. Russia continued its policy of supplying countries of the former U.S.S.R. with oil and gas, often below world market prices. In 1992 Russia supplied former Soviet republics with 87.6 million tons of oil and 109 billion cubic meters of natural gas. Plans for 1993 call for supplying former republics with 56 million tons of oil and 109 billion cubic meters of natural gas.

Coal.—In 1992, coal production fell by 5% to 335 million tons. In Russia's largest coal-producing basin, the Kuznetsk Basin (Kuzbas), production was 114.9 million tons, of which 47 million tons was coking coal. There are 73 mines in the Kuzbas region. Production has been falling in the Kuzbas as demand for Kuzbas coal has been increasing. The Kuzbas has, reportedly, a total of 60 billion tons of coal reserves, of which 33 billion tons is coking coal. In 1992, there were 171 fatal mining accidents in the Kuzbas, which was an increase of 47 fatalities compared with 1991.

A decree signed by the Russian President on December 30, 1992, calls for transforming 54 coal industry enterprises into joint stock companies by March 31, 1993. The Russian state enterprise Rosugol (Russian coal) would be created to manage the portion of the shares of these enterprises remaining in Government possession.

Russian coal exports in 1992 fell by 24% to 17.909 million tons in comparison with exports of 23.571 million tons in 1991. The coal mining industry was addressing serious environmental problems in coal mining regions. The Ministry of Fuel and Energy established a program of environmental goals for coal mining that includes halting dumping of polluted water, establishing systems of closed water circulation, installing air filtration systems to stop harmful dust and gaseous emissions, reducing slag, and using microbiological methods for land reclamation.

Natural Gas.—In 1992 natural gas production fell by 0.4% compared with 1991 to 640.4 billion cubic meters. Natural gas exports remained at approximately their 1991 level. The natural gas sector remained one of the most successful and profitable sectors of the Russian economy, with the Gazprom concern reporting profitability exceeding 35%. Of all of Russia's major gas-producing enterprises, only the Yamburg association in northern West Siberia, with production in 1992 of more than 178 billion cubic meters, was able to increase production. Yamburg is the latest major field to be developed and is therefore a relatively new field. Production at Yamburg increased by more than 11 billion cubic meters. Production increases

also were reported at the Kuban and Yakut gas associations, which are much smaller producers, but had respective increases of 5 and 10 billion cubic meters from levels of under 2 billion cubic meters of output in 1992. Target dates for completing infrastructure and construction work at a number of major fields including Yamburg, Urengoi, and Astakhan were met by less than 20%. At other fields the projected goals were met by less than 40%. However, because Gazprom plans to bring on-stream the Komsomo'skiy field in West Siberia with an estimated production capacity of 20 billion cubic meters annually, gas production was projected to remain at the same level in 1993. Gazprom claimed that its main problem in meeting work schedules was lack of funding because its customers were behind in payments and also because of the low state set-price for natural gas.

Nuclear Power.—In 1992 there were nine nuclear powerplants in operation that produced 120 billion kilowatt hours of electricity, which was slightly below the 1991 level. In 1992 there were 205 incidents reported at nuclear powerplants compared with 172 in 1991. An accident was reported at the Beloyarsk nuclear powerplant on the night of December 22-23 when radioactive water overflowed a storage area into a reserve pan with some water seeping into the ground. Reportedly, none of the plant personnel was subjected to radiation and there was no environmental damage. The accident was blamed on improper procedures by the workers rather than on a plant defect.

Petroleum.—Russian oil production decreased by 14.3% to 395 million tons in 1992, which was far below the Ministry of the Economy's projection of 480 million tons. Also, only about one-quarter of the drilling necessary to maintain 1992 extraction levels was carried out, and further drops in oil production in 1993 were predicted. Crude oil exports, however, increased. In 1992 there were 33 joint ventures in operation in the oil sector that produced 4.6 million tons of crude oil. Joint ventures were not only engaged in new oilfield development, but also were involved in increasing production at existing operations and restarting wells that were not operating.

Uranium.—At the Priargunskiy mining and chemical complex near Krasnokamensk in the Chita district, production had decreased in 1992 by 70% compared with that of 1990. Development of an open pit is now under way at Priargunskiy. In 1992 the Priargunskiy complex exported 800 tons of uranium, but plans call for increasing exports in 1993 to 1,500 tons of uranium. Plans also call for development of an enrichment plant at the Priargunskiy complex. In the past 2 years the Russian Ministry of Atomic Energy registered three cases of thefts of uranium, but no reported thefts of plutonium. Three other thefts of uranium also reportedly occurred in the years 1967, 1971, and 1989. The increased rate of thefts was attributed to the deteriorating economic conditions.

Reserves

Russia used the Soviet reserve classification system that was not comparable to that in the United States, and data on reserves for the majority of minerals were a state secret.

According to the Soviet classification system, approved in 1982, deposits of all solid mineral materials are classified under two cross-imposed systems, one relating to the economic viability of the material in question and the other relating to the reliability of the information on the quantity of material in place.

Under the first system, the Soviets separated deposits into one of two categories, "balansovyye" or "zabalansovyye." The former word literally translated means balance, referring to that materials so classified are included in studies relating to mineral reserves in places that are suitable for exploitation. This "balansovyye" material, in effect, is that which currently is regarded as viable for economic development or exploitable. The other category term, "zabalansovyye," translates literally as beyond balance, the term implying that materials so classified are not regarded as suitable for economic exploitation at present.

The second classification system relating to the reliability of information on the quantity of material in place assigns each occurrence to one of seven categories, the traditional A, B, C_1, and C_2, and three more, P_1, P_2, and P_3. The first four categories were regarded as reserves by the Soviets. Materials reported in each of these classes, however, may not correspond to the Western concept of reserves (i.e., material economically exploitable under present market prices with existing technology). The final three categories, "prognoznyye resursy" (prognosticated resources), together with "zabalansovyye" material from categories A, B, C_1, and C_2, correspond very roughly to the Western term "resources."

Mining and construction of mining enterprises and the appropriate capital investment were authorized in the U.S.S.R. on the basis of the economic "balansovyye" reserves in place in categories A + B + C_1, which must be in prescribed ratios. C_2 reserves provide a general perspective of the development of mining enterprises, but they do not constitute a justification for project planning.

All of these four categories (A, B, C_1, C_2) are based on the data obtained on an exploration grid of prescribed density (or its equivalent) and on certain types of chemical and other tests according to regulations. Density of the grid in each of the reserves categories is different for different kinds of ore and for five different types of ore bodies, depending on geological formation.

According to Soviet classification, the reserves and resources of solid mineral raw materials in place are divided into explored "razvedannyye"—A + B + C_1 categories—and the perspective "perspektivnyye"—C_2 category. The categories P_1, P_2, and P_3 are prognosticated resources, "prognoznyye resursy." There are appropriate

specifications for the first four traditional categories.

Category A means that the reserves in place are known in detail. The ore body boundaries are outlined by trenching, exploratory boreholes, or exploratory workings. The depositional environment, the proportion of different commercial grades of the ore, and the hydrogeologic conditions of the exploitations are ascertained. Quality and technological properties of the ore are ascertained in detail, ensuring the reliability of the projected beneficiation and production operations.

Category B means that the reserves in place are explored. The ore bodies are outlined by exploratory workings or by exploratory boreholes. The depositional environment is known, and types and industrial grades of the ore are ascertained, but without details of their distribution. Quality and technological properties of the ore are known sufficiently well to ensure the conditions of the exploitation, and the hydrogeological environment, as a whole, is known in fair detail.

Category C_1 means that the reserves in place are estimated by a sparse grid of exploratory boreholes or exploratory workings. This category also includes reserves adjoining the boundaries of the A and B categories of ore as well as the reserves of the very difficult deposits in which the distribution of the values or of minerals cannot be ascertained even by a dense exploratory grid. Quality, types, industrial grades, and technology of beneficiation are ascertained tentatively by means of analyses and laboratory tests and by analogy with known deposits of the same type. General conditions of exploitation and general hydrogeological environment of the deposit are known tentatively.

Category C_2 means that the reserves in place are adjoining the explored reserves of A + B + C_1; categories and reserves are indicated by geological and geophysical evidence confirmed by boreholes.

Depending on the nature of the deposits, various boring and excavation methods are used in the determination of ore reserves for all solid minerals in the U.S.S.R. Deposits are divided into five major groups.

The First Group Deposits are simple in form and have large dimensions and uniform distribution of minerals (such as coal deposits, many deposits of iron ore, and disseminated copper deposits). The high category reserves of such deposits can be determined by boring with a normal density grid of boreholes. Excavation is used only for controlling the data of samples from boreholes and for taking bulk samples.

The Second Group Deposits include large deposits of different and sometimes complicated forms, with uneven distribution of mineral content. A combination of both drilling and exploratory workings is required to determine ore reserves. With a normal grid of boreholes, only B category reserves might be revealed by drilling. With close-spaced drilling and control by exploratory workings, it is possible to establish A category reserves.

The Third Group Deposits include deposits of medium dimensions with irregular distribution of ore minerals, such as vein or dyke deposits. Reserves of A and B categories can be revealed only with the help of openings. Drilling alone can establish reserves only of C_1 category.

The Fourth Group Deposits include deposits similar to the Third Group Deposits, but with smaller ore bodies or more complicated forms. It is impossible to establish category A reserves under a normal grid of openings. Exploratory openings and underground drilling are needed to determine ore reserves of category B.

The Fifth Group Deposits are small pocket deposits where categories A and B cannot be established by systematic prospecting. Only category C reserves can be established.

Oil and gas reserves are classified according to a similar letter system using the A, B, C_1, and C_2 categories for reserves and the categories C_3, D_1, and D_2 for the determination of the prognosticated resources. Categories and the criteria for development are similar to those for other minerals except they are based on the specific characteristics of oil and gas deposits.

Reported data on Russian reserves have been located for only a small number of minerals. Table 5 shows estimated Russian reserves for a selected number of minerals. *(See table 5.)*

INFRASTRUCTURE

In 1991 Russia had a total of 87,100 km of rail lines; 879,100 km of highway, of which 652,500 km is hard surfaced; more than 100,000 km of navigable inland waterways; about 65,000 km of crude oil and products pipelines; and more than 140,000 km of natural gas pipelines.

Russia had the longest coastline of any country, with more than 15 open seaports including St. Petersburg, Kaliningrad, Murmansk, Arkhangelsk, Novorossiysk, Vladivostok, Nakhodka, and others and a large number of inland ports, including Astrakhan, Kazan, Khabarovsk, Krasnoyarsk, Kuybyshev, Moscow, Nizhniy-Novgorod, Rostov, and Volgograd. The greater portion of the sea coasts, however, are in sparsely populated or uninhabited regions along the Arctic Ocean. There are only a few good natural ports, and year-round access to the open seas is available only along the temperate coast in the extreme northwest.

Russia faced the problem of depleting older deposits in areas with developed infrastructure while new deposits are in remote eastern and northern areas with severe climates and lack of infrastructure. Despite the statistics quoted on Russia's extensive transportation network, the country has no cross-country road system and practically no developed road networks in most of the northern and northeastern portions of the country. Furthermore, most of the entire rail network was concentrated in the western part of the country. There were only two rail lines transversing the eastern part of the country, the trans-Siberian and the Baikal Amur Mainline (BAM), with the BAM only partially operational and lacking connecting lines to areas of

potential mineral development. Air transportation played a vital role in passenger and industrial transport owing to the vast distances and the lack of other transport means.

In some eastern and northern parts of the country, the Russians relied on a combination of road, rail, river, and sea for minerals transport and also had developed a number of deposits depending primarily on air transport for freighting supplies and shipping minerals. For oil and gas, the Soviets had developed extensive pipeline networks that were now in great need of expensive maintenance and repair.

OUTLOOK

The Russian mineral industry was still in a state of transition toward adopting market economy criteria for mineral production, including freeing prices, introducing some forms of private ownership, and encouraging foreign investment. Although further along than the other Republics of the former U.S.S.R., Russia was still a long way from making the legal and institutional changes needed for this transition.

Although Russia already possesses one of the world's largest mineral industries and is richly endowed with a wide variety of mineral resources, it will be difficult to ascertain the economic viability of existing mineral production enterprises or Russia's ability to attract foreign investment until these structural changes occur. In the meantime, the Russian mineral industry will experience decreasing production until new sources of capital, supplies of inputs, and markets are secured.

Although for the past 2 years Russia has exported to world markets increasing quantities of mineral commodities while production of these commodities was decreasing, this situation may not continue. The Russian Government is trying to exert greater control over mineral exports through a licensing system in order to ensure supplies to domestic producers and to ensure collection of revenues from these exports. Export quotas now are generally lower than the level of exports that occurred in the previous 2 years. It remains to be seen how successful the Russian Government will be in exerting these controls.

Russia is still a major supplier of mineral commodities to the countries of the former U.S.S.R. and to East Europe at below world market prices. Whether this situation will continue or whether Russia will seek to obtain world market prices for these minerals will depend on the development of economic ties between the countries of the former U.S.S.R. and East Europe. If these countries attempt to reintegrate their economies rather than integrating with the larger world market, then a significant portion of Russia's mineral production still will be consumed within the region of the former Soviet bloc. Currently, a significant percentage of Russia's mineral production is dependent on either raw material supplies, processing facilities or equipment from the other countries of the former U.S.S.R. These countries, in turn, are dependent on Russian supplies. Rapid disengagement may prove to be too costly, particularly when good alternative solutions are not in place. The pace of this disengagement, if it occurs, will determine, for example, what percentage of chromite Russia will obtain at favorable rates from Kazakhstan rather than at world market prices or the percentage of oil that Russia will ship to the other countries of the former Soviet bloc rather than sell on world markets.

In the area of foreign investments, Russia is still developing its policies and regulations regarding foreign investment in mineral development. The pace of foreign investment will be greatly dependent on the implementation of policies that will secure the rights of foreign investors. Russia, with adequate investment, has the potential to greatly increase mineral output, but this will depend on the creation of a more secure investment environment regarding ownership rights, taxation levels, export licenses, and other issues.

TABLE 1

RUSSIA: ESTIMATED[1] PRODUCTION OF MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity		1992
METALS		
Aluminum:		
Ore and concentrate:		
Bauxite, 26% to 57% alumina		4,000
Nepheline concentrate, 25% to 30% alumina		1,000
Alumina		2,500
Metal, smelter:		
Primary[2]		2,700
Secondary		350
Total		3,050
Antimony, mine output, recoverable Sb content	metric tons	10,000
Arsenic, white (As_2O_3)	do.	3,000
Beryllium: Beryl, cobbed, 10% to 20% BeO	do.	1,100
Bismuth, mine output, recoverable Bi content	do.	5
Cadmium metal, smelter	do.	800
Chromium: Chrome ore, marketable[2]	do.	121,400
Cobalt:		
Mine output, recoverable Co content	do.	2,500
Metal, smelter	do.	2,500
Copper:		
Ore: Cu content, recoverable		375
Metal:		
Blister:		
Primary		425
Secondary		60
Refined:		
Primary		425
Secondary		60
Gold, mine output, Au content	thousand kilograms	146
Iron and steel:		
Iron ore, 55% to 63% Fe[2]		86,700
Iron ore, Fe content[2]		45,000
Agglomerated products:		
Sinter		NA
Pellets		NA
Metal:		
Pig iron and blast furnace ferroalloys:		
Pig iron for steelmaking		44,000
Ferromanganese		200
Electric furnace ferroalloys		1,200
Crude steel[2]		67,000
Finished rolled steel[2]		46,800
Semimanufactures: Pipes and tubes[2]		9,200
Lead:		
Mine output, recoverable Pb content		70
Metal, smelter:		
Primary		70
Secondary		40

See footnotes at end of table.

TABLE 1—Continued

RUSSIA: ESTIMATED[1] PRODUCTION OF MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity		1992
METALS—Continued		
Magnesium metal, including secondary		40
Mercury metal, including secondary	metric tons	70
Molybdenum, mine output, Mo content	do.	5,000
Nickel:		
Mine output, recoverable Ni content	do.	215,000
Nickel, products	do.	215,000
Platinum-group metals:		
Platinum	do.	20
Palladium	do.	55
Others	do.	6
Silver metal including secondary	do.	800
Tin:		
Mine output, recoverable Sn content	do.	6,000
Metal, smelter:		
Primary	do.	6,000
Secondary	do.	1,500
Total	do.	7,500
Titanium, metal	do.	25,000
Tungsten concentrate, W content	do.	3,500
Vanadium metal	do.	7,000
Zinc:		
Mine output, recoverable Zn content		150
Metal:		
Primary		140
Secondary		60
INDUSTRIAL MINERALS		
Asbestos, grades I-VII		1,500
Barite		NA
Cement, hydraulic		68,000
Clays: Kaolin including china clay		NA
Corundum, natural		NA
Diamond:		
Gem	thousand carats	9,000
Industrial	do.	9,000
Total	do.	18,000
Diatomite		NA
Feldspar		100
Fluorspar, concentrate 55% to 96.4% CaF_2	metric tons	100,000
Graphite		15
Gypsum		1,800
Lime, dead-burned		NA
Lithium minerals, not further specified		NA
Magnesite: Marketable product		1,100
Mica		35
Nitrogen: N content of ammonia		10,000
Phosphate rock: Crude ore:		
Apatite concentrate, 37% to 39.6% P_2O_5		11,000

See footnotes at end of table.

TABLE 1—Continued

RUSSIA: ESTIMATED[1] PRODUCTION OF MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity		1992
INDUSTRIAL MINERALS—Continued		
Phosphate rock: Crude ore—Continued:		
Sedimentary rock, 19% to 30% P_2O_5		500
Total		11,500
Potash: K_2O equivalent		3,000
Pyrite, gross weight		NA
Salt, all types		4,000
Sodium compounds, n.e.s.:		
Carbonate		3,000
Sulfate:		
Natural		NA
Manufactured		NA
Sulfur:		
Frasch		NA
Other native		NA
S content of pyrite		NA
Byproducts:		
Of metallurgy		NA
Of natural gas		1,800
Of petroleum		NA
Total		1,800
Sulfuric acid		NA
Talc		NA
Vermiculite		60
MINERAL FUELS AND RELATED MATERIALS		
Coal:		
Bituminous		275,000
Lignite and brown coal		60,000
Total[3]		335,000
Coke: Coke oven, beehive, breeze, gas coke		NA
Fuel briquets:		
From anthracite and bituminous coal		NA
From lignite and brown coal		NA
Gas, natural, marketed: As reported[2]	million cubic meters	640,400
Oil shale		4,000
Peat:		
Agricultural use		NA
Fuel use		NA
Petroleum:		
Crude:		
As reported, gravimetric units[2]		395,000
Converted, volumetric units	thousand 42-gallon barrels	2,900,000
Refinery products[4]		250,000

NA Not available.
[1]Production estimated unless otherwise specified.
[2]Reported in Russian sources.
[3]Run-of-mine coal.
[4]Not distributed by type and therefore not suitable for conversion to volumetric units. Data include all energy and nonenergy products but exclude losses.

TABLE 2

RUSSIA: REPORTED DECREASES IN NONFERROUS METALS PRODUCTION IN 1992

Commodity	1992, percent of 1991 output
Aluminum, primary	99.5
Aluminum, secondary	55
Copper, refined	66
Lead	73
Magnesium	72
Molybdenum, concentrate	91
Nickel	83
Tin	45
Tungsten, concentrate	58

TABLE 3
RUSSIA: PRELIMINARY REPORTED MINERAL EXPORTS, 1992

(Metric tons unless otherwise specified)

Commodity	Quantity	Percent of 1991 exports
Aluminum	959,300	125.7
Coal	17,909,000	76
Copper	145,000	83.3
Crude oil	66,000,000	116.9
Gold	98	NA
Natural gas billion cubic meters	90.3	100.3
Nickel	112,000	99.5
Petroleum products	27,000,000	76.9
Pig iron	1,730,000	69.3
Rolled steel	1,225,000	49.1
Potassium fertilizers	3,380,000	99.4

NA Not available.

TABLE 4
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity[e]
Alumina	Achinsk	Achinsk in East Siberia	900,000.
Do.	Bogoslovsk	Urals	1,050,000.
Do.	Boksitogorsk	European north	
Do.	Nadvoitsy	Nadvoitsy in Karelia	266,000.
Do.	Uralsk	Kamensk region	536,000.
Do.	Volkhov	Volkhov, east of St. Petersburg	45,000.
Aluminum, primary	Smelters:		
	Volkhov	Volkhov, east of St. Petersburg	20,000.
Do.	Uralsk	Kamensk	70,000.
Do.	Bogoslovsk	Krasnoturinsk	162,000.
Do.	Novokuznetsk	Novokuznetsk	284,000.
Do.	Kandalaksha	Kola Peninsula	62,500.
Do.	Nadvoitsy	Nadvoitsy in Karelia	68,000.
Do.	Volgograd	Volgograd	168,000.
Do.	Irkutsk	Sherekov, near Irkutsk	262,000.
Do.	Krasnoyarsk	Krasnoyarsk	755,000.
Do.	Bratsk	Bratsk	843,800.
Do.	Sayansk	Sayanogorsk	274,000.
Apatite, concentrate	Khibiny apatit association	Kola Peninsula	18,000,000.
Do.	Kovdor iron ore mining association	do.	700,000.
Asbestos	Kiyembay	Orenburg Oblast	500,000.
Do.	Tuvaasbest	Tuva Republic	250,000.
Do.	Uralasbest	Central Urals	1,100,000.
Bauxite	North-Urals mining company	Severouralsk region	NA.
Do.	South-Urals mining company	South Urals region	NA.
Do.	Severnaya Onega mine	Northwest region	800,000.

See footnotes at end of table.

TABLE 4—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity[e]
Chromite	Saranov complex	Saranov	200,000.
Coal	Basins:		
	Donets (east)	Rostov Oblast	30,000,000.
Do.	Kansk Achinsk	East Siberia	50,000,000.
Do.	Kuznetsk	West Siberia	160,000,000.
Do.	Moscow	Moscow region	15,000,000.
Do.	Neryungri	Yakut-Sakha Republic	15,000,000.
Do.	Pechora	Komi Republic	30,000,000.
Do.	South Yakutia	Yakut-Sakha Republic	17,000,000.
Copper, mining and beneficiation complexes (Cu content of concentrates)	Buribai Enterprise	Buribai region	5,000.
Do.	Gai Complex	Gai region	40,000.
Do.	Kirovgrad Complex	Kirovgrad region	12,000.
Do.	Krasnouralsk Complex	Krasnouralsk region	12,000.
Do.	Norilsk Complex	Norilsk region	400,000.
Do.	Sredneuralsk Complex	Ekatrinenburg region	12,000.
Do.	Uchali Complex	Uchali region	40,000.
Do.	Urap Complex	Stavropol region	7,000.
Copper, metal (smelting and refining complexes)	Kirovgrad (smelting)	Kirovgrad	150,000.
Do.	Krasnouralsk (smelting)	Krasnouralsk	60,000.
Do.	Kyshtym (refining)	Kyshtym	40,000.
Do.	Norilsk (smelting and refining)	Norilsk	350,000.
Do.	Pyshma (refining)	Pyshma	350,000.
Do.	Severonickel (smelting)	Monchegorsk	20,000.
Do.	Sredneuralsk (smelting)	Revda	140,000.
Diamonds thousand carats	Yakutalmaz association	Aykhal, Mirnyy, Udachnaya areas of Yakut-Sakha republic	10,000 gem.
Do.	do.	do.	10,000 industrial.
Feldspar	Deposits:		
	Lupikko	Karelia	NA.
Do.	Kheto-Lanbino	do.	NA.
Ferroalloys	Kosaya Gora Iron works	Kosaya Gora	200,000.
Do.	Kuznetsk ferroalloy plant	Novokuznetsk	400,000.
Do.	Lipetsk Iron and steel works	Lipetsk	NA.
Do.	Serov ferroalloy plant	Serov	NA.
Do.	Tulachermet Scientific and Industrial Association	Tula	NA.
Do.	Chelyabinsk Electrometallurgical plant	Chelyabinsk	350,000.
Do.	Chusvoy Iron and steel plant	Chusovoy	NA.
Do.	Klyuchevsk ferroalloy plant	Dvurechinsk	160,000.
Fluorspar	Mining and beneficiation complexes		
	Abagaytuy	Transbaikal	NA.
Do.	Kalanguy	do.	NA.
Do.	Kyakhtinsky	do.	NA.
Do.	Usugli	do.	NA.
Do.	Yaroslavsky	Far East	NA.
Gold kilograms	Gold mining regions:		
	Yakut-Sakha	Yakut-Sakha Republic	30,515.
Do.	Buryat	Buryat Republic	2,725.

See footnotes at end of table.

TABLE 4—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity[e]
Gold—Continued: kilograms	Krasnoyarsk	Krasnoyarsk region	10,596.
Do.	Maritime	Maritime region	244.
Do.	Tuva	Tuva Republic	131.
Iron ore	Mining areas:		
	Kursk Magnetic Anomaly (KMA) containing following enterprises:		
	Mikhailovka	Zheleznogorsk	50,000,000 total KMA.
Do.	Lebedi	Gubkin	
Do.	Stoilo	do.	
Do.	Northwest containing following enterprises:		
	Olenogorsk	Olenogorsk	22,000,000 total Northwest.
Do.	Kostomuksha	Kostomuksha	
Do.	Kovdor	Kola Peninsula	
Do.	Siberia (east) containing the following mining enterprises:	Zheleznogorsk	
	Korshunovo		
Do.	Rudnogorsk	Rudnogorsk	
Do.	Siberia (west) including the following mining enterprises:		18,000,000 total Siberia (east and west).
	Abakan	Abaza	
Do.	Sheregesh	Sheregesh	
Do.	Tashtagol	Tashtagol	
Do.	Teya	Vershina Tei	
Do.	Urals containing following mining enterprises:		
	Akkermanovka	Novotroitsk	
Do.	Bakal	Bakal	
Do.	Goroblagodat	Kushva	22,000,000 total Urals.
Do.	Kachkanar	Kachkanar	
Do.	Magnitogorsk	Magnitogorsk	
Do.	Peshchanka	Rudnichny	
Lead-zinc (recoverable metal content of ore)	Mining complexes: Altay mining and beneficiation complex	Altay mountains region, South Siberia	2,000 lead, 1,000 zinc.
Do.	Dalpolymetal mining and beneficiation complex	Maritime Distric	20,000 lead, 25,000 zinc.
Do.	Nerchinsk polymetallic complex	Chita Oblast	7,000 lead, 12,500 zinc.
Do.	Sadon lead-zinc complex	Severo-Ossetiya	5,000 lead, 14,000 zinc.
Do.	Salair mining and beneficiation complex	Kemerovo Oblast	2,000 lead, 10,500 zinc.
Lead, metal	Dalpolymetal lead smelter	Rudnaya in the Maritime district	10,000.
Do.	Elektrozinc lead smelter	Vladikavkaz in North Caucasus	15,000.
Magnesite	Satka deposit	Chelyabinsk Oblast	3,800,000.
Magnesium, metal	Berezniki, Solikamsk plants	Berezniki	NA.
Do.	Solikamsk plants	Solikamsk	NA.
Mica	Mining complexes: Aldan	Yakut-Sakha Republic	NA.
Do.	Karel	Karelia	NA.

See footnotes at end of table.

TABLE 4—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity[e]
Mica—Continued:	Kovdor	Kola Peninsula	NA.
Do.	Mam	Irkutsk complex	NA.
Molybdenum, mining enteprise	Dzhida tungsten-molybdenum mine	West Transbaikal	NA.
Do.	Sorsk molybdenum mining enterprise	Sorsk region	NA.
Do.	Tyrny-Auz tungsten-molybdenum mining enterprise	North Caucasus	NA.
Do.	Shakhtaminskoye molybdenum mining enterprise	Chita Oblast	NA.
Natural gas billion cubic meters	Regions:		
	Komi Republic	Komi Republic	8.0.
Do.	Norilsk area	Norilsk area	5.5.
Do.	North Caucasus	North Caucasus	6.0.
Do.	Sakhalin	Far East	2.0.
Do.	Tomsk Oblast	West Siberia	.5.
Do.	Tyumen Oblast including:	do.	575.
Do.	Medvezhye field	do.	75.
Do.	Urengoi field	do.	300.
Do.	Vyngapur field	do.	17.
Do.	Yamburg field	do.	170.
Do.	Urals	Urals	45.
Do.	Volga	Volga region	6.
Do.	Yakut-Sakha	Yakut-Sakha Republic	1.5.
Nepheline syenite	Apatite complex	Kola Peninsula	1,500,000.
Do.	Kiya-Shaltyr mine	Goryachegorsk region, east Siberia	NA.
Nickel, mining enterprise (Ni in ore)	Norilsk Nikel association	Norilsk region and Kola Peninsula	300,000.
Do.	Yuzhuralnikel association	Southern Urals	20,000.
Nickel, metal (smelting and refining complexes)	Norilsk Nikel (smelting and refining)	Norilsk	160,000 (smelting), 100,000 (refining).
Do.	do.	Pechenga	50,000 (smelting).
Do.	do.	Monchegorsk	50,000 (smelting),
Do.			140,000 (refining).
Do.	Yuzhuralnikel association (smelting and refining)	Southern Urals	60,000 (smelting), 50,000 (refining).
Platinum-group metals:			
Ore	Norilsk Nikel association	Norilsk region	130 (total metal).
Metals	Krasnoyarsk refinery of Norilsk Nikel association	Krasnoyarsk	
Potash, K_2O	Uralkaliy	Verknekamsk deposit	3,000,000.
Do.	Silvinit	Solikamsk-Berezniki region of Urals	2,000,000.

See footnotes at end of table.

TABLE 4—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity[e]
Petroleum	Producing regions:		
	European Russia:		
	Astrakhan	Northern Caspian Sea Basin	700,000.
Do.	Bashkortostan	Urals	28,000,000.
Do.	Checheno-Ingush Republic	Southern Caucasus	4,500,000.
Do.	Dagestan	North Caucasus	700,000.
Do.	Kaliningrad Oblast	Baltic coast	1,800,000.
Do.	Komi Republic	Northwest	15,000,000.
Do.	Krasnodar Kray	North Caucasus	2,000,000.
Do.	Orenburg Oblast	Urals	13,000,000.
Do.	Perm Oblast	do.	12,000,000.
Do.	Samara	Volga region	16,000,000.
Do.	Saratov Oblast	do.	1,500,000.
Do.	Stavropol Kray	North Caucasus	2,000,000.
Do.	Tatarstan	Volga region	40,000,000.
Do.	Udmurt Republic	Urals	9,000,000.
Do.	East Siberia:		
	Tomsk Oblast	Tomsk Oblast	11,000,000.
Do.	West Siberia:		
	Tyumen Oblast:	Tyumen Oblast	300,000,000.
Do.	Kogolym field	do.	34,000,000.
Do.	Krasnoleninskiy field	do.	12,000,000.
Do.	Langepas field	do.	30,000,000.
Do.	Megion field	do.	18,000,000.
Do.	Nizhnevartovsk field	do.	70,000,000.
Do.	Noyabrsk field	do.	37,000,000.
Do.	Purneftegaz field	do.	12,000,000.
Do.	Surgut field	do.	48,000,000.
Do.	Uray field	do.	8,000,000.
Do.	Varegan field	do.	10,000,000.
Do.	Sakhalin Island	Sakhalin Island	2,500,000.
Soda ash	Sterlitamak plant	Sterlitamak	NA.
Do.	Mikhaylovskiy plant	Siberia	NA.
Do.	Pikalevo plant	Leningrad Oblast	NA.
Steel, crude	Amurstal	Komsomolsk na Amur	1,600,000.
Do.	Asha	Asha	450,000.
Do.	Beloretsk	Bashkir Republic	380,000.
Do.	Chelyabinsk	Chelyabinsk	7,000,000.
Do.	Cherepovets	Cherepovets	14,000,000.
Do.	Chusovoy	Chusovoy	570,000.
Do.	Elektrostal	Moscow	314,000.
Do.	Gorky	Nizhniy-Novgorod	78,000.
Do.	Guryevsk	Guryevsk	160,000.
Do.	Karaganda	Karaganda	6,300,000.
Do.	Kuznetsk	Novokuznetsk	4,700,000.
Do.	Lipetsk	Lipetsk	9,900,000.
Do.	Lysva	Lysva	350,000.
Do.	Magnitogorsk	Magnitogorsk	16,200,000.

See footnotes at end of table.

TABLE 4—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity[e]
Steel, crude—Continued:	Nizhniy Tagil	Nizhniy Tagil	8,000,000.
Do.	Nizhniy Sergi	Nizhniy Sergi	300,000.
Do.	Novosibirsk	Novosibirsk	1,100,000.
Do.	Omutninsk	Omutninsk	210,000.
Do.	Orsko-Khalilovo	Novotroitsk in Orenburg Oblast	4,600,000.
Do.	Oskol Electric Steel	Stary Oskol	1,450,000.
Do.	Petrovsk-Zabaikalsky	Petrovsk-Zabaikalsky	426,000.
Do.	Revda	Revda	281,000.
Do.	Salda	Sverdlovsk Oblast	1,900.
Do.	Serov A.K.	Serov	1,000,000.
Do.	Serp i Molot	Moscow	70,000.
Do.	Seversky	Polevskoy in Sverdlovsk Oblast	825,000.
Steel	Sibelektrostal	Krasnoyarsk	110,000.
Do.	Sulin	Sulin	280,000.
Do.	Taganrog	Taganrog	925,000.
Do.	Tulachermet-Scientific and Industrial association	Tula	18,400.
Do.	Verkh-Isetsky	Ekatrinenburg	132,000.
Do.	Volgograd	Volgograd	2,000,000.
Do.	Vyksa	Vyksa	540,000.
Do.	West Siberian	Novokuznetsk	6,900,000.
Do.	Zlatoust	Zlatoust in Chelyabinsk Oblast	1,200,000.
Talc	Deposits:		
	Onotsk	Irkutsk Oblast	NA.
Do.	Kirgiteysk	Krasnoyarsk Kray	NA.
Do.	Miass	Chelyabinsk Oblast	NA.
Do.	Shabrovsk	Sverdlovsk Oblast	NA.
Tin, mining and beneficiation complexes	Khingan	Khabarovsky Kray	NA.
Do.	Solnechnyy	do.	NA.
Do.	Iultin	Magadan Oblast	NA.
Do.	Khrustalnyy	Maritime region	NA.
Do.	Deputatsky	Yakut-Sakha Republic	NA.
Tin, smelters	Novosibirsk	Novosibirsk	NA.
Do.	Podolsk	Podolsk	NA.
Do.	Ryazan	Ryazan	NA.
Titanium, metal	Berezniki plant	Berezniki	35,000.
Do.	Moscow plant	Moscow	NA.
Do.	Podolsk plant	Podolsk	NA.
Tungsten, mining and beneficiation complexes (W content of concentrates)	Antonovogorsk	East Transbaikal	80.
Do.	Balkan	Urals, northeast of Magnitogorsk	40.
Do.	Belukha	East Transbaikal	60.
Do.	Bom-Gorkhom	West Transbaikal	85.
Do.	Dzhida	do.	750.
Do.	Iultin	Magadan Oblast	175.
Do.	Sherlovogorsk	East Transbaikal	40.
Do.	Solnechnyy	Southern Khabarovsk region	40.
Do.	Tyrny-Auz	North Caucasus	3,000.
Do.	Vostok-2	Maritime region	1,200.

See footnotes at end of table.

TABLE 4—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facilities	Location	Annual capacity*
Tungsten, metal	Nalchik plant	Caucasus	NA.
Vanadium, ore	Kachkanar iron ore mining complex	Urals	NA.
Vanadium, metallurgical processing facilities	Chusovoy plant	do.	9,000 total metal.
Do.	Nizhniy Tagil plant	do.	
Zinc (not associated with lead) (metal content of ore)	Bashkir copper-sulfur complex	Sibai in southern Urals	5,000.
Do.	Buribai copper-zinc mining complex	Buribai in southern Urals	1,500.
Do.	Gai copper-zinc mining and beneficiation complex	Gai in Southern Urals	25,000.
Do.	Kirovgrad copper enterprise	Kirovgrad in central Urals	1,200.
Do.	Sredneuralsk copper complex	Revda in central Urals	5,000.
Do.	Uchali copper-zinc mining and beneficiation complex	Uchali in southern Urals	30,000.
Zinc, metal	Chelyabinsk electrolytic zinc plant	Chelyabinsk	190,000.
Do.	Elektrozink plant	Vladikavkaz in North Caucasus	107,000.

*Estimated. NA Not available.

TABLE 5

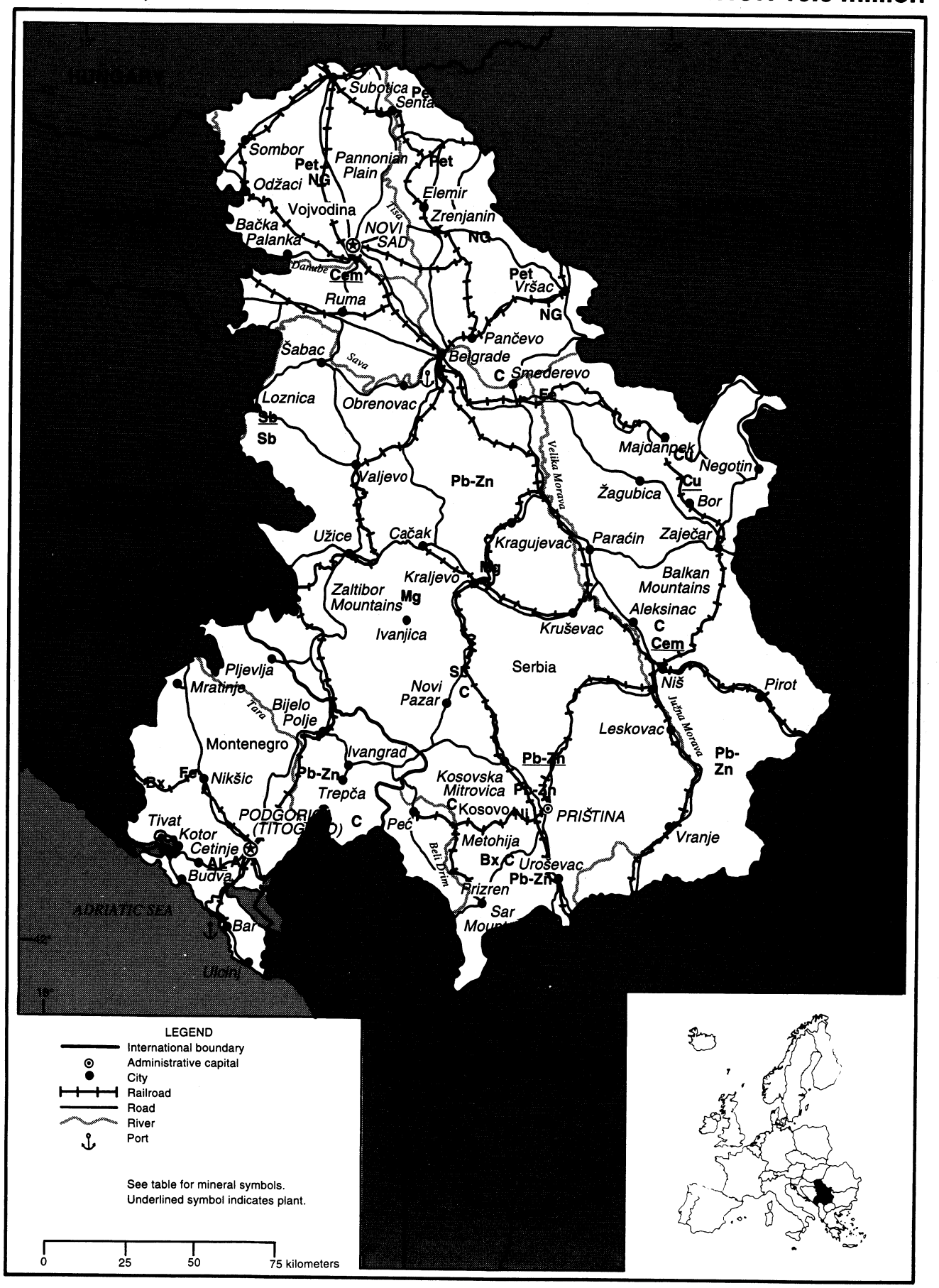
RUSSIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Quantity
Antimony	3,000
Asbestos	100,000
Bauxite	250,000
Cobalt	135
Copper	20,000
Diamond, industrial million carats	35
Fluorspar	60,000
Iron ore million metric tons	55,000
Lead	3,000
Magnesite	585,000
Manganese	15,000
Molybdenum	250
Nickel	6,300
Peat	160,000,000
Phosphate rock, marketable	240,000
Platinum-group metals metric tons	2,000
Potash (K_2O equivalent)	3,000,000
Silver	17
Tin	265
Tungsten	230
Vanadium	5,000
Zinc	4,000

SERBIA and MONTENEGRO

AREA 102,350 km² **POPULATION 10.6 million**



THE MINERAL INDUSTRY OF

SERBIA AND MONTENEGRO

By Walter G. Steblez

In 1992, the Federal Republic of Yugoslavia, as an internationally recognized entity, ceased to exist. The civil war that began in the second half of 1991, involving the Federal Government (supported by the Republics of Serbia and Montenegro) and the Republics of Croatia and Slovenia, spread to the Republic of Bosnia and Hercegovina in 1992. Although the fighting between the Federal Government of Yugoslavia and the Republics of Slovenia and Croatia, respectively, ceased and subsided by mid-1991 and early 1992, heavy and almost continuous military actions were conducted throughout the year in Bosnia and Hercegovina between ethnic factions of Bosnians, Croatians, and Serbians over the control of large areas of Bosnia and Hercegovina that included several of the major industrial cities within the former Yugoslavia. While the Republics of Bosnia and Hercegovina, Croatia, Macedonia, and Slovenia seceded from the Yugoslav union, Serbia and Montenegro continued to preserve a Federal union, claiming continuity as the Federal Republic of Yugoslavia. However, neither the Government of the United States nor the governments of most of the members of the international community recognized this claim. Additionally, because of continuing efforts by the Federal Government of Serbia and Montenegro to support the active military efforts of ethnic Serbian forces in the Republic of Bosnia and Hercegovina, international economic sanctions by the UN were levied on Serbia and Montenegro, which added to an already heavy burden on the country's economy and minerals industry.

Serbia and Montenegro, before 1992, was Yugoslavia's chief producer of nonferrous metals and a leading producer of iron and steel, industrial minerals, and mineral fuels. In 1992, despite severe political and economic upheavals in the country, Serbia and Montenegro continued to be one of Europe's chief producers of refined copper and an important European producer of aluminum, lead, silver, and zinc. In 1992, the country's economy continued to decline. Although reliable GDP index statistics were unavailable, industrial production (mining, quarrying, and manufacturing), measured in terms of volume of physical output, declined by 21% in 1992 compared with that of 1991. Despite the limitations imposed on Serbia and Montenegro's mineral industries by the dissolution of the Yugoslav state, civil war, and the international embargo, activity in this sector during the year by the country's geologists reportedly revealed commercially valuable deposits of alluvial gold and decorative dimension stone. The petroleum industry also reported positive activity during the year.

GOVERNMENT POLICIES AND PROGRAMS

Despite the political and economic situation previously mentioned, the Federal Government of Serbia and Montenegro apparently maintained assistance to the country's mineral industry and heavy industry, in general, to ensure the availability of needed raw materials and equipment to the economy and to prevent potential large-scale social unrest from occurring owing to rapid closures and bankruptcies. However, few details were available during the year concerning specific Government policies that addressed both economic reform or long-term plans to rationalize the major enterprises in Serbia and Montenegro's mineral industry.

PRODUCTION

Serbia and Montenegro was one of the few constituent states of the former Yugoslavia that was not directly affected by civil war battlefield action in 1991 and 1992. The forums of statistical information of the former Yugoslavia largely were continued both in format and reporting methodology by Serbia and Montenegro in 1992 but without data from any of the other constituent states of the former Yugoslavia. Official statistical data, aggregated by major sectors of the minerals industry of Serbia and Montenegro for 1992, indicated declines of production ranging from 12% to 17% compared with that of 1991. Within the sector for energy and mineral fuels, the petroleum refinery component declined by about 49%, although the extraction of crude petroleum and natural gas increased by 6% compared with that of 1991. Aggregated data for the metals sector, both ferrous and nonferrous, indicated a decline of 12%, and for industrial minerals and building materials and chemical products showed declines for these sectors of 14% and 16%, respectively, compared with that of 1991. The decline in the country's mineral and other industrial production was caused not only by the disruption of routine commerce in what formerly was Yugoslavia but also by trade sanctions that were placed on Serbia and Montenegro during the year by the international community. This decline was evident especially from July to December 1992, in all the broad categories of production, ranging from raw materials to capital and consumer

goods. *(See table 1.)*

TRADE

Detailed official information concerning foreign trade for 1992 was unavailable. Aggregated data for the value of the country's exports and imports showed major declines of 77% and 81%, respectively. However, some selected foreign trade data for 1991 were available.

In 1991, Italy was a major importer of metals from Serbia and Montenegro with imports of aluminum, copper, and lead and zinc amounting to about 45,000 mt, 47,000 mt, and 2,500 mt, respectively. Italy was also a major importer of magnesite, with shipments during 1991 amounting to more than 5,800 tons, or about 93% of total exports of this commodity. In 1991, the Federal Republic of Germany imported 9,200 tons of ferroalloys, or about 78% of the total amount of ferroalloys exported by Serbia and Montenegro. In 1991, Poland was among the major exporters of mineral fuels to Serbia and Montenegro. Poland's exports of coal and coke amounted to about 46,000 and 95,000 tons, respectively. The major exporters of crude petroleum to Serbia and Montenegro were Iran and Libya, with shipments in 1991 of about 748,000 tons and 1,508,000 tons, respectively. Imports of rolled steel products amounted to more than 173,000 tons, of which about 47,000 tons, or the largest share, was supplied by Czechoslovakia.

STRUCTURE OF THE MINERAL INDUSTRY

Table 2 lists the administrative bodies as well as subordinate production units of the main branches of the country's mineral industry for 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Aluminum and Bauxite.—Serbia and Montenegro's bauxite mining, alumina refining, and aluminum smelting facilities were chiefly in Montenegro. Rudnici Boksita Niksic operated bauxite mines in Montenegro, and RB Kosovo Klina operated mines in Serbia. The entire output of the latter operation has been exported because of the unsuitability of the bauxite for domestic refineries. Apart from the deposits exploited by RB Kosovo Klina, which contained a refractory-grade diaspore material, Montenegro's monohydrate (boehmitic) bauxite deposits were suitable for metallurgical end use. These deposits were formed into lenticular or irregular-shaped bodies occurring in Triassic and Eocene carbonate rocks.

The civil war in the former Yugoslavia in 1992 did not severely affect Serbia and Montenegro's aluminum production, except at yearend when shortages of petroleum and other fuels, brought about by international trade sanctions against Serbia and Montenegro, were reported to have raised questions about the viability of producing aluminum in the future.

Copper.—Serbia and Macedonia were the former Yugoslavia's principal copper-producing areas. Rudarsko Topionicki Bazen's (RTB) Bor mining, beneficiation, and smelting complex in Serbia accounted for all of the country's mine output of copper from its Bor, Majdanpek, and Veliki Krivelj open pit mines. In 1992, the UN's trade sanctions reportedly not only severely affected the country's copper exports but also resulted in large and potentially environmentally dangerous stocks of sulfuric acid, which normally would have been exported as a byproduct of copper production. Reportedly, the Cerovo deposit, near Bor, which had been under development in 1992, would begin production of copper ore in 1993 at a rate of 2 Mmt/a.

Gold.—Serbia and Montenegro has been a modest producer of gold, in large measure as a byproduct of processing domestic and some imported nonferrous metal ores. The sharp increase of gold production reported from 1990 to 1992 may have reflected production from newly developed deposits in Serbia such as Grabova Reka, Volujski Kluc, and Sveta Barbara. In April, the Department of Mining and Geology of the University of Belgrade and the Bor Mining Institute announced the existence of potentially valuable commercial deposits of alluvial gold near Bor and Lec in Serbia. Extensive prospecting in this region was to have been initiated by yearend. Also, geological studies of alluvial deposits in the upper reaches of the Timok and Pek Rivers reportedly indicated a gold content ranging from 0.78 to 1.84 g/m^3 of sand.

Iron and Steel.—Despite considerable difficulties during the first half of 1992, associated with the civil war in the former Yugoslavia, the nongovernmental Yugoslav Iron and Steel Industry Federation, which consisted of steelworks in Bosnia and Hercegovina, Macedonia, and Montenegro and Serbia, continued its attempt to follow guidelines proposed by British Consulting Ltd. to rationalize the steel industries in these Republics to Western European standards. However, this effort apparently came to an end with continued fighting in Bosnia and Hercegovina and the imposition of economic sanctions on Serbia and Montenegro by the UN. The impact of trade embargoes on Serbia and Montenegro was strongly felt during the year. The Smederevo integrated iron and steel complex was heavily dependent on imported ore from the CIS countries, India, and several African countries and on coking coal from Russia and the United States. Shortages of needed raw materials threatened to disrupt and/or stop production at this facility throughout the year. Also, the Boris Kidric minimill at Niksic in Montenegro, which depended entirely on supplies of iron and steel scrap, reportedly had to stop operations at yearend for several weeks because of supply shortages.

Lead and Zinc.—Serbia and Montenegro's share of the former Yugoslavia's total mine production of ore constituted slightly more than 40% in

1990. The country's deposits of Pb-Zn ore are of the hydrothermal metasomatic type in limestone and siliceous rocks. The irregular but compact ore bodies reportedly range in size from several thousand to several million tons. The Trepca deposit in the Kosovo province of Serbia was the country's largest Pb-Zn deposit. Reportedly, since the mid-1960's, some Pb-Zn ores and concentrates had been imported to meet the needs of the country's smelters and refineries. Additionally, some of Serbia and Montenegro's refinery capacity had been used to toll refine lead for foreign consumers.

In 1992, an ecological disaster reportedly was narrowly avoided at the Brskovo Lead and Zinc Mine at Mojkovac in Montenegro when a swollen Tara River damaged a 100-meter section of a retaining dam at the mine tailing dump that contained an estimated 3.5 Mm^3 of highly toxic wastes (arsenic, cadmium, cyanides, lead, mercury, sulfides, etc.). Reportedly, the EC approved a loan of $135,000 for repair of the dam. Long-term plans were reviewed for eliminating the tailings dump entirely from the proximity of the Tara River to prevent similar situations from occurring. Should the Tara River become contaminated by the contents of the tailings dump, it reportedly would poison the downstream ecosystems along the entire length of the Danube riverine system.

Industrial Minerals

Serbia and Montenegro produced a large number of industrial minerals that included barite, bentonite, gypsum, kaolin, magnesite, and pumice for domestic needs as well as exports.

Magnesite.—Serbia and Montenegro was an important European producer of magnesite, ranking third after Greece and Spain. The country's operating deposits, all situated in Serbia, had the combined capacity to produce more than 400,000 mt/a of ore. The largest deposit was operated by Rudnik i Industrija Magnezita "Strezovce" at Beli Kamen. The lenticular ore deposit was measured up to 160 m in thickness, dipping northwest at angles between 40° and 60° with a northeast-southwest strike. The open pit mine was rated to produce 300,000 mt/a of magnesite.

Stone.—In March, officials of "Ukras," DP industrija i rudnici mermera (Ukras) of Serbia, a marble quarrying and facing stone manufacturing concern, announced the discovery of a deposit of black granite at Mount Kapaonik in southwestern Serbia. The deposit was reported to contain 200,000 m^3 of exploitable decorative stone. Ukras officials indicated that the granite would be used domestically and also would be exported after the lifting of international sanctions from Serbia and Montenegro.

Mineral Fuels

In January, officials of the country's natural gas and petroleum industry indicated that owing to the cutoff of imported petroleum along the Adriatic pipeline, Serbia and Montenegro would import 100,000 tons of petroleum per month from Romania through the Danube River. Also, about 100,000 mt/month would be obtained from abroad through rail carriage, and an additional 100,000 tons of crude petroleum per month would be produced domestically to supply the country's refineries at Pancevo an Novi Sad. In April, the completion of a 733-km section of a natural gas pipeline was announced. The completion of the entire pipeline project of more than 1,400 km was scheduled for 1995. The gasline would serve the cities of Bor, Cacak, Knjazevac, Leskovac, Nis, and Uzice with 4,600 Mm^3/a of natural gas, and replace an annual consumption of coal of more than 10 Mmt.

Reserves

The eventual development and transformation of Serbia and Montenegro's economy to a market-base system would require a reevaluation of the country's mineral resources from a market perspective. Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other nonmarket economy countries, such as Yugoslavia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade. In category A the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological

environment are known in good detail.

In category C_1 the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of minerals cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively. The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes. Major exploitable mineral resources in Serbia and Montenegro included antimony (12 Mmt ore), copper (4 Mmt, contained in ore), and magnesite (13 Mmt ore).

INFRASTRUCTURE

Serbia and Montenegro's inland system of ways and communications consisted of 49,966 km of railroads and highways. The country's inland waterway system was another important component of this network. Although data in respect to the total length of the inland waterway system had not yet been officially reported, it was reported that a total of 11.6 Mmt of freight was carried on this system in 1991. The railroad system consisted of 3,947 km of 1.435-meter gauge track, of which 277 km was double track and 1,339 km was electrified. The highway and road system consisted of 46,019 km of paved, gravel, and earth-surfaced road, of which 26,949 km was paved, 10,373 km was gravel, and 8,697 km was earth surfaced. The country's merchant marine fleet consisted of 43 ships amounting to 1,449,049 dwt. Pipelines for crude petroleum were 415 km in length, while those for refinery products and natural gas were 130 km and 2,110 km, respectively.

OUTLOOK

Serbia and Montenegro in the long term could remain an important European producer of minerals because of its long history of mining and sufficient resources of a number metalliferous and industrial minerals. The political future of the country and the types of government structures that will emerge are difficult to foresee. However, in the postcivil war and embargo period, Serbia and Montenegro will require extensive modernization of its infrastructure, giving added value to the construction materials and structural steels sectors in the country.

OTHER SOURCES OF INFORMATION

Agencies

Privredna Komora Jugoslavije (Yugoslav Chamber of Economy)
11001 Belgrade, Terazije
15-23 P.O Box 1003
Savezni Geoloski Zavod (Federal Geological Institute)
Belgrade, Yugoslavia

Publications

Indeks (Index), monthly.
Statisticki Godisnjak (Statistical Yearbook).
Nafta (Petroleum), monthly.
Celik (Steel), monthly.

TABLE 1

SERBIA AND MONTENEGRO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Bauxite, gross weight		934,000	979,940	940,000	900,000	[3]792,000
Alumina, calcined, gross weight		273,000	267,000	269,000	208,000	185,000
Metal, ingot, primary and secondary		71,000	74,000	81,000	76,000	[3]75,792
Antimony:						
Mine and concentrate ouput:						
Ore, gross weight		34,873	[e]40,000	[e]20,000	—	—
Sb content of ore		725	798	405	—	—
Concentrate, gross weight		1,045	[e]1,259	[e]530	—	—
Metal		1,145	1,081	248	19	10
Bismuth, metal		23	40	85	70	60
Cadmium		162	133	100	110	90
Chromite, concentrate (produced largely from imported ores)		15,917	13,329	11,610	4,250	3,000
Copper:						
Mine and concentrator output:						
Ore, gross weight	thousand tons	26,134	26,252	26,463	25,758	[3]23,085
Cu content of ore		93,741	130,000	132,000	[e]100,000	90,000
Concentrate, gross weight		515,876	536,000	542,000	519,000	470,000
Metal:						
Blister and anodes:						
Primary		106,457	101,606	105,908	[e]100,000	90,000
Remelted		65,519	71,394	68,349	[e]55,000	40,000
Total		171,976	173,000	174,257	155,000	130,000
Refined:						
Primary		105,595	101,877	102,221	[e]100,000	85,000
Remelted		39,781	49,158	49,174	[e]34,193	29,763
Total		145,376	151,035	151,395	[3]134,193	[3]114,763
Gold, refined	kilograms	4,620	3,741	8,190	[e]7,500	6,000
Iron and steel:						
Ore and concentrate: Agglomerate		952,000	1,350,000	1,196,000	[e]600,000	400,000
Metal: Ferroalloys:						
Ferronickel		15,047	17,102	11,850	[e]10,000	5,000
Pig iron		794,000	881,000	767,000	526,000	500,000
Crude steel		1,111,000	1,170,000	1,012,000	725,000	[3]678,000
Semimanufactures		1,821,000	2,019,000	1,856,000	1,352,000	950,000
Lead:						
Mine and concentrate output:						
Ore, gross weight (Pb, Zn ore)		2,207,000	1,920,000	1,573,000	1,237,000	700,000
Pb content of ore		55,508	48,000	39,000	[e]30,000	20,000
Concentrate, gross weight		66,973	58,000	46,000	[e]45,000	40,000
Metal:						
Smelter, primary and secondary		98,360	89,000	70,000	51,000	30,000
Refined, primary and secondary		83,000	70,000	48,000	44,000	[3]25,000
Magnesium: Metal		6,176	6,105	5,788	[e]6,000	4,000
Nickel: Metal, Ni content of Fe Ni[e]		4,000	5,100	3,600	2,400	2,000

See footnotes at end of table.

TABLE 1—Continued

SERBIA AND MONTENEGRO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS—Continued						
Platinum-group metals:						
Palladium	kilograms	142	199	130	[r]120	60
Platinum	do.	23	23	21	20	10
Selenium	do.	60,812	55,241	59,181	[r]55,000	30,000
Silver	do.	116,785	[r]109,000	85,896	69,918	[3]66,420
Zinc:						
Zn content of Pb, Zn ore		47,936	42,000	33,000	[r]27,000	17,000
Concentrator output, gross weight[e]		[3]76,144	68,000	51,000	50,000	36,000
Refined zinc		75,523	69,000	61,305	38,648	[3]14,185
INDUSTRIAL MINERALS						
Asbestos, all kinds		956	1,502	1,353	1,767	2,000
Cement	thousand tons	2,891	2,931	2,723	2,411	[3]2,036
Clays:						
Bentonite		14,863	16,000	5,000	[r]5,000	5,000
Ceramic clay		60,097	64,000	61,000	35,000	25,000
Fire clay:						
Crude		92,162	95,000	68,000	[r]67,000	65,000
Calcined		28,070	30,760	20,291	[r]16,600	15,000
Kaolin:						
Crude		156,855	135,000	143,000	[r]115,000	100,000
Washed[e]		[3]20,933	24,000	18,000	15,000	13,000
Feldspar, crude		5,209	14,490	12,716	9,309	9,000
Gypsum, crude[e]		39,777	56,782	45,541	42,595	18,000
Lime	thousand tons	944	846	671	680	[3]565
Magnesite:						
Crude	do.	376	352	252	210	185
Caustic calcined		11,113	11,682	9,257	10,034	9,000
Mica, all grades		807	794	802	800	500
Nitrogren, N content of ammonia	thousand tons	338	180	179	170	150
Pumice and related volanic materials, volanic tuff		57,083	103,000	150,000	100,000	80,000
Quartz, sand	thousand tons	1,886	1,771	1,467	1,249	1,000
Salt, all sources		29,491	32,864	43,815	34,603	[3]46,945
Sand and gravel excluding glass sand	thousand cubic meters	9,317	10,132	8,655	7,037	[3]5,343
Sodium compounds:						
Caustic soda		81,369	90,600	88,427	51,332	[3]23,176
Sodium sulfate[e]		[3]27,195	25,000	20,000	15,000	5,000
Stone, excluding quartz and quartzite:						
Dimension: Crude:						
Ornamental	square meters	342,000	597,000	356,000	234,000	[3]278,000
Crushed and broken, n.e.s.	thousand cubic meters	4,422	4,676	4,222	4,059	4,000
Other	cubic meters	19,519	15,419	13,607	10,445	10,000
Sulfur:[e]						
Sulfur content of pyrite	thousand tons	356	292	219	61	60

See footnotes at end of table.

TABLE 1—Continued

SERBIA AND MONTENEGRO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
INDUSTRIAL MINERALS—Continued						
Sulfur—Continued:						
Byproduct:						
Metallurgy	thousand tons	150	155	155	140	130
Petroleum	do.	1	1	1	1	1
Total	do.	507	448	375	202	191
MINERALS FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand tons	148	132	137	122	[3]102
Brown	do.	711	768	676	690	[3]703
Lignite	do.	42,730	43,603	44,678	39,598	[3]39,300
Natural gas, gross production	million cubic meters	861	660	646	749	[3]846
Petroleum:						
Crude:						
As reported	thousand tons	1,114	1,090	1,063	1,100	[3]1,165
Converted	thousand 42-gallon barrels	8,264	8,086	7,885	8,160	[3]8,642
Refinery products[e]	do.	38,000	55,000	55,000	45,000	25,000

[e]Estimated.

[1]Table includes data available through July 1993.

[2]In addition to commodities listed, common clay and diatomite also are produced, and tellurium may be recovered as a copper refinery byproduct, but available information is inadequate to make reliable estimates of output levels.

[3]Reported figure.

TABLE 2

SERBIA AND MONTENEGRO: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Kombinat Aluminijuma Titograd	Plant at Titograd, Montenegro	200.
Aluminum	do.	Smelter at Titograd, Montenegro	100.
Antimony, metal	Zajaca, Rudarsko Topionicarski Bazen	Smelter at Zajaca, Serbia	4.
Antimony ores and concentrates	do.	Mines and mills near Zajaca, Serbia	80.
Do.	do.	Mines and mill at Rajiceva Gora, Serbia	300.
Bauxite	Rudnici Boksita Niksić	Mines in Montenegro at Kutsko Brdo, Zagrad, Biocki Stan, Durakov Do., and other locations	650.
Coal:			
Bituminous	Ibarski Rudnici Kamenog Uglja	Mines at Jarando and Ušće, near Baljevac na Ibru, Serbia	250.
Lignite	SOUR Kolubara, Rudarsko Energetsko Industrijski Kombinat, RO	Opencast mines: Polje B and Polje D	10,000.
Do.	Kolubara Površinski Kopovi	Tamnavski Kopovi (also known as Kolubarski Rudnici Lignita), near Vreoci, Serbia	14,000.
Do.	SOUR Elektroprivreda Kosova, RO Kosovo, Proizvodnja Separacija i Transport Uglja	Opencast mines: Dobro Selo and Belacevac, near Obilić, Serbia	2,000.
Cement	Beocinska Fabrika Cementa	Plant at Beocin, Serbia	2,031.
Do.	Fabrika Cementa Novi Popovac	Plant at Popovac, Serbia	1,613.
Copper	Rudarsko Topionicki Bazen Bor	Smelter at Bor, Serbia	180.
Do.	do.	Electrolytic refinery at Bor, Serbia	180.
Do.	do.	Mine and mill at Bor, Serbia	5,000 ore.
Do.	do.	Mine and mill at Majdanpek, Serbia	15,000 ore.
Do.	do.	Mine and mill at Veliki Krivelj, Serbia	8,000 ore.
Lead-zinc ore	Rudarsko-Metalurško-Hemijski Kombinat za Olovo i Cink Trepca	Mines at Ajvalija, Kopaonik, Badovac; Trepca, Blagodat, Lece; Veliki Majdan, Tisovak; and Kišnica, Rudnik, Veliki, and Majdan, Šuplja Stijena	5,000.
Do.	do.	Mills at Kriva Feja, Lece, Rudnik, Badovac, Leposavic, Zvecan, and Maravce, Šuplja Stijena	3,160.
Do.	Hemijska Industrija Zorka:		
Do.	Brskovo, Rudnici Olova i Cinka	Mine at Brskovo, Montenegro	500.
Do.	Veliki Majdan Rudnik Olova i Cinka	Mine at mill near Krupanj, Serbia	250.
Lead, metal	Rudarsko Metalurško Hemijski Kombinat za Olovo i Cink Trepca	Smelter at Zvecan, Serbia	180.
Do.	do.	Refinery at Zvecan, Serbia	90.
Magnesite	Rudnici Magnezita "Šumadija"	Mine and plant at Šumadija, 20 kilometers northwest of Cacak, Serbia	120 concentrate.
Do.	Rudnik i Industrija Magnezita "Strezovce"	Opencast mine at Beli Kamen, Strezovce, near Titova Metrovica, Serbia	300.
Do.	do.	Sinter plant at Strezovce	40.
Do.	Magnohrom, Rudnik Magnezita "Magnezit"	Mine at Bela Stena, Baljevac na Ibru, Serbia	30.

TABLE 2—Continued

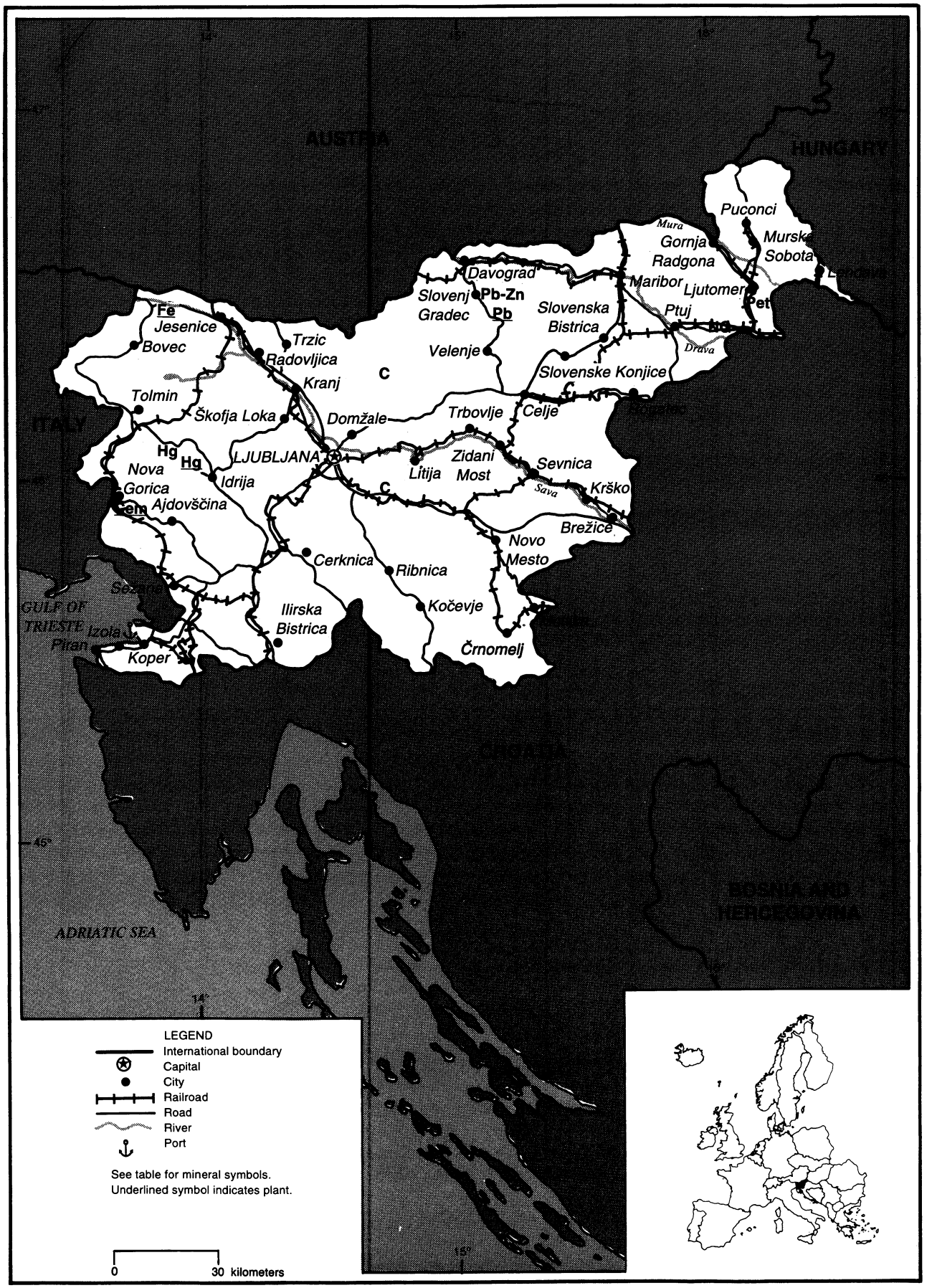
SERBIA AND MONTENEGRO: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Natural gas million cubic feet	Naftaplin (Naftagas), RO za Istrazivanje, i Proizvodnju Nafte i Gasa	Natural gas fields in Serbia: Kikinda and others	30,000.
Petroleum: Crude thousand barrels per day	Naftagas, Naftna Industrija	Oilfields in Serbia: Kikinda and others	30.
Refined	Naftagas, Naftna Industrija:		
Do. do.	Rafinerija Nafte Pancevo	Refinery at Pancevo, Serbia	110.
Do. do.	Rafinerija Nafte Novi Sad	Refinery at Novi Sad, Serbia	28.
Pig iron	Metalurški Kombinat, Smederevo	Blast furnace at Smederevo, Serbia	720.
Steel, crude	do.	Plant at Smederevo, Serbia	600.
Zinc metal	Rudarsko Metalurško Hemijski Kombinat Olova i Cinka Trepca, Metalurgija Cinka	Electrolytic plant at Titova Metrovica, Serbia	40.
Do.	Hemijska Industrija Zorka	Electrolytic plant at Šabac, Serbia	40.

SLOVENIA

AREA 20,296 km² **POPULATION 2 million**



THE MINERAL INDUSTRY OF

SLOVENIA

By Walter G. Steblez

In 1992, the Federal Republic of Yugoslavia, as an internationally recognized entity, ceased to exist. Slovenia was the first constituent republic of the former Yugoslavia to demand autonomy from the Yugoslav Federation. The demand for autonomy was followed by a declaration of independence and sovereignty by yearend 1991. The civil war that began in the second half of 1991, involving the Federal Government (supported by the Republics of Serbia and Montenegro) and the Republics of Croatia and Slovenia, ended rapidly for Slovenia in complete victory and independence; however, it spread to the Republic of Bosnia and Hercegovina in 1992. Slovenia's independence was followed by almost universal diplomatic recognition by the international community. The country's industry and infrastructure largely remained unscathed. Slovenia was a modest producer of minerals within the context of total mineral production in the former Yugoslavia. According to data on industrial production for 1990, the last year for which complete comparative production statistics for Yugoslav Republics were available, Slovenia produced about 29% of the former Yugoslavia's primary aluminum and 46% of the total electric furnace steel output. The country, however, was only a modest producer of industrial minerals and fossil fuels. On the other hand, Slovenia reportedly had the most modern and technologically advanced fabricating industry and a per capita national income equal to about twice the average of the former Yugoslavia.

GOVERNMENT POLICIES AND PROGRAMS

In 1992, the primary concern of the Government of Slovenia was to limit economic dislocations in terms of employment, production, and foreign commerce caused by the disintegration of Yugoslavia. Concurrently, the Government sought to limit the rate of inflation to 16% or less, as opposed to the 30% rate earlier in the year, and to continue efforts to bring the country's economy in line with Western European market practices. Enterprises in the country's mineral industries could no longer be required to produce at all costs as many of them did under central planning in the former Yugoslavia. Closure of unprofitable operations would be allowed, as was the case with mercury and uranium mining.

PRODUCTION

The production table for Slovenia was compiled from data presented in a variety of statistical publications of the former Yugoslavia through 1991. The major portion of the country's production statistics, however, was obtained from "Industrijska Proizvodnja," an annual statistical compendium published in Belgrade through 1990 that presented production data by constituent Federal republics, as well as by total output for the former Yugoslavia. *(See table 1.)*

TRADE

Detailed official information concerning Slovenia's foreign trade for 1992 largely was unavailable. However, aggregated data available for trade returns for 1990 for the value of the country's exports and imports showed Slovenia's exports, valued in U.S. dollars, to have amounted to about 28.8% of Yugoslavia's exports during that year. Similarly, Slovenia's imports in 1990 amounted to about 25% of total imports by the former Yugoslavia. The value of the country's exports of crude materials (including non-fuel minerals) amounted to more than 12% of the total exports for 1990 by the former Yugoslavia. Slovenia's imports in this category and that of fossil fuels amounted to about 14% of the total. For 1992, Slovenia reported a positive balance of trade that showed a growth of 8% compared with that of 1991.

STRUCTURE OF THE MINERAL INDUSTRY

Table 2 lists the apparent administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1992. *(See table 2.)*

COMMODITY REVIEW

Metals

Aluminum.—Slovenia produced both alumina and aluminum at the refinery and smelter operated by Unial Tvornica Glinice i Aliminija Boris Kidric in Kidricevo. The alumina refinery and aluminum smelter, respectively, produced about 7% and 29% of the former Yugoslavia's total production of these commodities in 1990 and represented 10% and 16% of that country's refining and smelting capacity. Lacking a domestic bauxite mining industry, Slovenia in past years relied on bauxite mined in other constituent republics of the former Yugoslavia. In common with other raw materials produced in the former Yugoslav republics on which Slovenia's processing and manufacturing sectors depended, the necessity of

looking for new sources of bauxite supplies was one of the chief concerns in the country's industry in 1992.

Iron and Steel.—Slovenia's steel industry consisted of three steel mills operated by Zdruzeno Podjetje Slovenske Zeljezare at Jesenice, Ravna na Kuroskem, and Store. The combined capacity at the facilities was about 800,000 mt/a of steel. Although open-hearth steel capacity at the Jesenice steel mill amounted to about 300,000 mt/a, only a small portion of this capacity had been utilized in recent years. More than 90% of the steel produced in the country was at electric furnaces at the three steel mills that used steel scrap as a feedstock. Owing to the dislocation of commerce caused by the civil war in the former Yugoslavia, in 1991-92, Slovenia reported crude steel production to have declined by about 40% in 1992 compared with that of 1990.

Lead and Zinc.—Reportedly, Slovenia's only lead and zinc mine, an underground operation at Mezica, was scheduled for closure at the end of the year, mainly because of the total disruption of markets in the former Yugoslavia. Outside the commercial system that existed in the former Yugoslavia, apparently the Mezica Mine proved to be uneconomic. Whether or not the Mezica mill and lead smelter and refinery were to be closed or were to operate on the basis of imported ores and concentrates had not yet been determined.

Mercury.—Similar to the situation in lead and zinc mining, Croatia's and the former Yugoslavia's only mine producer of mercury, Rudnik Zivego Srebra at Idrija, proved to be uneconomic and was to have been closed by yearend.

Industrial Minerals

Apart from being a substantial producer of glass sand (about 400,000 mt/a), Slovenia was a modest producer of clays, gypsum, ornamental stone, and other industrial minerals, mostly for domestic uses.

Mineral Fuels

Uranium.—In mid-1991, the Republic of Slovenia decided to permanently close down the Zirovski Vrh uranium mine at Todraz following the last shipment of 60 tons of yellowcake to the United States for processing. Although the Zirovski Vrh uranium mine, Yugoslavia's sole producer of uranium ore, reportedly ceased mine production in 1990 because of environmental concerns, it was officially decommissioned in 1992. Uranium produced at Zirovski Vrh was consumed by the 650-MW Krsko nuclear powerplant in Slovenia, near the Croatian border. Reportedly, the Government of Slovenia also planned to decommission the nuclear powerplant by 1995, owing partly to difficulties associated with the disposition of nuclear waste.

Reserves

The transformation of Slovenia's economy to a market-based system should generate a reevaluation of the country's mineral resources from a market perspective. Reserves, as defined by market economy countries, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other non-market-economy countries, such as Yugoslavia, political rather than economic consideration was paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data. The system that was used to measure "reserves" was based on two cross-imposed classification schemes, one relating to the exploitability of the mineral in question and the other relating to the reliability of the information on its quantity and grade. The first system determined whether or not the deposit was suitable for exploitation, given the current technological capability and need. The second classification related to the reliability of the data gathered on the quantity of the mineral in situ. The second classification designated deposits into "reserve" categories A, B, C_1, and C_2, based on the Soviet classification system, where sufficient geological data had been gathered relative to the size of the deposit and its mineral grade.

In category A the "reserves" are known in detail. The ore boundaries are outlined by trenching, exploratory, workings, or exploratory boreholes. The depositional environment, the proportion of different commercial grades of ore, and the hydrogeological conditions of the exploitations have been ascertained, and the quality and technological properties of the ore ascertained in detail, ensuring the reliability of projected beneficiation and production operations.

In category B, the "reserves" in place are explored. The ore bodies are outlined by exploratory workings or boreholes. The depositional environment is known, and the types and industrial grades of ore are ascertained but without details of their distribution. The quality and technological properties of the ore are known sufficiently well to ensure the correct choice of the system for its beneficiation. The general conditions of exploitation and the hydrogeological environment are known in good detail.

In category C_1, the "reserves" in place are estimated by a sparse grid of exploratory boreholes or workings. This category also includes "reserves" adjoining the boundaries of A and B categories of ore as well as "reserves" of very difficult deposits in which the distribution of the values of minerals cannot be determined even by a dense exploratory grid. The quality, types and industrial grades, and technology of beneficiation are ascertained tentatively by means of laboratory tests and analyses and by analogy with known deposits of the same type. The general conditions of exploitation and the hydrogeological environment are known tentatively.

The C_2 category includes those "reserves" in place that adjoin the explored "reserves" of A plus B plus C_1 categories as well as "reserves" indicated by geological and geophysical evidence and confirmed by boreholes.

INFRASTRUCTURE

Slovenia's inland system of ways and communications consisted of railroads, highways, and waterways. Although data with respect to the total lengths of the railroad and inland waterway systems have not yet been officially reported, the highway and road system reportedly consisted of 14,553 km of paved and gravel road, of which 10,525 km was paved and 1,404 km was gravel-surfaced. The country's merchant marine fleet consisted of 21 ships under foreign flags, totaling 558,621 dwt. Pipelines for the carriage of natural gas extended 305 km, while those for petroleum were 290 km in length.

OUTLOOK

Slovenia had not been severely affected by the civil war that occurred in the former Yugoslavia and the country's industries and infrastructure remained mostly intact. Because of Slovenia's relatively advanced industry and infrastructure, the country should adapt more easily to Western European economic practices than most other former centrally planned economy countries in central Europe. The country's mineral industries, apart from the steel industry, will likely an have even smaller profile in the economy than in previous years.

OTHER SOURCES OF INFORMATION

Agency

Mining Institute of Ljubljana
Ljubljana, Slovenia

Publication

Rudarsko-Matalurski Zbornik (Mining and Metallurgy Quarterly for geology, mining, and metallurgy) Ljubljana, Slovenia.

TABLE 1
SLOVENIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[e]
METALS						
Aluminum:						
Alumina		100,678	98,000	83,000	e80,000	75,000
Metal, ingot; primary and secondary		86,262	98,000	100,000	e84,000	80,000
Iron and steel:						
Metal: Ferroalloys:						
Ferrochromium		17,765	20,880	16,734	e10,000	7,000
Ferrosilicochromium		1,348	—	—	—	—
Ferrosilicocalcium		772	144	835	e500	400
Ferrosilicon		26,253	24,980	16,901	16,000	14,000
Crude steel:						
From Siemens-martin furnaces		4,897	—	—	—	—
From electric furnaces		764,130	751,000	504,000	e350,000	300,000
Total		769,027	751,000	504,000	e350,000	300,000
Semimanufactures[e]		[3]589,000	[3]533,000	420,000	300,000	250,000
Lead:						
Mine and concentrator output:						
Ore, gross weight (Pb-Zn ore)		202,727	148,000	137,000	e150,000	[3]152,225
Pb content of ores		2,734	2,974	2,239	e2,000	2,000
Concentrate, gross weight		3,143	3,593	2,744	e2,400	[3]1,774
Metal:						
Smelter, primary and secondary		20,576	19,360	23,726	e12,000	6,000
Refined, primary and secondary		7,543	7,845	12,163	e6,000	4,000
Mercury[e]	kilograms	[3]69,980	[3]51,000	37,000	35,000	32,000
Silver	do.	1,523	3,624	1,432	e800	400

See footnotes at end of table.

TABLE 1—Continued

SLOVENIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992e
METALS—Continued						
Uranium:						
Mine output, gross weight ore		107,365	125,995	80,457	—	—
Concentrate		93	101	58	—	—
U_3O_8 content[e]		65	71	40	[3]—	—
Zinc:						
Zinc content of Pb-Zn ore		6,288	4,679	4,097	e2,500	[3]1,550
Concentrate output, gross weight		6,495	6,493	6,255	e6,000	[3]5,567
Zn alloys from smelter[e]		[3]2,748	[3]3,200	3,000	3,000	2,500
INDUSTRIAL MINERALS						
Cement	thousand tons	1,285	1,176	1,143	e1,100	1,000
Clays:						
Ceramic clay, crude		23,891	2,942	2,944	e2,500	2,500
Fire clay, crude		5,228	4,597	3,124	e3,000	3,000
Kaolin:						
Crude		34,738	26,736	13,559	15,000	15,000
Washed[e]		[3]8,196	7,000	5,000	5,000	5,000
Gypsum, crude[e]		[3]17,059	16,000	16,000	12,000	10,000
Lime	thousand tons	507	493	472	e350	250
Pumice and related materials, volcanic tuff[e]		[3]105,182	105,000	100,000	90,000	50,000
Quartz, quartzite, glass sand:						
Quartz and quartzite		18,635	18,759	11,383	e12,000	10,000
Glass sand		495,123	483,000	390,000	e350,000	300,000
Total		513,758	501,759	401,383	e362,000	310,000
Salt, all sources[e]		[3]6,800	[3]—	3,500	3,000	3,000
Sand and gravel, excluding glass sand	thousand cubic meters	2,803	2,899	2,519	e2,300	2,000
Stone, excluding quartz and quartzite:[e]						
Dimension: Crude:						
Ornamental	do.	550,000	593,000	600,000	500,000	300,000
Other	do.	2,700	3,700	3,500	3,000	3,000
Crushed and brown, n.e.s.	thousand cubic meters	1,712	1,669	1,700	1,500	1,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Brown coal	thousand tons	1,606	1,653	1,373	e1,000	1,000
Lignite	do.	4,737	4,617	4,210	e4,000	4,000
Natural gas, gross producing	million cubic meters	31	35	24	e24	20
Petroleum:						
Crude:						
As reported	thousand tons	2,700	2,600	3,000	e3,000	3,000
Converted	thousand 42-gallon barrels	20,029	19,287	22,255	22,250	22,250
Refinery products[e]	do.	3,100	4,500	4,700	3,800	3,800

[e]Estimated.

[1]Table includes data available through Aug. 1993.

[2]In addition to commodities listed, common clay also was produced, but available information is inadequate to make reliable estimates of output levels.

[3]Reported figure.

TABLE 2

SLOVENIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

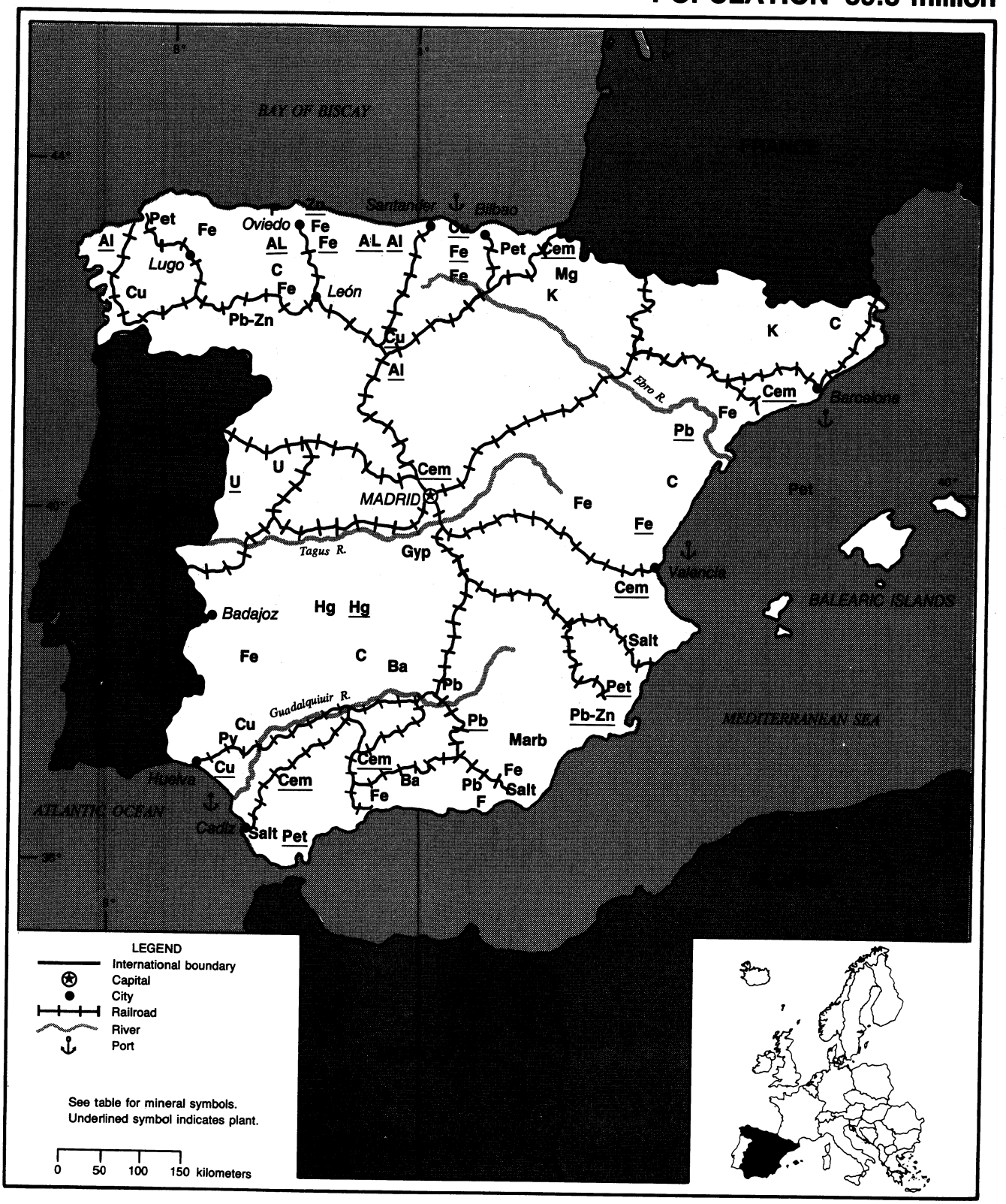
(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Unial, Tvornica Glinice in Aluminija Boris Kidric	Plant at Kidricevo, Slovenia	120
Aluminum	do.	Smelter at Kidricevo, Slovenia	50
Coal:			
Brown	SOZC, Rudarsko Energetski Kombinat E. Kardelj, Trbovlje, Slovenia	Mines: Sasavski Rudnici at Trbovlje, Hrastnik, Ojstro, Senovo, and Kanižarnica	1,300
Lignite	Rudarsko Energetski Kombinat Velenje, RO Rudnik Lignita-Velenje	Mine at Velenje, Slovenia	5,000
Cement	Salonit Anhovo	Plant at Anhovo, Slovenia	1,120
Lead-zinc ore	Rudnik Svinca, Topilnica, Mezica	Mine and mill near Mezica, Slovenia	400
Lead metal	do.	Smelter at Mezica, Slovenia	35
Do.	do.	Refinery at Mezica, Slovenia	30
Mercury	Rudnik Zivega Srebra, Idrija	Mine and smelter in Idrija, Slovenia	[1]15,000
Petroleum:			
Refined thousand barrels per day	Industrija Nafte (INA): Rafinerija Nafte Lendava	Refinery at Lendava, Slovenia	16
Pig iron	Zdruzeno Podjetje Slovenske Zelezarne	2 blast furnaces at Zelezara Jesenice, Slovenia	300
Do.	Zelezara Štore	Electric reduction furnaces at Štore pri Celju, Slovenia	290
Steel, crude	Zdruzeno Podjetje Slovenske Zeljezare	Plant at Jesenica, Slovenia	500
Do.	do.	Plant at Ravne, Slovenia	162
Do.	do.	Plant at Štore, Slovenia	140

[1]Flasks per year.

SPAIN

AREA 504,750 km² **POPULATION 39.3 million**



THE MINERAL INDUSTRY OF

SPAIN

By Harold R. Newman

Spain, whose land area includes a major portion of the Iberian Peninsula, is one of the most mineralized areas in western Europe. The area is geologically very complex, and this increases its potential for mineral resources. The Iberian Pyrite Belt is within the southwestern part of the Iberian Peninsula, covers an area 230 km long and an average of 30 km in width, and trends in an east-west direction from the Portuguese coast near Setubal to the Guadalquivir River near Seville, Spain. This area is considered the most significant mining district within the EC and is an important source of nonferrous and precious metals. The main polymetallic deposits from west to east are Aljustrel and Neves-Corvo in Portugal and Tharsis, Scotiel, Rio Tinto, and Aznalcollar in Spain.

The Iberian Peninsula has a diverse mining history that dates to Phoenician times. Since then, there have been exploitations to extract a wide range of minerals. However, it was not until the middle of the 19th century that intense mining activities were initiated owing primarily to the influx of English and French foreign capital.

In 1992, Spain continued as one of Europe's important mineral producers of base metals and industrial minerals. The country was the EC's major producer of mercury and tantalite and the only significant producer of natural sodium sulfate. The country's entry into the EC meant that many industries had to adjust to economic realities and prepare to compete in the European single market. Sectors particularly affected by this were the coal, fertilizer, and steel industries. Spain's economic growth in recent years has been largely due to the availability of plentiful natural resources, lower labor costs than most other EC countries, and access to EC markets. As a result of a general slowdown in activity in several industrial sectors, Spain had a real GDP increase of about 1% in 1992.

GOVERNMENT POLICIES AND PROGRAMS

The Government has fostered economic growth, but has had to rationalize some of the Government-controlled industries. The coal and steel industries had to reduce production capacity in accordance with Spain's acceptance into the European Coal and Steel Community (ECSC). The resulting loss of jobs increased the rate of unemployment, which was already higher than the EC average unemployment rate. Unemployment at yearend was estimated to be about 19% of the working population.

Investment-led economic growth has provided some relief to the unemployment problem. Over the past 5 years, Spain has enjoyed one of the higher investment-led output growth rates in the Organization for Economic Cooperation and Development (OECD) countries. The Government continued consultations to improve relationships with labor and business in an attempt to maintain a competitive advantage and to control inflation. The Government sees challenges to competitive advantage if inflation and wages are not managed and market-oriented reforms are not continued.

Because of a very high oil dependency ratio, energy supply was a high priority of the Government. The 1990-95 National Energy Plan (PEN) seeks to reduce this ratio by shifting to natural gas and using renewable sources of energy more intensively. Five new coal-fired powerplants were scheduled to be built, and it was expected they would use imported coal.

PRODUCTION

The mineral industry operated in numerous regions throughout the country. The estimated value of Spanish mineral production in 1991, the latest year that full data were available, was about $374,000 million.[1] Fifty percent of this value was attributed to the mineral fuels sector; 10% to the metals sector; and 40% to the industrial minerals sector, including ornamental stone. The number of persons employed in the minerals resource sector in 1991, the latest date data were available, was reported to be 67,000.

Within the EC, Spain was the largest producer of mined lead and zinc, a major producer of pyrites, the only producer of mercury, and had the highest level of self-sufficiency with respect to mineral raw materials.

The industrial growth in the EC contributed to the demand for quarried mineral products from Spain. Quarried natural stone accounted for 16% of the value of Spanish mining. With the exception of coal it was the most important mining sector in dollar value in the country. *(See table 1.)*

TRADE

Liberalization of foreign trade flows has proceeded quickly since Spain's entry into the EC. More than 50% of the differences between Spanish tariffs and EC common market external tariffs had been removed with complete elimination planned by 1994. Table 4 shows the impact of selected classes of mineral commodities on Spain's balance of

payments position in relation to the EC and the world. (*See table 4.*)

Table 3 shows the reserves of selected minerals. Spain was a large importer of mineral fuels, and it was expected that this situation would continue as the demand for energy increased. About 15% of consumption was satisfied by imported coal. Spain received about 80% of its gas supplies from Algeria and Libya, with the remaining from domestic production.

STRUCTURE OF THE MINERAL INDUSTRY

The mineral industry is composed of both state-owned and private-owned entities. Minerals belong to the state under an arrangement known as the "Regalian Principal." The Mining Law of July 19, 1944, as amended, and the Hydrocarbon Law of December 26, 1950, as amended, govern the mineral industry. The Ministry of Industry and Energy implements the mineral laws, regulates the private sector, and manages most of the state-owned companies through the Instituto Nacional de Industria (INI), a state holding company. INI and Instituto Geologico y Minero (IGM) are the principal Government mineral resource agencies. *(See table 6.)*

COMMODITY REVIEW

Metals

Aluminum.—Alumina and primary aluminum were produced almost entirely by the Industria Espanola del Aluminio S.A. (Inespal) Group. INI is Inespal's major shareholder. Alumina Espanola S.A., a subsidiary near San Ciprian, produced alumina, primary aluminum in standard sheets and ingots, and special alloys. In 1992 Inespal's share of the Spanish market for primary aluminum was more than 90% and almost 40% for downstream products.

Difficult times continued for Inespal because of increased electricity cost, increases in Spain's interest rates, and weak world aluminum prices. To reduce costs, the company was reportedly considering closing two of its potlines, one at Aviles and one at La Coruna. If the closure lasts for 12 months, it would result in the loss of 38,000 tons of aluminum at Aviles and 35,000 tons at La Coruna. The company was also considering reducing its work force by an unspecified number. Negotiations were ongoing with the trade unions.

Also, Inespal was to be reformed into a new holding company with four operating subsidiaries: Aluminio Espanol, Inespal Extrusion, Inespal Conversion, and Inespal Productos Planos.

Aluminum Co. of Canada Ltd. (Alcan) sold its 23.9% financial share of Inespal to INI in 1990. It was reported that Alcan was in negotiations with INI to acquire a majority shareholding of Inespal. Alcan had stated it would be interested only if a majority interest in Inespal could be acquired.

Alcan was still involved in the Iberian market and has established a subsidiary, Alcan Iberica, to market its products in Spain and Portugal from Alcan plants in Germany, Switzerland, and the United Kingdom.

Industria Navarra del Aluminio (Inasa), a 77%-owned subsidiary of Reynolds International Inc., completed a $25 million expansion of its aluminum foil operation at its Pamplona plant. This expansion raises Inesa's foil capacity to 18,600 mt/a.

Copper.—Rio Tinto Minera S.A. (RTM) operated a smelter and refinery at Huelva with a capacity of 90,000 mt/a of copper cathodes, 150 mt/a of refined silver, and 5 mt/a of gold. The copper smelter was the second largest in Europe, and the complex was the only one in Spain that both transformed copper ore into raw copper and then refined the copper in an electrolysis plant.

Ercros Group, Spain's largest chemicals, fertilizers, mining, and explosives company, was negotiating with Freeport McMoRan Inc. of the United States to sell its Fertilizantes Espanoles S.A. (Fesa) and Empresa Nacional de Fertilizantes S.A. (Enfersa) fertilizer divisions and RTM. Terms were undisclosed; however, it was reported that an agreement would include expansion of capacity of the smelter at Huelva from the current 90,000-mt/a to 130,000-mt/a utilizing feed from McMoRan's Indonesian operation.

Electrolisis de Metales S.A. (ELMET) was constructing a new plant to treat secondary materials to produce black copper. The black copper material to be produced is a binding of 80% copper with varying amounts of lead, nickel, and tin. The technology is based on "Caldo" ovens with oxygen injection, which Metallo Chimique of Belgium developed. Metallo Chimique is the parent company of ELMET.

La Farga Lacambra, a copper semimanufacturer and operator of a secondary copper smelter, constructed a new copper tube plant at its operation near Barcelona. The company reportedly had a 11% share of the Spanish copper tube market in 1992. Lacambra has a total plant capacity of 55,000 mt/a of wire rod, tubes, and wire.

Gold.—Navan Resources PLC of Ireland and Tolsa S.A. of Spain were continuing with their joint-venture gold exploration project in the Almeria Province of southern Spain. Navan, with 80% interest, would participate as operator in the exploration of a 150-km^2 area. Previous exploration by Billiton Minerals S.A. on the La Mezquita concession at Palai-Islica had delineated a deposit of 750,000 tons of ore with a grade of almost 2.2 g/mt of gold.

Filon Sur and Thorco Resources continued processing gold ore at Europe's first heap-leach gold project in Spain. The project, near the southwestern Spanish port of Huelva, focused on processing tailings to recover gold. The ore was produced from Minas de Tharsis' mining operations that originally recovered copper, sulfur, and zinc from pyrite deposits.

Iron Ore.—Compania Andaluza de Minas S.A. (CAM) is the largest iron ore producer in Spain. In addition to an open pit mine that produced about 3.3 Mmt/a from the Alquife deposit on the north side of the Sierra Nevada approximately 80

km from Granada, CAM operated a 90,000-dwt-capacity shiploader at the Port of Almeira.

Golden Shamrock Mines of Australia, which owns 62% of CAM, and Banco Central Hispano of Spain, which owns 38% of CAM, have agreed to sell their respective shares to CAM's management and employees. A plan was drawn up for capital investments of $6 million over 2 years to improve existing operations.

CAM was in the process of negotiations with various organizations to reduce its costs. This involved energy costs, rail to port costs, and labor costs through some reduction in the work force. CAM was also considering reducing production. On the whole these measures were expected to enable the company to continue mining the Alquife deposit for another 5 years.

CAM also started a drilling program at its new Calahora deposit about 3 km from the current mine site. If sufficient reserves are defined, CAM was expected to start exploiting the deposit in the late 1990's.

Iron and Steel.—The Spanish steel industry was continuing in its efforts to adapt to the economic environment and realities of the common market in Europe. The industry was completely integrated into the EC except for some minor issues such as residual tariffs that remained in effect until the end of 1992. However, the industry remained under heavy pressure because of an excess of supply in the Spanish market.

The Spanish Government set up a new state-owned holding company, Corporacion de la Siderurgia Integral (CSI), for Spain's two largest integrated steel producers, Ensidesa and Altos Hornos de Vizcaya (AVH). CSI has been charged with developing the future strategy of the two companies to reduce production costs and improve productivity.

CSI announced a proposal to restore the integrated steel industry to profit by 1995 at a cost of about $6 billion. The plan calls for the shutting down of seven blast furnaces, four at Aviles and three at Sestao, for a total reduction of about 4.8 Mmt/a of blast furnace capacity.

An electric furnace-based thin-slab mill using the SMS-Nucor process would be built at AVH's plant at Sestao near Bilboa. All pig iron production would be concentrated at the Gijon works where blast furnace capacity would be expanded to 3.8 Mmt/a and a series of modifications would be made at the Aviles plant to improve the quality of flat products. The plan is based on a forecast of no growth in Spanish steel demand for the period 1990-98.

The plan requires the approval of both the Spanish Government and the EC. This had not been forthcoming at year-end. The EC's position in the past has been that Spain's raw steel capacity should be reduced to 3.8 Mmt/a. The Government's position has been that, as part of its plan to ease the burden of state subsidies, capacity has already been reduced by 20% to 4.5 Mmt/a.

The Government considers this to be a reasonable level and would stabilize raw steel production, of which 3.5 to 3.7 Mmt/a would be at Ensidesa and 0.8 to 1 Mmt/a would be at AHV. It is unlikely that this issue will be resolved in the near future.

Mercury.—Spain was second only to the former U.S.S.R. in mercury production. It is the only producer in the EC. Work continued on Minas de Almaden y Arrayanes S.A.'s (MAYASA) Las Cuvas Mine at Almaden, in southern Spain. The new mine, expected to begin production in 1993, contained estimated reserves of 140,000 tons of ore at a grade of 5% mercury.

The world's oversupply of mercury during the year hurt the profitability of mercury producers. The drop in both mercury sales and prices continued to aggravate MAYASA's economic problems at its mines. MAYASA was reported to have stopped production and was selling from stockpiled material.

Zinc.—Asturiana de Zinc S.A. is the largest refined zinc producer in the EC and accounts for approximately 4% of the world's zinc production. Asturiana was continuing with its expansion project. The company initiated production from its new 850-mt/a roasting unit. This unit, along with the two existing roasting units, was considered sufficient to cover the planned zinc metal production of 320,000 mt/a. Also, a new electrolytic section with a capacity of 100,000 mt/a was under construction.

The Asturiana smelter is better suited than most European operations to increase output. The company's nearby Reocin Mine supplies 45% of the feed concentrates. Another 40% is supplied by Exminesa with whom Asturiana has a long-term contract.

Penarroya Espana SA's 40,000-mt/a zinc refinery and Espanola del Zinc's 30,000-mt/a smelter and refinery complex at Cartagena were temporarily closed for 1 month by the Murcia regional government. The government stated the closure was due to the companies' nonconformance to environmental legislation, which resulted in sulfur and heavy-metal emissions over Cartagena in southern Spain. Nonferrous producers in Spain have come under renewed pressure to reduce pollution emissions.

Penarroya closed its 90,000-mt/a primary lead smelter at Cartgena, and the company filed for temporary receivership. The country has gone from being self-sufficient in primary lead a few years ago to not presently having primary lead refining capacity. However, secondary lead production has risen significantly and now satisfies more than 50% of domestic consumption needs.

Navan SA, a subsidiary of Navan Resources PLC of Ireland, acquired an option with a 100% interest in the ground holdings of Minerales no Fericos SA (Minofer) in the Mercia region.

The 90-ha project is within a tertiary volcanic complex and consists of a stockwork vein system of base metals of epithermal association. It was reported that two major mineralized zones had been identified and both were open to the 600-m level.

Navan reported it had completed a drilling program on the Mazarron zinc, lead, and silver project. The deposit was considered to be amenable to open pit mining and had reported estimated re-

serves of 8.3 Mmt of ore that graded 3.5% zinc, 0.8% lead, and 26 g/mt of silver. A detailed feasibility study was under way to determine the profitability of a mine.

INDUSTRIAL MINERALS

Ammonia.—The major Spanish nitrogen producer, Fesa, continued with the closure of several plants. Under the company's rationalization plan, the less competitive ammonia-producing units were closed. Primarily, these were plants with annual outputs of less than 100,000 tons. As a result, ammonia production was to be concentrated at three large plants: Fesa's plant at Huelva with a capacity of 246,000 mt/a of ammonia and Enfersa's plants at Cartagena and Puertollano. Enfersa's two plants had a combined capacity of 380,000 mt/a of ammonia.

The annual capacity of the Puertollano plant was to be increased from 217,000 mt/a to 228,000 mt/a, and production of the Huelva plant was to be increased to 307,000 mt/a. Also, energy consumption was made more efficient by converting the plants' feedstocks from naphtha to natural gas.

With the completion of the rationalization plan, ammonia capacity in Spain would be about 700,000 mt/a, well below the high of 900,000 mt/a produced during the decade of the 1980's.

Negotiations were under way between the Ercros Group, the parent company of Fesa and Enfersa, and Freeport McMoRan for the purchase of these two divisions and RTM. There was a problem of Fesa's accumulated debt that Freeport reportedly was not willing to assume. This reportedly was one of the issues to be resolved.

Cement.—Major construction projects such as the Seville Expo, the Barcelona Olympics, and associated infrastructure projects contributed to growth in the cement industry in all sectors except exports. Because domestic production was unable to keep up with demand, there was an increase in imports.

Since 1984 cement consumption has almost doubled, going from 16 Mmt/a to 28 Mmt/a. Total national cement production was equivalent to about 80% of the effective milling capacity of 36 Mmt/a.

Kaolin.—Kaolin deposits occur in two different geological environments in Spain. The first occurs as hydrothermal alteration of Pre-Hercynian granites in the northwestern part of Spain. The other source in eastern Spain was derived from the weathering of crystalline rocks of the Lower Cretaceous age.

These two areas in the country produced more than 400,000 mt/a of kaolin and have resulted in Spain becoming one of the more important kaolin producers in Europe. Most operations are small and all are mined by open pit methods.

Other Industrial Minerals.—Spain is the world's largest producer of slate and, along with Greece, Italy, and Portugal, provides a significant volume of the world's supply of granite and marble. Increased infrastructure construction has led to a growing importance of aggregates.

RTM was continuing exploration of a rare-earths deposit in Galicia. The Monte Galineiro deposit reportedly contained neodymium and yttrium used for superconducting materials. The deposit was also reported to contain cesium, niobium, thorium, and zirconium.

MINERAL FUELS

Coal.—Spain is endowed with reserves of anthracite and bituminous coal and lignite, and is the third largest anthracite/bituminous coal producer in the EC. In the past, domestic production had provided the coal requirements of the power generation industries. About 97% of the coal produced is consumed domestically in thermoelectric plants. In 1991, about one-third of Spain's coal needs was imported, and future plans called for increased coal usage in the electric generating industry. More coal was expected to be imported because Spanish coal, particularly lignite, has a high sulfur content. Imported coal, mainly from the Republic of South Africa, was about 15% of consumption and was expected to reach 30% by the end of this century. Compliance with environmental legislation would require significant investments by most companies to utilize domestic lignite in their operations.

The Spanish Government presented its coal mines redevelopment plan to the European Commission for Energy. The plan was expected to cost approximately $940 million over the next 4 years. Greater mechanization of the mines would be provided, along with mine closures. Twenty mines were closed in 1991. It was expected that another 20 mines would be closed in the future under the Government's plan. The total loss of jobs was estimated at 12,000. In conjunction with this, the Government created a state company, Empresa Nacional de Innovation, which was set up to alleviate unemployment in mining areas by channeling investments to create jobs.

Natural Gas.—The energy contribution of domestic natural gas has historically been small, contributing only 3% of the country's energy requirements. The Spanish Government's National Energy Plan (PEN) has indicated that natural gas was expected to furnish 5% of Spain's energy requirements in the early 1990's. There have been significant gas discoveries, and the country has embarked on a drilling program to bring these resources to market. The Gaviota field in the Cantabrian Sea and the Marisma onshore field provided most of Spain's natural gas. It was estimated these resources could provide about 2 billion m^3a.

A new planned pipeline will initially deliver 1.3 billion m^3 of natural gas from Algeria. This volume would reportedly increase to 2.8 billion m^3 by the mid-1990's. The 2,000-km-long by 1.2-m-diameter pipeline, expected to be completed in the late 1990's, would cross the Strait of Gibraltar and enter Spain at a point still to be determined.

Petroleum.—Spain had very little do-

mestic crude production, which accounted for a small percentage of the country's requirements. Casablanca, an offshore oilfield, and Ayoluengo, an onshore field, were the only two producing fields. There has been little effort to discover new reserves since Amoco Inc. and Chevron Inc. withdrew from Spanish exploration in 1989.

Chevron also withdrew from production operations in 1991 and sold both its exploration and operations assets to Cimaz S.A., a Spanish investment company. Chevron owned 18.92% of the Casablanca offshore oilfield, 25% of the Ayoluengo onshore oilfield, and 25% of the Marisma onshore gasfield. The price was not disclosed.

Uranium.—Empressa Nacional del Uranio (Enusa) was proceeding with the construction of a uranium concentrate plant to increase capacity at Saelices el Chico in the Province of Salamanca. The capacity of the plant would be increased from the 254 mt/a of U_3O_8 existing at yearend 1990 to 950 mt/a and was expected to be in operation in 3 years. The project, estimated to cost $40 million, was being subsidized by the EC through the Salamanca Regional Development Organization.

The Spanish Government continued with the moratorium on construction of nuclear powerplants. Reportedly, the reasons for extending the moratorium were cost, diversification of energy supply, and environmental protection.

INFRASTRUCTURE

The Spanish National Railways (RNFE) operates on 13,500 km of 1.668-m-gauge track and 1,820 of 1-m-gauge track. This is different from the 1.435-m-gauge track used throughout most of the rest of Europe. Most of the 150,000 km of highways are paved; however, only a small portion are limited-access divided highways. Infrastructure improvements were one of the Government's priorities. The main ports are Bilboa, Gijon, Barcelona, Tarragona, Cartagena, Cadiz, and Huelva.

OUTLOOK

The mineral resource base in Spain has not been fully exploited, and this mineral resource-rich country is expected to continue to contribute these resources for the continued development of Spain and the EC. For example, mercury and zinc are important export commodities, and continued exploration may lead to additional reserves of these commodities.

The lower labor costs in Spain and the abundant natural resources have fueled growth above the EC average growth rate. The fears of an overheated economy have resulted in the tightening of the country's fiscal policy by the Government. Industrial growth has been above the EC average, and the projected economic advantages of Spain's entry into the EC would appear to indicate a strong near-term outlook for the country. By joining the EC, Spain gained virtually unrestricted access to a market that was 15 times larger in terms of purchasing power than its own.

[1]Where necessary, values have been converted from Spanish pesetas (Ptas) to U.S. dollars at the rate of Ptas 114.45=US$1.00, the average exchange rate in 1992.

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Panorama Minero, annual.
Annual reports from various mineral resource companies:
Altos Hornos de Vizcaya, Asturiana de Zinc; Ensidesa Group, Grupo Instituto Nacional de Industria (INI), Inespal Group, Rio Tinto Minero, Repsol Petroleos, et al.

TABLE 1

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
METALS						
Aluminum:						
Bauxite		2,500	970	1,000	e1,000	1,000
Alumina[2]		880,500	949,125	1,001,605	e1,003,000	1,000,000
Metal:						
Primary		323,100	352,435	353,302	r355,150	3359,022
Secondary		e40,000	44,410	63,318	r e72,000	380,747
Antimony, mine output, Sb content		20	—	—	—	—
Cadmium metal		306	361	e300	e300	300
Copper:						
Mine output, Cu content		14,165	28,519	10,877	r7,716	39,818
Metal:						
Blister:						
Primary[e]		3111,000	120,000	110,000	111,100	110,000
Secondary		34,600	e32,300	40,300	e38,000	40,000
Total[e]		3145,600	152,300	150,300	149,100	150,000
Refined:[e]						
Primary		3108,756	115,700	116,000	129,500	129,000
Secondary		350,000	50,000	50,000	60,000	50,000
Total		3158,756	165,700	166,000	189,500	179,000
Gold, mine output, Au content	kilograms	7,882	8,566	r6,814	r7,402	36,582
Iron and steel:						
Iron ore and concentrates (including byproduct concentrate):						
Gross weight	thousand tons	4,212	4,563	e3,030	e3,920	33,648
Fe content	do.	1,925	2,128	1,438	1,840	31,715
Metal:						
Pig iron	do.	4,691	5,535	5,542	5,404	35,076
Ferroalloys, electric furnace	do.	153	161	157	e160	140
Steel:						
Crude	do.	11,886	12,765	12,718	r12,933	312,295
Castings and forgings	do.	160	182	169	e170	160
Total	do.	12,046	12,947	12,887	r e13,103	12,455
Semimanufactures	do.	8,843	11,012	11,341	11,146	310,753
Lead:						
Mine output, Pb content		74,672	62,783	58,482	r e46,000	347,000
Metal:						
Primary		68,800	62,032	r e60,000	r e65,000	60,000
Secondary		52,000	52,500	r e50,000	r e50,000	50,000
Mercury:						
Mine output, Hg content	kilograms	1,967,037	1,224,053	—	—	—
Metal	do.	1,614,586	967,100	961,515	e900,000	—
Silver, mine output, Ag content	do.	573,511	668,298	e500,000	r e300,000	3211,000
Tantalum minerals (tin byproduct):[e]						
Gross weight	do.	310,890	10,000	10,000	r8,000	8,000
Ta content	do.	32,725	2,600	2,600	2,000	2,000
Tin:						
Mine output, Sn content		66	56	27	r12	311

See footnotes at end of table.

TABLE 1—Continued

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
METALS—Continued						
Tin—Continued:						
Metal, primary		806	800	e600	e600	600
Titanium dioxide[e]		37,000	37,000	30,000	30,000	30,000
Tungsten, mine output, W content		81	58	r10	r—	—
Uranium, mine output, U_3O_8 content		323	273	269	e260	3219
Zinc:						
Mine output, Zn content		281,724	266,724	257,500	e261,000	3197,000
Metal, primary and secondary		245,400	246,400	252,700	e273,400	270,000
INDUSTRIAL MINERALS						
Barite		6,585	6,745	11,285	e9,000	310,000
Bromine[e]		300	300	300	300	250
Cement, hydraulic, other than natural	thousand tons	e25,000	27,374	28,092	27,581	28,000
Clays:						
Attapulgite		43,585	23,990	e30,000	r e25,000	25,000
Bentonite		103,753	143,389	151,226	e150,000	150,000
Kaolin, marketable:						
Crude		150,840	40,530	e125,000	e125,000	125,000
Washed		438,160	395,805	423,357	r e413,000	350,000
Refractory, not further described		3506,456	500,000	500,000	500,000	600,000
Other[e]	thousand tons	10,000	10,000	10,000	10,000	10,000
Diatomite and tripoli		81,331	83,943	r107,561	r e60,000	336,000
Feldspar		195,668	198,274	214,152	r192,000	r204,000
Fluorspar:						
Gross weight:						
Acid-grade		121,640	162,741	144,010	r107,000	3108,000
Metallurgical-grade		5,435	9,584	9,681	r e5,000	5,000
Total		127,075	172,325	153,691	r e112,000	113,000
CaF_2 content:						
Acid-grade		118,599	158,400	144,010	e150,000	100,000
Metallurgical-grade		4,598	7,452	7,394	e7,000	5,000
Total		123,197	165,852	151,404	e157,000	105,000
Gypsum and anhydrite, crude	thousand tons	7,469	e5,500	r7,808	r8,054	37,750
Kyanite, andalusite, related materials[e]		33,360	3,500	3,600	3,600	3,600
Lime, hydrated and quicklime[e]	thousand tons	1,200	1,200	1,200	1,200	1,200
Magnesite:						
Calcined		151,216	165,881	158,828	r e145,000	3123,000
Crude		467,816	430,778	444,350	e445,000	400,000
Mica		2,233	951	913	r e300	250
Nitrogen: N content of ammonia	thousand tons	477	552	r466	r557	3479
Pigments, mineral:						
Other		8,394	e8,400	r8,993	e8,600	8,200
Red iron oxide[e]		20,000	20,000	20,000	20,000	18,000
Potash, K_2O equivalent		766,089	741,454	780,875	r588,000	350,000
Pumice		909,625	828,408	e900,000	e800,000	800,000
Pyrite, including cuprous, gross weight	thousand tons	1,521	941	1,638	r1,358	3862
Salt:						
Rock, including byproduct from potash works	do.	2,455	2,496	2,519	e2,500	2,870

See footnotes at end of table.

TABLE 1—CONTINUED

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
INDUSTRIAL MINERALS—Continued						
Salt—Continued:						
Marine and other	thousand tons	1,425	594	858	r e900	900
Sand and gravel: Silica sand[e 4]	do.	3,2,420	2,400	2,200	2,200	2,200
Sepiolite		507,782	494,647	515,340	e500,000	500,000
Sodium compounds: n.e.s.:						
Soda ash, manufactured	thousand tons	e550	483	527	e500	500
Sulfate:						
Natural:						
Glauberite, Na_2SO_4 content		269,518	298,500	475,752	e450,000	425,000
Thenardite, Na_2SO_4 content		209,700	240,105	240,688	e250,000	250,000
Manufactured[e]		160,000	160,000	150,000	150,000	150,000
Stone:						
Calcareous:						
Chalk	thousand tons	361	429	e400	e400	350
Dolomite	do.	2,829	4,371	e4,000	e4,000	4,500
Limestone	do.	100,222	112,439	e115,000	e115,000	175,000
Marble	do.	1,369	r e1,500	r2,345	r2,210	3,1,990
Marl	do.	5,106	5,105	e6,000	e600	600
Basalt	do.	2,109	2,356	e2,500	e2,500	2,500
Granite	do.	9,635	7,609	r1,183	r1,150	3,980
Ophite	do.	1,905	2,184	e2,000	e2,000	1,500
Phonolite	do.	763	678	e750	e750	700
Porphyry	do.	805	678	e700	e700	600
Quartz	do.	977	923	e900	e900	1,800
Quartzite	do.	715	881	e700	e700	1,000
Sandstone	do.	1,768	1,967	e1,800	e1,800	1,700
Serpentine	do.	422	420	e400	e400	450
Other	do.	37,232	43,853	e28,000	e30,000	30,000
Strontium minerals:						
Gross weight		45,631	35,134	e35,000	e30,000	20,000
Sr_2O_4 content		41,981	32,323	e31,000	e28,000	18,000
Sulfur:						
S content of pyrites	thousand tons	1,057	894	748	e800	700
Byproduct:[e]						
Of metallurgy	do.	110	110	100	100	100
Of petroleum	do.	8	8	8	8	8
Of coal (lignite) gasification	do.	2	2	2	2	2
Total	do.	1,177	1,014	858	910	810
Talc and steatite		68,979	71,660	e70,000	e70,000	70,000
MINERAL FUELS AND RELATED MATERIALS						
Coal (marketable):						
Anthracite	thousand tons	5,276	5,519	5,758	r5,950	6,450
Bituminous	do.	13,609	13,605	r9,160	r12,550	8,650
Lignite	do.	12,960	17,275	r20,870	r21,071	18,530
Total	do.	31,845	36,399	r35,788	r39,571	33,630
Coke, metallurgical[e]	do.	3,000	3,000	3,000	3,000	2,500
Gas, natural (marketed)	million cubic meters	952	1,150	1,553	r1,288	3,1,297
Peat[e]		3,75,434	75,000	77,000	75,000	70,000

See footnotes at end of table.

TABLE 1—Continued

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	15,949	7,564	7,593	7,615	r7,818
Refinery products:						
Liquefied petroleum gas	do.	20,497	21,541	20,056	e20,000	20,000
Naphtha	do.	20,336	13,294	15,062	e15,000	16,000
Gasoline, motor	do.	68,655	78,464	80,376	e80,000	75,000
Jet fuel e	do.	r27,600	27,000	30,000	30,000	25,000
Kerosene e	do.	r29,613	28,000	29,000	29,000	30,000
Distillate fuel oil	do.	95,757	100,151	109,408	e110,000	110,000
Residual fuel oil	do.	93,220	89,417	92,907	e92,000	90,000
Other	do.	37,709	30,093	30,128	e30,000	30,000
Refinery fuel and losses e	do.	r12,026	12,000	12,000	12,000	12,000
Total e	do.	r405,413	399,960	418,937	418,000	408,000

eEstimated. rRevised.
[1]Table includes data available through June 1993.
[2]Reflects aluminum hydrate.
[3]Reported figure.
[4]Includes sand obtained as a byproduct of feldspar and kaolin production.

TABLE 2

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	7	1	(2)	All to Venezuela.
Alkaline-earth metals	107	1	—	All to France.
Aluminum:				
Ore and concentrate	1,182	558	—	Portugal 510; Denmark 26; France 22.
Oxides and hydroxides	281,662	303,581	—	Netherlands 96,532; Sweden 57,535; Poland 38,144.
Ash and residue containing aluminum	47	512	—	Italy 297; France 127; Netherlands 56.
Metal including alloys:				
Scrap	3,721	7,449	—	France 1,932; Belgium-Luxembourg 1,634; Germany 1,327.
Unwrought	106,383	122,375	326	Netherlands 29,848; Germany 24,708; Italy 20,877.
Semimanufactures value, thousands	$178,751	$119,039	$326	Germany $39,433; Netherlands $35,913; Italy $33,749.
Antimony:				
Ore and concentrate	—	2	—	All to Portugal.
Oxides	156	306	—	Italy 276; Portugal 15; France 10.
Ash and residue containing antimony	321	NA		
Metal including alloys, all forms	1	(2)	—	All to France.
Bismuth: Metal including alloys, all forms value, thousands	$7	$32	$26	Portugal $6.
Cadmium: Metal including alloys, all forms	155	390	35	Netherlands 355; Venezuela 1.
Chromium:				
Ore and concentrate	143	25	—	All to Portugal.

See footnotes at end of table.

TABLE 2—Continued

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Chromium—Continued:				
Oxides and hydroxides	28	269	(2)	Italy 109; Czechoslovakia 90; Germany 31.
Metal including alloys, all forms	5	21	—	Saudi Arabia 20; Portugal 1
Cobalt:				
Ore and concentrate	1	—		
Oxides and hydroxides	21	9	—	Portugal 5; Italy 2; United Kingdom 2.
Metal including alloys, all forms	76	32	—	United Kingdom 22.
Columbium and tantalum: Tantalum metal including alloys, all forms value, thousands	$49	$15	$15	
Copper:				
Ore and concentrate	42,476	19,967	—	Japan 19,879; Italy 89.
Matte and speiss including cement copper	4,117	1,496	—	All to Germany.
Oxides and hydroxides	7	2	—	Morocco 1; Portugal 1.
Sulfate	515	953	—	France 619; Portugal 240; Germany 48.
Ash and residue containing copper	1,429	2,998	—	Belgium-Luxembourg 2,910; Germany 52; Italy 22.
Metal including alloys:				
Scrap	17,038	34,107	—	France 9,826; Germany 8,874; Italy 4,169.
Unwrought	32,713	85,720	—	Belgium-Luxembourg 22,912; Netherlands 21,360; Italy 10,018.
Semimanufactures	31,604	44,100	1,517	France 8,888; Germany 7,380; Italy 5,374.
Germanium: Oxides	16	—		
Gold:				
Waste and sweepings value, thousands	$4	$1	—	All to United Kingdom.
Metal including alloys, unwrought and partly wrought kilograms	16,040	2,703	—	Switzerland 1,650; Italy 936; Germany 48.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite thousand tons	1,633	2,219	(2)	United Kingdom 744; Netherlands 564; France 313.
Pyrite, roasted	70,989	53,149	1	France 16,593; Kenya 4,050; United Kingdom 620.
Metal:				
Scrap	22,528	25,469	30	France 17,870; Italy 3,214; Portugal 2,226.
Pig iron, cast iron, related materials	40,469	27,402	252	Italy 5,528; Germany 2,962; Portugal 2,712.
Ferroalloys:				
Ferrochromium	2,621	1,895	1,558	Japan 194; Thailand 43.
Ferromanganese	20,442	15,432	316	Italy 4,830; Algeria 1,829; Canada 1,210.
Ferromolybdenum	4	4	—	All to Portugal.
Ferrophosphorus	8	—		
Ferrosilicomanganese	21,000	12,650	2,273	Italy 3,468; Germany 3,349.
Ferrosilicon	9,826	7,425	231	Germany 4,850; Portugal 1,650.
Ferrotitanium and ferrosilicotitanium	43	—		
Ferrovanadium	36	—		
Silicon metal	212	295	136	Portugal 144; Netherlands 15.
Unspecified	123	241	(2)	Portugal 141; Mexico 47; France 41.
Steel, primary forms	81,141	227,020	92	Iran 54,479; Belgium-Luxembourg 22,160; Malaysia 21,944.

See footnotes at end of table.

TABLE 2—Continued

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued:				
Metal—Continued:				
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated thousand tons	[3]1,182	1,262	85	France 158; Germany 135; Republic of Korea 105.
Clad, plated, coated	426,425	526,258	9,708	France 72,975; Italy 60,584; United Kingdom 60,472.
Of alloy steel	174,546	266,207	18,130	Germany 41,195; Italy 32,064; France 25,422.
Bars, rods, angles, shapes, sections	1,897,418	2,090,441	56,850	Germany 307,565; Portugal 280,976; France 273,980.
Rails and accessories	5,615	14,631	—	Portugal 10,702; Germany 2,644; Italy 410.
Wire	[4]59,425	60,480	853	France 22,367; Portugal 11,581; Libya 6,795.
Tubes, pipes, fittings	[5]333,801	366,968	25,716	France 61,552; Venezuela 39,917; Germany 32,703.
Lead:				
Ore and concentrate	63,522	50,858	—	Italy 18,024; Morocco 9,846; France 9,792.
Oxides	1,264	1,266	—	Portugal 701; Morocco 341; Singapore 60.
Ash and residue containing lead	261	NA		
Metal including alloys:				
Scrap	825	3,197	—	France 2,319; Turkey 306; Germany 108.
Unwrought	19,888	7,875	—	Portugal 6,062; France 1,002; Algeria 450.
Semimanufactures	241	32	—	Germany 14; Gibraltar 6; Netherlands 4.
Lithium: Oxides and hydroxides	2	—		
Magnesium: Metal including alloys:				
Scrap	—	2	—	All to France.
Unwrought	4	—		
Semimanufactures	21	9	—	France 8; Portugal 1.
Manganese:				
Ore and concentrate	3,314	855	44	Sweden 690; Portugal 34.
Oxides	3,192	3,937	3	United Kingdom 993; Algeria 500; Czechoslovakia 370.
Metal including alloys, all forms	1	18	—	France 15; Portugal 3.
Mercury	475	781	28	Netherlands 341; Philippines 86; India 73.
Molybdenum: Metal including alloys forms	1	49	—	All to France.
Nickel:				
Ore and concentrate	10	[2]	—	All to Chile.
Matte and speiss	[2]	[2]		
Oxides and hydroxides	1	2	—	All to Germany.
Ash and residue containing nickel	149	NA		
Metal including alloys:				
Scrap	84	256	—	Netherlands 106; Germany 80; France 47.
Unwrought	29	41	—	Netherlands 10; Portugal 8.
Semimanufactures	235	112	—	Japan 71; Netherlands 15; Italy 14.
Platinum-group metals:				
Waste and sweepings value, thousands	$2,780	$419	—	Germany $186; Italy $130; United Kingdom $95.
Metals including alloys, unwrought and partly wrought:				
Palladium kilograms	101	NA		
Platinum value, thousands	$1,508	$10,305	$15	France $6,030; United Kingdom $3,489; Netherlands $565.

See footnotes at end of table.

TABLE 2—Continued

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals—Continued:					
Metals including alloys, unwrought and partly wrought—Continued:					
Rhodium	grams	8,213	NA		
Iridium, osmium, ruthenium	do.	3,200	NA		
Unspecified	value, thousands	—	$3,411	—	France $1,149; United Kingdom $970; Netherlands $829.
Rare-earth metals including alloys, all forms	value, thousands	$22	$34	—	France $27; Portugal $6; Germany $1.
Selenium, elemental	do.	$10	$13	—	Portugal $11; Andorra $1.
Silver:					
Ore and concentrate	kilograms	—	150	—	All to France.
Waste and sweepings[6]	value, thousands	$1,354	$40,904	$704	France $34,448; Germany $3,934; United Kingdom $1,265.
Metal including alloys, unwrought and partly wrought	do.	$52,901	$66,680	$362	United Kingdom $24,124; Switzerland $22,594; France $10,826.
Tin:					
Oxides		3	NA		
Ash and residue containing tin		35	NA		
Metal including alloys:					
Scrap		(e)	80	—	Belgium-Luxembourg 50; Germany 15; Netherlands 14.
Unwrought		407	166	5	Mexico 51; United Kingdom 48; Egypt 13.
Semimanufactures		17	13	—	Italy 6; Portugal 3; Netherlands 2.
Titanium:					
Ore and concentrate		39	48	—	Portugal 47; France 1.
Oxides		122	157	1	Malaysia 78; Portugal 25; Greece 20.
Ash and residue containing titanium		25	NA		
Metal including alloys:					
Unwrought including scrap		15	27	—	Portugal 23; Ireland 3; Belgium-Luxembourg 1.
Semimanufactures		24	39	—	Italy 28; Belgium-Luxembourg 8; Ireland 2.
Tungsten:					
Ore and concentrate		—	132	80	Netherlands 51.
Oxides and hydroxides		8	—		
Metal including alloys:					
Scrap		2	8	—	All to Germany.
Unwrought		—	10	—	Germany 8; France 2.
Semimanufactures		2	1	—	NA.
Uranium and thorium:					
Ore and concentrate		—	213	209	Germany 4.
Oxides and other compounds	value, thousands	$3,899	$4,086	$4	United Kingdom $4,080; Austria $1.
Vanadium: Ash and residue		—	31	31	
Zinc:					
Ore and concentrate		142,773	105,880	3,621	Finland 37,802; France 31,673; Italy 25,228.
Oxides		2,950	3,751	1	U.S.S.R. 2,300; France 750; Belgium-Luxembourg 240.
Blue powder		127	48	—	France 45; Portugal 3.
Ash and residue containing zinc[7]		38,875	32,393	—	United Kingdom 11,819; Australia 10,550; Italy 3,535.
Metal including alloys:					
Scrap		51	133	—	France 70; Portugal 63.

See footnotes at end of table.

TABLE 2—Continued

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Zinc—Continued:				
Metal including alloys—Continued:				
Unwrought	137,055	144,472	25,687	Netherlands 96,510; United Kingdom 7,000.
Semimanufactures	440	566	—	France 318; Germany 146; Equatorial Guinea 27.
Zirconium: Ore and concentrate	1,425	32	—	Portugal 28; Italy 4.
Other:				
Ores and concentrates	123	147	2	Italy 142; Germany 2.
Oxides and hydroxides	14	2,197	76	France 701; Portugal 554; Italy 280.
Ashes and residues	1,486	2,192	57	France 677; Belgium-Luxembourg 609; Germany 164.
Base metals, including alloys, all forms	—	500	35	Netherlands 355; Portugal 24.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	2,261	2,194	(2)	Germany 1,257; Portugal 281; United Kingdom 108.
Artificial:				
Corundum	54	266	—	Italy 182; France 48; Portugal 24.
Silicon carbide	8,015	8,548	280	United Kingdom 4,259; Germany 1,124; Japan 940.
Dust and powder of precious and semi-precious stones excluding diamond value, thousands	$200	$155	$2	Ireland $123; Belgium-Luxembourg $21; France $3.
Grinding and polishing wheels and stones	6,100	5,095	36	Germany 1,236; France 991; Portugal 604.
Asbestos, crude	127	84	—	Morocco 54; Portugal 25; Lebanon 5.
Barite and witherite	2,713	2,705	—	Italy 1,332; France 1,049; Netherlands 111.
Boron materials:				
Crude natural borates	878	1,309	—	Portugal 1,075; Tunisia 180; Germany 30.
Oxides and acids	79	168	(2)	Tunisia 100; Italy 43; France 21.
Bromine	—	1	—	All to Cuba.
Cement thousand tons	3,075	3,548	748	Algeria 853; Netherlands 247.
Chalk	17,113	26,922	—	Algeria 14,987; Libya 4,489; Morocco 1,890.
Clays, crude:				
Bentonite	65,343	30,016	—	Germany 19,071; United Kingdom 5,820; Portugal 3,671.
Chamotte earth	5,294	NA		
Fuller's earth	7,624	7,429	—	Italy 5,009; Netherlands 1,282; United Kingdom 562.
Fire clay	4,092	5,699	—	Italy 4,860; United Kingdom 289; Germany 245.
Kaolin	123,262	158,573	—	Italy 31,833; Netherlands 28,415; Germany 27,955.
Unspecified	29,549	22,140	—	France 11,215; Belgium-Luxembourg 4,179; Italy 2,887.
Cryolite and chiolite	22	23	—	All to Italy.
Diamond, natural:				
Gem, not set or strung value, thousands	$154	$190	$5	United Kingdom $86; Belgium-Luxembourg $58; Germany $26.
Industrial stones do.	$163	$315	$127	Belgium-Luxembourg $124; Hong Kong $22.
Dust and powder kilograms	47	—		
Diatomite and other infusorial earth	4,398	2,137	—	Belgium-Luxembourg 754; Italy 289; France 285.
Feldspar, fluorspar, related materials:				
Feldspar	8,027	10,275	—	Portugal 7,993; Italy 959; France 847.
Fluorspar	54,784	40,644	11,207	Netherlands 9,896; Norway 7,682.
Unspecified	—	87	—	Morocco 38; Portugal 24; Guatemala 18.

See footnotes at end of table.

TABLE 2—Continued

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Fertilizer materials:				
Crude, n.e.s.	4,146	7,933	(2)	Andorra 4,187; France 1,536; Greece 633.
Manufactured:				
Ammonia	7,370	1,797	—	France 1,087; Thailand 676; Angola 9.
Nitrogenous	818,598	581,204	—	France 181,061; Germany 97,424; Netherlands 93,657.
Phosphatic	7,655	—		
Potassic	678,251	481,801	29	France 195,645; Brazil 173,280; Portugal 29,141.
Unspecified and mixed	257,346	292,185	—	China 106,585; Italy 75,026; France 52,657.
Graphite, natural	624	138	—	Portugal 104; France 25; Morocco 4.
Gypsum and plaster thousand tons	2,760	2,469	411	Sweden 470; Denmark 251.
Iodine	8	8	—	Hungary 2; Mexico 2; Pakistan 2.
Kyanite and related materials: Andalusite, kyanite, sillimanite	—	104	—	Morocco 93; Thailand 11.
Lime	19,181	19,250	—	France 15,231; Equatorial Guinea 1,500; Cameroon 457.
Magnesium compounds:				
Magnesite, crude	20,937	9,516	—	Denmark 5,120; France 2,376; Portugal 1,200.
Oxides and hydroxides	75,085	69,520	—	France 34,635; United Kingdom 22,289; Germany 2,180.
Mica:				
Crude including splittings and waste	1,091	806	—	United Kingdom 538; Germany 113; Italy 94.
Worked including agglomerated splittings	131	152	(2)	Germany 68; Italy 28; United Kingdom 19.
Nitrates, crude	2,144	216	—	Tunisia 190; France 26.
Phosphates, crude	30	—		
Phosphorus, elemental	1	—		
Pigments, mineral:				
Natural, crude	571	—		
Iron oxides and hydroxides, processed	12,570	12,095	1,113	Germany 1,234; United Kingdom 1,095.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$444	$477	—	Venezuela $95; Germany $70; France $65.
Synthetic do.	$1,425	$922	$103	Switzerland $501; Greece $114.
Pyrite, unroasted	13,651	7,685	—	United Kingdom 7,567; Portugal 73; Italy 35.
Quartz crystal, piezoelectric	480,201	—		
Salt and brine	67,659	99,203	38	Norway 21,292; Iceland 19,723; Faroe Islands 15,800.
Sodium compounds, n.e.s.:				
Soda ash, manufactured	188,771	146,876	—	Argentina 43,912; Brazil 40,000; Belgium-Luxembourg 21,499.
Sulfate:				
Natural	127,293	—		
Manufactured	207,733	342,001	—	Portugal 48,917; United Kingdom 46,101; Algeria 35,319.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	566,120	562,271	200	Italy 331,594; France 24,233; Belgium-Luxembourg 11,970.
Worked	506,112	486,335	35,363	France 220,706; Germany 91,770.
Dolomite, chiefly refractory-grade	104,644	127,330	—	United Kingdom 120,559; Finland 3,860; Portugal 1,977.
Gravel and crushed rock	225,213	309,505	—	Gibraltar 149,988; Andorra 115,130; Belgium-Luxembourg 26,045.

See footnotes at end of table.

TABLE 2—Continued

SPAIN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel—Continued:					
Limestone other than dimension		—	25	—	Mainly to Portugal.
Quartz and quartzite		480,201	337,023	—	Norway 200,699; Iceland 93,528; Canada 33,060.
Sand other than metal-bearing		676,253	918,725	—	Andorra 675,274; Gibraltar 180,545; Portugal 41,366.
Sulfur:					
Elemental:					
Crude including native and byproduct		43,317	62,137	—	Algeria 20,735; Israel 11,730; Portugal 10,980.
Colloidal, precipitated, sublimed		146	170	—	France 110; Faroe Islands 59; Morocco 1.
Dioxide		1,995	1,512	—	Portugal 1,500; Egypt 6; Morocco 6.
Sulfuric acid		403,715	227,726	—	Portugal 58,441; France 47,180; Italy 45,934.
Talc, steatite, soapstone, pyrophyllite		10,248	7,531	—	Belgium-Luxembourg 2,496; Portugal 1,975; Italy 776.
Vermiculite, perlite, chlorite		1,772	2,083	—	France 1,183; Portugal 594; Italy 187.
Other:					
Crude		824,178	895,942	10	Belgium-Luxembourg 275,705; France 215,222; Italy 81,060.
Slag and dross, not metal-bearing		77,670	95,856	—	Portugal 72,058; France 12,231; United Kingdom 5,535.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		4,051	5,304	—	Portugal 3,852; Andorra 1,323; Belgium-Luxembourg 79.
Carbon black		23,698	24,526	(2)	France 10,510; Germany 3,580; Morocco 3,094.
Coal:					
Anthracite		3,012	576	—	All to Portugal.
Bituminous		53	49	—	Andorra 39; Portugal 10.
Briquets of anthracite and bituminous coal		25	14	—	Cuba 10; Morocco 4.
Lignite including briquets		—	78	—	All to Portugal.
Coke and semicoke		52,719	54,581	—	Italy 11,701 United Kingdom 9,669; France 9,540.
Peat including briquets and litter		36	327	—	Portugal 313; France 11; Andorra 3.
Petroleum refinery products:					
Liquefied petroleum gas	thousand 42-gallon barrels	1,268	1,579	—	France 676; Morocco 486; United Kingdom 223.
Gasoline	do.	20,795	20,000	5,879	Netherlands 4,685; France 2,652; Portugal 2,611.
Mineral jelly and wax	do.	277	243	—	Germany 54; Morocco 43; Venezuela 26.
Kerosene and jet fuel	do.	21,735	20,537	110	Netherlands 2,114; Italy 1,126; Iran 775.
Distillate fuel oil	do.	NA	10,094	86	France 4,876; Netherlands 1,652; Gibraltar 420.
Lubricants	do.	1,181	961	41	United Arab Emirates 165; Italy 154; United Kingdom 98.
Residual fuel oil	do.	49,607	53,520	6,045	Netherlands 7,356; Portugal 6,361.
Bitumen and other residues	do.	4,518	13,280	9,051	Portugal 1,645; France 758.
Bituminous mixtures	do.	120	154	—	Canada 54; Libya 49; Portugal 34.
Petroleum coke	do.	255	99	—	Netherlands 43; France 29; Germany 16.

NA Not available.

[1]Table prepared by Amy M. Burk, International Data Section.

[2]Less than 1/2 unit.

[3]Excludes unreported quantity valued at $705,000.

[4]Excludes unreported quantity valued at $1,780,000.

[5]Excludes unreported quantity valued at $31,220.

[6]May include other precious metals.

[7]Includes hard zinc spelter.

TABLE 3

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	112	76	—	France 49; Germany 25; United Kingdom 3.
Alkaline-earth metals	121	69	—	Germany 22; U.S.S.R. 19; France 17.
Aluminum:				
Ore and concentrate thousand tons	1,862	1,935	—	Guinea 1,838; China 29; Guyana 26.
Oxides and hydroxides	38,357	37,259	490	France 21,746; Germany 10,052; Netherlands 2,574.
Ash and residue containing aluminum	37,772	41,358	—	U.S.S.R. 13,762; France 7,771; Germany 7,698.
Metal including alloys:				
Scrap	21,879	13,498	1,221	Portugal 4,232; France 2,769; Venezuela 2,585.
Unwrought	31,212	61,943	—	U.S.S.R. 13,099; Netherlands 8,309; Yugoslavia 7,052.
Semimanufactures	72,679	77,760	1,679	Germany 18,810; France 15,590; Italy 15,291.
Antimony:				
Ore and concentrate	100	91	—	All from China.
Oxides	510	486	36	United Kingdom 230; France 55; China 52.
Ash and residue containing antimony	373	NA		
Metal including alloys, all forms	683	959	—	China 586; Thailand 180; U.S.S.R. 133.
Arsenic: Metal including alloys, all forms	30	—		
Beryllium: Metal including alloys, all forms value, thousands	$10	—		
Bismuth: Metal including alloys, all forms	59	55	2	Peru 17; United Kingdom 14; Belgium 10.
Cadmium: Metal including alloys, all forms	69	85	—	Germany 75; Italy 6; Belgium 4.
Chromium:				
Ore and concentrate	54,699	40,115	—	Republic of South Africa 18,252; Albania 12,369; Turkey 5,892.
Oxides and hydroxides	995	879	4	Germany 534; Poland 80; Belgium-Luxembourg 74.
Metal including alloys, all forms	110	116	1	Germany 55; France 40; Italy 8.
Cobalt:				
Ore and concentrate	—	4	—	All from Belgium-Luxembourg.
Oxides and hydroxides	255	209	—	Belgium-Luxembourg 113; Finland 47; Canada 24.
Metal including alloys, all forms	233	189	5	Belgium-Luxembourg 57; Zaire 52; Germany 32.
Columbium and tantalum: Metal including alloys, all forms:				
Columbium (niobium)[2]	1	—		
Tantalum	6	(3)	—	All from Germany.
Copper:				
Ore and concentrate	393,694	464,853	10,199	Chile 180,267; Portugal 126,931; Canada 67,258.
Matte and speiss including cement copper	365	111	10	Portugal 74; France 27.
Oxides and hydroxides	406	431	26	Belgium-Luxembourg 157; Norway 98; Italy 64.
Sulfate	955	1,640	—	France 722; Italy 703; Taiwan 60.
Ash and residue containing copper	15,209	12,177	685	Italy 3,611; Belgium-Luxembourg 2,719; France 977.
Metal including alloys:				
Scrap	39,318	31,599	96	France 11,984; Portugal 5,426; Germany 3,884.
Unwrought	28,390	68,207	14	Belgium-Luxembourg 37,649; Chile 12,873; France 8,316.
Semimanufactures	217,529	133,546	1,824	France 51,387; Italy 22,443; Germany 18,929.
Germanium: Metal including alloys, all forms	1	(3)	(3)	

See footnotes at end of table.

TABLE 3—Continued

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Gold:				
Waste and sweepings value, thousands	$1,087	$4	$4	
Metal including alloys, unwrought and partly wrought kilograms	18,861	22,040	25	United Kingdom 4,229; Switzerland 3,982; Sweden 3,641.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite-thousand tons	6,705	7,596	—	Brazil 3,595; Venezuela 1,037; Australia 939.
Pyrite, roasted	26,293	12,394	—	Portugal 12,350; Germany 44.
Metal:				
Scrap thousand tons	4,291	4,278	190	United Kingdom 1,386; France 1,274; Germany 523.
Pig iron, cast iron, related materials	272,195	338,761	1,562	Brazil 94,474; Canada 28,943; Poland 28,165.
Ferroalloys:				
Ferrocolumbium	145	NA		
Ferrochromium	100,370	93,510	—	Republic of South Africa 69,475; Finland 6,600; Netherlands 4,848.
Ferronickel	32,041	29,916	—	Greece 14,164; New Caledonia 11,427; Dominican Republic 3,607.
Ferrophosphorus	1,398	NA		
Ferrosilicochromium	1,184	1,612	—	Zimbabwe 1,564; Germany 48.
Ferrosilicomanganese	19,375	31,231	—	Norway 8,707; France 3,612; Netherlands 3,341.
Ferrosilicon	16,410	25,727	(3)	France 6,011; Netherlands 5,433; Norway 4,398.
Ferrotitanium and ferrosilicotitanium	699	NA		
Ferrotungsten and ferrosilicotungten	30	NA		
Silicon metal	1,900	3,785	(3)	France 2,387; Brazil 582; Norway 297.
Unspecified	4,728	8,882	106	Germany 1,713; United Kingdom 1,654; France 1,576.
Steel, primary forms	94,407	125,368	11,456	Brazil 42,218; United Kingdom 17,872; Germany 17,671.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	1,597,478	1,641,529	252	Germany 461,527; France 455,077; United Kingdom 263,886.
Clad, plated, coated	456,596	471,155	1,309	United Kingdom 97,639; France 96,105; Germany 79,818.
Of alloy steel	152,332	128,569	529	France 44,814; Germany 33,423; Belgium-Luxembourg 19,465.
Bars, rods, angles, shapes, sections	841,942	892,824	793	Italy 169,099; United Kingdom 154,457; Germany 117,173.
Rails and accessories	26,886	12,208	(3)	Germany 3,866; Poland 3,378; Austria 2,335.
Wire	52,727	50,043	118	Belgium-Luxembourg 15,883; Italy 9,239; France 9,179.
Tubes, pipes, fittings	311,094	233,227	1,998	France 85,372; Germany 39,493; Italy 29,777.
Lead:				
Ore and concentrate	42,335	53,158	12,334	Morocco 12,106; Ireland 9,608.
Oxides	638	1,511	—	Portugal 1,447; Germany 26; Italy 14.
Ash and residue containing lead	2,108	5,941	821	Australia 3,682; Ghana 508.
Metal including alloys:				
Scrap	9,247	2,593	42	Portugal 2,155; France 397, Switzerland 62.
Unwrought	12,603	20,689	10	Morocco 11,723; France 6,110; Italy 764.
Semimanufactures	517	1,598	(3)	Morocco 1,152; France 248; Germany 73.

See footnotes at end of table.

TABLE 3—Continued

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Lithium: Oxides and hydroxides		197	109	9	China 64; United Kingdom 34.
Magnesium: Metal including alloys:					
Scrap		111	19	—	France 14; Tunisia 5.
Unwrought		1,444	1,828	907	France 456; United Kingdom 313.
Semimanufactures		49	79	3	Germany 25; Switzerland 22; France 8.
Manganese:					
Ore and concentrate		262,367	56,179	52	Ghana 17,863; Gabon 11,657; Australia 5,437.
Oxides		1,655	1,809	5	Japan 1,144; Belgium-Luxembourg 348; Canada 105.
Metal including alloys, all forms		981	991	(3)	China 584; France 205; United Kingdom 75.
Mercury		79	196	40	United Kingdom 114; Germany 15.
Molybdenum:					
Ore and concentrate		2,297	2,014	404	Chile 1,188; Netherlands 334.
Oxides and hydroxides		14	10	—	All from Netherlands.
Metal including alloys:					
Unwrought including scrap		4	4	1	Germany 2; United Kingdom 1.
Semimanufactures		52	48	17	Belgium-Luxembourg 16; Germany 6.
Nickel:					
Ore and concentrate		19	38	—	Germany 23; United Kingdom 15.
Matte and speiss		342	280	—	Australia 150; Albania 62; Canada 48.
Oxides and hydroxides		86	46	—	Canada 17; Netherlands 10; Finland 8.
Ash and residue containing nickel		182	NA		
Metal including alloys:					
Scrap		12	26	—	Portugal 15; France 7; United Kingdom 3.
Unwrought		10,858	9,665	2	U.S.S.R. 5,542; Canada 2,192; United Kingdom 359.
Semimanufactures		852	804	63	Germany 274; United Kingdom 149; Italy 106.
Platinum-group metals:					
Waste and sweepings	value, thousands	$4,591	$8,560	—	Mexico $4,567; Colombia $2,204; Costa Rica $804.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	4,227	NA		
Platinum	value, thousands	$5,398	$7,558	$213	United Kingdom $4,513; France $1,087; Switzerland $552.
Rhodium	kilograms	22	NA		
Iridium, osmium, ruthenium	grams	120	NA		
Unspecified	value, thousands	—	$7,122	$10	United Kingdom $4,068; U.S.S.R. $1,478; Switzerland $1,396.
Rare-earth metals including alloys, all forms		68	3	3	
Selenium, elemental		44	116	6	United Kingdom 47; China 17; Germany 16.
Silicon, high-purity		3	28	—	France 25; Germany 2; United Kingdom 1.
Silver:					
Ore and concentrate[4]	kilograms	462,885	1,177,877	721	Chile 523,211; Portugal 446,923; Ireland 101,615.
Waste and sweepings[4]	value, thousands	$553	$698	—	All from Portugal.
Metal including alloys, unwrought and partly wrought	do.	$139,795	$166,510	$22,520	France $79,848; Germany $31,662.
Tellurium, elemental		3	—		

See footnotes at end of table.

TABLE 3—Continued

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Tin:				
Ore and concentrate	1,989	1,878	—	Nigeria 1,316; Zaire 442; Bolivia 96.
Oxides	341	NA		
Metal including alloys:				
Scrap	22	32	—	United Kingdom 23; France 8.
Unwrought	2,752	3,223	1	Netherlands 597; Brazil 322; Indonesia 265.
Semimanufactures	408	372	8	France 173; Germany 71; United Kingdom 67.
Titanium:				
Ore and concentrate	96,473	114,205	2	Australia 103,133; Canada 7,015; Republic of South Africa 2,507.
Oxides	3,972	5,882	1,782	Germany 783; United Kingdom 628.
Metal including alloys:				
Unwrought including scrap	351	603	268	France 128; Germany 79.
Semimanufactures	1,161	948	242	Germany 544; United Kingdom 63.
Tungsten:				
Ore and concentrate	77	86	—	China 80; Germany 5; France 1.
Oxides and hydroxides	55	NA		
Metal including alloys:				
Unwrought including scrap	24	1,863	908	France 470; Norway 310.
Semimanufactures	28	29	6	Belgium-Luxembourg 7; Austria 6.
Uranium and thorium:				
Ore and concentrate value, thousands	$1	$3	—	France $1; Niger $1.
Oxides and other compounds do.	$134,789	$175,025	$81,956	United Kingdom $69,566; France $23,504.
Metal including alloys, all forms:				
Uranium kilograms	9	—		
Vanadium:				
Oxides and hydroxides	2	6	—	Germany 5.
Ash and residue containing vanadium	—	24	—	All from Germany.
Metal including alloys, all forms	1	—		
Zinc:				
Ore and concentrate	142,988	130,553	—	Canada 98,886; Morocco 20,046; Peru 4,983.
Oxides	7,288	7,723	(3)	France 3,370; Portugal 1,382; China 1,024.
Blue powder	279	1,593	—	Belgium-Luxembourg 792; Germany 705;
Ash and residue containing zinc[5]	20,216	14,566	38	Netherlands France 6,849; Italy 3,834; Germany 1,463.
Metal including alloys:				
Scrap	1,415	2,249	2	France 1,606; United Kingdom 457; Canada 67.
Unwrought	7,967	11,057	—	Belgium-Luxembourg 3,771; France 3,439; Netherlands 2,657.
Semimanufactures	1,794	914	1	France 659; Belgium-Luxembourg 121; Germany 79.
Zirconium:				
Ore and concentrate	29,611	41,226	30	Republic of South Africa 26,326; Australia 9,390; Brazil 2,001.
Oxides	327	NA		
Metal including alloys:				
Unwrought including scrap	43	4	—	Germany 3.
Semimanufactures	26	86	7	Germany 47; United Kingdom 18.

See footnotes at end of table.

TABLE 3—Continued

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Other:					
Ores and concentrates		25	12	—	Belgium-Luxembourg 5; Netherlands 4; Germany 2.
Oxides and hydroxides		97	2,721	192	United kingdom 594; Belgium-Luxembourg 506; France 490.
Ashes and residues		377	523	—	Morocco 181; France 105; Mexico 100.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		17,923	10,743	40	Turkey 6,854; Greece 1,749; Italy 1,424.
Artificial:					
Corundum		9,348	9,109	55	France 3,439; Germany 1,691; Brazil 1,147.
Silicon carbide		5,664	4,791	20	Germany 1,337; France 878; Belgium-Luxembourg 647.
Dust and powder of precious and semiprecious stones excluding diamond	value, thousands	$13,789	[6]$13,711	$1,699	Ireland $5,867; Belgium-Luxembourg $4,905.
Grinding and polishing wheels and stones		4,163	4,802	12	Italy 2,277; Germany 800; France 498.
Asbestos, crude		39,653	37,112	—	Canada 27,116; Zimbabwe 6,709; Swaziland 1,710.
Barite and witherite		23,103	24,678	—	Morocco 22,995; China 950; United Kingdom 400.
Boron materials:					
Crude natural borates		50,834	54,416	(3)	Turkey 54,366; Germany 25; Peru 10.
Elemental		24	8	(3)	France 6; United Kingdom 2.
Oxides and acids		7,887	6,837	129	France 3,882; Chile 1,626; Italy 575.
Bromine		85	59	—	Netherlands 55; Israel 4.
Cement	thousand tons	2,869	3,392	1	Romania 1,217; Turkey 1,206; Greece 485.
Chalk		20,264	19,117	9	France 17,028; Portugal 1,078; Italy 894.
Clays, crude:					
Bentonite		44,723	34,064	2,466	Morocco 15,500; France 7,871; Italy 3,695.
Chamotte earth		11,860	NA		
Fuller's earth		27	607	—	United Kingdom 561; Malaysia 29; Italy 17.
Fire clay		4,622	4,911	18	France 4,551; Germany 283; Italy 58.
Kaolin		293,446	281,997	17,826	United Kingdom 174,467; France 35,464; Brazil 17,275.
Unspecified		321,841	434,533	299	Andorra 403,898; France 12,844; Germany 7,620.
Cryolite and chiolite		99	35	—	Denmark 34; Netherlands 1.
Diamond: Natural:					
Gem, not set or strung	value, thousands	$19,339	$15,464	—	Belgium-Luxembourg $13,199; Israel $1,707; India $374.
Industrial stones	do.	$1,537	$882	$62	Belgium-Luxembourg $533; Zaire $91.
Dust and powder	kilograms	1,290	NA		
Diatomite and other infusorial earth		4,078	3,622	1,785	France 1,631; Germany 148.
Feldspar, fluorspar, related materials:					
Feldspar		79,601	73,575	—	France 62,725; Turkey 6,590; Germany 3,358.
Fluorspar		5,014	4,714	—	China 4,522; Netherlands 107; France 83.
Unspecified		13,528	11,869	—	Norway 6,930; Canada 4,326; Germany 613.
Fertilizer materials:					
Crude, n.e.s.		8,323	10,859	72	Israel 3,966; Indonesia 2,455; France 1,787.
Manufactured:					
Ammonia		638,396	616,937	—	U.S.S.R. 355,062; Algeria 49,768; Netherlands 46,116.
Nitrogenous		1,004,765	1,098,109	22,588	Netherlands 293,918; Germany 238,100; Italy 157,451.
Phosphatic		75,308	86,671	4,498	Israel 26,666; Morocco 12,458; France 10,656.
Potassic		70,089	79,620	—	Israel 27,219; United Kingdom 20,342; Germany 11,943.

See footnotes at end of table.

TABLE 3—Continued

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Fertilizer materials—Continued:					
Manufactured—Continued:					
Unspecified and mixed		902,648	902,782	50,195	France 187,826; Morocco 167,516; Germany 113,405.
Graphite, natural		4,414	2,442	10	Germany 657; Netherlands 453; Canada 198.
Gypsum and plaster		45,115	28,739	85	Morocco 21,331; France 5,258; Germany 1,089.
Iodine		352	572	341	Mexico 154; Netherlands 3.
Kyanite and related materials:					
Andalusite, kyanite, sillimanite		15,543	9,753	298	Republic of South Africa 8,426; France 938.
Mullite		2,315	2,534	92	United Kingdom 1,863; Germany 403; Belgium 172.
Lime		21,531	9,082	—	France 6,979; Portugal 1,302; Germany 474.
Magnesium compounds:					
Magnesite, crude		883	372	18	Mexico 215; Republic of South Africa 42; Italy 35.
Oxides and hydroxides		75,296	73,124	131	China 28,657; Italy 8,423; North Korea 6,636.
Sulfate		962	NA		
Mica:					
Crude including splittings and waste		1,854	1,889	19	India 766; Austria 496; France 377.
Worked including agglomerated splittings		105	118	1	Belgium-Luxembourg 26; Austria 23; France 18.
Nitrates, crude		24,056	11,932	—	Chile 10,188; Norway 1,604; Belgium-Luxembourg 96.
Phosphates, crude	thousand tons	2,080	1,998	11	Morocco 1,363; Togo 260; U.S.S.R. 126.
Phosphorus, elemental		62	90	—	Republic of South Africa 52; U.S.S.R. 24; Germany 9.
Pigments, mineral:					
Natural, crude		1,496	NA		
Iron oxides and hydroxides, processed		10,407	10,753	189	Germany 6,426; Belgium-Luxembourg 2,296; Italy 555.
Potassium salts, crude		—	4	—	All from Italy.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$12,291	$10,350	$106	Thailand $5,197; India $2,315; Brazil $914.
Synthetic	do.	$10,049	$9,620	$429	France $1,791; Ireland $1,789; Thailand $1,146.
Pyrite, unroasted		220	247	—	Italy 164; Germany 58; France 24.
Quartz crystal, piezoelectric	value, thousands	$116	$369	$1	Japan $357; Germany $7.
Salt and brine		194,644	95,456	(3)	France 65,161; Algeria 12,400; Germany 11,414.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		531	39,159	35,713	Turkey 2,068; Romania 473; Poland 264.
Sulfate:					
Natural		1,200	NA	—	
Manufactured		4,965	4,916	—	France 3,725; Germany 919; Belgium-Luxembourg 230.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		379,672	437,879	2,947	Portugal 121,032; Greece 87,962; Italy 74,517.
Worked		101,861	133,747	38	Italy 61,410; Portugal 48,328; Greece 9,538.
Dolomite, chiefly refractory-grade		11,215	7,394	—	France 6,029; United Kingdom 687; Norway 433.
Gravel and crushed rock		127,184	153,626	18	Morocco 93,858; France 52,896; Italy 4,662.
Limestone other than dimension		—	36	—	France 28; Portugal 8.
Quartz and quartzite		5,016	4,308	7	Germany 1,871; Yugoslavia 1,002; France 788.
Sand other than metal-bearing		349,920	397,589	59	Portugal 158,159; Morocco 157,426; France 75,814.

See footnotes at end of table.

TABLE 3—Continued

SPAIN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur:					
Elemental:					
Crude including native and byproduct		46,930	41,748	—	France 34,399; United Arab Emirates 5,221; Germany 1,853.
Colloidal, precipitated, sublimed		69	49	(3)	France 28; Germany 17; United Kingdom 5.
Dioxide		437	425	—	Italy 403; France 22.
Sulfuric acid		20,663	49,428	3	Italy 33,474; Germany 9,352; France 3,209.
Talc, steatite, soapstone, pyrophyllite		31,639	41,725	497	France 29,902; Belgium-Luxembourg 5,506.
Vermiculite, perlite, chlorite		40,141	55,906	—	Greece 36,648; Turkey 10,800; Republic of South Africa 4,734.
Other:					
Crude		58,640	42,078	1,588	Norway 7,919; Morocco 7,851; Germany 6,173.
Slag and dross, not metal-bearing		189,510	215,684	—	Germany 91,911; France 65,770; Sweden 31,844.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		12,349	25,064	362	France 24,228; Portugal 178.
Carbon black		44,996	41,594	1,123	France 21,949; Mexico 4,162; Netherlands 3,351.
Coal:					
Anthracite		218,661	522,941	—	United Kingdom 257,237; Belgium-Luxembourg 155,155; Netherlands 54,450.
Bituminous	thousand tons	10,237	12,465	4,813	Republic of South Africa 4,812; Australia 957.
Briquets of anthracite and bituminous coal		52	11	—	All from Netherlands.
Lignite including briquets		315,818	5,157	—	Germany 4,272; France 886.
Coke and semicoke		175,098	140,883	48,426	France 31,753; Argentina 25,281; Poland 20,795.
Gas, natural:					
Gaseous	cubic meters	235	NA		
Liquefied	thousand tons	3,545	4,277	—	Algeria 2,726; Libya 1,516; Brazil 18.
Peat including briquets and litter		79,145	90,154	—	Germany 56,007; U.S.S.R. 9,583; Belgium-Luxembourg 5,411.
Petroleum:					
Crude	thousand 42-gallon barrels	355,728	371,067	(3)	Nigeria 79,622; Mexico 79,587; Saudi Arabia 48,627.
Refinery products:					
Liquefied petroleum gas	do.	5,325	11,297	220	Saudi Arabia 6,890; United Kingdom 1,975; Algeria 800.
Gasoline	do.	24,776	16,607	(3)	Libya 4,856; France 2,045; Italy 1,161.
Mineral jelly and wax	do.	124	119	46	China 22; France 12.
Kerosene and jet fuel	do.	1,227	724	(3)	Italy 370; Portugal 155; Mexico 105.
Petroleum:					
Refinery products:					
Distillate fuel oil	do.	13,936	16,108	1,207	Italy 4,722; United Kingdom 3,612; France 1,985.
Lubricants	do.	812	737	35	France 281; Italy 132; Belgium-Luxembourg 79.
Residual fuel oil	do.	20,343	37,998	942	U.S.S.R. 6,770; Venezuela 4,132; Netherlands 4,096.
Bitumen and other residues	do.	764	1,251	79	France 774; Belgium-Luxembourg 335.
Bituminous mixtures	do.	22	27	(3)	France 12; Germany 5; Sweden 3.
Petroleum coke	do.	9,408	8,725	7,870	Republic of Korea 422; United Kingdom 273.

[1]Table prepared by Amy M. Burk, International Data Section.
[2]May include rhenium.
[3]Less than 1/2 unit.
[4]May include other precious metals.
[5]Includes hard zinc spelter.
[6]May include diamond dust and powder.

TABLE 4

SPAIN: 1991 BALANCE OF PAYMENTS, SELECTED MINERAL COMMODITIES[1]

(Thousand dollars)

Mineral commodity	Exports to EC	Imports from EC	Net gain or (loss)	Exports to the world	Imports from the world	Net gain or (loss)
Crude industrial minerals:						
Feldspar	909	5,012	(4,103)	$1,002	7,119	(6,117)
Magnesite	969	59	910	1,289	229	1,060
Slate	277	82	195	436	83	353
Other	188,921	175,809	13,112	267,365	417,384	(150,019)
Total	191,076	180,962	10,114	270,092	424,815	(154,723)
Metalliferous ores:						
Copper	2,319	38,186	(35,867)	8,708	209,283	(200,575)
Lead	6,847	3,907	2,940	8,960	13,303	(4,343)
Tin	—	93	(93)	—	7,516	(7,516)
Zinc	12,894	2,521	10,373	24,906	38,345	(13,439)
Other (including waste and scrap)	184,188	559,927	(375,739)	248,164	1,046,257	(798,093)
Total	206,248	604,634	(398,386)	290,738	1,314,704	(1,023,966)
Nonmetallic mineral manufactures	275,467	154,156	121,311	461,932	326,444	135,488
Metals:						
Iron and steel	1,583,817	1,950,607	(366,790)	2,918,401	2,431,718	486,683
Mercury	1,379	404	975	2,796	579	2,217
Other nonferrous metals	717,977	1,045,474	(327,497)	996,755	1,413,065	(416,310)
Total	2,303,173	2,996,485	(693,312)	3,917,952	3,845,362	72,590
Mineral fuels	1,272,699	1,289,138	(16,439)	2,806,653	10,222,594	(7,415,941)

[1]Table prepared by Harold Willis, Section of International Data.

TABLE 5

SPAIN: RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity (in situ resources)	Reserves[e] (thousand tons)
Barite	1,170
Coal, anthracite and bituminous	500,000
Copper	2,600
Fluorspar	25,000
Iron ore[1]	6,000
Lead	2,800
Mercury	76,000
Potash	28,000
Pyrite	150,000
Sulfur	30,000
Uranium[2]	46
Zinc	7,200

[e]Estimated.
[1]Thousand tons of Fe.
[2]Uranium concentrate, U_3O_8.

TABLE 6
SPAIN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Alumina Española S.A.	Alumina plant at San Ciprián, Lugo	800.
Aluminum	Aluminio Española S.A.	Electrolytic plant at San Ciprián, Lugo	180.
Do.	Empresa Nacional del Aluminio (Endasa) S.A.	Electrolytic plant at Avilés	110.
Do.	do.	Electrolytic plant at La Coruña	25.
Do.	Aluminio de Galicia S.A.	Electrolytic plant at Sabiñánigo	78.
Do.	do.	do.	14.
Coal:			
Anthracite	Approximately 95 producers, including—65 producers in Province of León, of which the largest are—		6,100 including—(3,400).
Do.	Antracitas Gaiztarro S.A.	Mines at María and Paulina	(385).
Do.	Minero-Siderúrgica de Ponferrada S.A.	NA	(230).
Do.	13 producers in Province of Oviedo, of which the largest are—		(1,900).
Do.	Antracita de Gillón S.A.	NA	(500).
Do.	González y Diez S.A.	Mines: Grupo Minero de Tineo	(130).
Do.	14 producers in Province of Palencia, of which the largest are—		(600).
Do.	Antracita de Gillón S.A.	Mines at La Velilla	(135).
Do.	Sdad. Minera San Luis	Mines at Trueno and Cecilia	(61).
Do.	Nacional de Carbon del Sur (Encosur)	Rampa 3 and Pozo San Jose Mines, in Province of Córdoba-Empresa	(200).
Bituminous	88 producers, of which the largest is—	Mines and plants in Provinces of Ciudad Real, Córdoba, León, Oviedo, Palencia, and Seville	14,000 including—
Do.	Hunosa S.A.	Various mines and plants	(3,300).
Lignite	Empresa Nacional de Electricidad Endesa	Mines: Grupo Minero de Puentes, La Coruna	25,000.
Barite	Minas de BAritina S.A. (Kali-Chemie of West Germany, 100%)	Mine and plant in Espiel area, Córdoba	50.
Cement	Approximately 36 cement companies, of which the largest is—	54 plants, including—	44,000 including—
Do.	Asland S.A.	5 (Asland) plants, of which the largest ones are—	(6,600).
Do.	do.	Plant at Puerto de Sagunto, Valencia	(2,000).
Do.	do.	Plant at Villaluenga de la Sagra, Toledo	(2,000).
Copper:			
Metal	Rio Tinto Minera S.A. (Unión Explosivos Rio Tinto, 75%; Rio Tinto Zinc, 25%)	Smelter at Huelva	85.
Do.	do.	Electrolytic refinery at Huelva	105.
Do.	Industrias Reunidas de Cobre	Smelter at Asua-Bilbao	30.
Do.	Electrolítico y Metales S.A.	Fire and electrolytic refinery at Asua-Bilbao	36.
Do.	Electrólisis de Cobre S.A.	Smelter at Barcelona	24.
Do.	do.	Electrolytic refinery at Palencia	32.
Ore	Rio Tinto Minera S.A. (Unión Explosivos Rio Tinto, 75%; Rio Tinto Zinc, 25%)	Mines and plant at Arientero, near Santiago de Compostela, Galicia	12.
Do.	do.	Corta Atalay opencast mine, Cerro Colorado opencast mine and plant, and Alfredo underground mine—all in Rio Tinto area	30.

See footnotes at end of table.

TABLE 6—Continued

SPAIN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Fluorspar	Fluoruros S.A. (Bethlehem Steel Corp., 49%) Asturias	Plant at Caravía, near Colunga,	400 (ore).
Do.	do.	Opencast mines at San Lino and Val Negro, and underground mine at Eduardo, near Caravía—all in Asturias	350 (ore).
Do.	do.	Plant at Collada, Gijón Mines at Veneros Sur and Corona, Gijón	200 (ore).
Iron ore	Compañía Andaluza de Minas S.A. (Mokta, 62%)	Mine at Alquife, Granada	4,000.
Do.	Altos Hornos de Vizcaya S.A. (U.S. Steel, 25%)	Nine mines in Province of Vizcaya	4,000.
Do.	Compañía Minera Siderúrgica de Ponferrada S.A.	Eight mines in Province of León	3,000.
Do.	Minera del Andévalo S.A.	Opencast mine at Coba, Huelva	2,000.
Lead:			
Metal	Sociedad Minera y Metalúrgica de Peñarroya de España, S.A. (Peñarroya, France, 98%)	Smelter at Cartagena, Murcia	60.
Do.	do.	Refinery at Cartagena, Murcia	60.
Do.	Compañía La Cruz, Minas y Fundaciones de Plomo S.A.	Smelter at Lineares, Jaén	40.
Do.	do.	Refinery at Lineares, Jaén	40.
Do.	Tudor S.A.	Secondary smelter at Saragoza	16.
Do.	Ferroaleaciones Españolas, S.A.	Secondary smelter at Medina del Campo	12.
Do.	Derivados de Minerales y Metales	Secondary smelter at Barcelona	5.
Ore	Sociedad Minera y Metalúrgica de Peñarroya España, S.A. (Peñarroya, France 90%)	Opencast mine at Montos de los Azules, near Unión, Murcia	25.
Do.	Andaluza de Piritas S.A. (APIRSA)	Open pit mine at Aznalcóllar, Sevilla	21.
Do.	Exploración Minera International España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	16.
Magnesite	Magnesitas de Rubián S.A.	Plants at Zubiri	100.
Do.	do.	Mines and plant near Sarria, south of Lugo	220.
Mercury	Minas de Almadén y Arrayanes S.A. (Government, 100%)	Mine and smelter at Almadén	70,000 flasks.
Petroleum:			
Crude barrels per day	Chevron S.A.	Oilfield at Casablanca	300.
Refined do.	Repsol Petróleo S.A (Repsol)	Refineries at Escombreras	200,000.
Do. do.	do.	Puertollano	140,000.
Do. do.	do.	Tarragona	260,000.
Do. do.	Refineria de Petróleos del Norte S.A. (Petronor)	Refinery at Somorrostro	240,000.
Do. do.	Compañía Española de Petróleos S.A.	Refinery at Santa Cruz de Tenerife	160,000.
Do. do.	do.	Refinery at Algeciras	160,000.
Do. do.	Petróleos del Mediterraneo S.A. (Petromed)	Refinery at Castellón de la Plana	120,000.
Do. do.	Compañía Iberica Refinadora de Petróleos S.A. (Petroliber)	Refinery at La Coruña	140,000.
Potash	Potasas de Navarra S.A.	Mines and plant near Pamplona	3,000 (ore).
Do.	Minas de Potasas de Suria S.A.	Mines at Suria	1,000 (ore).
Do.	Unión Explosivos Rio Tinto S.A.	Mines at Balsareny/Sallent and Cardona	2,000 (ore).

See footnotes at end of table.

TABLE 6—Continued

SPAIN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

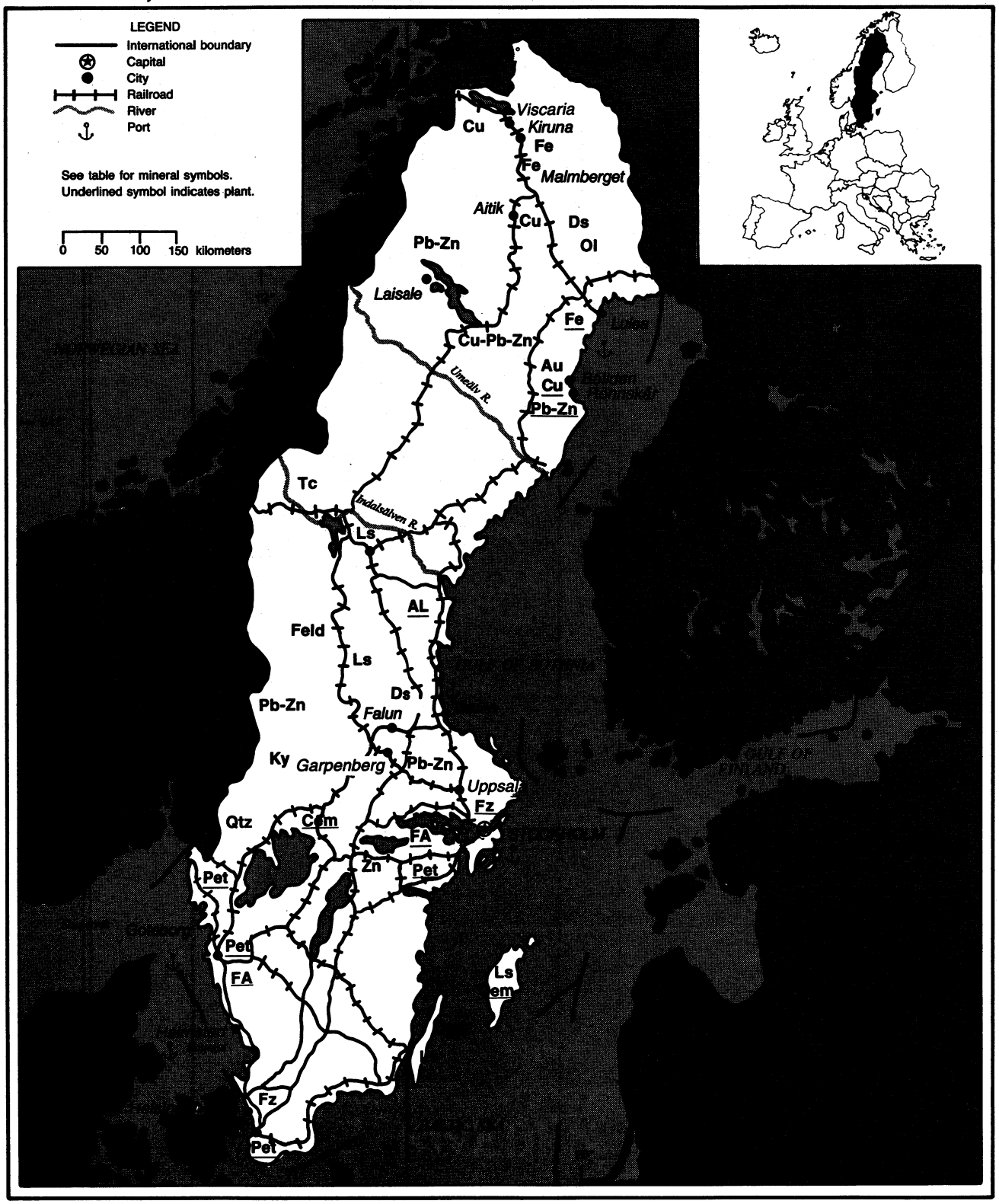
(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Pyrite	Compañía Española de Minas de Tharsis	Mines and plants at Tharsis and Zarza, near Seville	1,300.
Do.	do.	Plant at Huelva	600.
Do.	Rio Tinto Minera S.A. (Unión Explosivos Rio Tinto, 75%; Rio Tinto Zinc, 25%)	Mines and plant at Rio Tinto, near Seville	900.
Sepiolite	Tolsa S.A.	Mine at Vicalvaro, near Toledo	100.
Do.	do.	Plant at Vicalvaro, near Toledo	100.
Do.	Silicatos-Anglo-Ingleses S.A.	Mine at Villecas near Madrid	200.
Do.	do.	Plant at Villecas near Madrid	200.
Steel	Empresa Siderúrgica S.A. (Ensidesa)	Plants at Avilés, Veriña, and Mieres in Oviedo, and Moreda, Gijón	6,000.
Do.	Altos Hornos de Viscaya S.A. (U.S. Steel, about 20%)	Ironworks and steelworks at Sestao, Bilbao	1,500.
Uranium metric tons	Government	Mines and plant near Ciudad Real	500 (U_3O_8).
Zinc:			200.
Metal	Real Cia. Asturiana de Minas S.A.	Electrolytic zinc plant at San Juan de Nueva	
Ore	do.	Reocín mines and plants near Torrelavega, Santander	500 (ore).
Do.	Andaluza de Piritas S.A. (APIRSA)	Open pit mine at Aznalcóllar, Sevilla	3,500 (ore).
Do.	Exploración Minera International España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	500 (ore).
Do.	Sociedad Minera y Metalúrgica de Peñarroya España S.A.	Mines and plants at Montos de los Azules y Sierra de Lujar, San Agustín	220 (ore).

NA Not available.

SWEDEN

AREA 449,000 km² **POPULATION 8.5 million**



THE MINERAL INDUSTRY OF

SWEDEN

By Jozef Plachy

Sweden produces about 3% of the world's output of iron ore and is a significant producer of copper, lead, and zinc. Sweden's steel industry, particularly with regard to specialty steels, is one of the most advanced in the world. The most widely available industrial minerals are dolomite, feldspar, granite, ilmenite, kaolin, limestone, quartz, rare-earth metals, and wollastonite. Sweden relies heavily on imports for its energy minerals.

GOVERNMENT POLICIES AND PROGRAMS

In 1992, Sweden continued to implement policies that began after the 1991 general election. This included a decrease in the level of taxation, as well as the privatization of Government-owned enterprises. The new Minerals Act, passed by the Parliament in July 1992, opens up the exploration and mining of a wide range of minerals, although exploration in the offshore areas is reportedly restricted. The Swedish Government has reportedly ceased Government funding of mineral exploration and supposedly turned this activity over to the private sector. The State Mining Property Commission, the Government agency that previously undertook mineral exploration, is now offering geological information and records on mineral occurrences to stimulate interest in exploration by private investors. Starting on January 1, 1993, foreigners will reportedly be entitled to acquire shares in Swedish companies without restrictions. Privatization of Government-held companies will reportedly continue with return to private ownership of 35 major companies, including giants like Luossavaara-Kiirunavaara AB (LKAB) and Svenskt Stal AB (SSAB).

PRODUCTION

In 1991, Sweden produced more than half of Western European iron ore, 38% of lead ore, 28% of copper ore, and 18% of zinc ore. Most of these ores were exported to other Western European countries. Sweden's share of Western European refined metal production in 1991 was only 7% of copper metal production and 5% of refined lead. No primary zinc metal was smelted in Sweden. *(See table 1.)*

TRADE

Sweden's exports account for 30% of gross domestic product. About 13% of exports are supplied by the mineral industry, one-third of which is steel related. Indigenous production of smelted or refined metals is often supplemented by foreign raw materials, usually imported duty free.

Sweden's most important markets are in Western Europe. The largest trading partner in 1992 was Germany, followed by the United Kingdom, Norway, and the United States. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

A large part of the mineral industry is Government owned. However, in order to comply with European Community (EC) requirements for admission, the Swedish Government has reportedly liberalized foreign investments into the country and sought to denationalize some industries. *(See table 4.)*

COMMODITY REVIEW

Metals

Copper.—Swedish copper ore production continued to increase in 1992. The estimated output of 86,000 tons of contained copper was more than 5% higher than that in 1991. Copper production is dominated by the Aitik open pit mine located in the northern part of the country, 100 km north of the Arctic Circle. The main pit, the largest in Europe, is 2,500 m long, 915 m wide, and 230 m deep. The mine reportedly has proven reserves of about 200 Mmt. The average content of copper is reportedly 0.38% and the ore reportedly contains 0.22 g/mt gold and 4 g/mt silver. After recent modernization and expansion, sulfide ore production reportedly increased to 16.5 Mmt (along with 14.3 Mmt of waste rock), resulting in 190,000 tons of concentrate containing about 50,000 tons of copper, 1.7 tons of gold, and 38 tons of silver. The concentrate is sent to Boliden's Ronnskar smelter and refinery, where it accounts for more than one-half of its feed. The average recovery of copper is reportedly about 90%, with 50% recovery of gold and somewhat less than 70% of silver.

Ore production at the underground Viscaria Mine and the adjacent open pit Pahtohavara Mine, both owned by Outokumpu of Finland, averages about 740,000 mt/a. The average copper content is about 2.8%. Resources in the area are estimated at about 50 Mmt at a grade of 1.9% at the upper level, which increases with the depth of deposit. The ore body consists of several parallel sheets, measuring 5 to 20 m in thickness, in a zone several kilometers long. The principal mineral of the deposit is

chalcopyrite, without the usual gold and silver content.

Additional major copper mines include the Garpenberg Mine, the Kristineberg Mine, and the Restrom Mine.

In December 1992, one of the oldest mines in Sweden, the Falun Mine, began the closing process. After a millennium of continuous operation, Stora Kopparberget (the Great Copper Mountain) has reportedly run out of ore. It produced a total of 0.4 Mmt of copper, 0.5 Mmt of zinc, and 0.16 Mmt of lead. Only the manufacture of red paint, "Falun red," will remain, using tailings containing iron ochre and silicic acid.

Gold.—The two primary gold mines operating in 1992 were Boliden's Akerberg Mine and Bjorkdal Mine, both owned by Terra Mining AB. These mines are in northern Sweden, close to the shore. Both are reportedly based on vein-type deposits with open pit production. The deposit of the Akerberg Mine is reportedly 300 to 400 m long and 10 to 30 m wide, and, at the time production was started (1989), it reportedly contained 1 Mmt of ore containing 3 g/mt gold. Most of the gold at the Bjorkdal Mine is native, with some associated with pyrite. Reserves were originally about 9 Mmt containing 3 g/mt. In 1992, about 1 Mmt of ore was reportedly mined. In addition to the above-mentioned mines, the State Mining Property Commission (NSG) lists 46 gold occurrences, mainly vein-type.

Iron Ore.—Reported 1992 production of iron ore was 19.28 Mmt, a slight decline from that of the previous year. About 15.5 Mmt was reportedly exported, of which 83% went to Western Europe and 10% to the Middle East. Pellet production in 1992 was 10.3Mmt, of which 6.7 Mmt were exported. With the closure of the Dannemora Mine in central Sweden, the only mines remaining in operation are Kiruna and Malmberget, both owned and operated by LKAB.

Output of iron ore at the Kiruna mining complex, made up of the Kiirunavaara, Luossavaara, and Leveaniemi Mines, is now running at 13 Mmt/a. The ore body is approximately 4 km long, 80 m thick, and 2,000 m deep. Reserves of 460 Mmt of ore consist principally of magnetite (average 60% iron content) with minor hematite. Instead of producing bulk ore as in the past, LKAB now reportedly specializes in high-quality iron ore products, reportedly tailored to customers' specific requirements. The upgraded beneficiation plant and three pellet plants produce both olivine-base pellets for blast furnaces and dolomite-base pellets for direct reduction. The total capacity of the Swedish pelletizing plants are reportedly about 10.8 Mmt/a, which is reportedly due to increase to about 15 Mmt/a by 1995.

At Malmberget, ore is obtained from seven separate zones. Composition of reserves is similar to Kiruna. Reserves are estimated at about 400 Mmt with about approximately 50% iron content; 10% lower than at Kiruna.

Iron and Steel.—Swedish pig and sponge iron production had increased steadily from 1988 to 1992, while crude steel production had shown a continued decrease from 1988 until 1991, increasing slightly in 1992.

Lead.—The 1992 production of contained lead reportedly increased by about 16% over that of 1991. The main contributor was Boliden's underground Laisvall Mine in northern Sweden, the largest lead mine in Europe. The deposit consists of three major zones of mineralization, unevenly disseminated in sandstone. The ore grade ranges from 0% to 40% lead, with an average metal content of 4.26% lead, 10 g/mt silver, and 0.74% zinc. Because part of the deposit is under a lake and inaccessible, minable reserves are estimated to last for only 5 years. Annual ore production averages about 1.63 Mmt, resulting in about 71,000 tons of lead concentrate and 24,000 tons of zinc concentrate. The metal content of concentrates is about 55,300 tons of lead, 11.8 tons of silver, and 14,200 tons of zinc.

Silver.—Although most silver production in Sweden is a byproduct of copper or lead/zinc production, the underground Garpenberg Norra Mine is primarily a silver mine. Although it is adjacent to the Garpenberg polymetallic sulfide deposit, the Garpenberg Norra deposit is of different composition. Silver occurs in association with both galena and sphalerite, in a system of narrow veins, hosted in both dolomites and leptites. Estimated reserves at Garpenberg Norra are about 3 Mmt, grading 168 g/mt of silver plus other metals (0.05% copper, 1.03% lead, 0.3 g/mt of gold, and 2.54% zinc). Ore production averages about 500,000 mt/a. Ores from both the Garpenberg and Garpenberg Norra Mines are treated in one concentrator. The annual combined metal content of the concentrates is about 800 tons of copper, 330 kg of gold, 14,000 tons of lead, 95 tons of silver, and 26,000 tons of zinc.

Zinc.—The slight increase of mine output in 1992 was greatly affected by the Zinkgruvan Mine west of Stockholm, at the northern end of Lake Vattern. It is owned and operated by Vieille-Montagne Sverige AB, a Swedish subsidiary of the Belgian mining and smelting company. The deposit consists of three main sections: (1) Kanallagruvan to the west (the ore body extends to a 350-m depth and is nearly exhausted), (2) Burkland, and (3) the main body that accounts for the bulk of production. The average ore grading is 1.6% lead, 40 g/mt of silver, and 9.9% zinc. The average production of about 650,000 tons of ore is locally concentrated, resulting in about 107,000 tons of 55% zinc concentrate and 15,000 tons of 68% lead concentrate.

Another major producer of zinc is the Langdal Mine in northern Sweden. Production of the complex ore containing copper, lead, and zinc began in 1967. In 1991 it converted from underground mining to open pit. Annual production of about 200,000 tons is concentrated in Boliden and smelted at the Ronnskar smelter, 800 km north of Stockholm.

Industrial Minerals

Cement.—Sweden's cement in 1992 was produced at three factories, all owned by Cementa: at Degerhamn on the Island of Oland, Skovde on the mainland, and Slite on the Gotland. Domestic sales declined by about 20%, from just under 2 Mmt in 1991 to 1.6 Mmt in 1992.

Feldspar.—After 13 years of prospecting and surveying, Berglings Malm & Mineral AB (BMM) is ready to commence full production of feldspar at its deposit at Backegruvan in central Sweden. BMM, a private company established in 1979, started to develop the deposit in 1989. Reserves have reportedly been estimated at 50 Mmt of high-purity, homogeneous pegmatite, with low levels of iron. Extraction is to be by open pit mining and is to increase in stages to 150,000 mt/a. Processing will be by froth flotation at a nearby abandoned iron ore mine. Test running of the 150,000-mt/a-capacity plant began in October 1992.

The only other producer of feldspar in Sweden is Svenska Forshammar Mineral.

Fertilizer.—Production of phosphate fertilizer at Hydro-Supra AB's Landskrona plant reportedly ceased in 1992. There are reportedly no plans to close the calcium-ammonium-nitrate (CAN) plant at Landskrona. Only the production of CAN and nitric acid will continue at the location. Production of NPK will continue at Supra's plant at Koping in central Sweden.

Mineral Fuels

Coal.—Coal production in Sweden is about 10,000 mt/a. Coal is extracted as a byproduct of clay by Hoganas Corp. at Skane. It is mainly used locally by the Perstrop Co., and a small remainder is used at the nearby Helsingborg heating plant. Reserves are reportedly about 30 Mmt.

Peat.—Sweden produces about 1 Mm^3 of horticultural peat and about 3.2 Mm^3 of fuel peat. Presently there are about 50 producers of horticultural peat, mainly in the south and central part of the country. About 60% is produced as sod peat and the remaining 40% as milled peat.

Production of fuel peat is about equally divided between sod peat (mainly sausage peat) and milled peat. Because of the reported decision to cease nuclear power production by the year 2010, fuel peat production may increase in the future.

Petroleum.—Swedish Crude oil production in 1992 amounted to 20,000 barrels. Nearly all of the crude oil that is refined annually is imported, mainly from Norway, with a small amount coming from the former U.S.S.R. and the Middle East. Three out of the five refineries are around Goteborg, southern Sweden. The largest refinery, owned by Skandinaviska Raffinaderi AB, with an annual capacity of 200,000 tons of crude oil, is in Lysekil, 70 km north of Goteborg.

Reserves

The State Mining Property Commission, a Government agency, has been responsible for undertaking state-funded minerals exploration since 1974. The organization is reportedly to close in mid-1993, and its responsibility will be reduced to offering geological data about mineral reserves to interested companies. Exploration will reportedly be taken over by individual enterprises, after securing a permit from the owner of the property.

The estimated reserves of major minerals are shown in table 5. *(See table 5.)*

INFRASTRUCTURE

Sweden has a well-developed transportation system, especially in the southern part of the country. It includes 97,400 km of highway, of which about 51,900 km is paved. Out of 12,000 km of railroads operated by the Swedish State Railway, about 10,820 is of standard gauge, of which about 70% is electrified. The inland waterways add up to about 2,050 km, navigable by small steamers and barges. The major ports are at Gavle, Goteborg, Halmstad, Helsingborg, Kalmar, Malmo, and Stockholm.

OUTLOOK

The reported removal of limitations to foreign acquisition of Swedish businesses and foreign ownership of real estate should encourage foreign investment in the country, and Sweden's anticipated membership in the EC in 1995 will permit greater access to Swedish products in EC countries.

OTHER SOURCES OF INFORMATION

Agencies

National Board for Technical Development
Stockholm, Sweden
State Mining Property Commission,
Stockholm, Sweden
Swedish Geological Company
Stockholm, Sweden
Swedish Geological Survey
Stockholm, Sweden
Swedish Iron Industry Association
Stockholm, Sweden
Swedish Mining Association
Stockholm, Sweden

Publications

Allman manadsstatistik (Monthly Digest of Swedish Statistics).
Euroc, Annual Report 1992.
LKAB, Annual Report 1991.
Mineralmarknaden (Mineral Market).
Trelleborg, Annual Report 1991.

TABLE 1

SWEDEN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
METALS						
Aluminum metal:						
Primary		98,597	96,982	96,300	96,912	2 77,210
Secondary		14,101	e 16,000	25,500	28,500	30,000
Arsenic, trioxide, refined e		10,000	10,000	10,000	10,000	10,000
Copper:						
Mine output, Cu content		74,548	69,489	74,283	81,650	2 88,569
Metal:						
Smelter:						
Primary		93,653	r 69,977	r 76,385	r 68,113	2 77,804
Secondary		22,247	24,623	r 31,615	r 29,437	2 20,596
Total		115,900	r 94,600	r 108,000	r 97,550	2 98,400
Refined:						
Primary		68,300	69,977	66,278	67,587	71,634
Secondary e		22,000	2 24,623	31,000	29,000	30,000
Total		e 90,300	94,600	97,278	96,587	2 101,634
Gold:						
Mine output, Au content	kilograms	3,590	5,120	6,326	6,247	6,000
Metal, primary 3	do.	3,339	r 8,122	r 7,946	r e 6,300	6,300
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand tons	20,440	21,763	19,877	19,328	19,000
Fe content	do.	13,392	14,124	12,901	e 12,000	12,000
Pyrite, roasted	do.	e 400	387	375	e 350	350
Metal:						
Pig iron and sponge iron	do.	2,527	2,638	2,736	2,812	3,000
Ferroalloys:						
Ferrochromium		143,055	r 153,800	r 117,680	r 120,884	130,000
Ferrosilicon		20,622	19,303	23,600	e 23,000	23,000
Total		163,677	r 173,103	r 141,280	r 143,884	153,000
Steel, crude	thousand tons	4,779	4,692	4,454	4,248	2 4,356
Semimanufactures, rolled e	do.	4,100	4,200	4,000	4,000	4,000
Lead:						
Mine output, Pb content		91,579	88,967	98,259	91,127	2 106,200
Metal:						
Smelter:						
Primary:						
Crude		1,257	1,294	e 1,200	e 1,000	1,000
Refined e		62,000	58,000	55,800	55,000	55,000
Total e		63,257	59,294	57,000	56,000	56,000
Secondary e		32,000	30,000	27,500	26,000	26,000
Total smelter e		95,257	89,294	84,500	82,000	82,000
Refined:						
Primary		57,764	48,694	47,466	49,168	2 46,800
Secondary		26,936	22,706	22,134	38,835	2 44,300
Total 4		84,700	71,400	69,600	88,003	2 91,100

See footnotes at end of table.

TABLE 1—Continued

SWEDEN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
METALS—Continued						
Molybdenum, oxide, roasted, Mo content		3,371	3,082	e3,000	e3,000	3,000
Nickel, metal:						
Unwrought, secondary		NA	279	298	e300	300
Alloy, primary		NA	572	610	e650	650
Selenium, elemental, refined		19	r23	r29	e27	27
Silicon metal[e]		217,059	10,000	10,000	10,000	10,000
Silver:						
Mine output, Ag content	kilograms	207,804	227,715	242,685	239,321	280,000
Metal, primary[3]	do.	e149,000	r302,177	r274,467	r e253,000	250,000
Tin, metal:						
Unwrought		NA	149	364	e400	500
Alloy		NA	1,270	1,482	e1,500	1,500
Tungsten: Mine output, W content		420	e80	—	—	—
Zinc: Mine output, Zn content		200,393	173,515	164,128	161,170	2169,800
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	r2,247	r2,431	r2,475	r e2,500	2,500
Clays: Kaolin		92	r106	r108	e100	100
Feldspar, saleable, crude and ground		r38,180	r38,437	r41,197	32,000	30,000
Fertilizer, manufactured:						
Nitrogenous	thousand tons	e300	333	401	e400	400
Phosphatic	do.	e90	94	91	e90	90
Mixed	do.	e500	524	514	e500	500
Fluorspar concentrate		225	r—	—	—	—
Kyanite[e]		6,000	6,000	6,000	6,000	6,000
Lime	thousand tons	589	r656	r603	r e600	600
Olivine	do.	e120	e120	100	114	120
Phosphate rock (byproduct):						
Gross weight	do.	142	71	r7	—	—
P_2O_5 content	do.	52	26	r3	—	—
Pyrite, gross weight	do.	355	301	252	89	80
Quartz	do.	15	r52	r378	r e400	400
Sodium sulfate, synthetic[e]	do.	100	100	100	100	100
Stone:						
Dimension, mostly unfinished:						
Granite	do.	89	r101	r113	e100	100
Limestone	do.	r e5	r5	r6	r e6	6
Sandstone	do.	e3	r—	r—	r—	—
Slate	do.	28	r28	r26	20	20
Other	do.	e40	36	29	e30	30
Crushed:						
Dolomite	do.	r e300	r328	r321	r e300	300
Granite	do.	4,978	r6,110	r6,358	r e6,400	6,500
Limestone:						
For cement manufacture	do.	1,064	r1,179	r1,175	r e1,200	1,200

See footnotes at end of table.

TABLE 1—Continued

SWEDEN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued						
Stone—Continued:						
Crushed—Continued:						
Limestone—Continued:						
For lime manufacture	thousand tons	r e600	r660	r760	r e800	800
For other construction and industrial uses	do.	1,878	r2,138	r1,954	e2,000	2,000
Chalk (ground)	do.	38	r34	29	r30	30
For agricultural uses (ground)	do.	122	r320	r347	r e350	350
For other uses (ground)	do.	e100	r81	r96	e100	100
Total	do.	r3,802	r4,412	r4,361	r e4,480	4,480
Quartzite	do.	1,220	r994	r1,234	r e1,300	1,300
Sandstone[e]	do.	258	50	50	50	50
Undifferentiated	do.	e20,000	13,883	24,945	e25,000	25,000
Other	do.	e700	r845	r718	e700	700
Sulfur:						
S content of pyrite	do.	r170	r144	r121	r e43	38
Byproduct:[e]						
From metallurgy	do.	125	125	125	125	125
From petroleum	do.	45	40	40	40	40
Total[e]	do.	r340	r309	r286	r208	203
Sulfuric acid, gross weight		962	r902	r855	e900	900
Talc, soapstone		16,550	r17,975	r15,021	r e20,000	20,000
MINERAL FUELS AND RELATED MATERIALS						
Carbon black[e]	thousand tons	30	30	30	30	30
Coal, anthracite and bituminous	do.	—	—	11	e10	10
Coke, metallurgical	do.	893	r473	r318	r305	300
Gas, manufactured:						
Coke oven gas	million cubic meters	e400	460	501	e500	500
Blast furnace gas	do.	e3,500	3,526	3,723	e3,800	4,000
Peat:						
Agricultural use	thousand tons	r227	r227	r250	r263	260
Fuel[e]	do.	1,000	21,450	1,400	1,400	1,400
Petroleum:						
Crude	thousand 42-gallon barrels	15	19	19	19	20
Refinery products:						
Liquefied petroleum gas	do.	e2,500	1,856	2,552	2,946	3,000
Naphtha	do.	e2,640	1,632	503	226	500
Gasoline, motor	do.	e37,600	32,122	31,801	31,330	31,500
Jet fuel	do.	e6,600	4,130	4,202	2,390	2,500
Kerosene	do.	e395	245	113	38	50
Distillate fuel oil	do.	e44,230	52,551	46,526	80,742	81,000
Residual fuel oil	do.	e25,785	26,855	24,895	27,254	28,000
Other	do.	e6,000	4,488	e4,500	e4,000	4,000
Refinery fuel and losses[e]	do.	7,500	11,300	11,300	10,000	10,000
Total[e]	do.	133,250	135,179	126,392	158,926	160,550

[e]Estimated. [r]Revised. NA Not available.

[1]Table includes data available through June 1993.

[2]Reported figure.

[3]Includes only that recovered from indigenous ores excluding scrap.

TABLE 2

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	2	1	NA	NA.
Alkaline-earth metals	(2)	27	NA	NA.
Aluminum:				
Ore and concentrate	3,956	124	—	Mainly to Finland.
Oxides and hydroxides	452	191	NA	NA.
Ash and residue containing aluminum	2,248	4,707	NA	NA.
Metal including alloys:				
Scrap	20,882	34,006	181	Spain 12,356; Finland 6,380; Germany 5,102.
Unwrought	64,140	57,802	—	Germany 30,385; Netherlands 7,664; United Kingdom 6,093.
Semimanufactures	55,666	60,222	3,724	Denmark 15,862; United Kingdom 10,115; Germany 5,815.
Antimony:				
Ore and concentrate	30	36	NA	NA.
Oxides	22	20	NA	NA.
Metal including alloys, all forms	7	4	—	Mainly to Finland.
Beryllium: Metal including alloys, all forms value, thousands	$2	$5	—	All to Germany.
Bismuth: Metal including alloys, all forms do.	$2	$4	—	Germany $2; Norway $2.
Cadmium: Metal including alloys, all forms do.	(2)	$5	—	All to Belgium-Luxembourg.
Chromium:				
Ore and concentrate	19,060	31	—	Norway 29.
Oxides and hydroxides	67	10	—	Norway 7; Denmark 3.
Metal including alloys, all forms	3	4	(2)	Mainly to Germany.
Cobalt:				
Ore and concentrate	—	8	—	All to New Zealand.
Oxides and hydroxides	181	117	—	Norway 102; Finland 15.
Metal including alloys, all forms	142	140	36	Netherlands 48; Italy 25; United Kingdom 10.
Columbium and tantalum: Tantalum metal including alloys, all forms value thousands	$5	$2	—	Denmark $1; Norway $1.
Copper:				
Ore and concentrate	r93,376	116,722	5,785	Finland 69,413; Germany 15,478; Spain 14,465.
Matte and speiss including cement copper	21	1	—	All to Denmark.
Oxides and hydroxides	1	7	NA	NA.
Sulfate	35	18	NA	NA.
Ash and residue containing copper	r1,885	5,554	NA	NA.
Metal including alloys:				
Scrap	3,019	6,463	221	Denmark 1,991; Germany 1,662; Belgium-Luxembourg 988.
Unwrought	44,505	37,477	2	United Kingdom 12,645; Finland 11,173; Netherlands 7,042.
Semimanufactures	100,448	102,807	3,664	Germany 12,844; Denmark 11,146; Finland 9,454; unspecified 69,363.
Germanium: Metal including alloys, all forms value, thousands	$160	$1	—	All to Denmark.

See footnotes at end of table.

TABLE 2—Continued

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Gold:					
Waste and sweepings	value, thousands	$11,282	$11,281	NA	NA.
Metal including alloys, unwrought and partly wrought	do.	$96,401	$103,953	NA	NA.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite	thousand tons	16,398	15,226	51	Germany 5,791; Belgium-Luxembourg 2,617; Finland 1,746.
Pyrite, roasted		—	25,227	—	United Kingdom 13,291; Netherlands 5,514; Norway 3,775.
Metal:					
Scrap		122,257	236,762	(2)	Spain 65,670; Italy 53,073; Greece 22,204.
Pig iron, cast iron, related materials		130,270	130,929	NA	NA.
Ferroalloys:					
Ferrochromium		93,305	88,879	NA	NA.
Ferrocolumbium		59	74	NA	NA.
Ferromanganese		792	538	NA	NA.
Ferromolybdenum		90	112	NA	NA.
Ferronickel	value, thousands	$33	$35	NA	NA.
Ferrophosphorus		151	164	NA	NA.
Ferrosilicochromium		(2)	—	NA	NA.
Ferrosilicomanganese		91	60	NA	NA.
Ferrosilicon		13,301	11,648	NA	NA.
Ferrotitanium and ferrosilicotitanium		17	121	NA	NA.
Ferrotungsten and ferrosilicotungsten	value, thousands	—	$5	NA	NA.
Ferrovanadium		55	17	NA	NA.
Silicon metal	value, thousands	$11,814	$1,724	NA	NA.
Unspecified		12	90		
Steel, primary forms		239,482	337,738	89,416	Italy 95,285; Finland 41,752; Germany 34,491.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		914,137	1,156,413	79,798	Germany 256,711; Denmark 194,073; Italy 95,572.
Clad, plated, coated		256,626	313,739	26,923	Denmark 44,957; Norway 37,364; United Kingdom 36,076.
Of alloy steel		391,741	386,073	40,192	Germany 106,727; Italy 33,143; Finland 30,142.
Bars, rods, angles, shapes, sections		654,780	560,870	26,680	Germany 160,310; United Kingdom 74,897; Norway 60,270.
Rails and accessories		27,276	34,988	—	United Kingdom 15,572; Finland 6,269; unspecified 6,080.
Wire		60,882	56,015	7,147	Germany 13,363; Denmark 5,617; Finland 5,399.
Tubes, pipes, fittings		212,676	184,618	9,383	Germany 38,744; Denmark 18,805; France 16,800.

See footnotes at end of table.

TABLE 2—Continued

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Lead:					
Ore and concentrate		80,334	60,513	—	Belgium-Luxembourg 26,215; Germany 23,772; Netherlands 8,364.
Oxides		19	28	—	Denmark 14; Norway 13.
Ash and residue containing lead		4,925	72	NA	NA.
Metal including alloys:					
Scrap		253	531	—	Denmark 229; Belgium-Luxembourg 203; Germany 93.
Unwrought		51,678	65,178	—	Netherlands 20,042; Italy 11,919; Germany 9,603.
Semimanufactures		661	757	—	Denmark 257; Germany 203; Finland 153.
Lithium: Oxides and hydroxides		3	1	NA	NA.
Magnesium: Metal including alloys:					
Scrap		701	231	36	Germany 123; United Kingdom 56; Norway 16.
Unwrought		(2)	1	—	All to Norway.
Semimanufactures		3	4	—	Denmark 2; Italy 1; Japan 1.
Manganese:					
Ore and concentrate, metallurgical-grade		14	—		
Oxides		3	13	—	Italy 8; Norway 4; Hungary 1.
Metal including alloys, all forms		60	112	—	Finland 41; U.S.S.R. 18; Germany 9.
Mercury		45	79	NA	NA.
Molybdenum:					
Ore and concentrate, roasted		2,952	3,602	—	Netherlands 1,705; United Kingdom 1,646; Finland 140.
Oxides and hydroxides		146	—		
Metal including alloys:					
Unwrought including waste and scrap		2	(2)	—	Mainly to Finland.
Semimanufactures		1	1	—	Mainly to Japan.
Nickel:					
Matte and speiss		12	—		
Oxides and hydroxides	value, thousands	—	$2	NA	NA.
Metal including alloys:					
Scrap		542	947	(2)	Netherlands 506; Germany 207; United Kingdom 131.
Unwrought		95	62	—	Norway 56; Belgium-Luxembourg 3; Switzerland 2.
Semimanufactures		1,785	1,700	722	Germany 197; United Kingdom 151; Italy 146.
Platinum-group metals:					
Waste and sweepings	value, thousands	$13,265	$11,276	$6,303	Norway $2,565; Germany $1,008; United Kingdom $492.
Metals including alloys, unwrought and partly wrought:					
Palladium	do.	$312	$251	NA	NA.
Platinum	do.	$4,724	$1,426	NA	NA.
Rhodium	do.	$17	—		
Iridium, osmium, ruthenium	do.	$3	$7	NA	NA.
Rare-earth metals including alloys, all forms		54	—		

See footnotes at end of table.

TABLE 2—Continued

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Silver:					
Ore and concentrate[3]	value, thousands	$15,980	$17,246	—	Germany $9,614; United Kingdom $7,632.
Waste and sweepings[3]	do.	$7,130	$7,210	—	United Kingdom $2,227; Germany $2,178; Norway $1,828.
Metal including alloys, unwrought and partly wrought		297	306	NA	NA.
Tellurium and boron, elemental		3	44	NA	NA.
Tin: Metal including alloys:					
Scrap		(2)	6	—	All to Germany.
Unwrought		134	131	—	Norway 63; Finland 37; Denmark 29.
Semimanufactures		155	157	(2)	Denmark 88; Norway 42; Finland 24.
Titanium:					
Ore and concentrate		80	20	—	Denmark 10.
Oxides		765	514	22	Germany 290; Netherlands 98; Denmark 52.
Metal including alloys:					
Unwrought including waste and scrap		286	246	53	United Kingdom 192.
Semimanufactures		482	205	6	Chile 78; France 46; Norway 20.
Tungsten:					
Ore and concentrate		110	217	130	India 36; United Kingdom 36; Brazil 15.
Metal including alloys:					
Unwrought including scrap		9	16	—	Mainly to Germany.
Semimanufactures		3	3	(2)	Netherlands 1.
Uranium and thorium:					
Oxides and other compounds	value, thousands	$9,761	$16,161	$135	Germany $15,384; Norway $640.
Metal including alloys, all forms, uranium	do.	$5	$38	$7	United Kingdom $21; Hungary $9; Denmark $2.
Vanadium: Metal including alloys, all forms	do.	$1	—		
Zinc:					
Ore and concentrate		313,180	322,259	—	Norway 91,496; Finland 77,489; France 60,638.
Oxides		647	697	—	Germany 467; Norway 108; Netherlands 85.
Blue powder	value, thousands	$1	—		
Ash and residue containing zinc		41,019	39,875	NA	NA.
Metal including alloys:					
Scrap		5,350	5,891	—	Norway 1,069; Germany 423; unspecified 2,889.
Unwrought		855	225	—	Norway 149; Netherlands 28; Finland 21.
Semimanufactures		165	347	—	Norway 221; France 56; Finland 30.
Zirconium:					
Ore and concentrate		2	6	—	All to Norway.
Oxides[4]		(2)	1	NA	NA.
Metal including alloys:					
Unwrought including waste and scrap		33	20	13	United Kingdom 7.
Semimanufactures		76	76	(2)	Germany 70; Japan 5.
Other:					
Ores and concentrates		95	40	—	Denmark 18; Norway 18; Netherlands 4.
Oxides and hydroxides		41	(2)	NA	NA.
Ashes and residues		1,118	1,050	NA	NA.
Base metals including alloys, all forms	value, thousands	$20	$20	—	Spain $7; United Kingdom $7; Denmark $4.

See footnotes at end of table.

TABLE 2—Continued

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		43	55	—	Denmark 35; Portugal 11; Finland 5.
Artificial:					
Corundum		53	90	NA	NA.
Silicon carbide		97	91	NA	NA.
Grinding and polishing wheels and stones		2,208	1,847	6	France 436; United Kingdom 277; Norway 204.
Barite and witherite		2	21	—	Mainly to Germany.
Boron materials:					
Crude natural borates		1,134	289	—	Austria 230; Norway 33; Netherlands 24.
Oxides and acids		44	185	NA	NA.
Bromine including fluorine	value, thousands	(2)	$5	NA	NA.
Cement		261,594	317,844	—	Nigeria 309,690; United Kingdom 5,731; Norway 1,334.
Chalk		5,366	6,225	—	Finland 2,734; Norway 1,825; Denmark 1,582.
Clays, crude:					
Bentonite		466	60	—	Finland 36; Norway 24.
Chamotte earth		35	31	NA	NA.
Fuller's earth		76	95	NA	NA.
Fire clay		42	11	NA	NA.
Kaolin		1,935	974	—	Finland 409; Denmark 299; Norway 183.
Unspecified		76	62	NA	NA.
Cryolite and chiolite		2	2	—	India 1; Turkey 1.
Diamond, natural:					
Gem, not set or strung	value, thousands	$12,542	$1,302	—	Belgium-Luxembourg $485; Malaysia $342; Israel $191.
Industrial stones	do.	$154	$108	$33	Germany $33; Netherlands $20; Belgium-Luxembourg $11.
Dust and powder	do.	$104	$250	—	Finland $98; Ireland $58; Norway $44.
Diatomite and other infusorial earth		188	37	—	Finland 31; Norway 4; Israel 1.
Feldspar, fluorspar, related materials:					
Feldspar		24,202	19,531	—	United Kingdom 11,023; Italy 2,813; Austria 2,558.
Fluorspar		1,514	912	—	Finland 743; Norway 118; Germany 22.
Fertilizer materials:					
Crude, n.e.s.		568	715	—	Norway 537; Japan 168.
Manufactured:					
Ammonia		1,063	233	NA	NA.
Nitrogenous[3]		211,751	195,614	NA	NA.
Phosphatic		87,612	81,086	NA	NA.
Potassic		55,430	99,091	NA	NA.
Unspecified and mixed		260,089	238,766	NA	NA.
Graphite, natural		70	54	(2)	Republic of Korea 28; Japan 16; Norway 2.
Gypsum and plaster		814	649	—	Finland 440; Norway 111; Denmark 87.
Iodine	value, thousands	$3	$2	NA	NA.

See footnotes at end of table.

TABLE 2—Continued

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Kyanite and related materials: Andalusite, kyanite, sillimanite	3,623	2,365	NA	NA.
Lime	42,743	64,441	140	Denmark 40,985; Finland 19,386; Norway 3,151.
Magnesium compounds:				
Magnesite, crude	116	186	—	Norway 89; Finland 25; United Kingdom 24.
Oxides and hydroxides	176	101	—	United Kingdom 41; Denmark 38; Hungary 12.
Mica:				
Crude including splittings and waste	15	85	—	Finland 43; Norway 31; Denmark 11.
Worked including agglomerated splittings	18	3	—	Japan 1; Norway 1.
Nitrates, crude	405	12,344	—	United Kingdom 4,346; Thailand 4,030; Malaysia 3,945.
Phosphates, crude	12,354	1,659	—	Denmark 1,657; Norway 2.
Phosphorus, elemental value, thousands	$1	$3	NA	NA.
Pigments, mineral:				
Natural, crude	4	3	NA	NA.
Iron oxides and hydroxides, processed	5,193	6,109	2,866	Singapore 1,278; France 722; United Kingdom 362.
Potassium salts, crude	1	—		
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$10,430	$10,200	$1,145	Belgium-Luxembourg $4,245; Hong Kong $4,029; Thailand $459.
Synthetic do.	$35,829	$43,272	—	Ireland $43,256; Netherlands $16.
Pyrite, unroasted	93	100	—	Norway 60; Thailand 20; Venezuela 20.
Salt and brine	1,985	1,478	(2)	Norway 415; Denmark 401; Finland 326.
Sodium compounds, n.e.s.:				
Soda ash, manufactured	40	1,560	—	Finland 1,516; Norway 38; Denmark 4.
Sulfate, manufactured	r56,293	27,674	NA	NA.
Sulfate, natural	r—	—		
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	402,109	294,333	892	Denmark 120,024; Germany 54,051; United Kingdom 41,376.
Worked	8,577	10,320	3	Norway 4,748; Denmark 3,410; Germany 1,105.
Dolomite, chiefly refractory-grade	42,980	43,550	—	Finland 18,140; Netherlands 13,090; Norway 7,304.
Gravel and crushed rock	1,303,249	1,668,414	—	Germany 1,003,775; Denmark 547,207; Norway 57,659.
Limestone other than dimension	967,420	976,101	—	Finland 835,572; Denmark 79,137; Germany 58,375.
Quartz and quartzite	368,574	222,245	—	Norway 221,183; Germany 785; Japan 179.
Sand other than metal-bearing	95,441	123,502	—	Denmark 50,533; Norway 42,935; Germany 25,391.
Sulfur:				
Elemental:				
Crude including native and byproduct	38,299	29,757	—	France 17,807; United Kingdom 8,783; Norway 2,382.
Colloidal, precipitated, sublimed	841	643	NA	NA.

See footnotes at end of table.

TABLE 2—Continued

SWEDEN: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Sulfur—Continued:					
Dioxide		40,497	45,034	NA	NA.
Sulfuric acid		41,008	16,842	NA	NA.
Talc, steatite, soapstone, pyrophyllite		12,160	17,388	—	Netherlands 12,110; Norway 3,011; United Kingdom 1,740.
Vermiculite[6]		274	223	—	Norway 210; Czechoslovakia 12.
Other:					
Crude		2,363	2,674	(2)	Norway 1,906; Denmark 272; Finland 192.
Slag and dross, not metal-bearing		170,267	116,706	—	Ireland 35,087; United Kingdom 21,947; Netherlands 13,713.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		17	11,135	—	Norway 11,084; Finland 35; Denmark 13.
Carbon black		15,812	12,446	—	Poland 4,604; Norway 2,339; Finland 2,324.
Coal:					
Anthracite		(2)	—		
Bituminous		2,290	13,091	—	United Kingdom 4,252; Denmark 3,474; Norway 3,191.
Briquets of anthracite and bituminous coal		30	(2)		
Lignite including briquets		(2)	19	—	Denmark 18; Spain 1.
Coke and semicoke		40,506	34,413	—	Finland 32,181; Germany 2,045; Norway 133.
Peat including briquets and litter		55,947	58,246	—	Netherlands 21,951; Norway 15,829; Denmark 14,375.
Petroleum:					
Crude	42-gallon barrels	—	611,806	—	Norway 611,711; Netherlands 95.
Refinery products:					
Liquefied petroleum gas	thousand 42-gallon barrels	1,209	918	NA	Netherlands 240; Norway 184; United Kingdom 70.
Gasoline	do.	9,548	13,069	214	Denmark 3,117; Norway 2,674; Germany 1,854.
Mineral jelly and wax	42-gallon barrels	6,115	4,077	39	Norway 1,857; Denmark 1,362; Poland 512.
Kerosene and jet fuel	thousand 42-gallon barrels	744	521	—	United Kingdom 259; Norway 186; Denmark 76.
Distillate fuel oil	do.	23,429	21,107	149	Germany 7,537; Denmark 6,235; Norway 3,229.
Lubricants	do.	2,291	1,812	(2)	Norway 403; France 285; France 285.
Residual fuel oil	do.	21,364	20,266	379	United Kingdom 9,297; Italy 3,992; Germany 2,188.
Bitumen and other residues	do.	1,733	1,878	—	Norway 875; Denmark 659; Finland 297.
Bituminous mixture	42-gallon barrels	30,524	34,063	1,770	Denmark 9,199; Belgium-Luxembourg 3,842; Norway 2,624.
Petroleum coke	do.	1,265	25,608	—	United Kingdom 24,849; Finland 429; Norway 204.

[r]Revised. NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]ess than 1/2 unit.

[3]May include other precious metals.

[4]Includes germanium oxide.

[5]Excludes unreported quantities valued at $5,640,000 in 1990 and $14,302,000 in 1991.

[6]Includes perlite and chlorite.

TABLE 3
SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	33	14	(2)	Austria 7; Germany 5; United Kingdom 1.
Alkaline-earth metals	20	12	(2)	Austria 6; Italy 3; China 1.
Aluminum:				
Ore and concentrate	48,822	65,879	(2)	Australia 35,089; France 7,343; Netherlands 6,908.
Oxides and hydroxides	219,426	505,656	13	Venezuela 275,000; Jamaica 101,387; Spain 56,193.
Ash and residue containing aluminium	11,608	5,577	NA	NA.
Metal including alloys:				
Scrap	6,779	4,593	34	Norway 1,414; Denmark 1,054; U.S.S.R. 936.
Unwrought	46,667	48,970	400	Norway 18,196; Canada 7,306; Bahrain 5,379.
Semimanufactures	100,972	93,328	1,950	Germany 28,368; Norway 15,004; France 13,820.
Antimony:				
Oxides	563	502	NA	NA.
Metal including alloys, all forms	59	29	—	China 28; Denmark 1.
Arsenic: Metal including alloys, all forms	29	7	NA	NA.
Beryllium: Metal including alloys, all forms value, thousands	$21	$15	—	United Kingdom $14; Germany $1.
Bismuth: Metal including alloys, all forms	15	13	(2)	United Kingdom 8; Germany 2; Ireland 2.
Cadmium: Metal including alloys, all forms	252	157	—	Finland 63; United Kingdom 38; Canada 35.
Chromium:				
Ore and concentrate	r190,308	225,229	NA	NA.
Oxides and hydroxides	440	371	14	Germany 201; China 52; United Kingdom 38.
Metal including alloys, all forms	315	253	—	United Kingdom 129; France 46; U.S.S.R. 44.
Cobalt:				
Ore and concentrate	—	$12	NA	NA.
Oxides and hydroxides	5	7	(2)	Germany 4; France 2.
Metal including alloys, all forms	785	568	49	Finland 138; United Kingdom 100; Zimbabwe 62.
Columbium and tantalum: Tantalum metal including alloys, all forms value, thousands	$524	$818	$47	Austria $528; Germany $118; Switzerland $54.
Copper:				
Ore and concentrate	51,084	40,299	—	Finland 18,716; Chile 16,685; Germany 3,841.
Matte and speiss including cement copper	r11	2,593	—	France 2,080; Bulgaria 513.
Oxides and hydroxides	726	795	NA	NA.
Sulfate	1,149	1,254	NA	NA.
Ash and residue containing copper	r55,538	61,445	NA	NA.
Metal including alloys:				
Scrap	r14,605	33,060	3,347	Finland 8,386; United Kingdom 4,499; Netherlands 3,468.
Unwrought	67,445	65,995	1,421	Finland 14,959; Norway 11,035; Canada 10,539.
Semimanufactures	43,002	40,135	651	Germany 15,191; France 7,608; United Kingdom 5,448.
Germanium: Metal including alloys, all forms value, thousands	$63	$39	$4	Germany $28; Belgium-Luxembourg $6; United Kingdom $1.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Gold:					
Waste and sweepings	value, thousads	$542	$951	—	Denmark $916; Finland $22; Norway $7.
Metal including alloys, unwrought and partly wrought	do.	$27,543	$26,985	$201	Germany $12,879; Switzerland $4,323; Norway $3,886.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite	thousand tons	268	438	—	Canada 297; Norway 100; U.S.S.R. 41.
Pyrite, roasted		r(2)	—		
Metal:					
Scrap		246,897	164,677	7,155	Germany 58,355; Netherlands 39,836; Denmark 39,267.
Pig iron, cast iron, related materials		54,068	35,738	289	U.S.S.R. 7,962; Poland 7,427; Norway 7,169.
Ferroalloys:					
Ferrochromium		46,068	38,772	77	Finland 15,593; Norway 10,410; U.S.S.R. 4,912.
Ferrocolumbium		368	342	NA	NA.
Ferromanganese		24,953	19,907	—	Norway 11,911; France 4,726; Belgium-Luxembourg 2,777.
Ferromolybdenum		3,292	2,513	NA	NA.
Ferronickel		12,863	10,927	—	Greece 5,386; New Caledonia 3,736; Colombia 1,044.
Ferrophosphorus		291	614	NA	NA.
Ferrosilicochromium		1,379	1,369	—	All from Zimbabwe.
Ferrosilicomanganese		11,478	12,298	—	Norway 7,536; Belgium-Luxembourg 3,600; France 1,100.
Ferrosilicon		22,838	19,520	(2)	Norway 15,215; U.S.S.R. 3,908; Germany 213.
Ferrotitanium and ferrosilicotitanium		1,634	1,140	NA	NA.
Ferrotungsten and ferrosilicotungsten		705	241	NA	NA.
Ferrovanadium		1,040	869	NA	NA.
Silicon metal		1,332	1,391	NA	NA.
Unspecified		2,653	1,717	NA	NA.
Steel, primary forms		87,187	53,087	172	Finland 29,733; United Kingdom 8,910; Germany 6,045.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		535,408	434,026	15	Germany 144,377; Belgium-Luxembourg 77,772; Denmark 50,353.
Clad, plated, coated		398,094	346,112	264	Germany 83,154; France 56,694; Belgium-Luxembourg 36,572.
Of alloy steel		127,944	127,687	175	Germany 70,691; Finland 28,760; Japan 8,388.
Bars, rods, angles, shapes, sections		562,885	440,007	1,347	Germany 95,762; Finland 89,592; France 35,499.
Rails and accessories		18,455	31,131	(2)	Austria 23,351; United Kingdom 3,000; France 2,790.
Wire		34,350	32,683	26	United Kingdom 9,350; Belgium-Luxembourg 7,855; Finland 3,661.
Tubes, pipes, fittings		330,125	265,928	767	Germany 60,074; Finland 46,753; Denmark 33,856.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Lead:				
Ore and concentrate	—	4,001	—	Greece 4,000; Germany 1.
Oxides	4,347	3,266	1	Germany 2,893; United Kingdom 289; Belgium-Luxembourg 70.
Ash and residue containing lead	r375	265	NA	NA.
Metal including alloys:				
Scrap	20,007	29,496	(2)	Denmark 9,764; Norway 9,654; Finland 5,999.
Unwrought	3,755	2,072	—	United Kingdom 1,183; Germany 316; Norway 268.
Semimanufactures	706	557	1	Germany 429; Netherlands 85; Belgium-Luxembourg 25.
Lithium: Oxides and hydroxides	83	53	NA	NA.
Magnesium: Metal including alloys:				
Unwrought	2,036	1,376	204	Norway 762; Germany 259; U.S.S.R. 120.
Semimanufactures	107	121	22	France 41; United Kingdom 29; Germany 12.
Manganese:				
Ore and concentrate, metallurgical-grade	217	27,531	—	Brazil 16,274; Netherlands 7,737; Belgium-Luxembourg 2,829.
Oxides	559	852	258	United Kingdom 429; Netherlands 104; Belgium-Luxembourg 24.
Metal including alloys, all forms	1,254	1,862	217	China 990; France 500; United Kingdom 82.
Mercury	14	9	—	Germany 5; Netherlands 4.
Molybdenum:				
Ore and concentrate:				
Roasted	4,261	3,212	684	Netherlands 1,238; Chile 714; Belgium-Luxembourg 465.
Unroasted	3,861	5,166	3,085	Mexico 1,487; Canada 534; Netherlands 61.
Oxides and hydroxides	201	471	NA	NA.
Metal including alloys:				
Unwrought including scrap	217	199	32	Germany 95; U.S.S.R. 41; Netherlands 20.
Semimanufactures	49	42	19	Austria 17; United Kingdom 3; Germany 1.
Nickel:				
Ore and concentrate	1,055	—		
Matte and speiss	2,330	2,228	—	All from Australia.
Oxides and hydroxides	13	60	NA	NA.
Metal including alloys:				
Scrap	8,492	9,878	3,244	Germany 4,980; United Kingdom 1,260; U.S.S.R. 195.
Unwrought	12,533	11,484	66	United Kingdom 3,439; Canada 2,298; Australia 1,647.
Semimanufactures	1,846	1,918	267	United Kingdom 729; France 437; U.S.S.R. 146.
Platinum-group metals:				
Waste and sweepings value, thousands	$97	$1,191	$337	France $500; Finland $263; Germany $91.
Metals including alloys, unwrought and partly wrought:				
Palladium do.	$5,656	$4,679	NA	NA.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Platinum-group metals—Continued:					
Metals including alloys, unwrought and partly wrought—Continued:					
Platinum	value, thousand	$20,010	$22,255	NA	NA.
Rhodium	do.	$140	$91	NA	NA.
Iridium, osmium, ruthenium	do.	$201	$119	NA	NA.
Rare-earth metals including alloys, all forms		19	11	NA	NA.
Selenium, elemental		8	3	NA	NA.
Silicon, high-purity		14	29	NA	NA.
Silver:					
Ore and concentrate[3]	value, thousands	$33,367	$25,894	—	Saudi Arabia $17,822; United Kingdom $4,383; Peru $2,134.
Waste and sweepings[3]	do.	r$7,795	$726	—	Finland $677; France $16; United Kingdom $13.
Metal including alloys, unwrought and partly wrought	do.	$14,498	$9,253	$103	Norway $3,111; Germany $2,520; United Kingdom $799.
Tellurium and boron, elemental		2	1	NA	NA.
Tin:					
Ore and concentrate		—	5	—	All from Netherlands.
Metal including alloys:					
Scrap		180	170	—	Denmark 130; Norway 31; France 9.
Unwrought		814	572	(2)	Brazil 183; Germany 139; Malaysia 60.
Semimanufactures		175	155	1	Germany 74; Netherlands 42; United Kingdom 37.
Titanium:					
Ore and concentrate		1,203	663	—	Australia 658; Netherlands 5.
Oxides		4,452	3,979	20	Norway 2,005; Finland 1,022; United Kingdom 338.
Metal including alloys:					
Unwrought including waste and scrap		1	16	(2)	Mainly from U.S.S.R.
Semimanufactures		1,129	594	122	Japan 379; Germany 37; United Kingdom 22.
Tungsten:					
Ore and concentrate		314	410	NA	NA.
Metal including alloys:					
Unwrought including waste and scrap		235	154	5	U.S.S.R. 50; Germany 41; China 26.
Semimanufactures		12	9	2	Austria 1; Germany 1; Japan 1.
Uranium and thorium:					
Oxides and other compounds	value, thousands	$177,341	$237,094	$9,035	France $64,533; Netherlands $62,786; U.S.S.R. $38,806.
Metal including alloys, all forms, uranium		4	4	(2)	Mainly from Netherlands.
Vanadium:					
Oxides and hydroxides		1	(2)	NA	NA.
Ash and residue containing vanadium		—	20	NA	NA.
Metal including alloys, all forms		55	37	—	Germany 30; Belgium-Luxembourg 6.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Zinc:				
Ore and concentrate	3	4	—	All from Germany.
Oxides	1,146	1,258	11	Germany 463; United Kingdom 304; Belgium-Luxembourg 220.
Blue powder	311	358	—	NA.
Ash and residue containing zinc	5,674	92	NA	NA.
Metal including alloys:				
Scrap	92	205	—	Poland 143; Norway 47; U.S.S.R. 16.
Unwrought	43,209	35,441	274	Norway 17,588; Finland 15,264; Poland 610.
Semimanufactures	329	285	(2)	Germany 185; Belgium-Luxembourg 54; Norway 24.
Zirconium:				
Ore and concentrate	117	79	2	United Kingdom 30; Germany 25; Netherlands 22.
Oxides[4]	7	3	NA	NA.
Metal including alloys:				
Unwrought including waste and scrap	143	45	1	France 35; United Kingdom 6; Germany 2.
Semimanufactures	157	480	67	U.S.S.R. 339; France 73.
Other:				
Ores and concentrates	r6	23	NA	Netherlands 20.
Oxides and hydroxides	89	72	NA	NA.
Ashes and residues	r3,965	970	NA	NA.
Base metals including alloys, all forms	2	9	(2)	Netherlands 6; United Kingdom 2.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	2,707	2,812	39	Iceland 2,570; Germany 99; Italy 42.
Artificial:				
Corundum	6,805	5,826	38	Germany 2,473; United Kingdom 1,333; Hungary 706.
Silicon carbide	5,330	3,611	NA	NA.
Dust and powder of precious and semiprecious stones excluding diamond value, thousands	$156	$7	NA	NA.
Grinding and polishing wheels and stones	3,233	2,367	48	Austria 810; Germany 486; France 244.
Asbestos, crude	595	420	—	All from Canada.
Barite and witherite	3,809	3,215	—	Germany 2,017; China 790; United Kingdom 192.
Boron materials:				
Crude natural borates	9,559	6,764	1,150	Turkey 5,614.
Oxides and acids	528	1,110	121	Turkey 721; Argentina 129; France 72.
Bromine including flourine	10	8	NA	NA.
Cement	240,668	198,028	220	Poland 83,002; U.S.S.R. 59,562; France 18,621.
Chalk	r124,868	79,473	297	Denmark 68,530; Germany 9,728; Belgium-Luxembourg 456.
Clays, crude:				
Bentonite	11,788	10,576	249	Germany 4,527; Cyprus 2,978; United Kingdom 1,352.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Clays, crude—Continued:					
Chamotte earth		3,864	6,142	NA	NA.
Fuller's earth		6,435	6,595	NA	NA.
Fire clay		5,652	4,000	NA	NA.
Kaolin		374,746	399,466	76,586	United Kingdom 309,759; Czechoslovakia 9,679; Germany 1,731.
Unspecified		r10,001	8,891	NA	NA.
Cryolite and chiolite		143	546	—	Norway 486; Denmark 60.
Diamond, natural:					
Gem, not set or strung	value, thousands	$8,977	$6,950	$46	Belgium-Luxembourg $4,472; Israel $1,132; Switzerland $577.
Industrial stones	do.	$1,950	$1,121	$63	Belgium-Luxembourg $477; Ireland $413; Switzerland $40.
Dust and powder	do.	$6,890	$6,815	NA	NA.
Diatomite and other infusorial earth		2,186	2,351	533	Denmark 1,400; Spain 208; Germany 124.
Feldspar, fluorspar, related materials:					
Feldspar		5,907	8,270	NA	NA.
Fluorspar		11,407	9,550	—	Mexico 3,485; United Kingdom 2,084; China 2,054.
Leucite, nepheline, nepheline syenite		6,218	6,912	NA	NA.
Fertilizer materials:					
Crude, n.e.s.		339	537	(4)	Denmark 411; Germany 77; United Kingdom 42.
Manufactured:					
Ammonia		258,664	263,444	10,000	U.S.S.R. 175,905; Germany 55,018; Netherlands 18,527.
Nitrogenous[5]		596,623	435,026	NA	NA.
Phosphatic		8,516	2,247	NA	NA.
Potassic		214,181	220,032	NA	NA.
Unspecified and mixed		r261,389	170,750	NA	NA.
Graphite, natural		627	701	47	Germany 317; United Kingdom 189; China 61.
Gypsum and plaster		511,968	449,789	48	Spain 416,935; Germany 15,400; Denmark 8,874.
Iodine		3	5	NA	NA.
Kyanite and related materials:					
Andalusite, kyanite, sillimanite		864	962	NA	NA.
Mullite		101	—		
Lime		47,514	58,959	14	Belgium-Luxembourg 14,591; U.S.S.R. 14,220; Norway 11,867.
Magnesium compounds:					
Magnesite, crude		12,864	22,308	540	China 13,153; Spain 2,599; Switzerland 2,376.
Oxides and hydroxides		16,663	10,302	66	Greece 6,510; China 1,348; Germany 914.
Sulfate		6,845	6,439	NA	NA.
Mica:					
Crude including splittings and waste		574	746	—	Norway 325; Finland 171; France 123.
Worked including agglomerated splittings		80	105	2	Switzerland 47; Austria 21; Belgium-Luxembourg 8.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Nitrates, crude	5,036	5,558	—	Chile 1,855; Germany 1,694; Belgium-Luxembourg 1,055.
Phosphates, crude	649,904	380,286	123,262	Morocco 201,046; Syria 32,285; Mexico 22,604.
Phosphorus, elemental	43	28	NA	NA.
Pigments, mineral:				
Natural, crude	195	698	NA	NA.
Iron oxides and hydroxides, processed	5,654	4,820	28	Germany 4,160; Austria 118; Italy 115.
Potassium salts, crude	5,720	1,050	—	All from Germany.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$12,424	$8,025	$363	Sri Lanka $4,418; Brazil $1,028; Thailand $517.
Synthetic do.	$149	$145	$4	Ireland $50; Switzerland $34; Germany $15; Thailand $15.
Pyrite, unroasted	225,107	167,791	—	Finland 165,068; Australia 2,557.
Quartz crystal, piezoelectric-value, thousands	$10	$101	—	Japan $85; Switzerland $10; Germany $5.
Salt and brine	931,183	894,218	53	Germany 367,147; Netherlands 204,293; Denmark 179,593.
Sodium compounds, n.e.s.:				
Soda ash, manufactured	101,499	98,328	27,916	Germany 36,338; Poland 14,558; Netherlands 8,497.
Sulfate, manufactured	r4,940	5,981	1	Norway 1,925; Finland 1,356; Netherlands 1,059.
Sulfate, natural	r—	—		
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	9,668	9,635	1	Norway 4,923; Finland 1,960; Italy 821.
Worked	38,057	36,848	83	Portugal 17,250; Italy 6,126; Poland 4,316.
Dolomite, chiefly refractory-grade	140,694	138,786	—	Belgium-Luxembourg 53,279; United Kingdom 50,749; Norway 28,543.
Gravel and crushed rock	173,434	267,535	1	Norway 119,425; Germany 66,232; Finland 57,957.
Limestone other than dimension	67,284	64,722	—	Norway 30,475; Denmark 25,147; United Kingdom 5,218.
Quartz and quartzite	22,066	2,083	7	Finland 1,251; Norway 366; Germany 272.
Sand other than metal-bearing	341,473	467,962	232	Denmark 352,972; Belgium-Luxembourg 88,646; United Kingdom 13,892.
Sulfur:				
Elemental:				
Crude including native and byproduct	5,416	5,756	—	Poland 5,527; Germany 177; Belgium-Luxembourg 38.
Colloidal, precipitated, sublimed	10,803	7,680	—	Poland 3,133; Switzerland 3,058; Norway 1,073.
Dioxide	12,269	10,551	(2)	Mainly from Poland.
Sulfuric acid	131,779	90,966	(2)	Poland 40,682; Norway 21,719; Finland 14,165.
Talc, steatite, soapstone, pyrophyllite	25,276	26,667	22	Finland 21,371; Norway 3,089; Belgium-Luxembourg 2,150.
Vermiculite[6]	1,864	1,138	20	Belgium-Luxembourg 429; Norway 282; United Kingdom 160.

See footnotes at end of table.

TABLE 3—Continued

SWEDEN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Other:					
Crude		192,762	155,706	NA	NA.
Slag and dross, not metal-bearing		115,889	57,688	8	Finland 27,426; Norway 12,308; Germany 10,044.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		1,213	628	45	Germany 372; Netherlands 77; Denmark 54.
Carbon black		11,956	9,075	192	Netherlands 6,456; Germany 1,205; France 634.
Coal:					
Anthracite		50,705	33,058	34	United Kingdom 15,924; China 10,058; Poland 3,336.
Bituminous	thousand tons	3,491	3,086	1,068	Australia 598; U.S.S.R. 488; Poland 483.
Briquets of anthracite and bituminous coal		1,542	53	—	Indonesia 30; United Kingdom 23.
Lignite including briquets		275	10,631	—	Australia 10,350; Germany 281.
Coke and semicoke		318,320	301,256	13,734	Japan 77,449; Netherlands 50,706; United Kingdom 48,857.
Gas, natural: Gaseous	million cubic meters	418	385	NA	NA.
Peat including briquets and litter		27,732	57,993	—	United Kingdom 21,335; Finland 18,929; U.S.S.R. 13,120.
Petroleum:					
Crude	thousand 42-gallon barrels	125,042	120,855	—	Norway 55,082; Italy 20,441; Denmark 13,037.
Refinery products:					
Liquefied petroleum gas	do.	8,292	7,980	—	Norway 2,692; Algeria 2,047; United Kingdom 1,275.
Gasoline	do.	19,693	21,762	28	Finland 7,140; Norway 4,399; Denmark 4,189.
Mineral jelly and wax	do.	103	99	1	Germany 57; United Kingdom 17; Czechoslovakia 4.
Kerosene and jet fuel	do.	7,033	6,907	(2)	United Kingdom 2,212; Netherlands 784; Finland 758.
Distillate fuel oil	do.	12,285	12,150	264	Finland 4,785; Denmark 2,706; U.S.S.R. 1,647.
Lubricants	do.	1,562	1,369	17	Belgium-Luxembourg 405; Netherlands 323; United Kingdom 179.
Residual fuel oil	do.	7,197	6,114	24	U.S.S.R. 2,043; Norway 785; Libya 699.
Bitumen and other residues	value, thousands	$12,776	$11,223	$52	Finland $5,430; Germany $1,472; United Kingdom $1,394.
Bituminous mixtures	thousand 42-gallon barrels	39	54	1	Spain 26; Germany 10; France 5.
Petroleum coke	do.	260	490	312	United Kingdom 156; Germany 6; Indonesia 5.

[r]Revised. NA Not available.

[1]Table prepared by Douglas Rhoten, International Data Section.

[2]Less than 1/2 unit.

[3]May include other precious metals.

[4]Includes germanium oxide.

[5]Excludes unreported quantities valued at $15,918,000 in 1990 and $12,311,000 in 1991.

[6]Includes perlite and chlorite.

TABLE 4

SWEDEN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Granges AB (AB Electrolux)	Sundsvall smelter at Kubikenborg	100
Arsenic, white	Boliden Mineral AB (Trelleborg AB)	Smelter at Ronnskar	15
Cement	Cementa AB (Industry AB Euroc)	Plants at Degerhamn, Skovde, and Slite	3,400
Copper, concentrate	Boliden Mineral AB (Trelleborg AB)	Mines at Aitik, Garpenberg, and Kristineberg	70
Do.	Luossavaara-Kiirunavaara AB	Mine at Viscaria	35
Copper, refined	Boliden Mineral AB (Trelleborg AB)	Refinery at Ronnskar	100
Feldspar	Forshammars Mineral AB (Ernstrom Mineral AB)	Mine and plant at Riddarhyttan	40
Ferroalloys	Vargon Alloys AB	Plant at Vargon	120
Gold	Terra Mining AB (Norsk Hydro A/S)	Bjorkdal Mine at Skelleftea	2.1
Do.	Boliden Metals AB (Trelleborg AB)	Mines at Akerberg, Bjorkdal, and Enasen	5
Do.	do.	Refinery at Ronnskar	9
Iron ore	Luossavaara-Kiirunavaara AB	Mines at Kiruna and Malmberget	20,000
Iron and steel	Svenskt Stal AB (Government 67%)	Steelworks at Lule, Oxelosund, and Domnarvet	3,000
Kyanite	Svenska Kyanite AB (Svenska Mineral AB)	Quarry at Halskoberg	40
Lead, concentrate	Boliden Metals AB (Trelleborg AB)	Mines at Boliden, Garpenberg, and Laisvall	70
Lead, smelter	do.	Smelter at Ronnskar	85
Lime	Euroc Mineral AB	Plants at Limham, Koping, and Storugns	270
Do.	Svenska Mineral AB	Plants at Rattvik and Boda	250
Petroleum, refined billion barrels per day	Skandinaviska Raffinaderi AB	Refinery at Lysekil	210,000
Do. do.	BP Raffinaderi AB	Refinery at Goteborg	100,000
Do. do.	Shell Raffinaderi AB	do.	82,000
Do. do.	AB Nynas Petroleum	Refineries at Goteborg, Malmo, and Nynashamn	54,000
Phosphate, apatite concentrate	Luossavaara-Kiirunavaara AB	Plant at Kiruna	200
Do.	Svenskt Stal AB (Government 67%)	Plant at Grangesberg	130
Pyrite	Boliden Mineral AB (Trelleborg AB)	Mines at Kedtrask, Langsele, and Udden	400
Do.	Stora Kopparbergs AB	Mine at Falun	50
Silica sand	Ahlsell Mineral AB	Southern Sweden	600
Silicon	KemaNord AB (Nobel Industries)	Plant at Ljungaverk	24
Silver	Boliden Metals AB (Trelleborg AB)	Refinery at Ronnskar	250
Zinc, concentrate	Boliden Mineral AB (Trelleborg AB)	Mines at Garpenberg, Laisvall, and Langdal	130
Do.	Vieille-Montagne Sverige AB	Zinkgruvan Mine at Ammeberg	80

TABLE 5

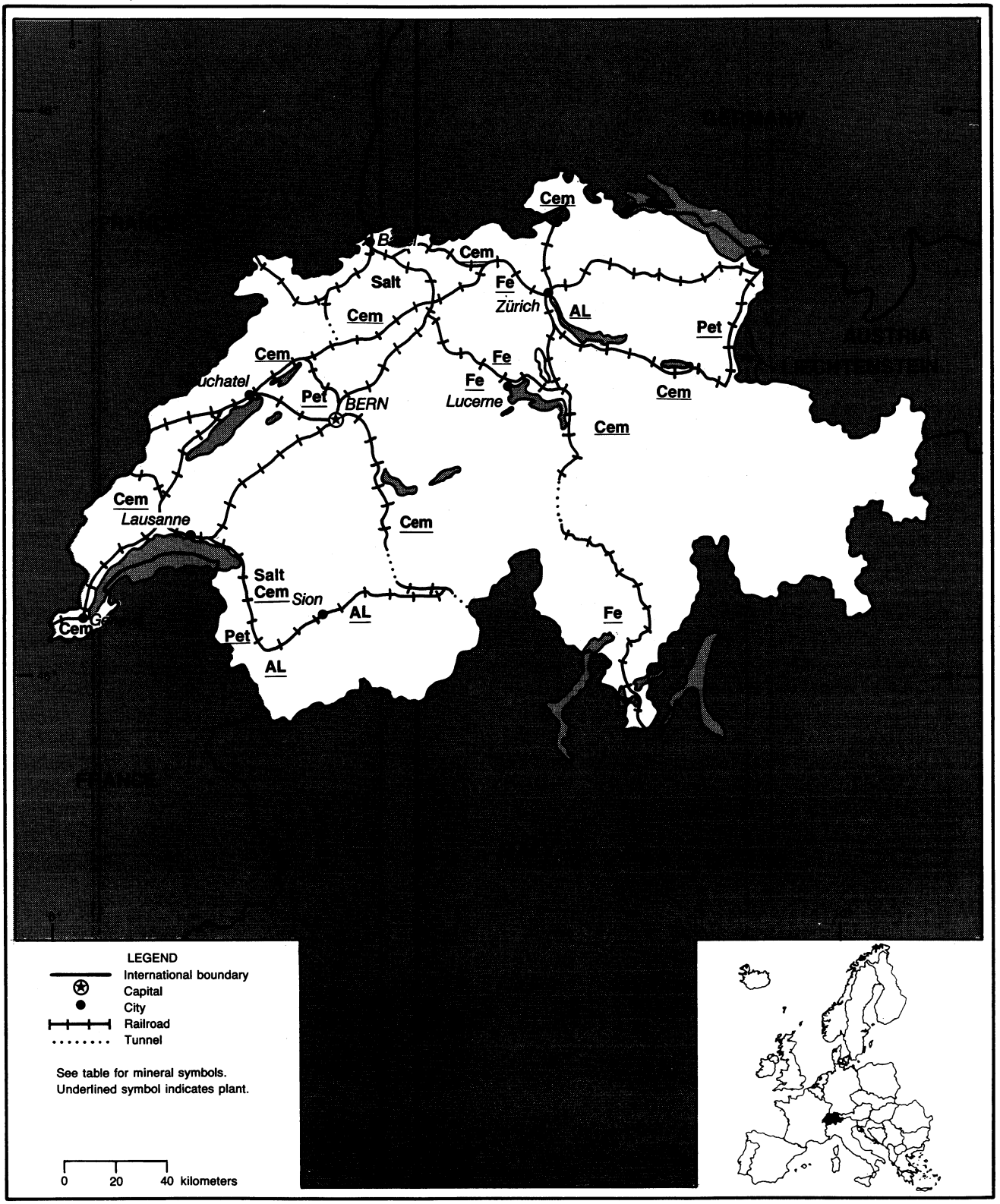
SWEDEN: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 1992

(Million metric tons unless otherwise specified)

Commodity	Reserves
Copper ore	350
Iron ore	860
Lead ore	50
Zinc	20

SWITZERLAND

AREA 41,000 km² **POPULATION 6.8 million**



THE MINERAL INDUSTRY OF

SWITZERLAND

By Jozef Plachy

The small, diversified deposits of metalliferous ores in Switzerland have long ceased production. Present mineral production is limited mainly to commodities required for construction, including cement, clays, gravel, gypsum, lime, salt, and sand. Metal processing is confined to primary and secondary aluminum, secondary lead, and steel production.

GOVERNMENT POLICIES AND PROGRAMS

In 1992, the Swiss people rejected membership in the EC. This refusal slowed down structural changes in the mineral industry, which is largely controlled by the Government.

The Swiss Government continued to adopt mineral and energy policies, reflecting the environmental concerns of the population. In 1991, the public voted for a 10-year moratorium on new nuclear powerplant construction. Because hydroelectric resources are fully exploited and concern about the greenhouse effect limits the construction of thermal powerplants, the present growth rate of electric energy consumption will reportedly be met by increased imports. The same concern about environmental pollution reportedly caused the adoption of a policy to gradually curtail or even cease smelting activities.

PRODUCTION

All metal production in Switzerland is either from imported raw materials (aluminum and steel) or from scrap (aluminum and lead). Although production of aluminum metal in 1992 declined by 21%, the production of lead and steel increased by 28% and 10%, respectively. Production of industrial minerals was slightly lower in 1992 than that of 1991, mainly due to a slump in the construction industry. *(See table 1.)*

TRADE

Because of self-imposed environmental restrictions, in addition to a lack of natural resources, Switzerland is dependent on imports. Its most important trading partners, in order of importance, are Germany, France, the United Kingdom, Italy, and the United States. *(See tables 2 and 3.)*

STRUCTURE OF THE MINERAL INDUSTRY

The mineral industry is owned either privately or by regional governments (cantons). Cantonal or communal governments grant mining or processing licenses and directly operate electrical generating facilities, water resources, gas utilities, and local transportation facilities.

In cases of dispute, the final authority concerning the mineral industry in Switzerland rests with the Federal Council. Established in 1955, it presides over the seven Ministries, with a rotating presidency for 1 year. *(See table 4.)*

COMMODITY REVIEW

Metals

Aluminum.—Alusuisse-Lonza Holding Aktien Gesellschaft (AG) is the only producer of primary aluminum and the major producer of aluminum semimanufactures and chemicals. Alusuisse-Lonza Holding AG consists of five divisions: Primary Operations, Materials and Energy, Industrial Products, Organic Chemicals, and Packaging. In Switzerland, it operates two smelters (Chippis and Steg), one rolling and extrusion plant (Sierre), and one casting plant using aluminum scrap (Refonda). Metallwerke Refonda AG, the only aluminum recycling plant in Switzerland, processes about 30,000 mt/a of scrap into 27,000 mt/a of casting-alloy ingots. Alusuisse-Lonza Holding AG also owns three plants in the United States: two rolling plants in Hannibal, Ohio, and Jackson, Tennessee, and an aluminum recycling plant in West Virginia.

Steel.—The steel industry in Switzerland is characterized by a relatively small domestic market and a high degree of specialization. There are four steelworks in Switzerland: Ferrowohlen AG (150,000-mt/a capacity Monteforno Acciaierie e Laminatoi SA (380,000-mt/a capacity), Von Moos Stahl AG (300,000-mt/a capacity), and Von Roll Group (300,000-mt/a capacity). Only about 50% of consumption is covered by domestic production. Most consumption (about 30%) consists of rebar and reinforcing mesh.

Because of the relatively high cost of steel production in Switzerland, Von Moos and Von Roll continued to diversify out of steel. The capacity of Von Roll's two steel plants (Gerlafingen and Monteforno) was recently reduced by 100,000 mt/a.

Industrial Minerals

Cement.—Because of a construction slowdown, the 1992 production of cement declined from 4.7 Mmt in 1991 to 4.3 Mmt. Imports declined by 11% and exports increased by 13%.

More than one-half of Switzerland's production capacity is controlled by Holderbank Management and Consulting Ltd., Zurich. It has more than 30 cement plants on 4 continents. One of its wholly owned subsidiaries, the Bundner Cementwerke AG, is the largest cement producer in Switzerland. Its Untervaz plant has four closed-type mills with 1.6-Mmt/a capacity and two preheated dry-type kilns with 0.8-Mmt/a capacity.

The cement industry in Switzerland faces an uncertain future. Newly imposed emission limits are more stringent than other European countries and a national carbon dioxide tax on fuel is reportedly in preparation. The Swiss cement industry's cartel organization, the Societe Suisse des Fabricants de Ciment, Chaux et Gypse, will reportedly be dissolved by the end of 1994. An encouraging future prospect for the cement industry is the planned building of three train tunnels between Switzerland and Italy, for which about 50 Mmt of cement will be required.

Salt.—Salt production and trade in Switzerland is a cantonal monopoly. The smaller of two producers, Bex in the Rhone Valley, is in Vaud Canton. Although the capacity is about 50,000 mt/a, the production in 1992 was only about 30,000 tons of evaporated salt. Salt from Schweizerhalle, near Basel in the Alps, supplies the rest of the cantons. Capacity is 350,000 mt/a, but the 1992 production was only about 246,000 tons. All cantons, except Vaud, are stockholders in the Salt Council, which controls the mining operations, salt distribution, and imports. Revenues derived from a set sale price are distributed between cantons according to consumption.

INFRASTRUCTURE

Switzerland is a highly developed country with an excellent network of highways and railways. The total length of paved roads was 62,145 km, of which 18,620 km was canton and 1,057 km was national highways. Out of the total of 5,147 km of railroads, 2,971 km was Government owned and 2,203 km was privately owned. Nearly all of the Government-owned tracks were electrified (99%) and of standard gauge (1.435 m). Only 65 km of inland waterways was navigable. Switzerland's merchant marine encompassed 22 ships, including 9 bulk carriers, 6 tankers, 5 cargo ships, and 2 roll-on/roll-off cargo ships.

OUTLOOK

Owing to increased competition from foreign aluminum producers and more stringent environmental restrictions in Switzerland, it is possible that the country's aluminum smelter production will continue to decline in the near future.

OTHER SOURCES OF INFORMATION

Agency

Bundesamnt fur Industrie, Gewerbe, und Arbeit (Federal Office for Industry, Business, and Labor)
Bern, Switzerland

Publications

Annuaire Statistique de la Suisse.
Jahresbericht Verein Schweizerische Zement, Kalk, und Gips Fabrikanten.
Alusuisse-Lonza Holding Ltd., Annual Report 1992.

TABLE 1
SWITZERLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		1988	1989	1990	1991	1992[p]
METALS						
Aluminum, smelter, primary	tons	71,816	71,328	71,602	r65,877	52,148
Iron and steel:						
Pig iron and blast furnace ferroalloys[e]		70	70	70	70	70
Electric-furnace ferroalloys[e]		5	5	5	5	5
Steel, crude		825	916	970	r955	1,050
Semimanufactures, rolled products[e]		1,100	1,300	1,100	1,000	1,000
Lead, refined, secondary	tons	1,500	r1,500	5,700	5,000	6,400
INDUSTRIAL MINERALS						
Cement, hydraulic		4,965	5,461	5,206	r4,700	4,260
Gypsum[e]		230	230	230	230	200
Lime		32	30	26	e40	e30
Nitrogen: N content of ammonia		e32	e32	32	r33	31
Salt		309	243	254	e250	276
Sulfur, from petroleum refining[e]	tons	3,550	3,700	3,700	r e3,999	3,160
MINERAL FUELS AND RELATED MATERIALS						
Gas:						
Manufactured	million cubic meters	14	11	r—	r—	—
Natural	do.	8	5	r—	r—	—
Petroleum refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	1,986	1,518	1,612	r2,264	1,989
Gasoline, all kinds	do.	8,695	6,180	6,450	r9,805	8,331
Naphtha	do.	9	—	80	NA	NA
Jet fuel	do.	1,949	2,018	1,832	r2,101	1,958
Kerosene	do.	19	15	15	r—	—
Distillate fuel oil	do.	11,887	9,134	8,478	r10,197	9,544
Residual fuel oil	do.	4,322	2,827	3,545	r6,179	5,516
Bitumen	do.	904	926	872	r916	812
Other refinery products	do.	1	1	1	r—	—
Refinery fuel and losses	do.	1,133	882	882	r1,991	2,181
Total[4]	do.	30,905	23,501	23,767	r33,453	30,331

[e]Estimated. [p]Preliminary [r]Revised. NA Not available.

[1]Table includes data available through July 1993.

[2]In addition to the commodities listed, a variety of crude construction materials (common clay, sand and gravel, and stone) were produced, but output was not reported, and available general information was inadequate to make reliable estimates of output levels.

[3]Reported figure.

[4]Total of listed products only.

TABLE 2

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals:					
Alkali metals		2,148	759	(2)	Germany 119; France 32; unspecified 608.
Alkaline-earth metals		r47	624	—	NA.
Aluminum:					
Ore and concentrate		41	—		
Oxides and hydroxides		1,432	2,656	14	Netherlands 1,654; France 649; Germany 202.
Ash and residue containing aluminum		12,562	10,777	—	Norway 5,828; Germany 335.
Metal including alloys:					
Scrap		36,846	34,537	(2)	Germany 21,529; Italy 9,637; France 2,071.
Unwrought		30,618	32,928	(2)	Germany 17,055; Austria 7,449; Italy 4,042.
Semimanufactures		126,646	124,963	(2)	Germany 37,773; France 21,925; Italy 10,181.
Antimony:					
Oxides	kilograms	7	—		
Metal including alloys, all forms	do.	590	532	—	Germany 525.
Arsenic: Metal including alloys, all forms	do.	1	(2)	NA	NA.
Beryllium: Metal including alloys, all forms	do.	409	1,186	725	Germany 399.
Bismuth: Metal including alloys, all forms	do.	76	1,591	1,262	NA.
Cadmium: Metal including alloys, all forms		1	(2)	NA	NA.
Chromium:					
Ore and concentrate		20	—		
Oxides and hydroxides		142	79	2	Germany 62; Australia 2.
Metal including alloys, all forms		39	8	2	Germany 4; France 1.
Cobalt:					
Oxides and hydroxides	kilograms	12,035	2,341	NA	France 2,025; Netherlands 8.
Metal including alloys, all forms		119	117	42	United Kingdom 20; France 17; Germany 17.
Columbium and tantalum: Tantalum metal including alloys, all forms	kilograms	587	1,479	13	Germany 903; France 347; United Kingdom 128.
Copper:					
Matte and speiss including cement copper		(2)	—		
Oxides and hydroxides		11	34	NA	Belgium-Luxembourg 25.
Sulfate		10	8	NA	Germany 2; France 1; Italy 1.
Ash and residue containing copper		4,582	5,811	89	Germany 4,626; Belgium-Luxembourg 858.
Metal including alloys:					
Scrap		18,721	25,786	100	Germany 11,598; Italy 7,234; Austria 2,999.
Unwrought		8,657	10,436	(2)	Germany 7,107; Italy 2,594; France 405.
Semimanufactures		26,626	26,903	3,840	Germany 11,652; France 3,469.
Germanium: Metal including alloys, all forms	kilograms	r116	118	—	Belgium-Luxembourg 59; Germany 16.
Gold:					
Waste and sweepings	value, thousands	$31,193	$6,601	—	Germany $2,122; Italy $1,924; United Kingdom $1,330.
Metal including alloys, unwrought and partly wrought		7,421	8,357	133	United Kingdom 3,558; France 2,083; Austria 1,025.

See footnotes at end of table.

TABLE 2—Continued

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel:					
Iron ore and concentrate, excluding roasted pyrite		9	15	1	France 4; India 4; Germany 3.
Metal:					
Scrap		66,060	79,199	—	Italy 44,198; Germany 13,178; Belgium-Luxembourg 2,141.
Pig iron, cast iron, related materials		1,059	753	(2)	Germany 398; Austria 145; Spain 128.
Ferroalloys:					
Ferroaluminum		1	3	NA	NA.
Ferrochromium		44	182	—	Germany 172; Mexico 3; Venezuela 3.
Ferromanganese		62	14	—	Germany 39; Brazil 8; Thailand 3.
Ferromolybdenum		11	22	—	Germany 21; France 1.
Ferrosilicomanganese		5	87	—	Germany 80; Italy 4; Spain 3.
Ferrosilicon		84	14	—	Germany 11; Thailand 2; Portugal 1.
Silicon metal		(2)	2	—	NA.
Unspecified		45	13	—	NA.
Steel, primary forms		16,233	38,922	2	Italy 34,155; France 4,074; Germany 662.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated		181,362	209,072	514	Germany 132,858; Austria 31,704; France 20,044.
Clad, plated, coated		11,700	20,933	1	Germany 9,930; France 5,814; Austria 3,269.
Of alloy steel		6,099	8,366	417	Germany 4,021; Italy 2,108; Austria 422.
Bars, rods, angles, shapes, sections		460,070	538,245	656	Germany 329,516; Italy 94,804; France 49,621.
Rails and accessories		1,948	970	23	Italy 558; Germany 108; France 57.
Wire		21,942	22,182	603	Germany 10,340; France 4,135; Italy 3,362.
Tubes, pipes, fittings		209,995	225,413	1,080	Germany 110,689; France 22,097; Italy 17,841.
Lead:					
Oxides		23	1	—	All to France.
Ash and residue containing lead		979	597	NA	Germany 423; France 111.
Metal including alloys:					
Scrap		13,402	16,679	—	France 8,489; Germany 2,464; Austria 2,171.
Unwrought		1,585	943	(2)	Italy 394; Germany 344; Netherlands 182.
Semimanufactures		20	37	(2)	France 23; Austria 7; Germany 5.
Lithium: Oxides and hydroxides	kilograms	1,711	1,210	19	Germany 841; United Kingdom 28.
Magnesium: Metal including alloys:					
Scrap		90	59	—	Germany 43; France 16.
Unwrought		11	65	—	Germany 60; India 3; Austria 1.
Semimanufactures		760	582	(2)	France 175; United Kingdom 119; Germany 65.
Manganese:					
Ore and concentrate, metallurgical-grade		18	20	—	Philippines 10; France 8; Germany 1.
Oxides		9	11	—	Mainly to France.
Metal including alloys, all forms		22	12	—	Bulgaria 10; Thailand 2.
Mercury	kilograms	32,575	11,000	—	Austria 5,000; Spain 4,000; Germany 1,000.

See footnotes at end of table.

TABLE 2—Continued

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Molybdenum:					
Ore and concentrate		—	27	—	Yugoslavia 16; Germany 6; Spain 3.
Oxides and hydroxides	kilograms	1,470	3,498	3,233	Germany 54.
Metal including alloys:					
Unwrought	do.	4,091	9,000	—	Germany 6,000; Brazil 1,000; Spain 1,000.
Semimanufactures	do.	887	1,219	23	Germany 360; France 169; Italy 162.
Nickel:					
Matte and speiss	do.	1,021	—		
Oxides and hydroxides	do.	110	41	NA	NA.
Metal including alloys:					
Scrap		276	347	—	Germany 336; United Kingdom 11.
Unwrought		63	64	—	Germany 40; Austria 16; Hong Kong 3.
Semimanufactures		520	512	4	France 172; Italy 152; Germany 54.
Platinum-group metals:					
Waste and sweepings	value, thousands	$7,462	$9,907	$1,660	United Kingdom $2,806; Germany $2,462; Belgium-Luxembourg $2,286.
Metals including alloys, unwrought and partly wrought:					
Palladium	kilograms	18,556	21,208	1,042	Germany 5,848; Japan 5,239; United Kingdom 4,054.
Platinum	do.	25,968	35,204	2,343	Japan 20,561; United Kingdom 4,977.
Rhodium	do.	70	213	—	United Kingdom 178; Germany 22; Netherlands 10.
Iridium, osmium, ruthenium	do.	42	139	8	Netherlands 81; United Kingdom 28; Germany 17.
Rare-earth metals including alloys, all forms	do.	311	1	(2)	NA.
Selenium, elemental	do.	44	638	NA	NA.
Silicon, high-purity	do.	695	2,000	—	All to Japan.
Silver:					
Waste and sweepings[3]	value, thousands	$20,478	$23,480	—	Germany $16,494; France $4,216; United Kingdom $1,328.
Metal including alloys, unwrought and partly wrought		1,767	2,376	1	France 69; Germany 32; unspecified 2,171.
Tellurium and boron, elemental	kilograms	20	26	6	Germany 3.
Tin:					
Ore and concentrate		(2)	—		
Metal including alloys:					
Scrap		86	70	—	Germany 39; Netherlands 28; Belgium-Luxembourg 3.
Unwrought		110	65	—	Netherlands 45; Austria 9; Germany 9.
Semimanufactures		162	100	(2)	France 84; Germany 7; Italy 2.
Titanium:					
Ore and concentrate		43	19	—	Yugoslavia 16; Portugal 2; Argentina 1.
Oxides		148	180	(2)	Italy 87; Germany 75; Mexico 7.
Metal including alloys:					
Unwrought including scrap		53	139	4	Germany 119; United Kingdom 13.
Semimanufactures		203	216	1	France 128; Germany 36; Italy 29.
Tungsten: Metal including alloys:					
Unwrought		91	71	—	Germany 64; Austria 6.

See footnotes at end of table.

TABLE 2—Continued

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Tungsten: Metal including alloys—Continued:					
Semimanufactures	kilograms	2,817	3,112	573	Germany 754; France 352.
Uranium and thorium: Oxides and other compounds	value, thousands	$50	$24	NA	NA.
Vanadium:					
Oxides and hydroxides	kilograms	68	10,428	NA	NA.
Metal including alloys, all forms	do.	39	500	NA	NA.
Zinc:					
Ore and concentrate		—	13	—	All to Belgium-Luxembourg.
Oxides		41	2	—	Belgium-Luxembourg 1; Hungary 1.
Blue powder		106	105	1	France 47; Netherlands 30; Germany 13.
Ash and residue containing zinc		5,759	4,653	—	Belgium-Luxembourg 1,744; Germany 1,489; Italy 1,236.
Metal including alloys:					
Scrap		1,238	1,267	—	Italy 422; Germany 353; France 350.
Unwrought		917	363	—	Italy 239; Netherlands 74; Spain 49.
Semimanufactures		158	108	—	Germany 70; Italy 17; Austria 12.
Zirconium:					
Ore and concentrate		13	8	—	Germany 5; Spain 3.
Metal including alloys, all forms	kilograms	10,576	3,159	11	Germany 3,135; Italy 8.
Other:					
Ores and concentrates		(2)	—		
Oxides and hydroxides		33	19	NA	NA.
Ashes and residues		3,313	3,455	490	Germany 1,040; Italy 98.
Base metals including alloys, all forms	kilograms	(2)	—		
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		61	15	—	Germany 2; unspecified 13.
Artificial:					
Corundum		211	94	(2)	Israel 25; Germany 22; France 20.
Silicon carbide		4,406	3,774	NA	NA.
Dust and powder of precious and semi-precious stones excluding diamond	kilograms	r223	34	NA	Thailand 33.
Grinding and polishing wheels and stones		3,130	3,083	155	Germany 665; United Kingdom 392; France 220.
Asbestos, crude		4	1	—	NA.
Barite and witherite		7	25	—	All to Germany.
Boron materials:					
Crude natural borates		1	(2)	NA	NA.
Oxides and acids		8	8	NA	Germany 2; unspecified 6.
Bromine		39	22	1	Cuba 6; unspecified 15.
Cement		23,588	30,579	—	Germany 30,375; France 116; Austria 37.
Chalk		176	102	—	France 28; Italy 20; Thailand 11.
Clays, crude:					
Bentonite		50	44	—	Austria 20; Germany 7; Italy 2.

See footnotes at end of table.

TABLE 2—Continued

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Clays, crude—Continued:					
Chamotte or dinas earth		79	167	—	Germany 166; France 1.
Kaolin		237	245	1	Germany 71; Austria 60; France 30.
Unspecified		60,024	9,108	—	Germany 9,055; Netherlands 37; France 6.
Cryolite and chiolite		2	4	—	Germany 3; Peru 1.
Diamond, natural:					
Gem, not set or strung	value, thousands	$2,407,688	$2,153,930	$159,453	United Kingdom $927,672; Israel $502,282.
Industrial stones	do.	$3,082	$3,155	$14	Germany $1,692; United Kingdom $317; Italy $144.
Dust and powder	kilograms	5,823	5,173	652	Italy 2,293; France 267.
Diatomite and other infusorial earth		76	19	(2)	Cuba 4; Germany 4; China 1.
Feldspar, fluorspar, related materials:					
Feldspar		36	50	(2)	Germany 19; Spain 6; France 5.
Fluorspar		55	18	—	Germany 7; Portugal 4; Thailand 3.
Unspecified		20	13	NA	NA.
Fertilizer materials:					
Crude, n.e.s.		5,212	4,674	—	Italy 1,972; Austria 1,400; France 762.
Manufactured:					
Ammonia		30	30	(2)	France 12; Tunisia 9; Cuba 4.
Nitrogenous		1,357	1,207	6	Germany 1,181; Israel 1.
Phosphatic		—	6	—	All to Sweden.
Potassic		15	1,368	—	France 1,366; Italy 2.
Unspecified and mixed		5,835	7,867	(2)	Germany 5,667; France 1,186; Ecuador 178.
Graphite, natural		11	21	(2)	Germany 19; France 1.
Gypsum and plaster		13,265	14,692	—	France 14,384; Austria 110; Germany 87.
Iodine		7	489	1	Germany 477; Cuba 7; Algeria 3.
Kyanite and related materials	kilograms	2	—		
Lime		957	1,479	1	Germany 1,030; Denmark 406.
Magnesium compounds:					
Magnesite, crude		27	(2)	NA	NA.
Oxides and hydroxides		72	27	—	Germany 20; Peru 3; Colombia 1.
Mica:					
Crude including splittings and waste		131	45	9	Germany 20; Thailand 10.
Worked including agglomerated splittings		615	687	53	Germany 142; France 115; United Kingdom 99.
Phosphates, crude	kilograms	523	NA	NA	NA.
Phosphorus, elemental	do.	137,861	NA	NA	NA.
Pigments, mineral:					
Natural, crude		19	3	NA	NA.
Iron oxides and hydroxides, processed		32	40	—	Austria 9; Indonesia 7; Philippines 5.
Potassium salts, crude		1	(2)	NA	NA.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$546,537	$420,943	$71,783	Hong Kong $85,278; United Kingdom $49,928.

See footnotes at end of table.

TABLE 2—Continued

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Precious and semiprecious stones other than diamond—Continued:					
Synthetic	value, thousands	$38,716	$39,844	$6,944	Germany $5,311; Italy $3,533.
Pyrites, unroasted		34	24	—	All to Philippines.
Quartz crystal, piezoelectric	kilograms	578	38	NA	Germany 1; unspecified 37.
Salt and brine		526	4,060	(2)	Germany 4,008; Sweden 12; Spain 11.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		24	19	(2)	Peru 9; Germany 4; France 1.
Sulfate, manufactured		11	34	1	France 4; Italy 3.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		34,318	39,756	3	Italy 29,273; Germany 9,254; Austria 763.
Worked		6,822	7,806	2	Germany 5,989; Italy 697; Austria 294.
Dolomite, chiefly refractory-grade		128	191	18	France 157; Ecuador 8.
Gravel and crushed rock		18,217	17,954	1	Germany 8,519; France 8,217; Netherlands 512.
Limestone other than dimension		—	41	—	France 27; Germany 13; Italy 1.
Quartz and quartzite		41,150	38,309	—	Italy 37,762; Austria 52; Netherlands 33.
Sand other than metal-bearing		18,636	27,189	—	Italy 14,864; France 9,974; Austria 1,071.
Sulfur:					
Elemental:					
Crude including native and byproduct		15,791	28,975	—	Italy 11,477; Netherlands 8,381; France 7,278.
Colloidal, precipitated, sublimed		7	2	—	Iran 1.
Dioxide		3,617	2,425	—	Germany 2,320; Austria 105.
Sulfuric acid		22,264	20,366	—	Germany 16,525; Italy 2,418; France 763.
Talc, steatite, soapstone, pyrophyllite		179	153	—	Austria 81; Germany 29; Netherlands 12.
Vermiculite, perlite, chlorite		5	30	—	Germany 18; France 10; Austria 2.
Other:					
Crude		r12,644	36,389	—	Germany 21,417; France 13,729; Italy 1,065.
Slag and dross, not metal-bearing		37,496	36,706	—	Germany 36,641; Libya 41; Italy 15.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		9	—		
Carbon black		269	184	—	Germany 62; Czechoslovakia 54; Netherlands 19.
Coal:					
Anthracite		351	—		
Bituminous		3,923	3,104	—	Germany 3,095; Austria 3.
Briquets of anthracite and bituminous coal		12	633	—	Mainly to Germany.
Coke and semicoke		8,678	4,558	—	Do.
Gas, natural: Gaseous	thousand cubic meters	2,853	1,975	—	Almost all to Italy.
Peat including briquets and litter		649	384	—	Germany 255; Austria 117; France 7.
Petroleum:					
Crude	42-gallon barrels	153	88	(2)	France 66; Germany 15.

See footnotes at end of table.

TABLE 2—Continued

SWITZERLAND: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum—Continued:					
Refinery products:					
Liquefied petroleum gas	42-gallon barrels	198,197	555,093	731	Italy 301,786; France 115,803; Germany 112,729.
Gasoline	do.	60,359	18,386	—	France 17,825; Germany 230; Austria 77.
Mineral jelly and wax	do.	9,216	645	118	Germany 173; Austria 79.
Kerosene and jet fuel	do.	—	8	—	NA.
Distillate fuel oil	do.	189,275	142,076	—	Austria 95,742; France 46,334.
Lubricants	do.	28,070	26,705	308	Germany 8,589; Italy 8,029; Libya 3,586.
Residual fuel oil	do.	748,950	3,208,515	—	Germany 2,751,559; Austria 345,434; France 80,872.
Bitumen and other residues	do.	5,884	248	—	Poland 109; Austria 103; Germany 30.
Bituminous mixtures	do.	11,969	50,304	497	Germany 34,191; France 10,732.
Petroleum coke	do.	3,729	5,374	297	Germany 2,646; Italy 1,518.

[r]Revised. NA Not available.
[1]Table prepared by Theodore T. Spittal.
[2]Less than 1/2 unit.
[3]May include other precious metals.

TABLE 3

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS					
Alkali and alkaline-earth metals:					
Alkali metals		619	526	(2)	Germany 262; France 214; United Kingdom 38.
Alkaline-earth metals	kilograms	2,177	2,391	NA	Germany 308; unspecified 2,083.
Aluminum:					
Ore and concentrate		691	1,051	—	Germany 784; Netherlands 246; Belgium-Luxembourg 12.
Oxides and hydroxides		150,483	134,216	376	Australia 116,722; Germany 8,546; Ireland 6,427.
Ash and residue containing aluminum		766	648	—	Austria 360; Germany 288.
Metal including alloys:					
Scrap		4,110	6,191	93	Germany 3,122; Norway 1,615; Netherlands 533.
Unwrought		104,595	93,389	11	Germany 30,163; Iceland 26,218; Norway 18,925.
Semimanufactures		91,720	82,054	341	Germany 37,160; France 9,828; Austria 9,024.
Antimony:					
Ore and concentrate		—	2	NA	NA.
Oxides		390	408	3	Germany 183; China 118; United Kingdom 45.
Metal including alloys, all forms		79	67	—	China 65; Germany 1.
Arsenic: Metal including alloys, all forms		8	8	NA	NA.

See footnotes at end of table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Beryllium: Metal including alloys, all forms	kilograms	599	1,943	780	Germany 1,003; France 1.
Bismuth: Metal including alloys, all forms		15	12	—	Mexico 5.
Cadmium: Metal including alloys, all forms		11	9	—	France 3; Canada 3; Netherlands 2.
Chromium:					
Ore and concentrate		2,682	1,568	—	Germany 563; Republic of South Africa 426; Italy 312.
Oxides and hydroxides		560	435	10	Germany 262; Italy 153.
Metal including alloys, all forms		184	246	1	Germany 212; France 25; Japan 9.
Cobalt:					
Ore and concentrate		24	—		
Oxides and hydroxides	kilograms	17,973	4,487	(2)	France 2,637; Netherlands 800.
Metal including alloys, all forms		256	248	88	Germany 81; France 22.
Columbium and tantalum: Tantalum metal including alloys, all forms	kilograms	1,664	1,968	442	Austria 1,256; Germany 117.
Copper:					
Ore and concentrate	do.	33	100	—	All from Norway.
Matte and speiss		—	5	—	All from Germany.
Oxides and hydroxides		60	18	NA	Belgium-Luxembourg 10.
Sulfate		773	805	NA	Italy 447; U.S.S.R. 97; Netherlands 79.
Ash and residue containing copper		366	929	NA	Germany 808; Italy 89.
Metal including alloys:					
Scrap		8,188	8,403	—	Germany 5,957; France 967; Italy 446.
Unwrought		8,844	8,937	246	Germany 3,897; Austria 2,410; Belgium-Luxembourg 1,354.
Semimanufactures		102,380	90,865	—	Germany 43,725; France 11,836; Italy 10,796.
Germanium: Metal including alloys, all forms	kilograms	116	118	(2)	Belgium-Luxembourg 59; Germany 16.
Gold:					
Waste and sweepings	value, thousands	$66,809	$197,408	$2,196	Saudi Arabia $143,048; Republic of South Africa $21,245; France $8,656.
Metal including alloys, unwrought and partly wrought		r1,403	1,411	NA	NA.
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite		232	4,598	—	Belgium-Luxembourg 4,145; Germany 166; Yugoslavia 106.
Pyrite, roasted		13,898	15,792	—	Germany 12,466; Norway 3,176; Belgium-Luxembourg 150.
Metal:					
Scrap		135,923	227,043	49	Germany 153,597; France 59,028; Netherlands 8,084.
Pig iron, cast iron, related materials		55,807	42,791	2	Germany 17,985; Republic of South Africa 10,815; Poland 3,336.
Ferroalloys:					
Ferroaluminum		806	682	NA	United Kingdom 624; France 56.
Ferrochromium		1,308	1,040	15	Germany 424; Belgium-Luxembourg 264; Republic of South Africa 90.

See footnotes at end of table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Metal—Continued:				
Ferroalloys—Continued:				
Ferromanganese	5,372	3,820	—	France 1,327; U.S.S.R. 799; Germany 582.
Ferromolybdenum	225	171	NA	Chile 60; Germany 22; Netherlands 22.
Ferronickel	26	15	3	Germany 6; Republic of South Africa 2.
Ferrosilicomanganese	7,318	8,828	—	Norway 3,711; U.S.S.R. 2,818; Brazil 971.
Ferrosilicon	6,071	5,329	—	Germany 2,007; U.S.S.R. 1,893; Norway 580.
Silicon metal	4,395	4,282	NA	Brazil 1,572; France 891; Italy 669.
Unspecified	1,134	890	NA	Germany 224; France 172; United Kingdom 103.
Steel, primary forms	124,341	88,911	67	Germany 40,538; United Kingdom 36,417; Italy 9,723.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated	798,474	793,657	318	Germany 264,495; Belgium-Luxembourg 104,158; France 94,303.
Clad, plated, coated	205,458	205,951	277	Germany 74,342; United Kingdom 31,681; France 24,422.
Of alloy steel	137,066	134,415	937	Germany 44,541; France 23,638; Italy 14,053.
Bars, rods, angles, shapes, sections	763,855	625,271	734	Germany 181,916; Italy 159,295; France 101,945.
Rails and accessories	58,132	52,176	(2)	Austria 25,645; Germany 18,255; Italy 6,647.
Wire	106,341	88,604	17	Italy 47,061; Germany 22,324; Belgium-Luxembourg 6,513.
Tubes, pipes, fittings	176,801	164,436	202	Germany 73,365; Italy 28,369; France 12,718.
Lead:				
Ore and concentrate kilograms	—	2	—	All from Germany.
Oxides	478	720	—	Germany 660; United Kingdom 53.
Metal including alloys:				
Scrap	96	65	—	Spain 27; Germany 21; Czechoslovakia 16.
Unwrought	7,893	9,612	384	Australia 1,937; Belgium-Luxembourg 1,886; Canada 1,501.
Semimanufactures	1,888	1,764	24	Germany 1,555; Belgium-Luxembourg 163; Italy 7.
Lithium: Oxides and hydroxides	47	58	5	Germany 44; United Kingdom 9.
Magnesium: Metal including alloys:				
Scrap	25	63	—	All from Italy.
Unwrought	2,688	2,187	289	Norway 1,181; Italy 248; Canada 184.
Semimanufactures	77	136	1	United Kingdom 47; France 45; Germany 30.
Manganese:				
Ore and concentrate, metallurgical-grade	167	88	—	France 45; Netherlands 28; Germany 15.
Oxides	1,482	1,657	8	Japan 1,426; Greece 96; Belgium-Luxembourg 5.
Metal including alloys, all forms	629	519	—	Republic of South Africa 240; Belgium-Luxembourg 150; Netherlands 88.
Mercury	16	13	—	Germany 9; Netherlands 3; France 1.
Molybdenum:				
Ore and concentrate value, thousands	—	$1	—	All from Germany.
Oxides and hydroxides kilograms	1,900	5,489	NA	Germany 3,851.

See footnotes at end of table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Molybdenum—Continued:					
Metal including alloys:					
Unwrought	kilograms	8,608	11,196	NA	Poland 5,975; Germany 4,203; United Kingdom 631.
Semimanufactures	do.	8,393	8,063	96	Austria 4,396; France 1,958; Germany 1,003.
Nickel:					
Matte and speiss	do.	2	16	6	Canada 10.
Oxides and hydroxides	do.	1,712	71	NA	NA.
Metal including alloys:					
Scrap		64	77	—	Germany 54; Spain 12; United Kingdom 9.
Unwrought		1,408	1,194	5	Norway 267; Canada 145; U.S.S.R. 140.
Semimanufactures		1,274	1,166	197	Germany 508; United Kingdom 204.
Platinum-group metals:					
Waste and sweepings	value, thousands	$5,351	$3,766	—	Germany $1,184; United Kingdom $522; Hong Kong $587.
Metals including alloys unwrought and partly wrought:					
Palladium	kilograms	17,489	23,594	909	U.S.S.R. 9,686; Netherlands 4,587; United Kingdom 2,941.
Platinum	do.	23,814	47,109	2,118	U.S.S.R. 24,042; Republic of South Africa 7,511; United Kingdom 6,406.
Rhodium	do.	100	82	NA	United Kingdom 43; Germany 19; Republic of South Africa 12.
Iridium, osmium, ruthenium	do.	236	290	NA	United Kingdom 252; Republic of South Africa 15.
Rare-earth metals including alloys, all forms	do.	5,725	3,955	1,960	Japan 1,090; France 849.
Selenium, elemental	do.	5,682	6,218	NA	Netherlands 3,036; Canada 2,000.
Silicon, high-purity	do.	26,045	19,108	NA	Republic of South Africa 17,890; Japan 689; Germany 119.
Silver:					
Ore and concentrate[3]	value, thousands	$1,534	$1	—	All from Japan.
Waste and sweepings[3]	do.	$17,315	$17,838	$1	Germany $7,472; France $3,421; Spain $1,310.
Metal including alloys, unwrought and partly wrought		2,045	2,563	(2)	Germany 49; Italy 15; unspecified 1,952.
Tellurium and boron, elemental	kilograms	536	186	49	Germany 90.
Tin: Metal including alloys:					
Scrap		35	59	—	Germany 31; France 18; Poland 10.
Unwrought		1,219	941	—	Indonesia 288; Brazil 236; Germany 78.
Semimanufactures		234	254	(2)	Germany 166; Netherlands 34; Belgium-Luxembourg 32.
Titanium:					
Ore and concentrate		194	61	—	Germany 5; Netherlands 5; unspecified 50.
Oxides		1,490	1,222	61	Germany 522; Finland 203; France 146.
Metal including alloys, all forms		573	478	192	United Kingdom 91; Japan 85.
Tungsten:					
Ore and concentrate		20	40	40	
Metal including alloys, all forms		84	62	3	Germany 25; France 20; Poland 6.

See footnotes at end table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Uranium and thorium:					
Ore and concentrate	kilograms	5	2	2	
Oxides and other compounds	do.	152	52	NA	NA.
Metal including alloys, all forms	do.	34	1	NA	NA.
Vanadium:					
Oxides and hydroxides	do.	1,327	202	NA	NA.
Metal including alloys, all forms		58	48	—	Republic of South Africa 25; Netherlands 23.
Zinc:					
Ore and concentrate		21	41	—	Italy 23; Germany 18.
Oxides		731	710	1	France 275; Germany 156; United Kingdom 150.
Blue powder		2,871	2,864	—	Belgium-Luxembourg 1,082; Germany 1,058; Norway 667.
Ash and residue containing zinc		29	40	—	Germany 35; Hong Kong 5.
Metal including alloys:					
Scrap		36	8	—	All from Czechoslovakia.
Unwrought		26,122	22,229	—	France 4,831; Netherlands 3,549; Germany 2,576.
Semimanufactures		5,418	5,958	81	Germany 3,690; France 1,232; Belgium-Luxembourg 662.
Zirconium:					
Ore and concentrate		205	117	1	Germany 65; Italy 40; Australia 6.
Metal including alloys, all forms		41	55	7	Italy 40; Belgium-Luxembourg 4.
Other:					
Ores and concentrates		—	789	789	
Oxides and hydroxides		96	97	—	Italy 32; Germany 23; Yugoslavia 17.
Ashes and residues		665	645	NA	Yugoslavia 309; Austria 212; Germany 116.
Base metals including alloys, all forms	kilograms	1,045	1,000	(2)	NA.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		15,686	15,191	21	Germany 14,203; Italy 666; Iceland 128.
Artificial:					
Corundum		7,142	5,670	17	Austria 2,211; Germany 2,507; Yugoslavia 538.
Silicon carbide		1,243	1,280	NA	Germany 935; Norway 235; Netherlands 102.
Dust and powder of precious and semi-precious stones excluding diamond	kilograms	3,009	598	NA	Germany 570; Ireland 15; Thailand 6.
Grinding and polishing wheels and stones		2,707	2,426	8	Germany 1,267; Italy 469; Austria 282.
Asbestos, crude		1,341	576	—	Canada 382; Republic of South Africa 108; Mozambique 78.
Barite and witherite		1,547	1,289	—	Germany 868; Netherlands 176; France 172.
Boron materials:					
Crude natural borates		391	375	—	Netherlands 182; Belgium-Luxembourg 72; Turkey 72.
Oxides and acids		350	237	1	Chile 72; Germany 48; Turkey 42.
Bromine and fluorine		2,086	1,534	129	Israel 594; United Kingdom 444; France 265.
Cement		272,531	244,952	17	Italy 190,428; Germany 24,722; France 15,063.
Chalk		36,998	37,753	7	Italy 20,635; France 15,020; Germany 1,884.

See footnotes at end of table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS					
Clays, crude:					
Bentonite		10,668	14,692	117	Germany 9,450; Italy 1,899; Austria 1,311.
Chamotte or dinas earth		8,555	7,655	—	Germany 4,835; Czechoslovakia 1,854; Italy 607.
Fuller's earth		1,624	1,507	687	United Kingdom 718; Germany 75.
Fire clay		11,700	8,371	—	France 5,088; Germany 2,776; Spain 427.
Kaolin		102,766	87,827	1,916	United Kingdom 43,313; Germany 19,358; Brazil 16,866.
Unspecified		54,005	49,070	28	Germany 47,714; France 545; Italy 360.
Cryolite and chiolite		74	32	—	Denmark 17; Austria 10; Germany 5.
Diamond, natural:					
Gem, not set or strung	value, thousands	$2,576,016	$2,295,859	$248,175	United Kingdom $681,294; Bermuda $580,383.
Industrial stones	do.	$7,267	$7,222	$383	Belgium-Luxembourg $3,760; Germany $2,365.
Dust and powder	kilograms	7,733	7,737	1,854	Ireland 4,961; Germany 541.
Diatomite and other infusorial earth		6,877	6,073	343	Denmark 3,916; France 726; Italy 396.
Feldspar, fluorspar, related materials:					
Feldspar		14,266	13,120	(2)	Italy 5,868; Germany 3,446; France 3,028.
Fluorspar		999	575	—	Italy 511; France 32; Germany 31.
Unspecified		568	—		
Fertilizer materials:					
Crude, n.e.s.		20,810	18,589	1	Germany 8,486; France 6,871; Italy 2,504.
Manufactured:					
Ammonia:		14,235	10,074	(2)	Germany 3,709; France 3,368; Austria 2,609.
Nitrogenous		124,330	110,981	235	Netherlands 43,262; Austria 25,011; Germany 16,730.
Phosphatic		51,035	44,464	—	France 25,215; Belgium-Luxembourg 11,189; Netherlands 5,533.
Potassic		62,002	62,420	311	France 40,152; Germany 21,071; Canada 862.
Unspecified and mixed		171,394	173,401	5,898	France 55,276; Germany 41,031; Belgium-Luxembourg 27,379.
Graphite, natural		210	202	6	Germany 72; Czechoslovakia 8.
Gypsum and plaster		128,658	121,931	51	Germany 84,196; Italy 25,916; France 8,654.
Iodine		100	85	NA	Chile 43; Japan 30; United Kingdom 5.
Kyanite and related materials:					
Mullite		645	324	NA	Germany 300.
Unspecified		109	55	NA	NA.
Lime		104,126	96,475	NA	Germany 60,405; Italy 30,716; France 2,998.
Magnesium compounds:					
Magnesite, crude		368	379	—	Germany 196; Italy 54; Spain 40.
Oxides and hydroxides		5,967	5,813	2	Austria 2,881; Spain 1,591; Germany 579.
Sulfate		11,368	12,043	—	All from Germany.
Mica:					
Crude including splittings and waste		567	506	—	Germany 233; France 82; United Kingdom 81.
Worked including agglomerated splittings		611	625	1	France 357; Belgium-Luxembourg 125; India 103.
Nitrates, crude		506	516	—	Chile 263; France 132; Germany 89.
Phosphates, crude		2,039	446	(2)	Belgium-Luxembourg 228; France 145; Netherlands 57.
Phosphorus, elemental		5,812	4,820	113	France 1,702; Italy 1,253; Netherlands 1,202.

See footnotes at end of table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Pigments, mineral:					
Natural, crude		243	383	NA	France 174; Germany 113; Austria 44.
Iron oxides and hydroxides, processed		2,282	1,876	7	Germany 1,602; Japan 85; Netherlands 78.
Potassium salts, crude		29	700	—	All from France.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$490,578	$421,381	$100,360	Hong Kong $69,471; France $38,225; Thailand $37,572.
Synthetic	kilograms	81,600	65,613	894	France 21,357; Germany 19,927; Italy 8,224.
Pyrite, unroasted		212	209	—	Italy 201; Germany 6; Peru 2.
Quartz crystal, piezoelectric	kilograms	68	233	26	France 140; Germany 23.
Salt and brine		3,162	3,238	20	France 2,140; Germany 670; Belgium-Luxembourg 138.
Sodium compounds, n.e.s.:					
Soda ash, manufactured		42,154	39,928	—	France 25,080; Germany 13,898; Poland 341.
Sulfate, manufactured		16,347	15,688	—	Germany 7,358; Austria 6,824; France 815.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		204,209	170,798	27	Germany 85,908; Austria 39,722; Italy 21,775.
Worked		205,232	193,543	33	Italy 124,933; Portugal 35,244; Germany 12,107.
Dolomite, chiefly refractory-grade		19,611	21,933	—	Italy 12,301; Austria 3,769; France 1,533.
Gravel and crushed rock	thousand tons	9,953	8,537	(e)	France 3,870; Germany 3,092; Italy 1,018.
Limestone other than dimension		9,442	15,658	6	France 6,564; Italy 4,745; Germany 4,294.
Quartz and quartzite		10,152	7,668	2	Germany 6,327; Italy 567; India 276.
Sand other than metal-bearing	thousand tons	2,358	2,055	(e)	Germany 629; Italy 623; France 621.
Sulfur:					
Elemental:					
Crude including native and byproduct		56,163	51,381	—	Germany 51,321; France 41; Italy 17.
Colloidal, precipitated, sublimed		52	37	—	France 23; Germany 14.
Dioxide		61	56	—	Germany 25; Italy 19; France 12.
Sulfuric acid		3,457	3,616	—	France 1,450; Germany 1,387; Italy 753.
Talc, steatite, soapstone, pyrophyllite		15,260	14,510	1	Austria 8,426; Italy 3,038; France 1,208.
Vermiculite, perlite, chlorite		11,392	11,228	10	Republic of South Africa 9,213; Greece 984; Italy 376.
Other:					
Crude		80,612	92,721	997	Germany 38,195; France 23,830; Spain 18,852.
Slag and dross, not metal-bearing		45,498	45,989	—	Germany 32,332; France 11,305; Poland 1,227.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		1,404	802	104	Trinidad and Tobago 400; Germany 195.
Carbon black		7,029	6,630	121	Germany 4,250; France 1,700; Netherlands 194.
Coal:					
Anthracite		7,299	6,725	—	Germany 5,101; Republic of South Africa 823; France 660.
Bituminous		477,355	357,638	—	Republic of South Africa 338,964; Germany 10,774; Austria 4,604.
Briquets of anthracite and bituminous coal		3,137	4,409	—	Germany 4,030; Republic of South Africa 233; Belgium-Luxembourg 72.

See footnotes at end table.

TABLE 3—Continued

SWITZERLAND: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal—Continued:					
Lignite including briquets		8,356	12,887	—	Germany 12,732; Austria 155.
Coke and semicoke		27,153	32,896	—	Germany 21,220; France 10,291; Italy 949.
Gas, natural:					
Gaseous	thousand cubic meters	1,213,494	1,381,496	[2]	Netherlands 525,317; Germany 472,778; U.S.S.R. 236,242.
Liquefied	do.	22	22	22	
Peat including briquets and litter		88,993	100,332	—	Germany 90,610; Netherlands 5,969; U.S.S.R. 1,707.
Petroleum:					
Crude	thousand 42-gallon barrels	22,900	34,019	—	Libya 14,331; United Kingdom 10,506; Norway 4,851.
Refinery products:					
Liquefied petroleum gas	do.	497	361	[2]	Germany 309; France 31; Belgium-Luxembourg 22.
Gasoline	do.	35,387	24,757	[2]	Germany 7,204; Italy 4,294; France 3,284.
Mineral jelly and wax	do.	103	102	[2]	Germany 74; France 19; United Kingdom 2.
Kerosene and jet fuel	do.	88	122	[2]	Hungary 100; Netherlands 12; Italy 4.
Distillate fuel oil	do.	40,337	34,373	[2]	Germany 8,718; France 6,007; Belgium-Luxembourg 5,949.
Lubricants	do.	589	486	6	Germany 130; France 73; Italy 70.
Residual fuel oil	do.	466	279	—	Germany 264; France 14.
Bitumen and other residues	do.	993	1,011	[2]	Germany 636; Italy 202; France 145.
Bituminous mixtures	do.	76	78	[2]	Germany 36; France 22; Trinidad and Tobago 9.
Petroleum coke	do.	447	397	48	Germany 346; Italy 2.

[r]Revised. NA Not available.

[1]Table prepared by Theodore Spittal.

[2]Less than 1/2 unit.

[3]Includes other precious metals.

TABLE 4

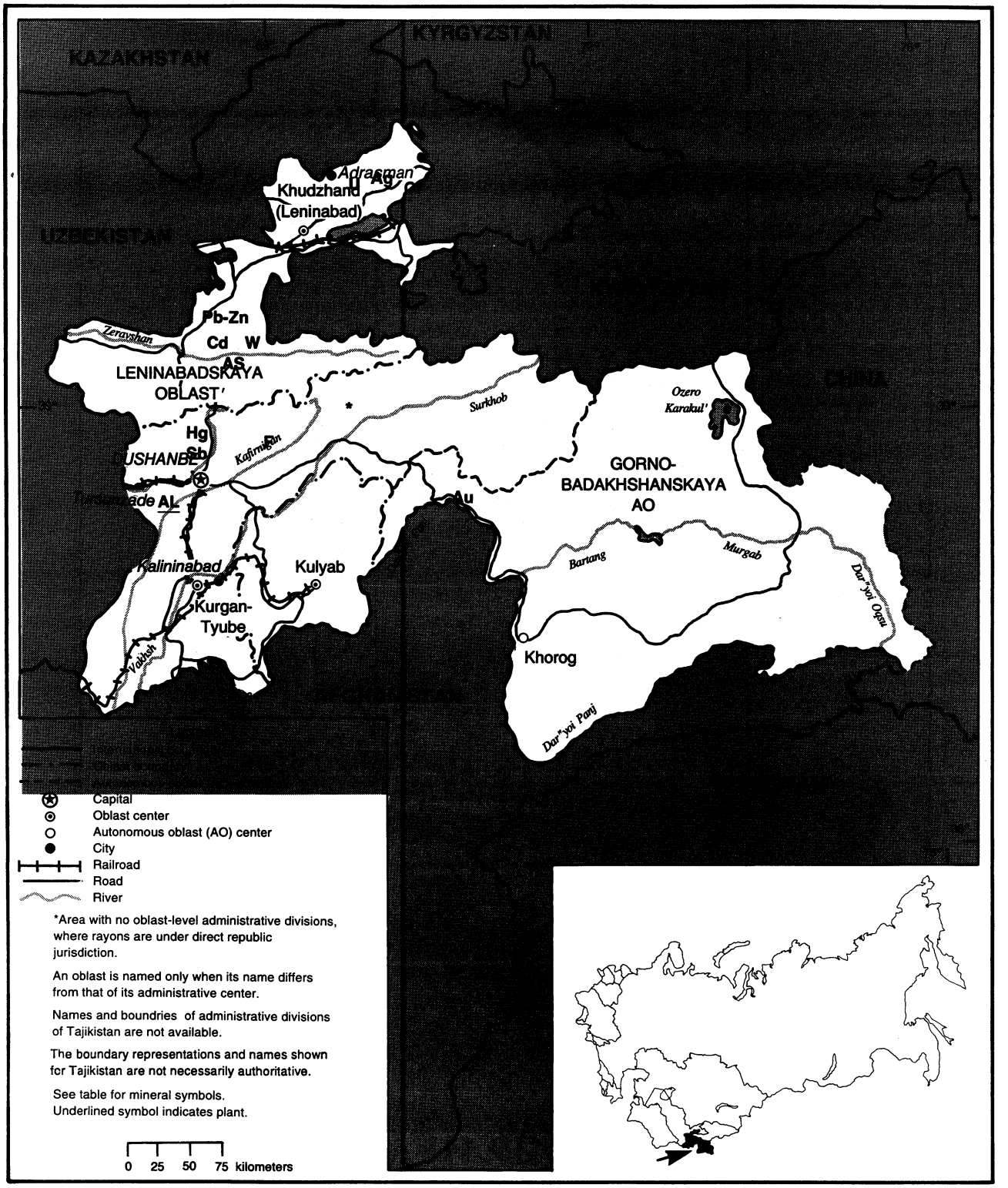
SWITZERLAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Alusuisse-Lonza Holding AG	Smelters at Chipis and Steg	70
Cement	Bundner Cementwerke AG (100% Holderbank Management and Consulting Ltd.)	Plant at Untervaz	800
Do.	Cementfabrik Holderbank AG	Plant at Rekingen	700
Do.	Portland Cement Werk Wurenlingen-Siggenthal AG	Plant at Wurenlingen-Siggenthal	600
Refinery, petroleum barrels per day	Raffinerie du Sud-Ouest SA (Compagnie Francaise des Petroles and British Petroleum, 49% each)	Refinery at Collombey	40,000
Do.	Reffinerie de Cressier SA (100% Kninklijke Nederlandsche Petroleum Maatschappij NV)	Refinery at Cressier	36,000
Salt	Zentralbureau des Vereins der Schweizerischen Rheinsalinen (100% Government)	Saline at Schweizerhalle	350
Do.	La Societe des Mines at Salines de Bex (100% Canton of Vaud)	Saline at Bex	150
Steel	Monteforno Acciaierie e Laminatoi AS (93.6% Von Roll Group)	Plant at Bodio	380
Do.	Von Roll Group	Plant at Gerlafingen	300
Do.	Von Moss Sthal AG	Plant at Emmenbrucke	300
Do.	Ferrowohlen AG	Plant at Wohlen	150

TAJIKISTAN

AREA 143,100 km² **POPULATION 5.7 million**



*Area with no oblast-level administrative divisions, where rayons are under direct republic jurisdiction.

An oblast is named only when its name differs from that of its administrative center.

Names and boundries of administrative divisions of Tajikistan are not available.

The boundary representations and names shown for Tajikistan are not necessarily authoritative.

See table for mineral symbols.
Underlined symbol indicates plant.

THE MINERAL INDUSTRY OF

TAJIKISTAN

By Richard M. Levine

In 1992, Tajikistan was engulfed in a civil war, which, according to some estimates, has resulted in tens of thousands of deaths. The civil war in Tajikistan in 1992 brought major economic disruption to the country and its mineral industries and sharply curtailed efforts to attract foreign investment.

GOVERNMENT POLICIES AND PROGRAMS

The Prime Minister of Tajikistan stated that his country's main prospects for economic development lay in developing mining of precious metals and precious and semiprecious stones and in developing nonferrous metallurgy.

Presently, Tajikistan is developing 60 deposits accounting for 15% of the country's explored deposits. Development of these deposits will increase the extraction of a number of minerals, including coal, fluorspar, iron, and silver.

PRODUCTION

Nonferrous metals mining was the leading sector of Tajikistan's mineral industry, with Tajikistan producing antimony, mercury, molybdenum, tungsten, rare and precious metals, and other metals. Tajikistan also produced oil, gas, coal, and industrial minerals. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992, the major mineral-producing enterprises in Tajikistan were state owned, although as with all former Soviet Republics, plans were being formulated for some form of privatization. Progress in enacting any type of economic reform was being impeded by the civil war. *(See table 2.)*

COMMODITY REVIEW

Metals

Aluminum.—The Tajik aluminum plant in Tursunzade became part of a new 33 member joint stock company, Aluminy, composed of the major aluminum industry enterprises in Russia, Azerbaijan, Kazakhstan, and Ukraine; the Aluminy concern combines government and private ownership. At the Tajik plant, with a production capacity of 500,000 tons per year, production reportedly fell from 430,000 tons in 1991 to 400,000 tons in 1992. Operations at the aluminum smelter suffered not only from the civil war, but also from an earthquake in the region and a curtailment of supplies from the other countries of the former U.S.S.R., including alumina from Azerbaijan and Ukraine.

Antimony and Mercury.—The Anzob plant was producing 17,000 tons per year of mercury-antimony concentrate, which it supplied to metallurgical plants in Kyrgyzstan. Tajikistan, which has considerable antimony and mercury reserves, is planning to construct metallurgical facilities to obtain greater value added from its output. The new metallurgical facilities should produce more than 1,000 tons of mercury per year. Plans also call for constructing facilities to produce several thousand tons per year of antimony trioxide.

Gold.—The Government of Tajikistan was reorienting defense industry enterprises to gold production. Plans called for increasing gold production to 8 to 10 tons by 1994. The Tajikistan Government, reportedly, was allocating 4 billion rubles for this purpose.

Iron Ore.—Development is planned of the Chokadan-Bulakskoye iron ore deposit for the purpose of developing domestic steel production to reduce reliance on imported steel. Plans also call for construction of a steel mill near the deposit.

Silver.—Plans call for development of the Adrasmanskoye silver deposit, which is considered one of the world's largest. The deposit is projected to produce 550 tons of silver per year. The deposit also contains considerable amounts of lead and zinc. Foreign investment will be needed to develop this deposit.

Mineral Fuels

Plans call for development of the Fan-Yagnobskoye coal deposit with 60 million tons of reserves. An open pit mine at the deposit now has the capacity to produce 1 million tons of coal per year. Plans are to increase production to 4 million tons per year, which will cover domestic needs and provide some coal for export.

Reserves

Tajikistan has reserves of a wide range of metals and industrial minerals as well as mineral fuels. Information at the present time, however, is not adequate to estimate the quantities of these reserves. For metals, reserves include alunite, antimony, bauxite, bismuth, copper, gold, iron, lead, manganese, mercury, molybdenum, nepheline syenite, nickel, rare metals, silver, tin, tungsten, and zinc; for nonmetallics, barite, boron,

construction materials, dolomite, fluorspar, phosphates, precious and semiprecious stones, and salt; and for mineral fuels, coal, natural gas, oil shale, peat, petroleum, and uranium.

INFRASTRUCTURE

Tajikistan is a landlocked country bordered on the west by Uzbekistan, on the north by Kyrgyzstan, on the east by China, and on the south by Afghanistan. As of 1990 the country had 29,900 km of highways, of which 24,400 km was hard surfaced. It had 480 km of broad-gauge railroads and 420 km of narrow-gauge railroads. A railroad connects the capital of Tajikistan, Dushanbe, with Termez, Uzbekistan, on the Afghanistan border; from there rail lines connect to Toshkent from where connections can be made to other countries of the former U.S.S.R. The terrain consists of mountains and valleys dominated by the Pamir and Altay Mountains, the western Fergana Valley in the north, and the Kafirnigan and Vakhsh Valleys in the southeast. The climate ranges from semiarid to polar in the Pamir Mountains.

OUTLOOK

Until the civil war in Tajikistan ends and a stable Government is formed that will promote the transition to a market economy and encourage foreign investment, further developing Tajikistan's mineral industries will remain quite difficult and attracting foreign investment even more difficult.

Despite its variety of reserves, Tajikistan's distant location from world markets and major transport arteries will result in transport and infrastructure development costs being major factors in assessing the viability of mineral development in Tajikistan.

TABLE 1
TAJIKISTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Aluminum, primary	400,000
Antimony, metal content of ore	1,500
Bismuth	20
Cement	300,000
Coal	200,000
Gold kilograms	500
Gypsum	500,000
Lead, metal content of ore	2,000
Mercury, metal content of ore	100
Natural gas million cubic meters	80
Petroleum, crude	70,000
Sand and gravel cubic meters	4,000,000

TABLE 2
TAJIKISTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

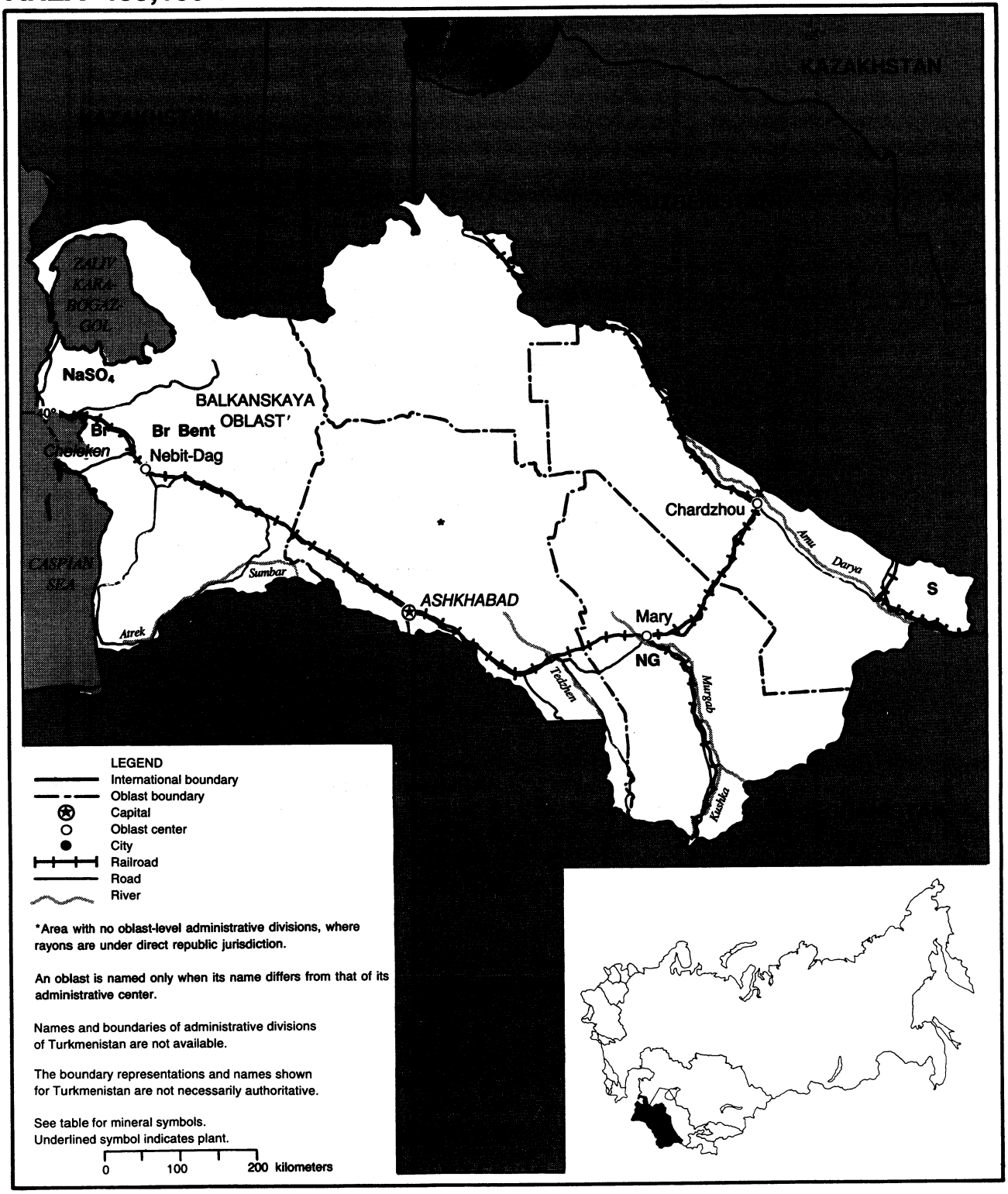
(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity[e]
Aluminum	Tajik aluminum plant	Tursunzade	500,000.
Antimony	Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	2,000.
Bismuth, metal	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	25.
Do.	Isfara hydrometallurgical plant	Isfara	
Coal	Shurabskoye brown coal	Shurab region	300,000 total.
Do.	Fan-Yagnobskoye hard coal, deposits	Pyandzh region	
Copper	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	NA.
Gold	Tajikzoloto mining-beneficiation complex, Pamir Artel	Darvazy, Rankul placer deposits, placers in central and southern part of country	3.
Lead	Leninabad mining and metallurgical complex	Yuzhno-Yangikanskiy deposit	2,500.
Mercury	Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	150.
Molybdenum	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	NA.
Petroleum and natural gas cubic meters	16 oil-gas deposits under exploration, including Ravatskoye, Ayritanskoye, Madaniyatskoye	Fergana depression	150,000 (petroleum), 150,000,000 (natural gas).
Do. do.	Shaambary Beshtentyakskoye, Uzunkhorskoye, Kichik-Bel'skoye	Southern Tajik depression	
Zinc	Leninabad mining and beneficiation complex	Yuzho-Yangikanskiy deposit	NA.

[e] Estimated NA Not available.

TURKMENISTAN

AREA 488,100 km² **POPULATION 3.8 million**



THE MINERAL INDUSTRY OF

TURKMENISTAN

By Richard M. Levine

In 1992 Turkmenistan, the fourth largest country in area to form from the former U.S.S.R. with a population of almost 4 million, avoided some of the economic hardships that befell other former republics of the U.S.S.R. The country did not experience food shortages and had adequate fuel supplies. Nevertheless, Turkmenistan's economy was closely integrated with the economies of the countries of the former U.S.S.R. and experienced a number of the same difficulties, including a 10% drop in gross domestic product and a 16.7% drop in industrial output in comparison with that of 1991 and a high inflation rate. Agricultural output, however, did not fall and prices for basic foodstuffs were controlled. With its large production of natural gas and gas and oil reserves, Turkmenistan had its own source of fuel and was able to achieve significant earnings from the export of natural gas.

GOVERNMENT POLICIES AND PROGRAMS

In 1992 Turkmenistan sought to market its natural gas to other countries of the former U.S.S.R. and to world markets. Turkmenistan was negotiating an alternate route for exporting gas via Iran and Turkey to West Europe rather than through Russia and other parts of the former U.S.S.R. to free its gas exports from control by these former Soviet republics.

In early 1993, Turkmenistan's President signed a decree, "On the Creation of Joint Ventures with Foreign Companies," which permits oil and gas companies in Turkmenistan, with Government approval, to establish joint ventures for developing deposits. The decree, it was claimed, establishes a previously lacking legal basis for the establishment of joint ventures and addresses issues such as taxation, of critical importance to foreign investors.

A new law passed at the beginning of 1993 states that export licenses will be required for releasing mineral-related information, and it is not yet clear if this new law will aid or impede the release of mineral production, trade, and reserve data.

PRODUCTION

The mineral industry of Turkmenistan was based primarily on the extraction of natural gas with production also of oil and a number of important industrial minerals, including clays, construction materials, gypsum, iodine and bromine, sodium sulfate and other sodium compounds, sulfur, and table salt. Following Russia, Turkmenistan had been the second largest producer of natural gas among the republics of the former U.S.S.R. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992 the major mineral-producing enterprises in Turkmenistan were state owned, although as with all former Soviet republics, plans were being formulated and enacted for some form of privatization. Turkmenistan, however, was not considering the state relinquishing total control of mineral production to the private sector. *(See table 2.)*

COMMODITY REVIEW

Minerals Fuels

Natural Gas.—Turkmenistan produced about 68 billion cubic meters of natural gas in 1992, which was a 19% drop in output in comparison with 1991 and was far below Turkmenistan's output of almost 90 billion cubic meters in the late 1980's. All of Turkmenistan's gas exports now pass via pipeline through Russia. Turkmenistan's Government decided to construct a gas export pipeline that would go from deposits in southern Turkmenistan through Iran and on to Turkey for shipment to European and other markets. The first stage of the pipeline system would be able to ship to Turkey about 15 billion cubic meters of gas per year by 1994; the second stage, which is planned to be operational in 1997, would raise the total to 28 billion cubic meters. Russia and Turkmenistan came to an agreement that Turkmenistan's share of total C.I.S. gas exports would be 11.3 billion cubic meters in 1993 in comparison with 11.2 billion cubic meters in 1992. Russia, according to this agreement, will transport Turkmenistan's gas through its territory via export pipelines to the borders of the former U.S.S.R. This agreement is conditional on Turkmenistan producing 80.2 billion cubic meters of natural gas in 1993 and also on Turkmenistan supplying 28.4 billion cubic meters of gas to Ukraine while Russia will supply Ukraine with about 70 billion cubic meters. This latter part of the agreement was considered essential as Turkmenistan stopped deliveries of gas to Ukraine from March to September 1992, necessitating that Russia divert gas to Ukraine that Russia had intended to export for hard currency.

Petroleum.—In 1992 Turkmenistan's oil production fell by 4% in comparison with that of 1991 to about 5.2 million tons. International tenders for the right to prospect and to develop joint ventures

with domestic oil companies were awarded to the Larmarg Energy Group of the Netherlands, Nobele Drilling International of the United States, Bridas of Argentina, and Estpac International of the United Arab Emirates.

Reserves

Turkmenistan has large reserves of oil and natural gas as well as large reserves of sodium compounds. Published reserve figures, however, are not available, although foreign investors are being given reserve information on investment properties. Such reserve figures, however, are based on the former U.S.S.R. reserve classification system, which is not directly comparable to the U.S. reserve classification system regarding the definition of economic reserves.

INFRASTRUCTURE

Turkmenistan borders the Caspian Sea to the west, Iran and Afghanistan to the south, and Uzbekistan and Kazakhstan to the north. Turkmenistan is landlocked as the Caspian Sea lacks direct outlets to the world's oceans. Turkmenistan, which is slightly larger in area than the State of California, as of 1990 had 2,120 kilometers of rail lines and 23,000 kilometers of highways, 18,300 of which was hard surfaced. The terrain in Turkmenistan is flat to rolling sandy desert with dunes. Cotton is grown in the irrigated western region of the country where the Karakumskiy canal is fed by the Amu Darya River.

OUTLOOK

Owing to its large reserves of oil and gas, which apparently will be developed with the aid of foreign investment, Turkmenistan will be able to derive significant revenues from these industries as well as have adequate domestic fuel supplies. Turkmenistan's revenues should increase further if Turkmenistan builds an alternate pipeline route that bypasses the countries of the former U.S.S.R. and enables Turkmenistan to more freely export natural gas and seek new export markets. Turkmenistan also has large reserves of sodium compounds, which it may be able to market outside as well as within the countries of the former U.S.S.R.

TABLE 1
TURKMENISTAN: PRODUCTION OF MAJOR MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Bentonite	70,000
Cement	700,000
Gypsum	300,000
Natural gas million cubic meters	68,000
Petroleum, crude	5,200,000
Sodium sulfate	100,000
Sulfur	300,000

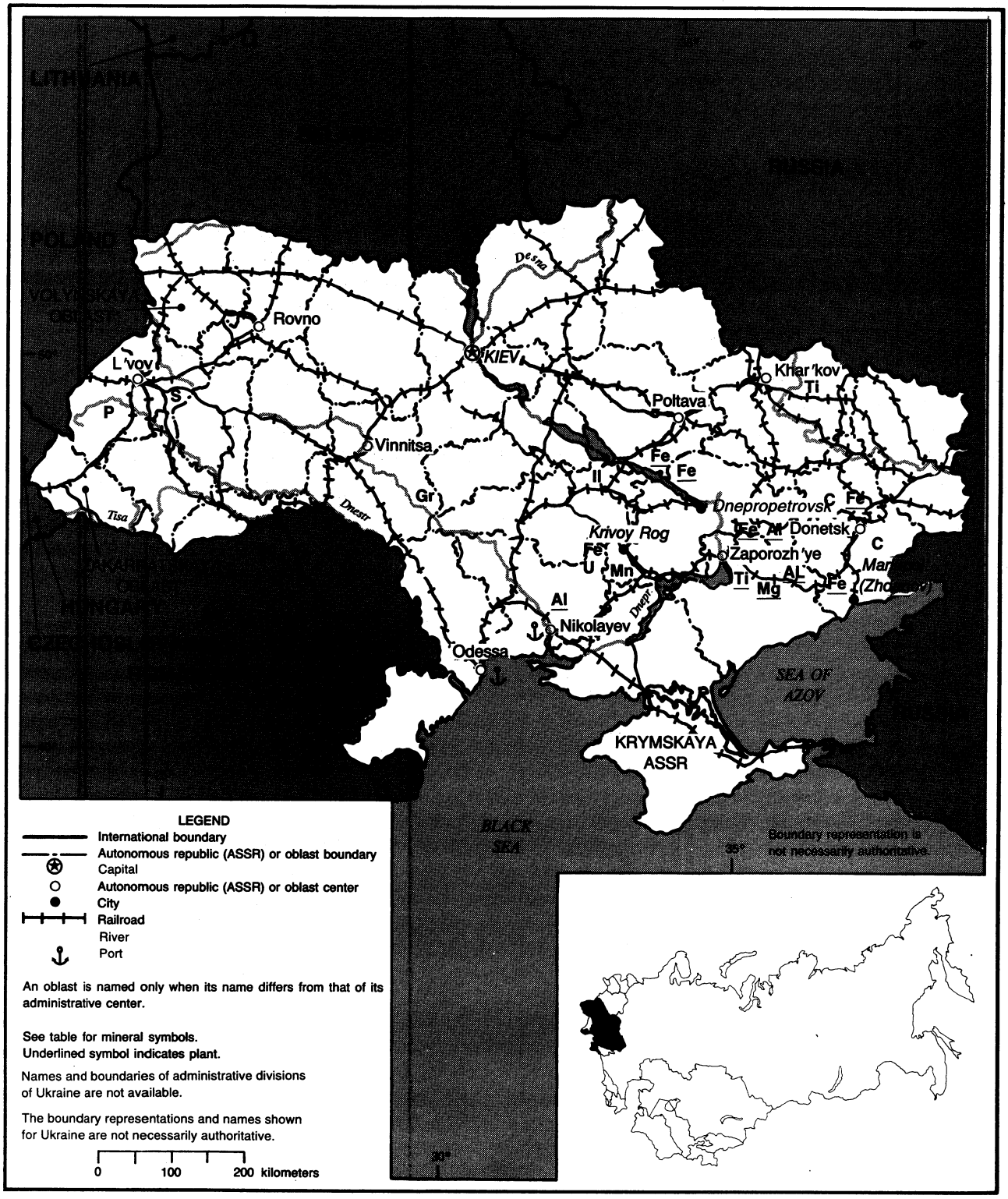
TABLE 2
TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Operating companies	Location of main facilities	Annual capacity
Bentonite	Oglaninskoye deposit	Oglany	80,000.
Gypsum	Krasnovodsk deposit	Krasnovodsk	250,000.
Do.	Wastes from Gaurdak sulfur deposit	Gaurdak	300,000.
Natural gas billion cubic meters	Deposits: Achakskoye, Gygyrtlinskoye, East and West Shatlykskiye, North and South Naipskiye, Dauletabad-Donmezskoye	Northeastern, eastern, southeastern, and southwestern part of country	85 total.
Petroleum and natural gas	Deposits: Nebit Dag, Cheleken, Kum Dag, Koturtepinskoye, Barsa-Gelmesskoye, Burunskoye, Kuydzhikskoye, Gograndagskoye, Okaremskoye, Kamyshldzhinskoye	Southwestern part of country on Caspian Sea	5,500,000 total.
Sodium sulfate	Karabogaz Sulfate Association	Karabogazgol Lagoon	150,000.
Sulfur	Gaurdak deposit	Gaurdak	350,000.

UKRAINE

AREA 603,700 km² **POPULATION 51.9 million**



THE MINERAL INDUSTRY OF

UKRAINE

By Richard M. Levine

Ukraine experienced deteriorating economic conditions in 1992 with gross national product falling reportedly by 14% in comparison with that of 1991. Ukraine experienced fuel and raw material shortages caused by the breakdown in the allocation and supply system of the former U.S.S.R. and lacked funds to purchase adequate quantities of these raw materials at market prices.

PRODUCTION

Ukraine was a large producer of a number of important mineral products, including coal, ferroalloys, iron ore, manganese, and steel, and also a lesser producer of a number of other metal products, including ilmenite and rutile-zirconium ores, nickel, mercury, titanium, magnesium, and uranium. Ukraine also produced a large number of industrial minerals, including dolomite, graphite, kaolin, limestone fluxes, potash, quartz, salt, and a variety of building materials.

There was a serious decrease in output in the mineral production sector, with a reported one-third decrease in metal production. Reportedly, ore mining decreased owing to a lack of gasoline, other petroleum-base fuels, timber, and natural gas. Serious shortages of iron ore, coke, and magnesite powder were reported. Reportedly, money was not available to buy needed raw materials abroad such as coke, and scrap was being exported while domestic plants were only receiving about one-half the needed scrap.

According to official Ukrainian statistics, in 1992 in comparison with 1991, in the ferrous metals sector production of iron ore fell by 11.5% to 75.7 million tons and steel output fell by 7.2% to 41.7 million tons. Electric furnace steel production was 3.2 million tons or a drop of 3.6% in comparison with that of 1991; production of steel in oxygen converter furnaces fell by 7.9% to 16.6 million tons. The remaining steel was produced in open-hearth furnaces. Pig iron production in 1992 dropped by 3.7% in comparison with that of 1991 to 35.3 million tons. Production of finished steel products in 1992 dropped by 10% in comparison with that of 1991 to 29.5 million tons; there was a 12.7% drop in steel sheet production to 10.3 million tons and a 1.9% drop in cold-rolled sheet production to 1.984 million tons. Steel pipe production fell by 8.5% to 5.087 million tons. There was a 3.3% decrease in coke production to 27.5 million tons.

In the fuel sector, production of coal fell by 1.5% in comparison with that of 1991 to 134 million tons, and coking coal production fell by 0.8% to 54.9 million tons. Crude oil production fell by 9.5% to 4.474 million tons, and natural gas production fell by 14.9% to 20.9 billion cubic meters. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992 the major mineral-producing enterprises in Ukraine were state owned, although as with all former Soviet republics, plans were being formulated for some forms of privatization. Privatization in Ukraine was just beginning in 1992 with only 4% of state enterprises privatized. *(See table 2.)*

COMMODITY REVIEW

Metals

Aluminum.—The alumina refinery in the port city of Nikolayev was one of the largest and most modern in the former U.S.S.R. with a capacity to produce more than 1 million tons per year of alumina; it was designed to operate on imported bauxite from Guinea. This refinery was originally intended to supply the new aluminum smelters in Tursunzade, Tajikistan, and Sayanogorsk in Russia, but with the breakup of the U.S.S.R. and the civil war in Tajikistan, the Nikolayev refinery was no longer committed to continuing its level of shipments to these former customers.

Another alumina refinery at Zaporizhya also is based on bauxites imported through the port of Nikolayev, but this refinery is smaller than Nikolayev; the bauxite is imported primarily from Greece, Hungary, and Yugoslavia. The Zaporizhya plant is smaller and older than the plant at Nikolayev and requires substantial renovation. This refinery is integrated with the Zaporizhya aluminum smelter with a capacity of slightly more than 100,000 tons per year of primary aluminum, which in 1992 was operating at near full capacity.

A U.S.-Ukrainian joint venture, Interprofile, plans to construct an aluminum extrusion plant in Ukraine that will consume 20,000 to 40,000 tons of aluminum per year produced by the Zaporizhya plant. The plant will be owned in equal shares by the Zaporizhya primary aluminum smelter, the Nikolayev alumina refinery, and the U.S. firm Global Interholding. A large market for aluminum fabricated products was considered to exist in Ukraine.

Industrial Minerals

Amber.—A new state firm was established in Rovno Oblast, Ukraine, to extract amber from deposits in the

Sarnenskiy district. The company also will have responsibility for developing gold deposits in the Polesye region. Planned output from the mine is about 5 tons of amber per year, although initial production will be about one-half this amount.

Gold.—Ukraine currently has no gold production but has significant undeveloped gold deposits in the Carpathian mountains region as well as reported gold discoveries in other regions. Exploration and preliminary development work has started. Owing to the importance of these deposits to Ukraine's economy, it is envisaged that development will occur at these deposits.

In the major Kryvyy Rih iron ore mining basin, gold production began from local ores at the Novokrivorozhskiy mining and beneficiation complex.

Iodine.—Plans call for Ukraine to begin producing iodine. Ukraine consumes about 400 tons of iodine per year, of which 80 tons was imported from other C.I.S. countries and the rest from other foreign producers, particularly Chile. The Ukrainian Ministry of Industry has initiated a program for the extraction and production of iodine.

Manganese.—Ukraine had been producing about 80% of the manganese output of the former U.S.S.R. with the remainder coming primarily from Georgia and a small amount from Kazakhstan. Manganese was mined in the area near Nikopol in the Nikopol and Bolshoy Tokmak Basins. In 1992, Ukraine produced 5.819 million tons of marketable manganese ore, which reportedly was about the same level as that produced in 1991. At Bolshoy Tokmak, where development of the Tavricheskiy complex began in the 1980's, development was proceeding slowly because of financial problems.

Manganese exports in 1992 totaled 500,000 tons, of which 375,000 tons was exported to C.I.S. countries. During the 1989-91 period, Ukraine ceased exports of manganese to its former East European customers. Then in 1992 Ukraine resumed these exports, sending 125,000 tons to East Europe, mostly in barter transactions in exchange for machinery and spare parts.

Titanium.—The Zaporizhya titanium and magnesium complex signed an agreement with the New York-based trading company Advanced Materials and Technology to export titanium sponge from Zaporizhya. In the first year the company plans to export 1,000 tons of sponge, mostly to Europe. This contract should help the Zaporizhya plant, which had been experiencing financial difficulties.

Mineral Fuels

Energy.—Ukraine in 1992 was suffering from an acute energy shortage. Before 1992 Ukraine refined between 55 and 60 million tons of oil, of which about 4 million tons was extracted in Ukraine and from 50 to 55 million tons imported from Russia. During 1992, Russian deliveries were reduced to 40 million tons while oil production in Ukraine fell by 9.5%. This resulted in shortages of gasoline, diesel fuel, and other petroleum products that were affecting production in all sectors. In an effort to solve its energy problems, Ukraine was planning a number of measures including partcipating in joint ventures to extract oil and gas in Russia, Uzbekistan, and other new countries of the former U.S.S.R; constructing oil-loading terminals on the Black Sea coast; forming its own tanker fleet; expanding domestic production of oil and gas; renovating Ukrainian refineries; and increasing Ukraine's nuclear power potential.

Coal.—In 1992, Ukraine extracted 12 million tons of coal less than planned with production decreasing at 150 of the more than 300 mines. Ukrainian steel mills were not receiving enough coal from the Donets Basin (Donbas) and were forced to reduce the work schedule of coke oven batteries. Also, Ukraine's coal industry, owing to the curtailment of economic ties with Russia, was not receiving equipment for use in the mines.

There were serious safety problems in Ukraine's coal mining industry; more than 46,000 injuries were reported and 438 people died. The rate of fatal accidents per 1 million tons of coal mined increased by 20% and is five times as high as in Russia. In general there are three fatalities for every million tons of coal mined in Ukraine.

Nuclear Power.—After planned maintenance was carried out at the Chernobyl nuclear powerplant on the first and third units, these units were again put into operation and the planned closing of the powerplant was postponed. In 1992, Ukrainian nuclear powerplants produced 29.4% of total electricity production. In addition to Chernobyl, Ukraine has the Zaporizhya, Rovno, Khmelnitsy, and Southern Ukraine nuclear powerplants. A moratorium continues to exist on the expansion of nuclear powerplant capacity, and for this reason three fully ready pressurized water reactor (VVER) power units have not been put into operation at Zaporizhya, Khmelnitsy, and Rovno capable together of supplying 18 to 20 billion kilowatt hours per year of electricity.

Reserves

Ukraine has reserves of a wide range of metals, industrial minerals, and mineral fuels. Its major reserves are of coal, iron ore, manganese, and sulfur. It also has significant reserves of graphite, mercury, nickel, potash, and a number of important industrial minerals. Information at the present time, however, is not adequate for estimating reserves for a number of these mineral commodities.

The reserve estimates that are available were assessed according to the Soviet reserve classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economy that did not account for production costs in the same way as a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western definition of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the

Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

INFRASTRUCTURE

Ukraine, with an area about the size of Texas and a population of more than 50 million people, is the second largest country to form out of the former U.S.S.R. Ukraine shares borders to the north with Belarus and Russia, to the east with Russia, to the south with Moldova, and to the west with Poland, Slovakia, Hungary, and Romania. On the western border of the former U.S.S.R., Ukraine has good railroad, highway, and pipeline connections with East Europe, and to the south on the Black Sea, Ukraine has port facilities for trade on world markets. Major ports include Odessa, Ilichevsk, Kherson, Izmail, Mariupol and Kerch. The Dneiper is the major river flowing through Ukraine to the Black Sea. A gas pipeline network connects the major gas-producing regions of West Siberia in Russia to Ukraine from where the gas is exported to European countries. Ukraine had as of 1990 22,800 km of railroads and 273,400 km of highways, 236,400 km of which was hard surfaced.

OUTLOOK

Although possessing one of the largest mineral industries in the former U.S.S.R., Ukraine's mineral industries face great economic difficulties in making the transition to a market economy. Its coal industry, although it produced about 40% of the coal in the former U.S.S.R., was in large part uneconomic even in Soviet terms because of the depth of the mines and the thinness of the seams. Its iron ore and manganese industries mine low-grade or lower quality ores with which it will be difficult to compete on world markets, and its steel and ferro-alloy industries are in need of modernization. If adequate investments are made, it may be possible to improve or upgrade the manganese and iron ore to meet world standards, but the cost of such investments will have to be assessed in terms of the potential profitability of these industries. The same issues apply to modernizing Ukraine's steel and ferro-alloys industries. Ukraine also possesses reserves of minerals that have either not yet been developed or been fully developed that could offer as good if not better opportunities for investment. These resources include reserves of gold, graphite, titanium raw materials and a wide range of industrial minerals.

Given the large size of Ukraine's current mineral industry, the near-term economic well-being of the country will depend to a significant degree on the results of efforts to either invest in Ukraine's mineral industries to make them profitable or to develop means for down-scaling these industries and to convert production to other areas. Major serious social and economic consequences could result if these mineral industries collapse without effective alternate programs in place to ameliorate the effects of such a transition.

TABLE 1
UKRAINE: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Alumina	900,000
Aluminum	90,000
Cement	20,000,000
Coal:	134,000,000
Of which coking coal	54,900,000
Coke	27,500,000
Graphite	50,000
Iron ore	75,700,000
Manganese, marketable ore	5,819,000
Mercury	100
Natural gas thousand cubic meters	20,900,000
Nickel, Ni content of ore	5,000
Petroleum, crude	4,474,000
Pig iron	35,300,000
Potash, K_2O content	200,000
Steel, crude	41,700,000
Steel, finished	29,500,000
Steel, pipe	5,087,000
Sulfur, native	1,200,000
Titanium:	
Ilmenite concentrates	200,000
Metal	20,000
Zinc, metal	15,000
Zirconium concentrate	75,000

TABLE 2

UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity
Alumina	Nikolayev refinery	Nikolayev	1,000,000.
Do.	Zaporizhya (Dneprovsk) refinery	Zaporizhya	245,000.
Aluminum	Zaporizhya (Dneprovsk) smelter	do.	110,000.
Coal:			
Hard	Donets coal basin with about 225 mines produces more than 90% of Ukraine's coal	Donetskaya, Dnepropetrovskaya, Luhanskaga oblasts	130,000,000.
Do.	L'viv-Volynskiy basin produces remainder from 18 mines	Western Ukraine	6,000,000.
Brown	Dneprovskoye Basin	Central Ukraine	7,000,000.
Dolomite	Novotroitskoye, Severskoye mining administrations	Novotroitskoye deposit, Yamskoye deposit	3,000,000 (total).
Do.	Dokuchayevskiy Flux-dolomite complex	Yelenovskoye and Stylskoye deposits	
Graphite	Zavalyevskiy graphite complex	Zavalyevskiy deposit	80,000.
Iron ore	Underground mining:		
Do.	Krivbassruda production association with 16 mines	Kryvyy Rih Basin	25,000,000.
Do.	Eksplutatsionnaya Mine of the Zaporozhskiy iron ore complex	do.	3,500,000.
Do.	Open pit mining: Yuzhniy, Novokrivorozhskiy, Tsentralnyy, Severnyy, Inguletskiy, Poltavskiy and Kamysh-Burunskiy mining and beneficiation complexes	do.	75,000,000 total.
Magnesium	Zaporizhya plant	Zaporizhya	NA.
Manganese ore, marketable	Ordzhonikidze, Marganets mining and benefication complexes	Nikopol Basin	7,000,000 (total).
Do.	Tavricheskiy mining and beneficiation complex (under development)	Bol'shoy Tokmak Basin	
Ferroalloys	Nikopol ferroalloys plant	Nikopol	250,000 (ferromanganese).
Do.	do.	do.	1,200,000 (silicomanganese).
Do.	do.	do.	3,000,000 (manganese sinter).
Do.	Stakhanov plant	Lugansk	NA (ferrosilicon)
Do.	Zaporizhya plant	Zaporizhya	300,000 (ferrosilicon) 160,000 (silico-manganese; NA (ferrochrome); NA (ferromanganese); 40,000 (manganese metal).
Mercury	Nikitovskiy mining and metallurgical complex	Donets Basin	120.
Nickel	Pobuzhskiy mining and metallurgical complex, comprising of three open pit mines and smelter	Pobuga region	10,000 (ferronickel).
Potash	Khlorvinil production association, Stebnik potash plant	Pricarpathian region	300,000 (K_2O).
Steel, crude	Azovstal plant	Mariupol	7,000,000.
	Dneprovsk plant	Dneprodzerzhinsk	6,000,000.
	Donetsk plant	Donetsk	2,000,000.
	Kommunarsk plant	Kommunarsk	4,500,000.
	Kryvyy Rih plant	Kryvyy Rih	14,000,000.
	Makeyevka plant	Makeyevka	4,000,000.
	Mariupol plant	Mariupol	7,000,000.
	Zaporizhya plant	Zaporizhya	5,000,000.

TABLE 2—Continued

UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity
Sulfur	Sera production association	Rozdol mining complex mines, Rozdol, Soroks, Zhidachev deposits, Yavorov complex mines, Nemirov and Yazov deposits in L'viv oblast	2,000,000 total.
Titanium, ilmenite and zircon-rutile-ilmenite ores	Irshanskiy mining and beneficiation complex, Verkhnedneprovskiy mining and metallurgical complex	Kiev oblast	250,000 total.
Titanium, metal	Zaporizhye plant	Zaporizhye	25,000.
Uranium	Zheltye Vody complex	Northern part of Kryvyy Rih Basin	NA.
Zinc	Ukrzinc plant	Konstantinovka	25,000.

* Estimated. NA Not available.

TABLE 3

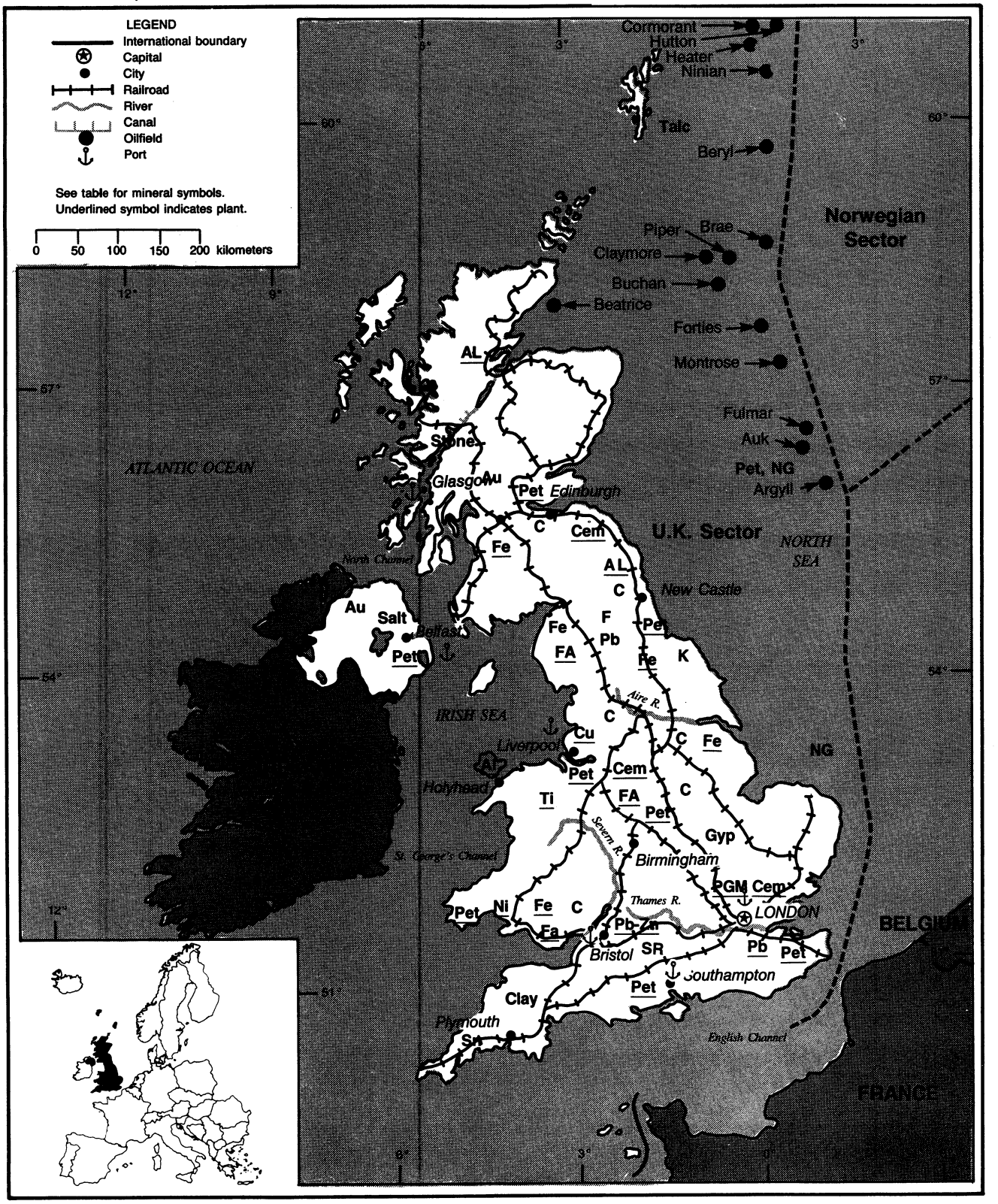
UKRAINE: RESERVES OF MINERAL COMMODITIES FOR 1992

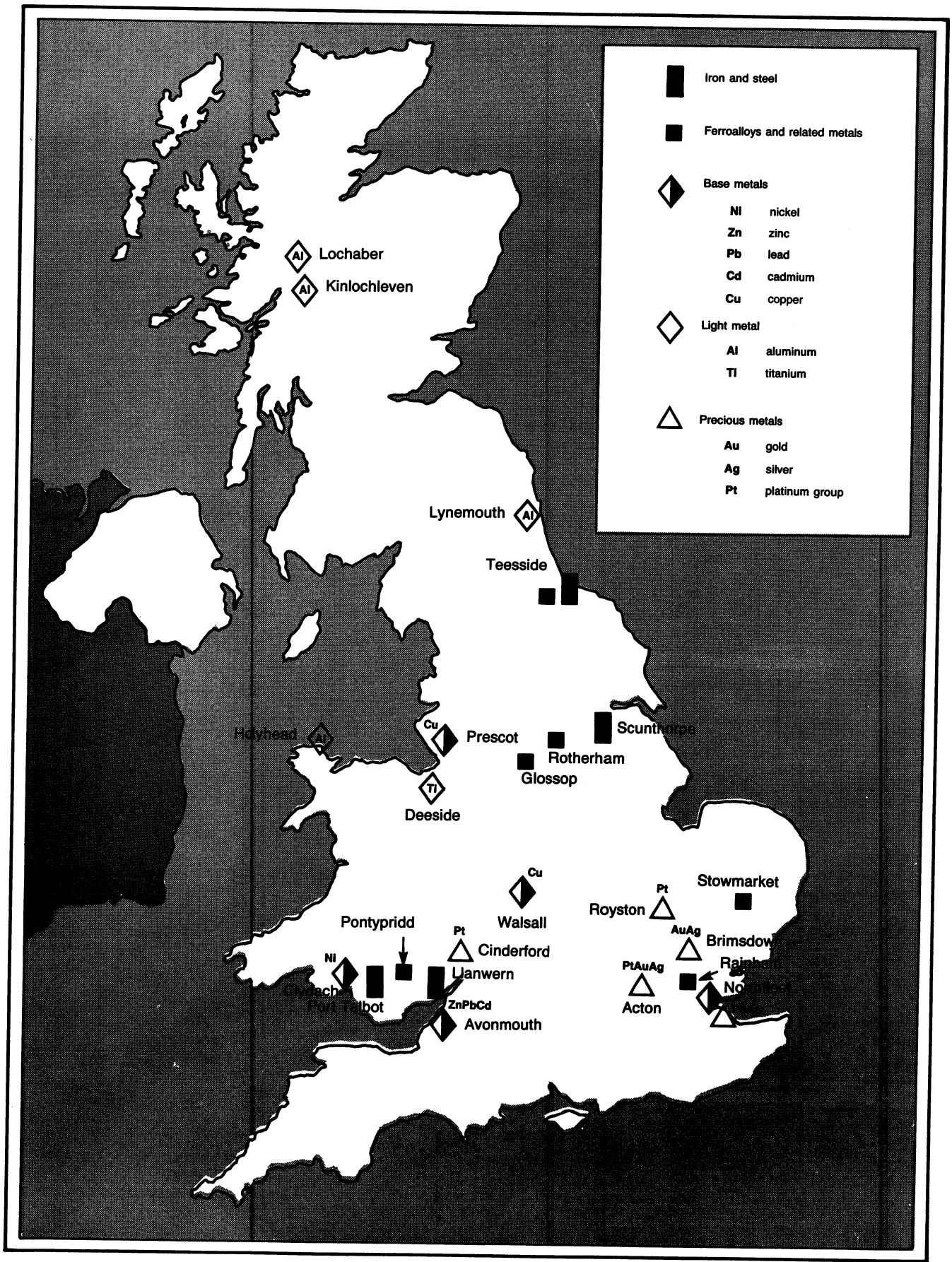
(Thousand metric tons unless otherwise specified)

Commodity	Quantity
Bentonite	112,400
Clays, refractory	492,700
Coal:	
Hard	48,780,000
Brown	3,650,000
Dolomite	439,000
Graphite	96,500
Gypsum	440,700
Iron ore	26,850,000
Kaolin	294,100
Limestone, for fluxing	2,720,000
Manganese ore	2,210,000
Potash	2,800,000

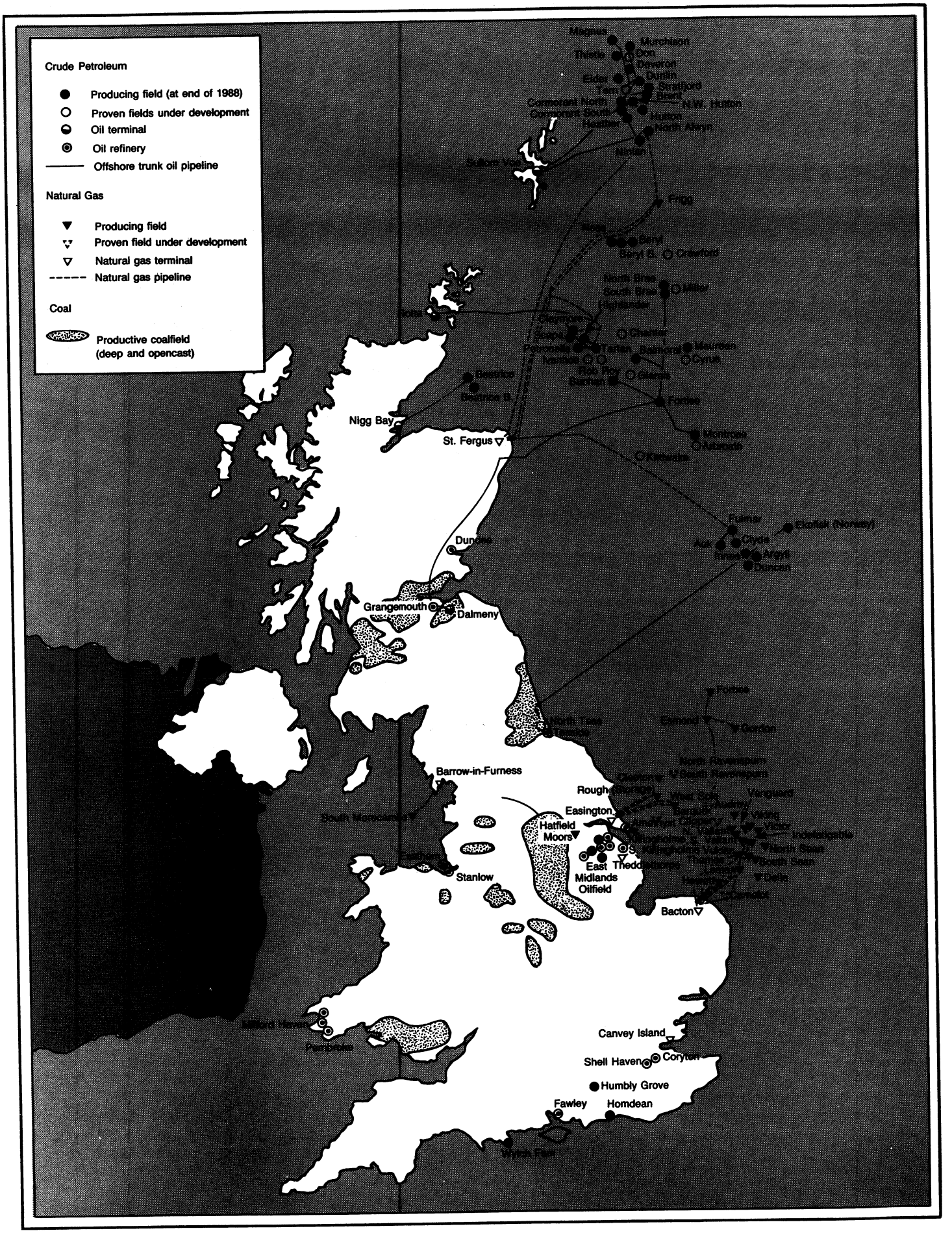
UNITED KINGDOM

AREA 244,820 km² **POPULATION 57.8 million**





Source: British Geologic Survey, United Kingdom Minerals Yearbook 1989



Source: British Geologic Survey, United Kingdom Minerals Yearbook 1989

THE MINERAL INDUSTRY OF

THE UNITED KINGDOM

By Harold R. Newman

As a result of a rather complex geologic history, the United Kingdom has historically been well endowed with mineral resources. Metallic ore deposits were typically small and of relatively high grade. Mining of nonferrous minerals, particularly copper and tin, has been ongoing since the Bronze age. Mine production of nonferrous minerals has been declining over the past 20 years because deposits are being depleted. Although the exploitation of nonferrous minerals has become less significant, the processing of these minerals is the basis of a large and economically important industry. Because most ore bodies have been exhausted, the industry requires imports to satisfy its metallurgical requirements.

The industrial minerals sector has provided a significant base for expanding the extractive industries and, in recent years, provided a shift in balance from the metallic mineral sector. United Kingdom companies have a substantial interest, both domestic and foreign, in the production of industrial minerals such as aggregates, ball clay, china clay (kaolin), and gypsum.

The offshore United Kingdom sector of the North Sea oilfield, now in its 28th year of activity, continues to be a significant player in the international oil and gas sector. As a result, the country has become a base for international oil companies and a major energy supplier to other countries.

Gross domestic product (GDP) growth rate registered a decline of 1.0% in 1992 as the United Kingdom continued to be one of the slowest growing economies among the industrialized nations. The United Kingdom joined the European Exchange Rate Mechanism (EMR) on October 8, 1990, which represented a commitment to attaining low inflation. In September 1992, the Government suspended its participation in the EMR. At yearend 1992, the inflation rate was 4.2% and the unemployment rate was almost 10% of the labor force.

GOVERNMENT POLICIES AND PROGRAMS

The development and working of mineral deposits are subject to laws and regulations dating back to 1948 when the Town and Country Planning Act of 1947 introduced general planning control over the development of land. The current statute is the 1971 Act, as amended, which consolidates all earlier planning legislation and has been amended by various statutes. Mineral development was specifically addressed in the Town and Country Planning (Minerals) Regulations, 1971, and the Town and Country Planning (Minerals) Act, 1981. Minerals are defined in section 209 of the 1971 Act to include all minerals and substances in or under land of a kind ordinarily worked for removal by underground or surface workings, except it does not include peat cut for purposes other than for sale.

Mineral rights to mineral fuels such as coal, petroleum, and uranium belong to the state. British Coal Corp. (BC), a state-owned company, controls almost all the mineral rights to the national coal reserves. However, BC is authorized to license open pit and underground mines to the private sector subject to restrictions on size and the payment of royalty on the amount of coal produced.

Most other mineral rights in Great Britain are privately owned. The exception is gold and silver, the rights to which are vested in the Royal Family and are referred to as Crown Rights. A different situation regarding mineral rights applies to Northern Ireland where, under the Mineral Development Act (Northern Ireland), 1969, the right to work minerals and the right to license others to do so is vested in the state as opposed to private ownership.

Currently, there is no national registry for mineral rights in the United Kingdom except for hydrocarbons. This has created problems and is a matter of concern for the mining industry. Locating current owners of mineral rights on some properties can be a costly and time-consuming process.

After the successful privatization of British Steel PLC, formerly British Steel Corp., the Government was proceeding with privatization plans for BC.

The Coal Industry Act of 1990 was given Royal Assent in March 1990. The act allowed the writeoff of BC's massive debt burden; increased the limitations on licenses for private company open pit coal operations from 25,000 to 250,000 metric tons; and increased the number of personnel permitted to work in private underground coal mines from 30 to 150 workers per mine.

PRODUCTION

The significant event of 1992 was the announcement in October that BC proposed closing 31 of its 50 underground coal mines. Of the 31 mines, 27 would be closed permanently and 4 would be placed on a care-and-maintenance basis. The closure program was postponed pending the outcome of an inquiry by the Department of Trade and Industry (DTI).

BC consists of six underground mining groups and the Opencast Executive,

which is responsible for open pit mining. BC owns most of the coal reserves in the country and licenses and collects royalties from the privately owned mines. Although BC might be considered a poor performer by world standards, the company was certainly the most efficient EC coal producer.

The sluggish economy was reflected in the 1.0% decline in industrial production. The steel sector's operations declined as the downturn in the construction industry depressed the demand for general steels.

Production of tin concentrate decreased as marginal mines were closed. Capper Pass Ltd. closed its tin smelter at Humberside and was tearing down the facility. Capper Pass stated that the difficulty of getting sufficient supplies of concentrates was a key factor in the decision to close the smelter. Open pit coal production continued strongly. In underground coal operations, production decreased as reserves were depleted even though overall productivity increased almost 17%.

Production of crude petroleum increased as redevelopment of the areas effected by the Piper Alpha drilling rig disaster in 1988 and the gas explosion on the Cormorant A drilling platform in 1989 was almost completed. Safety work was continuing and was scheduled to be completed in 1993. Capital investment in the United Kingdom sector of the North Sea increased 5.8% over 1991 to reach an estimated $9 billion.[1] *(See table 1.)*

TRADE

The United Kingdom has shifted from being a net exporter as recently as 1986 to being a net importer in 1991-92. Part of the reason for the weaker export performance has been problems in the United Kingdom sector of the North Sea oilfields. Other contributing factors were adverse currency exchange rates with trading partners and an oil surplus. The United Kingdom foreign trade is dominated by oil.

It was expected that the economy would experience a slow rate of growth and gradually move out of recession. This could cause the demand for imported consumer goods to increase. The trade balance deficit at yearend was nearly $16.7 billion. Table 2 shows the impact of selected classes of mineral commodities on the United Kingdom's balance of payments position in relation to the European Community (EC) and the world. The figures, in thousand dollars, are for 1991, which was the latest year that data were available. *(See tables 2, 3, and 4.)*

STRUCTURE OF THE MINERAL INDUSTRY

The Department of Trade and Industry (DTI) has the responsibility to ensure a continuing supply of minerals for the country's industry. DTI's overview includes all nonenergy, nonconstruction minerals. These include metallic ores and such industrial minerals as barite, china clay (kaolin), fluorspar, high-grade limestone, potash, salt, and silica sand.

The Department of Energy (DOE) was formerly responsible for mineral fuels that include coal, natural gas, and petroleum and also responsible for the issuing of licenses for the exploration, appraisal, and production of natural gas and petroleum.

DOE was absorbed by DTI, which now has responsibility for the former DOE functions. A new Metals and Minerals Branch was formed to oversee these activities.

The Department of the Environment is responsible for minerals used in the construction industry. These include aggregates, brick and brick clay, cement and its raw material, dimension stone, gypsum for plaster, and sand and gravel. Both state and privately owned corporations produce minerals and mineral-based products. State ownership is mostly in the mineral fuels and nuclear power industry.

In 1992, direct employment in the mineral industry, including quarrying, was about 100,000 workers. *(See table 5.)*

COMMODITY REVIEW

Metals

Aluminum.—There are four primary aluminum smelters in the United Kingdom. Three of these are owned and operated by British Alcan Aluminium Ltd. The fourth smelter, operated by Anglesey Aluminium Ltd., is 51% owned by RTZ Corp. Ltd. and 49% owned by Kaiser Aluminum and Chemical Corp. These smelters produce about 60% of domestic requirements for aluminum metal. The remaining 40% is imported from various countries, mainly Norway. All of the aluminum smelters depend on imported alumina for feedstock.

British Alcan shut down one of the two 66,000-mt/a potlines in its smelter at Lynemouth. The company stated this was in response to the world oversupply of primary aluminum. This shutdown reportedly represented a 8.5% reduction in Alcan's primary aluminum production worldwide.

The secondary aluminum metal industry in the country treats recycled aluminum and low-grade aluminum scrap such as swarf. The main consuming sector for secondary aluminum ingot is the automotive industry.

Cookson Aluminium PLC completed construction of its new secondary aluminum smelter at Repton near Derby. The new smelter will replace the original plant, which has been torn down. The smelter was reported to have a design capacity of 30,000 mt/a of secondary ingot.

The company had estimated the new facility would reduce their production costs by one-third and meet the new United Kingdom environmental regulations. The smelter will have a flux-free process and use electric furnaces to produce a salt-free dross. This eliminates the problem of disposing of salt-containing residues in landfills.

Copper.—Anglesey Mining PLC reportedly placed the development of its polymetallic mine on Parys Mountain at Anglesey, North Wales "on hold"

pending an upturn in metal prices. A mine development plan to produce 1,000 mt/d has been prepared for the shaft development area, which was reported to contain about 2.3 Mmt of the estimated 6 Mmt reserves.

The ore in this area was reported to grade 1.43% copper, 3.43% lead, 6.72% zinc, 78 g/mt silver, and 0.66 g/mt gold and was expected to provide material for the first 7 years of mining. Separate copper, lead, and zinc concentrates would be produced by the proposed dense media processing plant.

Gold.—Activities in gold exploration and development in the United Kingdom decreased in 1992. Northern Ireland, Scotland, and Wales continued as the three main areas of concentration by companies. Scotland was the most active area with 10 exploration licenses in effect.

Ennex International PLC's Cononish project near Tyndrum, about 96 km north of Glasgow, Scotland, was on a care-and-maintenance program pending an increase in the price of gold. However, the company was continuing a drilling program to locate addition ore zones at depth and to the west of the project. The company was seeking to expand minable reserves to a minimum of 7 years of mine life from the current estimated 4 years.

Ennex has filed a planning application that specified an underground mine, supported by surface facilities, and producing about 500 mt/d using both shrinkage and blasthole mining methods. Initial access would be by a 1,000-m adit. Gold would be recovered both in concentrate and doré. Capital cost was estimated to be $20 million with a construction time of 1 year after approval of the planning application.

Iron and Steel.—Production of iron ore was limited to a small amount of hematite ore mined by Egremont Mining Co. at the Florence Mine in Cumbria. Production of Jurassic ironstone ceased during 1992. Primary steel production was based on imported iron ore.

British Steel PLC's (BS) integrated steelworks were producing about 20% less than planned levels. BS reported this was because of weakening steel demand and stiff competition in international markets where a sizable percentage of its products are sold. The Central Statistics Office reported that steel consumption in the United Kingdom fell by 13.4% to 12.2 Mmt of finished products. Factors contributing to the drop in consumption was a decline in automotive and construction activity.

There are other factors that could cause BS problems in the future. The U.S. Commerce Department imposed a preliminary dumping duty of 71.84% on rail imports from BS. If this duty is upheld it would seriously affect the export of rails by BS to the United States. This business amounts to about 1% of BS's general steels division's total sales.

Also, if BC does close a majority of its collieries as it was announced then this would cause a decrease in consumption of steel in the United Kingdom mining sector. This market represents about 1.5% of the total apparent consumption of finished steel in the country, and the restructuring of the coal mining industry would significantly reduce domestic steel purchases.

BS was reportedly in negotiations with PT Gunawan Dianjaya of Malayasia to buy its idled Ravenscraig steel facility in Scotland. The Ravenscraig plant was closed in mid-1992. Gunawan had expressed interest in relocating the plant to Kemaman on the Malayan peninsula next to the company's Perwaja steel plant.

A feasibility study was reportedly under way to relocate the blast furnaces, melt shop, slab casters, and hot-strip mill to Kemaman. The company was said to be seeking partners, both domestic and foreign, to participate in the project.

Tin.—The continued low price for tin in the world market continued to cause rationalization in the industry. Carnon Consolidated Ltd.'s Wheal Jane Mine, near Truro, was shut down in early 1991. The pumps were turned off, and the mine was being allowed to flood. The area around the mine was being considered for development as a recreational park. The mill at Wheal Jane was continuing operations to treat ore from Carnon's South Crofty Mine near Camborne.

South Crofty produces about 2,000 mt/a of concentrate and sends it to the Wheal Jane mill, which produces a 58% grade of tin concentrate. The concentrate is then shipped to Malaysia for treatment.

Capper Pass Ltd.'s tin smelter at North Ferriby, Humberside, closed in early 1991, and the company was in the process of demolishing the smelter. Capper Pass had established itself in the market by producing high-grade tin from low-grade material. The company also processed complex residues. Although Capper Pass was primarily a tin smelter, several other metals were produced, including antimony, bismuth, cadmium, copper, indium, gold, and silver. The closure leaves Billiton's smelter in the Netherlands as the only plant in Europe capable of treating low-grade tin concentrates.

Industrial Minerals

Aggregates.—The United Kingdom, with production of about 22 Mmt/a, is the second largest marine aggregate producer in the world after Japan. The two countries collectively produce from 100 Mmt/a to 120 Mmt/a of marine aggregate, which represents approximately 85% of global output. Marine aggregate production amounts to about 10% of total production in the United Kingdom.

The marine aggregates are derived from six main areas—Humber, east coast, Thames estuary, south coast, Bristol Channel, and Liverpool Bay. Production is derived almost entirely from six companies operating a total of 50 dredges. Marine aggregates play a major role in the supply of material to southern England where there is a lack of crushed aggregate.

Bardon Group PLC and Evered PLC merged to form a new company, Evered Bardon PLC. The merger resulted in a new, enlarged quarrying operation and placed the new company as one of the largest aggregate producers in the United

Kingdom. Barton, a United Kingdom based company, has operations in the United States that include five quarries in the Massachusetts area.

Cement.—Castle Cement Ltd. was continuing with construction of a cement terminal at West Thurrock on the Thames River. The cement terminal will be the largest of its kind in Europe with a design capability to handle vessels of up to 30,000 dwt and will have a total storage capacity of 40,000 tons. Throughput capacity would be 500,000 mt/a with the potential to double this capacity.

Clays.—The United Kingdom is the leading world producer and exporter of ball clay. Also, it is the world's largest exporter and second largest producer, after the United States, of kaolin (china clay). Watts Blake Bearne & Co. PLC (WBB) is the largest producer of ball clay. English China Clays PLC (ECC) is the largest producer of kaolin in the United Kingdom and one of the major producers worldwide.

All mining of ball clay is carried out in Dorset and Devon Counties in the southwest area of the United Kingdom. WBB Devon Clays Ltd. is responsible for the ball clay operations of WBB. The division operates seven open pit mines and three underground mines, which have a total combined output of 450,000 mt/a of crude ball clay.

ECC Ball Clays Ltd. is responsible for the ball clay operations of ECC. The division operates five quarries, three underground mines, and two open pit mines with a combined output of 450,000 mt/a of crude ball clay. Seventy percent of the output is exported.

ECC completed its rationalization and restructuring activities and was focusing its efforts on industrial minerals and construction materials with the main emphasis on ball clay, kaolin, and aggregates. ECC operates twenty open pit kaolin mines, eighteen of which are in Cornwall.

ECC International Ltd. operates three underground mines and five quarries in the Wareham Basin in Dorset; four quarries and one underground mine in the Bovey Basin in south Devon; and three open pit mines in the Petrockstowe Basin in north Devon. Total production is about 350,000 mt/a. Sixty-five percent of this production is from the Bovey Basin.

Laporte Absorbents PLC was proceeding with the construction of a $32 million fuller's earth processing plant at Widnes, Cheshire. The plant, with a capacity of 200,000 mt/a, was scheduled for completion in 1993 and would produce an activated earth natural material and absorbent granules. The clay feedstock would come from Laporte's quarries in the United Kingdom and Spain.

Fluorspar.—Fluorspar mining is concentrated in Derbyshire from the Southern Pennine Orefield, and the major producer is Laporte Minerals PLC. Laporte operates two underground mines and one open pit mine. The new Milldam Mine came on-stream in early 1992. The company was expecting the mine to produce 85,000 mt/a of ore grading 45% to 50% CaF_2. The ore is processed at Laporte's Cavendish Mill near Sheffield.

Other producers included Deepwood Mining Co. Ltd. and Horace Taylor (Minerals) Ltd. A new company, Swan Industrial Minerals Ltd., acquired the mineral rights to these companies in late 1992. The company was reportedly planning to develop underground operations in addition to the existing open pit operations.

Gypsum.—British Gypsum, the subsidiary of BPB Industries PLC, is the major producer of gypsum in the United Kingdom. The company has mines in Cumbria, Leicestershire, Nottinghampshire, Staffordshire, and Sussex that produce about 3 Mmt/a of gypsum. With few exceptions, all of this material goes to supply the domestic market.

British Gypsum had almost completed its $187 million capital investment program. This included a new mine and a 600,000 mt/a plant at Barrow upon Soar and refurbishing plants at Robertsbridge and Kirkby Thore.

Potash.—Cleveland Potash Ltd. (CPL) operates the Boulby Mine in Yorkshire and was the only potash producer in the United Kingdom. The company also mines rock salt, as a coproduct, from an underlying seam in the Boulby Mine. CPL was continuing with construction of a hot-leach filtration plant, a new compactor, and additional screening facilities, and a $10 million capital investment program to improve recovery at the Boulby Mine.

Salt.—Imperial Chemical Industries PLC (ICI) is the largest salt producer in the United Kingdom. ICI operates the Winsford Mine in Cheshire, which is one of the largest underground mines in the United Kingdom. Rock salt is mined at the Winsford Mine, which has a capacity to produce 2 Mmt/a. ICI also produces vacuum salt at its Weston Point facility, which is the world's largest single-stream vacuum evaporation operation with a capacity of 1.1 Mmt/a. Brine salt is produced at the Holford, Preesal, and Saltholme facilities for the internal manufacture of chorine, caustic soda, and synthetic soda ash.

British Salt Ltd. is the major white salt producer. The company produces salt, from solution mining, at the Warmington brine field. This is processed at its Middlewich plant, which has a capacity of 825,000 mt/a of undried vacuum and pure dried vacuum salt.

Irish Salt Mining & Exploration Co. Ltd. produces rock salt from an underground mine at Kilroot, in Northern Ireland, which has a capacity of 300,000 mt/a. The company is an important producer of deicing salt.

Sand and Gravel.—TMC Pioneer Aggregates Ltd., a joint-venture operation between Pioneer Aggregates (UK) Ltd. and TMC, was continuing developing of what was expected to be the largest sand and gravel operation in the United Kingdom. Production was planned to be between 1 Mmt/a and 2 Mmt/a. The quarry is at Boreham, Essex, and covers

480 ha with estimated reserves of 34 Mmt. Pioneer Aggregates (UK) Ltd. owns 26 quarries in the United Kingdom.

Slate.—Most of the slate mining activities in the United Kingdom is in north Wales. There are also some mining operations in Cornwall and the Lake District. Penrhyn Quarries Ltd. is near Bangor, north Wales, and is the largest operation, producing about 25,000 mt/a of roof slate. The quarry, 2,415 m by 805 m excavated down to sea level,was considered to be the world's largest quarry. Penrhyn produces more than one-half of the total United Kingdom production of roofing slate. The company exports about two-thirds of its production.

Talc.—Alexander Sandison & Sons Ltd. continued to be the only producer of talc in the United Kingdom. Sandison produces from 12,000 to 14,000 mt/a of low-grade talc, containing up to 50% magnesium oxide, from an open pit operation at Crossgoe in the Shetland Islands. The ore is processed by Fordamin Co. Ltd. at its plants at Yate and Stockton. The ore is ground to 300 mesh and is used in fertilizers, ceramics, and general fillers.

Shetlands Talc Ltd., a joint venture between Anglo European Minerals Ltd. and Dalraida Mineral Ventures Ltd. was granted planning permission to exploit a talc-magnesite deposit at Cunningsburgh, Shetland Islands. The company reported that drilling had indicated an estimated 1.2 Mmt of reserves of 95% talc content material with a brightness of 80% to 85%.

The company was proceeding with flotation testing of bulk samples and assessing the market potential for its products. An output of 50,000 mt/a was expected when the mine becomes fully operational.

Mineral Fuels

Coal.—At the end of 1992, there were 50 underground mines operated by BC. This represented a reduction of 15 from the previous year. Privately owned licensed underground mines numbered 142. Also, there were 58 open pit mines operated by 20 different contractors. Fifteen open pit mines ceased production and 12 production contracts for new open pit mines were negotiated.

Since the coal strike of 1984-85, BC has made remarkable progress in improving its competitiveness. Operating costs have been reduced by one-third, and output has risen to more than 5 mt/worker-shift. The total work force has been reduced to about 65,000 from almost 300,000 in 1980. Overall productivity in BC's mines was 13% higher in 1992 compared to that of 1991. Although productivity has shown an impressive rise, total production has been declining since 1983.

All the mines of the Shelby Complex are now in full production. The five separate mines are North Selby, Riccall, Stillingfleet, Whitemoor, and Wistow. Each of the five mines, with total production targeted at more than 11 Mmt, sends its output through two spine tunnels to a drift outside the extraction area. This was the largest such project in Europe. The Wistow Colliery was the first colliery in Europe to mine more than 100,000 tons of coal in a workweek. The record output of 101,203 tons was achieved in five working days.

In the later part of 1992, BC announced that it would close 31 of the 50 remaining underground mines by March 1993 with 6 of the mines to be closed immediately. Of the 31 scheduled for closure, 27 would be closed permanently and 4 would be placed on a care-and-maintenance basis.

Because of public and parliamentary reaction to BC's plan, official approval was withheld until the DTI completed a review of the closure program and the country's long-term energy requirements. At the end of 1992 the Government's position was that 10 mines would be closed. The future of the remaining 21 mines would be determined when a viability study was completed by John T. Boyd Co., an international mining consulting firm based in the United States. The issue was not expected to be resolved until late 1993.

BC negotiated a 5-year contract to supply coal to the newly formed electric utilities, National Power and PowerGen. BC would supply 40 Mmt/a of coal for the first 2 years and for the remaining 3 years 30 Mmt/a would be supplied. The electricity industry accounts for 84% of BC's total sales. Coal contributes about 30% toward primary energy consumption.

British Coal Opencast (BCO)'s new Stobswood Mine in Norththumberland became fully operational in early 1992. Crouch Mining Ltd. is the contractor operating the open pit mine for BCO. The Stobswood Mine is a replacement for BCO's nearby Butterwell Mine, which ceased operations at yearend 1991.

The mine was expected to produce about 12 Mmt/a over a 15-year period. The coal will be mined from about 28 seams that vary in thickness from 0.13 m to 1.29 m. The overburden to coal ratio is 20:1.

Natural Gas.—At yearend 1991, there were 46 offshore and 1 onshore gasfields in production. One new field came into production. Onshore production includes a small amount of colliery methane. The decrease in production in 1992 was due largely to the mild winter.

British Gas reached an agreement with the Office of Fair Trade of the Monopolies and Mergers Commission on measures to stimulate more competition in the industrial and commercial natural gas market. British Gas will reduce its share of the contract market from the current 90% to 40% by the end of 1995. A company called BP Gas Marketing was expected to handle most of the contract market that British Gas was relinquishing.

In mid-1992, the United Kingdom and the Netherlands signed a treaty authorizing the first exports of United Kingdom natural gas to Europe. The gas will be piped from the Markham Field in the United Kingdom sector of the North Sea to Den Helder, Netherlands, and distributed to customers in Germany and the Netherlands. The Markham Field has estimated reserves of 19.8 billion cubic meters of natural gas.

Petroleum.—There were 107 offshore exploration and 79 appraisal wells drilled in 1991, the latest year data were available. This was the third highest level of drilling activity since exploration began in 1964. There was a reduction in exploration activity in 1992 as a result of the lowest oil prices in 20 years.

Hamilton Petroleum Ltd. shut down its Argyll and Ducan Fields in late 1992 stating that the production levels were uneconomic to support the operations. The Argyll Field, which started production in June 1975, was the first petroleum producer on the United Kingdom Continental Shelf. The Argyll and Duncan Fields together have produced 97 Mbbl.

The United Kingdom has an onshore producing oilfield. The Wytch Farm Field in Dorset contains estimated reserves of 400 Mbbl. Exploration and drilling by BP confirmed that the field extends offshore under Poole Bay. The extent and amount of additional reserves had not been reported at yearend.

INFRASTRUCTURE

Rail and trucking transportation is well developed and excellent. The state-owned British Railways (BR) operates a 16,629-km, 1.435-m standard-gauge system with 4,205 km of electrified and 12,591 km of double or multiple track. There are additional standard and narrow-gauge lines that are privately owned and operated. Northern Ireland Railways (NIR) operates a 332-km, 1.600-m-gauge system with 190 km of double track.

All three major steel-producing areas are on or near tidewater. Petroleum refineries are likewise on the coast. The major cargo ports are Bristol, Liverpool, London, and Southhampton in England; Glasgow in Scotland; Cardiff and Milford Haven in Wales; and Belfast in Northern Ireland.

Transportation, not only in the United Kingdom but also in the whole of Europe, will change significantly with the completion of the Channel Tunnel. The tunnel, referred to as the "Chunnel," is being constructed underneath the English Channel and will connect Folkestone, England, and Coquelles, near Calais, France. From these terminals, people will drive their cars and trucks onto trains that will transport them 49 km to each respective side in about one-half hour. Everything transported through the tunnel will move by rail.

The system consists of three tunnels: one running north, one running south, and a service tunnel with connections between the two main tunnels. The tunnel system, which has 38 km under water, is the longest undersea tunnel ever built. It is also the largest privately financed construction project in history with an estimated cost of $16 billion. Completion of the two railway tunnels was estimated for June 1993, at which time service between Folkestone, United Kingdom, and Calais, France, will begin. The Channel Tunnel linking the two countries was expected to be a vital component of the European single market concept when the EC becomes one marketplace of 320 million people.

OUTLOOK

The United Kingdom is a significant player in the world mining and mineral processing industries. This is more the result of an extensive range of organizations in the country, with various interests in the mineral industry internationally, rather than production from the domestic industry. This is expected to continue.

Exploration is also expected to continue both onshore and offshore. Onshore exploration activities will be mainly directed toward precious metals. Offshore exploration interest will continue to be focused on North Sea areas, particularly east of the Shetland Islands and in the southern North Sea, which have been the most prolific areas in the past.

There will be further efforts to raise the level of environmental management and to maximize the best use of natural resources, including use of recycled materials and alternate sources of energy.

[1]Where necessary, values have been converted from pounds sterling (£) to U.S. dollars at the rate of (£)1.00=US$1.65, the average rate during 1992.

OTHER SOURCES OF INFORMATION

Agencies

British Geologic Survey
Keyworth, Nottingham NG125GG
Central Statistics Office
Great George Street
London, SW1P 3AQ
United Kingdom
Department of Economic Development
(Northern Ireland)
Belfast BT1 3AJ
Northern Ireland
Department of Energy
1 Palace Street
London SW1E 5HE
United Kingdom
Department of Environment
2 Marsham Street
London SW1P 3EB
United Kingdom
Department of Trade and Industry
123 Victoria Street
London SW1E 6RB
United Kingdom

Publications

British Geologic Survey, Keyworth: United Kingdom Mineral Yearbook, annual.
Central Statistics Office, London: Annual Abstracts of Statistics, annual.
Monthly Digest of Statistics, monthly.
CSO Minerals, annual.
Department of Energy, London: Digest of United Kingdom Energy Statistics, quarterly.
Energy Trends, monthly.
Department of Trade and Industry, London: Overseas Trade Statistics of the United Kingdom, annual.
World Bureau of Metal Statistics, London: World Metal Statistics, monthly.
Annual Reports of various companies.

TABLE 1

UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
METALS						
Aluminum:						
Alumina from imported bauxite		114,600	116,200	e115,000	e110,000	100,000
Metal:						
Primary		300,166	297,313	293,678	r293,512	280,000
Secondary		105,764	109,695	120,854	e120,000	120,000
Cadmium: Metal including secondary		399	395	r438	r449	400
Copper:						
Ore and concentrate, Cu content		732	508	r955	r294	—
Metal, refined:						
Primary		49,258	48,643	46,991	r16,606	210,363
Secondary		74,700	70,390	74,643	r53,454	231,704
Total		123,958	119,033	121,634	r70,060	242,067
Iron and steel:						
Iron ore:						
Gross weight		224,100	34,297	r55,000	r59,400	25,000
Fe content		49,302	e8,000	r12,100	r12,580	25,250
Metal:						
Pig iron	thousand tons	13,056	12,638	12,277	r11,883	211,351
Ferroalloys, blast-furnace:						
Ferromanganese	do.	107	143	r144	r178	160
Steel, crude	do.	18,950	18,813	17,908	r16,474	216,050
Rolled products	do.	e20,909	15,165	14,502	r19,542	213,972
Lead:						
Mine output, Pb content		1,185	r2,161	r1,377	r1,020	500
Metal:						
Smelter:						
Bullion from imported concentrate		34,901	34,523	42,728	r40,304	242,164
Secondary (refined)e [3]		201,600	200,000	2113,172	110,000	100,000
Totale		236,501	234,523	2155,900	r150,304	142,164
Refined:						
Primary[4]		172,213	156,983	r155,873	r164,338	2198,805
Secondary[3]		201,632	e193,500	r173,505	r146,676	2147,990
Total		373,845	e350,483	r329,378	r311,014	2346,795
Magnesium metal, secondary including alloyse		1,200	1,000	900	800	800
Nickel metal, refinede [5]		27,700	26,100	26,800	r29,030	28,000
Silver: Mine output, Ag content	kilograms	2,113	1,689	e1,500	r565	—
Tin:						
Mine output, Sn content		3,454	3,846	r3,400	r2,326	1,000
Metal:						
Primary		9,014	3,584	e6,100	r1,661	—
Secondary (refined)		7,757	7,184	e5,900	r3,575	2100
Zinc:						
Ore and concentrate, Zn content		5,502	5,771	r6,673	r1,078	—
Metal, smelter		76,028	79,773	93,309	r100,651	296,813

See footnotes at end of table.

TABLE 1—Continued

UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992[e]
INDUSTRIAL MINERALS						
Barite[6]		76,253	70,026	r67,551	r85,505	82,000
Bromine		27,128	29,907	e28,000	r29,328	28,000
Cement, hydraulic	thousand tons	16,500	e15,000	e14,000	r12,700	12,000
Clays:						
Fire clay	do.	e1,060	r1,052	r892	r867	800
Fuller's earth[7]	do.	213	e210	204	r189	190
Kaolin (China clay)	do.	3,278	e3,140	3,037	r2,911	2,450
Ball clay and pottery clay[e]	do.	716	780	820	r 2729	740
Other, including shale	do.	18,899	e18,500	e17,000	r13,038	12,000
Diatomite[e]		320	270	240	r 2220	220
Feldspar (china stone)		6,267	6,470	e6,500	r6,417	8,000
Fluorspar, all grades[8]		103,800	122,057	r118,498	r77,903	285,000
Gypsum and anhydrite[e]	thousand tons	3,700	4,000	4,000	r 23,500	3,000
Lime: Quicklime and hydrated[e]	do.	2,800	2,800	2,800	2,800	2,500
Nitrogen: N content of ammonia	do.	1,105	1,037	1,148	r1,011	2869
Potash, K_2O equivalent		459,900	462,000	488,000	r462,000	490,000
Salt:						
Rock	thousand tons	877	r1,148	r1,102	r1,635	1,500
From brine	do.	1,426	r1,344	r1,341	r1,319	1,200
In brine, sold or used as such	do.	3,827	r4,228	r3,991	r3,874	3,600
Sand and gravel:						
Common sand and gravel	do.	136,404	e135,000	e122,000	r106,363	91,000
Industrial sand[e]	do.	4,300	4,500	4,300	r 23,900	3,600
Sodium compounds, n.e.s.: Carbonate, synthetic[e]	do.	1,000	1,000	1,000	1,000	1,000
Stone:						
Crushed:						
Calcite	do.	23	e17	e19	r8	10
Chalk	do.	14,516	r13,877	r13,129	r10,317	10,000
Chert and flint	do.	e11	e12	r14	r5	—
Dolomite	do.	r19,861	r21,271	r20,674	r19,454	19,500
Igneous rock	do.	51,959	r54,490	r57,395	r53,821	54,000
Limestone	do.	105,816	r111,393	r102,641	r93,431	95,000
Sandstone including ganister	do.	18,901	19,593	r18,042	r16,607	16,500
Slate including fill	do.	r708	590	r359	r293	500
Total[e]	do.	r211,795	r221,243	r212,273	r 2193,936	195,510
Dimension:[e]						
Igneous	do.	128	100	100	r 2127	100
Limestone	do.	233	200	200	r 2243	200
Sandstone	do.	183	200	200	200	200
Slate	do.	40	50	50	r 267	60
Strontium minerals		25,553	20,885	24,734	r e2,000	1,000
Sulfur, byproduct:[e]						
Of metallurgy		55,000	52,000	50,000	45,000	40,000
Of petroleum refining		2129,000	130,000	125,000	120,000	125,000
Total		184,000	182,000	175,000	165,000	165,000

See footnotes at end of table.

TABLE 1—Continued

UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1988	1989	1990	1991	1992e
INDUSTRIAL MINERALS—Continued						
Talc, soapstone, pyrophyllite		14,182	15,413	14,781	r10,818	10,000
Titaniae [9]		230,000	225,000	225,000	200,000	150,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	thousand tons	1,827	1,800	e1,900	r1,864	1,500
Bituminous including slurries, fines, etc.	do.	101,964	101,135	94,397	r94,280	85,700
Lignite	do.	e18	16	18	r3	2
Total	do.	e103,809	102,951	96,315	r96,147	87,202
Coke:						
Metallurgical		e7,610	7,572	r6,454	r7,011	6,500
Breeze, all typese		277	200	200	r 2152	150
Fuel briquets, all gradese		1,464	1,500	1,500	r 21,198	1,000
Gas, natural:						
Marketable[10]	million cubic meters	45,729	44,711	50,600	r69,300	64,140
Marketed[11]	do.	41,761	41,228	45,771	r55,330	50,226
Natural gas liquids[12]	thousand 42-gallon barrels	58,035	51,086	41,830	r51,353	58,340
Petroleum:						
Crude[13]	do.	820,515	655,530	r687,015	r684,420	706,500
Refinery products:						
Liquefied petroleum gases	do.	19,129	19,221	18,792	r19,302	18,200
Naphtha including white spirit	do.	16,728	15,359	16,209	21,376	25,840
Gasoline	do.	224,477	231,515	227,154	236,241	237,830
Jet fuel	do.	53,800	e56,800	60,328	56,296	61,450
Kerosene	do.	17,740	18,480	17,895	18,957	19,000
Distillate fuel oil	do.	178,480	173,706	174,594	194,385	191,350
Residual fuel oil	do.	83,217	82,477	87,359	87,945	82,500
Lubricants	do.	6,790	e7,350	6,832	6,811	8,140
Bitumen	do.	13,908	14,501	14,871	13,950	14,150
Petroleum coke e	do.	2,976	r3,102	3,225	r3,102	3,000
Petroleum waxe	do.	496	425	315	r291	300
Unspecifiede	do.	23,563	3,570	3,985	r4,340	3,300
Refinery fuel and losses	do.	47,626	36,825	r44,842	r45,675	42,500
Total e	do.	668,930	r663,331	r676,401	r708,671	707,560

eEstimated. rRevised.

[1]Includes data available through Apr. 1993.

[2]Reported figure.

[3]Includes a small quantity of primary lead from domestic concentrate.

[4]Produced entirely from imported bullion and includes the lead content of alloys.

[5]Refined nickel and nickel content of ferronickel.

[6]Includes witherite.

[7]Salable product.

[8]Proportions of grades not available; probably about two-thirds acid grade.

[9]Sales.

[10]Methane, excluding gas flared or reinjected.

[11]Marketable methane, excluding that used for drilling, production, and pumping operations.

[12]Includes ethane, propane, butane, and condensates.

[13]Excludes gases and condensates.

TABLE 2

UNITED KINGDOM: 1991 BALANCE OF PAYMENTS, SELECTED MINERAL COMMODITIES[1]

(Thousand dollars)

Mineral commodity	Exports European Community	Imports European Community	Net gain or (loss)	Exports to the world	Imports from the world	Net gain or (loss)
Crude industrial minerals:						
Feldspar	75	—	75	183	—	183
Magnesite	686	2,923	(2,237)	762	5,769	(5,007)
Slate	1,554	355	1,199	1,992	3,177	(1,185)
Other	334,146	274,076	60,070	642,776	495,971	146,805
Total	336,461	277,354	59,107	645,713	504,917	140,796
Metalliferous ores:						
Copper	580	296	284	1,124	321	803
Lead	108	—	108	112	—	112
Tin	60	378	(318)	3,969	3,188	781
Zinc	660	613	47	697	59,098	(58,401)
Other (including waste and scrap)	522,139	359,019	163,120	924,863	2,115,103	(1,190,240)
Total	523,547	360,306	163,241	930,765	2,177,710	(1,246,945)
Nonmetallic mineral manufactures	98,996	278,724	(179,728)	166,017	392,656	(226,639)
Metals:						
Iron and steel	3,130,328	3,496,595	(366,267)	5,320,637	4,628,951	691,686
Mercury	278	297	(19)	465	329	136
Other nonferrous metals	1,948,425	1,912,561	35,864	3,487,927	4,515,888	(1,027,961)
Total	5,079,031	5,409,453	(330,422)	8,809,029	9,145,168	(336,139)
Mineral fuels	8,774,057	3,012,179	5,761,878	12,623,934	13,392,520	(768,586)

[1]Table prepared by Harold Willis, Section of International Data.

TABLE 3

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	145	108	—	France 41; Ireland 31; Denmark 21.
Alkaline-earth metals	50	NA		
Aluminum:				
Ore and concentrate	1,402	2,123	—	Sweden 893; France 735; Italy 280.
Oxides and hydroxides	53,840	11,035	624	France 2,414; Netherlands 1,865; Republic of South Africa 1,231.
Ash and residue containing aluminum	793	NA		
Metal including alloys:				
Scrap	94,452	80,172	1,121	Japan 13,360; France 13,340; Germany 12,480.
Unwrought	156,600	130,327	1,246	Germany 48,101; Japan 15,109; Belgium-Luxembourg 11,378.

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
METALS—Continued				
Aluminum—Continued:				
Semimanufactures	185,581	222,642	7,952	Italy 44,703; Germany 42,272; France 28,658.
Antimony: Metal including alloys, all forms	115	274	(2)	Germany 87; Australia 70; Italy 47.
Arsenic: Metal including alloys, all forms	92	NA		
Beryllium:				
Oxides and hydroxides	2	NA		
Metal including alloys, all forms	11	41	(2)	Republic of Korea 19; Italy 12; France 8.
Bismuth: Metal including alloys, all forms	598	475	74	France 86; Netherlands 70.
Cadmium: Metal including alloys, all forms	621	67	22	Sweden 23; France 12.
Chromium:				
Ore and concentrate	36	75	—	Denmark 48; Libya 20; Sweden 5.
Metal including alloys, all forms	3,301	3,790	1,847	Germany 554; Japan 208.
Cobalt:				
Ore and concentrate	22	1	—	All to Netherlands.
Oxides and hydroxides	1,413	1,733	230	Belgium-Luxembourg 418; France 217.
Ash and residue containing cobalt	9	NA		
Metal including alloys, all forms	1,385	940	152	France 271; Netherlands 83.
Columbium and tantalum:				
Ore and concentrate	3	NA		
Metal including alloys, all forms:				
Columbium (niobium)[3]	3	NA		
Tantalum	38	23	(2)	Germany 18; Czechoslovakia 3; Finland 1.
Copper:				
Ore and concentrate	5,138	2,041	—	Canada 1,800; Germany 90; Netherlands 71.
Matte and speiss including cement copper value, thousands	$7	$16	—	Netherlands $5; Ireland $4; Switzerland $3.
Oxides and hydroxides	761	NA		
Sulfate	870	NA		
Ash and residue containing copper	2,942	NA		
Metal including alloys:				
Scrap	111,208	126,403	822	Belgium-Luxembourg 30,355; Germany 26,468; Italy 20,412.
Unwrought	32,651	38,078	406	Germany 8,522; France 8,069; Italy 7,355.
Semimanufactures	121,018	127,052	3,900	Germany 25,204; France 14,433; Ireland 13,740.
Germanium:				
Oxides and hydroxides	4	NA		
Metal including alloys, all forms	6	22	5	Germany 11; Hong Kong 6.
Gold:				
Waste and sweepings value, thousands	$11,069	NA		
Metal including alloys, unwrought and partly wrought kilograms	828,425	NA		
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite	2,442	2,070	231	Germany 838; Netherlands 628.
Pyrite, roasted	2	48	—	All to Netherlands.

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued:					
Metal:					
Scrap	thousand tons	3,198	3,215	1	Spain 1,258; Turkey 414; Malaysia 301.
Pig iron, cast iron, related materials		79,801	72,757	599	Belgium-Luxembourg 16,627; France 15,998; Germany
Ferroalloys:					
Ferrochromium		776	1,607	26	Japan 588; Iran 331; France 95.
Ferromanganese		41,389	70,994	15,187	Belgium-Luxembourg 25,698; Italy 8,117.
Ferromolybdenum		5,282	NA		
Ferronickel		5	14	(2)	Belgium-Luxembourg 7; Ireland 5; France 2.
Ferrosilicochromium		77	126	69	Ireland 54; Belgium-Luxembourg 3.
Ferrosilicomanganese		181	802	—	Egypt 403; Mozambique 338; Germany 36.
Ferrosilicon		1,670	3,724	693	Portugal 478; Ireland 469.
Silicon metal		894	744	15	France 246; Belgium-Luxembourg 183; Germany 89.
Unspecified		20,553	26,491	NA	NA.
Steel, primary forms	thousand tons	1,310	1,401	193	Germany 326; Italy 306; Greece 283.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated	do.	1,424	1,634	63	Spain 260; Germany 254; Italy 153.
Clad, plated, coated		763,022	888,619	13,003	Germany 106,317; Spain 99,193; France 80,846.
Of alloy steel		208,396	214,171	15,410	Germany 33,158; Italy 23,987; France 18,426.
Bars, rods, angles, shapes, sections		2,582	2,883	213	Germany 343; Belgium-Luxembourg 292; France 233.
Rails and accessories		149,825	136,261	15,941	Brazil 30,520; India 13,062.
Wire		142,199	136,311	17,574	France 16,976; Germany 13,790.
Tubes, pipes, fittings		579,405	742,166	15,921	Norway 269,875; Germany 55,546; Netherlands 47,383.
Lead:					
Ore and concentrate		1,424	872	(2)	France 829; Ireland 25; Italy 18.
Oxides		7,616	8,403	18	Germany 2,585; France 1,100; Austria 767.
Ash and residue containing lead		9,698	NA		
Metal including alloys:					
Scrap		20,663	23,912	31	Ireland 7,287; France 6,747; Sweden 3,528.
Unwrought		118,005	117,223	339	Germany 47,636; France 16,581; Netherlands 8,928.
Semimanufactures		8,810	8,607	135	Belgium-Luxembourg 3,074; Germany 1,523; Japan 1,111.
Lithium: Oxides and hydroxides		275	NA		
Magnesium: Metal including alloys:					
Scrap		177	135	—	Belgium-Luxembourg 93; Germany 42.
Unwrought		663	1,078	269	Iran 375; France 106.
Semimanufactures		646	825	17	Ireland 170; Turkey 125; Germany 78.
Manganese:					
Ore and concentrate: Metallurgical grade		394	491	—	Germany 389; Czechoslovakia 50; Ireland 23.
Oxides		442	790	—	Ireland 572; Republic of Korea 105; Belgium-Luxembourg 30.
Metal including alloys, all forms		1,697	NA		

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Mercury		176	107	(2)	Spain 93; India 3; Italy 3.
Molybdenum:					
Ore and concentrate:					
Roasted		2,886	753	—	Belgium-Luxembourg 335; Sweden 98; Germany 70.
Unroasted		174	124	—	Germany 90; France 15; Italy 10.
Oxides and hydroxides		557	NA		
Ash and residue containing molybdenum		96	NA		
Metal including alloys:					
Unwrought including scrap		341	273	10	Germany 164; Belgium-Luxembourg 45; Sweden 12.
Semimanufactures		57	177	48	Germany 38; Sweden 32.
Nickel:					
Ore and concentrate		96	80	—	Spain 39; Netherlands 23; Ireland 9.
Matte and speiss		255	700	—	Sweden 329; Canada 175; Austria 76.
Oxides and hydroxides		66	NA		
Ash and residue containing nickel		7,705	NA		
Metal including alloys:					
Scrap		5,070	5,880	1,343	Sweden 1,427; Netherlands 894.
Unwrought		18,126	18,460	329	Belgium-Luxembourg 4,286; Sweden 3,881; Germany 2,994.
Semimanufactures		12,817	12,709	391	Japan 3,929; France 2,257; Germany 1,632.
Platinum-group metals:					
Ore and concentrate	value, thousands	$423	[5]$309	$308	Ireland $1.
Waste and sweepings	do.	$24,247	$19,396	$2,393	Italy $12,344; Germany $2,986.
Metals including alloys, unwrought and partly wrought:					
Platinum	do.	$336,048	$371,235	$49,218	Japan $107,304; Germany 66,266.
Palladium	kilograms	30,371	NA		
Rhodium	do.	3,909	NA		
Iridium	do.	2,260	NA		
Unspecified	value, thousands	—	$676,871	$234,827	Switzerland $93,655; Japan $88,090.
Rare-earth metals including alloys, all forms		84	189	23	Germany 52; Switzerland 35.
Selenium, elemental		294	NA		
Silicon, high-purity		81	NA		
Silver:					
Ore and concentrate	value, thousands	$4	$40	—	All to Italy.
Waste and sweepings	do.	$33,179	18,898	$2,076	France $6,541; Belgium-Luxembourg $2,691; Germany $2,270.
Metal including alloys, unwrought and partly wrought	do.	$485,538	$254,952	$434	Germany $81,998; Switzerland $44,471; France $38,413.
Tellurium, elemental		21	NA		
Tin:					
Ore and concentrate		1,426	1,446	—	Malaysia 1,441; New Zealand 3; France 2.
Oxides		841	NA		

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Tin—Continued:					
Ash and residue containing tin		251	NA		
Metal including alloys:					
Scrap		448	1,885	—	Belgium-Luxembourg 605; India 448; Republic of Korea 205.
Unwrought		6,768	3,973	288	Netherlands 1,608; Germany 829.
Semimanufactures		3,406	1,861	40	Italy 534; Germany 413; Netherlands 264.
Titanium:					
Ore and concentrate		33	NA		
Oxides		26,714	19,584	6,450	France 2,015; Netherlands 1,318.
Metal including alloys:					
Unwrought including scrap		2,250	2,044	480	France 605; Germany 283.
Semimanufactures		2,445	1,800	181	France 526; Germany 437; Italy 186.
Tungsten:					
Ore and concentrate	value, thousands	$53	$15	—	Nigeria $8; Ireland $4; Turkey $3.
Oxides and hydroxides		15	NA		
Ash and residue containing tungsten		45	NA		
Metal including alloys:					
Unwrought including scrap		598	827	240	Germany 267; Japan 134.
Semimanufactures		279	248	23	Germany 73; Netherlands 58.
Uranium and thorium:					
Ore and concentrate		104	NA		
Oxides and other compounds	value, thousands	—	$422,415	NA	NA.
Metal including alloys, all forms:					
Uranium	do.	$98,917	$46,758	NA	NA.
Thorium	do.	NA	$885	NA	NA.
Vanadium:					
Oxides and hydroxides		31	NA		
Ash and residue containing vanadium		20	NA		
Metal including alloys:					
Scrap		1	31	3	Japan 16; Germany 11.
Semimanufactures		22	NA		
Zinc:					
Ore and concentrate		21,927	2,398	—	Netherlands 2,225; Portugal 61; Germany 51.
Oxides		6,141	4,075	84	Ireland 1,134; Germany 734; France 488.
Blue powder		221	3,636	17	Germany 695; Chile 438; India 430.
Matte		1,200	NA		
Ash and residue containing zinc		3,292	NA		
Metal including alloys:					
Scrap		25,636	25,920	12	Germany 5,783; Sweden 4,186; India 1,447.
Unwrought		19,085	30,232	323	France 8,252; Germany 5,429; Portugal 2,872.
Semimanufactures		4,569	2,792	3	Spain 671; Germany 452; France 236.
Zirconium:					
Ore and concentrate		888	1,356	—	Netherlands 817; Republic of South Africa 162; Italy 137.

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
METALS—Continued					
Zirconium—Continued:					
Oxides		2,281	NA		
Metal including alloys:					
Unwrought including scrap		49	38	23	Belgium-Luxembourg 7; Ireland 5.
Semimanufactures		95	18	5	Sweden 5; Belgium-Luxembourg 2.
Other:					
Ores and concentrates		72	NA		
Oxides and hydroxides		1,670	NA		
Ashes and residues		15,854	35,784	728	Belgium-Luxembourg 17,190; Canada 6,599; Netherlands 3,907.
Base metals including alloys, all forms		68	17	7	Bahrain 2; Belgium-Luxembourg 1; Germany 1.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.	value, thousands	$1,363	$1,491	$4	Australia $310; Ireland $177; Germany $132.
Artificial:					
Corundum		13,543	8,253	69	Germany 2,564; Netherlands 1,291; Finland 864.
Silicon carbide		721	1,795	NA	NA.
Dust and powder of precious and semiprecious stones including diamond	value, thousands	$19,114	$18,330	$4,459	Republic of South Africa $2,443; Ireland $2,106; Germany $1,190.
Grinding and polishing wheels and stones		5,838	4,573	559	Germany 1,032; France 574.
Asbestos, crude		291	111	—	France 47; Morocco 21; Canada 14.
Barite and witherite		25,365	9,058	—	Algeria 2,850; Ireland 1,300; France 717.
Boron materials:					
Crude natural borates		904	879	—	France 557; Netherlands 251; Ireland 34.
Elemental		22	NA		
Oxides and acids		212	424	1	France 107; Ireland 97; Netherlands 87.
Bromine		3,163	[6]4,489	1	Netherlands 1,429; Belgium-Luxembourg 1,206; Germany 744.
Cement		266,817	354,520	947	Ireland 233,411; Norway 34,381; Denmark 29,220.
Chalk		26,516	24,410	66	Germany 7,398; Bangladesh 2,137; Singapore 1,796.
Clays, crude:					
Bentonite		62,097	52,096	994	Sweden 14,511; Germany 6,283; Finland 5,910.
Chamotte earth		488	NA		
Fire clay		877	NA		
Fuller's earth		33,747	NA		
Kaolin	thousand tons	3,042	2,978	10	Finland 671; Germany 447; Sweden 324.
Unspecified		66,623	68,849	NA	NA.
Cryolite and chiolite		138	91	—	Ireland 30; Japan 21; Republic of South Africa 20.
Diamond, natural:					
Gem, not set or strung	thousand carats	32,839	NA		
Industrial stones	do.	27,054	NA		
Unsorted stones	do.	2,200	NA		
Diatomite and other infusorial earth		2,556	538	—	Yugoslavia 187; Iran 54; Ireland 49.

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Destinations, 1991	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Feldspar, fluorspar, related materials:				
Feldspar	2,447	1,389	—	Norway 750; Ireland 370; Trinidad and Tobago 187.
Fluorspar	3,983	3,938	—	Sweden 2,068; Netherlands 670; Peru 400.
Unspecified	341	—		
Fertilizer materials:				
Crude, n.e.s.	3,598	4,047	52	Ireland 2,981; United Arab Emirates 110; St. Helena 100.
Manufactured:				
Ammonia	166,970	134,057	1	Denmark 59,635; Finland 35,978; Spain 12,700.
Nitrogenous	261,471	130,792	2	France 43,012; Spain 38,826; Ireland 16,841.
Phosphatic	584	1,474	72	Ireland 1,292; Spain 40.
Potassic	386,066	530,614	(2)	Ireland 294; Germany 99; unspecified 530,221.
Unspecified and mixed	411,183	330,124	775	Ireland 243,642; Denmark 13,735; Germany 11,285.
Graphite, natural	2,888	2,683	142	Germany 1,013; France 199; Sweden 178.
Gypsum and plaster	16,511	21,969	549	Germany 6,338; Ireland 4,818; Hong Kong 1,671.
Iodine	289	NA		
Kyanite and related materials:				
Mullite	4,740	NA		
Unspecified	76	NA		
Lime	37,373	36,834	—	Ghana 9,601; Côte d'Ivoire 6,097; France 5,734.
Magnesium compounds:				
Magnesite, crude	376	2,010	—	Germany 942; Spain 648; Ireland 244.
Oxides and hydroxides	75,144	57,640	NA	NA.
Sulfate	10	NA		
Mica:				
Crude including splittings and waste	5,062	6,139	(2)	Germany 3,044; Belgium-Luxembourg 713; Ireland 705.
Worked including agglomerated splittings	183	797	8	France 607; Ireland 28; Italy 18.
Nitrates, crude	981	1,399	(2)	Ireland 1,224; France 71; Denmark 40.
Phosphates, crude	677	894	3	Thailand 574; Ireland 119; Saudi Arabia 66.
Pigments, mineral:				
Natural, crude	1,019	NA		
Iron oxides and hydroxides, processed	10,456	10,769	NA	NA.
Potassium salts, crude	40	5	(2)	Mainly to Ireland.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$71,745	$58,555	$1,255	Switzerland $22,560; France $7,209; Belgium-Luxembourg $2,905.
Synthetic do.	$721	$262	$72	France $307; Germany $191.
Pyrite, unroasted	259	130	—	Sweden 38; Ireland 27; Netherlands 19.
Quartz crystal, piezoelectric value, thousands	$328	$1,188	$575	France $307; Germany $191.
Salt and brine	325,542	198,611	32	Sweden 78,856; Ireland 41,113; Germany 21,360.
Sodium compounds, n.e.s.: Sulfate, manufactured	26,217	NA		

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		9,257	8,843	163	Ireland 4,459; Netherlands 1,251; Belgium-Luxembourg 1,005.
Worked		12,246	11,506	1,888	Ireland 2,327; Netherlands 1,461.
Dolomite, chiefly refractory-grade		5,201	NA		
Gravel and crushed rock		2,448,522	3,499,053	109	Germany 1,024,860; France 896,499; Belgium-Luxembourg 653,580.
Limestone other than dimension		684,034	658,994	—	Germany 259,515; Denmark 139,974; Belgium-Luxembourg 116,833.
Quartz and quartzite		330	363	—	France 282; Sweden 33; Spain 21.
Sand other than metal-bearing		104,091	195,897	633	Ireland 152,834; Sweden 11,660; Norway 9,626.
Sulfur:					
Elemental:					
Crude including native and byproduct		3,863	3,441	—	France 1,340; Netherlands 1,033; Germany 253.
Colloidal, precipitated, sublimed		2,184	1,583	—	France 963; Germany 216; Turkey 77.
Dioxide		258	150	—	Ireland 113; Thailand 31; Kenya 3.
Sulfuric acid		75,281	101,936	52,453	Netherlands 24,087; Ireland 11,812.
Talc, steatite, soapstone, pyrophyllite		1,774	1,927	2	Ireland 698; Netherlands 181; Belgium-Luxembourg 179.
Vermiculite, perlite and chlorite		1,122	2,506	—	France 1,848; Sweden 275; Finland 89.
Other:					
Crude		30,538	30,363	161	Netherlands 8,652; Ireland 6,313; Turkey 2,385.
Slag and dross, not metal-bearing		116,964	148,468	704	Germany 121,497; Republic of South Africa 6,486; Sweden 2,798.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		21,680	18,268	—	Ireland 9,604; Sweden 6,711; Netherlands 524.
Carbon black		37,186	41,532	271	France 10,368; Germany 7,628; Ireland 4,278.
Coal:					
Anthracite	thousand tons	509	696	—	France 338; Spain 191; Belgium-Luxembourg 61.
Bituminous	do.	1,813	1,083	—	Germany 233; Ireland 201; Denmark 175.
Briquets of anthracite and bituminous coal	do.	137	107	—	Norway 76; Spain 16; Sweden 10.
Lignite including briquets		3,467	317	—	Ireland 125; Libya 85; Norway 67.
Coke and semicoke[7]		301,263	273,876	—	Spain 199,268; Norway 115,363; Sweden 43,175.
Gas, natural:					
Gaseous	thousand cubic meters	4,692	830	—	Mainly to United Arab Emirates.
Liquefied	do.	9,405	15,894	(2)	Norway 11,200; France 2,800; Portugal 1,400.
Peat including briquets and litter		36,828	45,992	369	Sweden 18,956; France 12,831; Egypt 5,557.
Petroleum:					
Crude	thousand 42-gallon barrels	409,366	386,791	76,273	Netherlands 77,288; Germany 76,071.
Refinery products:					
Liquefied petroleum gas	do.	20,163	24,086	1,035	Netherlands 5,973; France 5,447; Portugal 3,139.
Gasoline	do.	52,463	53,967	4,752	Germany 15,836; Netherlands 12,402.
Mineral jelly and wax	do.	346	346	1	Germany 87; Netherlands 63; France 44.

See footnotes at end of table.

TABLE 3—Continued

UNITED KINGDOM: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Destinations, 1991	
				United States	Other (principal)
MINERALS FUELS AND RELATED MATERIAL—Continued					
Petroleum—Continued:					
Refinery products—Continued:					
Kerosene and jet fuel	thousand tons	11,142	8,564	—	Ireland 2,806; France 2,116; Sweden 1,085.
Distillate fuel oil	do.	75,652	49,311	NA	NA.
Lubricants	do.	6,782	5,110	70	Netherlands 959; Germany 693; Belgium-Luxembourg 686.
Residual fuel oil	do.	—	35,411	NA	NA.
Bitumen and other residues	do.	238	248	NA	NA.
Bituminous mixtures	do.	88	127	(2)	Norway 51; Ireland 20; Singapore 8.
Petroleum coke	do.	—	2,206	NA	NA.

NA Not available.
[1]Table prepared by Amy M. Burk.
[2]Less than 1/2 unit.
[3]May include rhenium.
[4]May include high-purity silicon.
[5]May include other precious metals.
[6]May include iodine.
[7]Includes gas carbon.

TABLE 4

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	3,205	1,732	782	Germany 848; France 58.
Alkaline-earth metals	343	NA		
Aluminum:				
Ore and concentrate	317,487	289,623	16	Ghana 225,464; Netherlands 35,693; Australia 15,050.
Oxides and hydroxides	642,488	586,067	NA	NA.
Ash and residue containing aluminum	875	NA		
Metal including alloys:				
Scrap	16,864	29,042	5,053	Ireland 8,331; Canada 6,441.
Unwrought	241,005	196,909	651	Norway 84,547; Netherlands 25,302; U.S.S.R. 22,131.
Semimanufactures	361,339	337,779	11,426	Germany 99,092; France 69,819; Belgium-Luxembourg 31,293.
Antimony:				
Oxides	2,172	NA		
Ash and residue containing antimony	218	NA		
Metal including alloys, all forms	604	1,185	(2)	Netherlands 723; Hong Kong 337; China 99.
Arsenic: Metal including alloys, all forms	80	—		

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Beryllium:				
Oxides and hydroxides	6	NA		
Metal including alloys, all forms	3	1	1	
Bismuth: Metal including alloys, all forms	449	571	114	Netherlands 213; Germany 96.
Cadmium: Metal including alloys:				
Unwrought including scrap	—	564	—	Netherlands 299; Canada 148; Finland 62.
Semimanufactures	970	131	18	Canada 96; Hong Kong 7.
Chromium:				
Ore and concentrate	154,919	80,277	—	Republic of South Africa 74,525; Greece 3,000; Philippines 1,013.
Oxides and hydroxides	1,014	1,485	NA	NA.
Metal including alloys, all forms	854	909	77	Japan 193; Germany 177; France 148.
Cobalt:				
Oxides and hydroxides	543	528	1	Canada 403; Finland 50; Belgium-Luxembourg 42.
Ash and residue containing cobalt	183	NA		
Metal including alloys:				
Unwrought including scrap	—	3,332	239	Netherlands 1,257; Belgium-Luxembourg 922; Canada 279.
Semimanufactures	3,856	226	48	Sweden 107; Germany 29.
Columbium and tantalum:				
Ore and concentrate[3]	1,457	1,721	—	All from Canada.
Ash and residue containing columbium and tantalum	25	NA		
Metal including alloys, all forms:				
Columbium (niobium)[4]	25	—		
Tantalum	84	132	58	Germany 26; Czechoslovakia 25.
Copper:				
Ore and concentrate	1,997	2,432	4	Netherlands 2,416; Italy 10.
Matte and speiss including cement copper	68	105	—	Italy 104; France 1.
Oxides and hydroxides	2,349	NA		
Sulfate	4,607	NA		
Ash and residue containing copper	8,167	NA		
Metal including alloys:				
Scrap	22,018	16,357	1,652	Germany 2,291; France 2,176; unspecified 10,238.
Unwrought	317,972	276,522	6,198	Chile 58,358; Canada 51,447; Peru 41,964.
Semimanufactures	151,333	145,026	2,344	Germany 47,957; France 22,916; Belgium-Luxembourg 16,704.
Gallium: Metal including alloys all forms[5]	33	—		
Germanium:				
Oxides	28	NA		
Metal including alloys, all forms	11	23	1	Belgium-Luxembourg 19; U.S.S.R. 3.
Gold:				
Ore and concentrate[6] value, thousands	—	$191,608	$3,547	Canada $138,992; Sweden $13,904; Norway $9,763.
Waste and sweepings do.	192,273	NA		
Metal including alloys, unwrought and partly wrought	2,245	NA		

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Hafnium: Metal including alloys, all forms		4	NA		
Iron and steel:					
Iron ore and concentrate:					
Excluding roasted pyrite	thousand tons	14,700	13,540	9	Australia 2,838; Brazil 2,273; Republic of South Africa 1,977.
Pyrite, roasted	do.	236	137	—	Sweden 109; Norway 27; Spain 1.
Metal:					
Scrap		60,246	68,148	28,298	Finland 10,173; Germany 7,589.
Pig iron, cast iron, related materials		23,377	131,657	1,494	Sweden 13,177; Germany 1,177; unspecified 115,809.
Ferroalloys:					
Ferrochromium		374,672	76,419	NA	NA.
Ferromanganese		45,685	31,717	881	Norway 14,434; Republic of South Africa 5,537; Germany 4,861.
Ferromolybdenum		502	NA		
Ferronickel		19,439	17,668	101	Greece 7,114; Belgium-Luxembourg 3,476; Netherlands 3,443.
Ferrosilicochromium		77	23	—	All from Germany.
Ferrosilicomanganese		35,809	31,713	20	Norway 13,985; Republic of South Africa 8,390; Netherlands 3,482.
Ferrosilicon		99,511	84,302	2,537	Norway 47,142; Netherlands 7,644.
Silicon metal		43,999	39,258	79	Republic of South Africa 14,219; France 13,421; Norway 4,936.
Unspecified		13,171	14,299	2,421	Norway 2,362; Germany 2,073.
Steel, primary forms		341,848	285,341	2,367	Germany 104,728; Netherlands 83,338; Finland 23,692.
Semimanufactures:					
Flat-rolled products:					
Of iron or nonalloy steel:					
Not clad, plated, coated	thousand tons	1,744	1,620	1	Germany 446; Netherlands 257; Belgium-Luxembourg 252.
Clad, plated, coated	do.	1,039	1,043	18	Germany 235; France 198; Belgium-Luxembourg 172.
Of alloy steel	do.	400	465	5	Germany 308; France 45; Belgium-Luxembourg 34.
Bars, rods, angles, shapes, sections	do.	1,184	1,075	14	Spain 227; Germany 215; France 129.
Rails and accessories		46,024	43,108	373	Sweden 15,784; Belgium-Luxembourg 13,294; Austria 5,340.
Wire		62,108	63,761	1,088	Belgium-Luxembourg 24,159; France 7,276; Italy 6,529.
Tubes, pipes, fittings		630,436	999,969	7,296	Germany 360,695; France 165,125; Japan 117,771.
Lead:					
Ore and concentrate		37,158	NA		
Oxides		549	3,313	22	Germany 2,317; Netherlands 886; Ireland 33.
Ash and residue containing lead		6,952	NA		
Metal including alloys:					
Scrap		16,192	5,511	806	Ireland 1,857; Finland 1,376.
Unwrought		190,731	204,460	5,092	Australia 170,651; Canada 19,412; Netherlands 3,415.
Semimanufactures		26,103	26,100	41	Ireland 18,512; Belgium-Luxembourg 3,904; France 1,427.
Lithium: Oxides and hydroxides		764	NA		
Magnesium: Metal including alloys:					
Scrap		961	459	43	Netherlands 185; Norway 71; Sweden 56.

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Magnesium: Metal including alloys—Continued:					
Unwrought		3,875	3,310	6	Norway 1,983; Netherlands 597; France 318.
Semimanufactures		1,811	2,362	808	Norway 950; Yugoslavia 168.
Manganese:					
Ore and concentrate, metallurgical grade		318,303	355,272	—	Republic of South Africa 312,778; Brazil 31,131; Morocco 4,498.
Oxides		4,945	3,926	36	Japan 812; Spain 776; Mexico 560.
Metal including alloys, all forms		4,274	3,686	96	Republic of South Africa 1,199; France 989; Netherlands 605.
Mercury		51	40	(2)	France 11; Sweden 7; Germany 5.
Molybdenum:					
Ore and concentrate:					
Roasted		3,051	5,156	690	Netherlands 2,270; Sweden 86.
Unroasted		15,171	9,057	7,697	Canada 407; Chile 351.
Oxides and hydroxides		160	NA		
Ash and residue containing molybdenum		527	NA		
Metal including alloys:					
Unwrought including scrap		192	255	18	Netherlands 106; Germany 68; Austria 45.
Semimanufactures		185	143	34	Austria 91; Germany 7.
Nickel:					
Ore and concentrate		1	35	(2)	France 21; Germany 10; Belgium-Luxembourg 4.
Matte and speiss		46,916	44,929	3	Canada 43,720; Netherlands 874; Germany 217.
Oxides and hydroxides		195	NA		
Ash and residue containing nickel		777	NA		
Metal including alloys:					
Scrap		6,372	5,767	436	Republic of South Africa 1,409; Netherlands 481.
Unwrought		19,008	16,848	566	Netherlands 4,021; Australia 2,742; Republic of South Africa 2,367.
Semimanufactures		7,349	6,088	2,992	Germany 1,387; France 461.
Platinum-group metals:					
Waste and sweepings	value, thousands	$154,481	$192,965	$76,386	Germany $21,241; Belgium-Luxembourg $11,150; Republic of South Africa $10,939.
Metals including alloys, unwrought and partly wrought	do.	$936,817	$762,789	$24,879	Republic of South Africa $525,588; Belgium-Luxembourg $62,248; Switzerland $43,056.
Rare-earth metals including alloys, all forms[8]		22	447	51	Netherlands 173; France 96; Germany 52.
Selenium, elemental		657	NA		
Silicon, high-purity		188	NA		
Silver:					
Ore and concentrate	value, thousands	$3,927	$2,587	$15	Canada $1,133; Bolivia $545; France $514.
Waste and sweepings[6]	do.	$205,935	$103,607	$22,029	Germany $12,037; Australia $10,492.
Metal including alloys, unwrought and partly wrought	do.	$161,361	$190,636	$126,307	Germany $11,690; Australia $10,305; Sweden $6,509.
Tellurium, elemental		40	NA		
Tin:					
Ore and concentrate		13,443	3,617	—	Peru 1,399; Portugal 725; Bolivia 585.
Oxides		146	NA		
Ash and residue containing tin		9,854	NA		

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
METALS—Continued					
Tin—Continued:					
Metal including alloys:					
Scrap		720	2,152	196	Ireland 1,614; United Arab Emirates 256.
Unwrought		6,095	6,879	45	Netherlands 3,067; Malaysia 802; Bolivia 547.
Semimanufactures		567	674	84	Netherlands 133; Italy 131; Belgium-Luxembourg 103.
Titanium:					
Ore and concentrate		374,616	271,761	18	Australia 194,697; Netherlands 29,315; Belgium-Luxembourg 16,200.
Oxides		2,767	13,812	1,184	Australia 4,062; Belgium-Luxembourg 2,791; Germany 2,221.
Ash and residue containing titanium		25	NA		
Metal including alloys:					
Unwrought including scrap		14,852	11,134	5,747	Japan 2,569; Germany 612.
Semimanufactures		2,988	1,908	980	Japan 369; France 310.
Tungsten:					
Ore and concentrate		111	38	—	Mainly to Netherlands.
Oxides and hydroxides		88	NA		
Ash and residue containing tungsten		42	NA		
Metal including alloys:					
Unwrought including scrap		423	4,596	158	Norway 2,054; Netherlands 972; Germany 361.
Semimanufactures		194	110	57	Netherlands 11; France 10.
Uranium and thorium:					
Oxides and other compounds	value, thousands	—	$659,290	NA	NA.
Metals including alloys, all forms:					
Uranium	do.	$13,319	$17,764	NA	NA.
Thorium	do.	NA	$3,698	NA	NA.
Vanadium:					
Ore and concentrate		25	NA		
Oxides and hydroxides		226	NA		
Ash and residue containing vanadium		1	NA		
Metal including alloys:					
Scrap		1	NA		
Unwrought		239	NA		
Semimanufactures		18	193	6	Germany 102; Australia 68; Netherlands 17.
Zinc:					
Ore and concentrate		278,301	207,171	42,749	Australia 64,880; Peru 51,215.
Oxides		7,610	8,129	39	Belgium-Luxembourg 1,745; Germany 1,522; France 1,202.
Blue powder		864	1,279	29	Germany 467; Norway 454; Netherlands 115.
Ash and residue containing zinc		27,308	NA		
Metal including alloys:					
Scrap		5,028	2,632	162	France 863; Canada 308; Australia 285.
Unwrought		128,323	122,110	435	Netherlands 36,479; Finland 26,019; Germany 20,502.
Semimanufactures		2,486	2,188	2	Germany 953; France 656; Belgium-Luxembourg 122.

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1990	1991	Sources, 1991	
			United States	Other (principal)
METALS—Continued				
Zirconium:				
Ore and concentrate	35,685	36,389	685	Australia 19,233; Netherlands 7,653; Republic of South Africa 6,966.
Oxides	1,160	NA		
Metal including alloys:				
Unwrought including scrap	85	77	71	Germany 4; Israel 1.
Semimanufactures	55	43	27	France 7; Sweden 7.
Other:				
Ores and concentrates	18	—		
Oxides and hydroxides	8,557	12,272	1,555	Switzerland 3,231; Germany 2,447.
Ashes and residues	2,815	62,418	13,999	Spain 13,440; Netherlands 11,364.
Base metals including alloys, all forms	47	62	3	Germany 40; Belgium-Luxembourg 7; France 6.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	70,832	66,710	152	Greece 32,724; Italy 17,151; Iceland 12,469.
Artificial:				
Corundum	29,685	23,981	NA	NA.
Silicon carbide	43,357	22,214	82	Norway 10,231; Spain 3,860; Germany 2,223.
Dust and powder of precious and semiprecious stones including diamond value, thousands	$25,128	$24,272	NA	NA.
Grinding and polishing wheels and stones	10,273	6,927	296	Germany 1,515; France 1,395; Netherlands 996.
Asbestos, crude	16,022	11,250	—	Canada 10,289; Zimbabwe 498; Republic of South Africa 448.
Barite and witherite	217,427	183,429	20	Morocco 94,195; Netherlands 41,718; Ireland 41,503.
Boron materials:				
Crude natural borates	53,461	53,812	21	Turkey 51,160; Belgium-Luxembourg 2,135; Netherlands 363.
Elemental	1	NA		
Oxides and acids	11,906	10,265	15	Netherlands 6,113; Chile 1,721; France 1,494.
Bromine[9]	7,197	9,088	125	Israel 7,198; Japan 1,033; Belgium-Luxembourg 513.
Cement thousand tons	2,426	1,793	(2)	Greece 444; Ireland 302; Denmark 296.
Chalk	11,308	4,764	(2)	Denmark 3,900; France 682; Germany 49.
Clays, crude:				
Bentonite	154,133	137,443	28,480	Greece 57,820; Cyprus 19,644.
Chamotte earth	46,633	NA		
Fire clay	1,959	NA		
Fuller's earth	6,114	NA		
Kaolin	16,925	28,459	17,718	Belgium-Luxembourg 4,320; France 3,443; Netherlands 1,806.
Unspecified	27,572	134,895	21,186	France 40,714; Netherlands 30,215.
Cryolite and chiolite	1,108	565	—	Denmark 348; Canada 145; France 67.
Diamond, natural:				
Gem, not set or strung value, thousands	$3,082	NA		
Industrial stones do.	$73	—		

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Diamond, natural—Continued:					
Unsorted	value, thousands	$552	NA		
Diatomite and other infusorial earth		35,718	33,470	4,605	Denmark 21,811; France 3,333.
Feldspar		49,010	NA		
Fertilizer materials:					
Crude, n.e.s.		9,728	6,989	32	France 6,310; Ireland 208; Germany 133.
Manufactured:					
Nitrogenous	thousand tons	396	1,392	10	Netherlands 223; Germany 176; Ireland 175.
Phosphatic	do.	390	330	—	Netherlands 107; Morocco 76; Tunisia 54.
Potassic	do.	1,679	45	(2)	Mainly from Germany.
Unspecified and mixed	do.	744	887	18	Norway 373; Netherlands 126; France 84.
Fluorspar		4,525	NA		
Graphite, natural		24,767	15,050	723	Madagascar 6,354; Netherlands 1,825; China 1,779.
Gypsum and plaster		431,608	545,349	1,162	Spain 271,606; Germany 219,169; Ireland 34,684.
Iodine		1,441	NA		
Kyanite and related materials		54,979	NA		
Mullite		3,239	NA		
Lime		5,673	6,169	100	Ireland 3,980; France 1,704; Germany 223.
Magnesium compounds:					
Magnesite, crude		22,406	29,772	5	France 6,014; China 5,550; Greece 4,680.
Oxides and hydroxides		130,355	143,188	615	Netherlands 38,773; Ireland 27,280; Spain 23,397.
Sulfate		23,839	NA		
Mica:					
Crude including splittings and waste		20,820	16,569	25	China 6,302; India 5,507; France 1,287.
Worked including agglomerated splittings		562	636	1	Belgium-Luxembourg 160; France 112; Switzerland 91.
Nitrates, crude		8,094	13,076	19	Sweden 7,275; Belgium-Luxembourg 4,776; Germany 555.
Phosphates, crude		548,126	340,845	5	Morocco 305,552; Tunisia 25,417; Netherlands 8,611.
Phosphorus, elemental		6	NA		
Pigments, mineral:					
Natural, crude		6,469	NA		
Iron oxides and hydroxides, processed		29,304	29,948	1,509	Germany 13,351; China 4,349; Finland 2,644.
Potassium salts, crude		19,605	16,413	(2)	Mainly from Germany.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$89,747	$61,582	$255	Switzerland $730; Singapore $714; unspecified $59,883.
Synthetic	do.	$3,064	$314	$159	Ireland $135; Germany $12.
Quartz crystal, piezoelectric	do.	$349	$498	$300	Japan $143; Italy $25.
Pyrite, unroasted		14,325	8,371	NA	NA.
Salt and brine		166,797	164,102	178	Italy 48,547; Germany 46,693; Netherlands 15,842.
Sodium compounds, n.e.s.:					
Soda ash		86,082	116,223	NA	NA.
Sulfate, manufactured	thousand tons	1,282	55	NA	NA.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		297,403	371,080	3,148	Norway 232,305; Sweden 83; 443; France 25,412.

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel—Continued:					
Dimension stone—Continued:					
Worked		166,183	131,785	2,743	Italy 40,964; Spain 29,748; Portugal 26,761.
Dolomite, chiefly refractory-grade		182,185	145,589	76	Spain 101,494; Norway 41,691; Germany 2,102.
Gravel and crushed rock	thousand tons	1,564	1,798	(2)	Ireland 572; France 546; Netherlands 322.
Limestone other than dimension		11,598	17,283	(2)	Norway 14,533; Ireland 2,587; Canada 33.
Quartz and quartzite		10,270	8,069	98	Netherlands 3,241; Germany 1,442; Belgium-Luxembourg 864.
Sand other than metal-bearing		102,619	68,743	1,672	Netherlands 29,212; Belgium-Luxembourg 25,559; Sweden 3,246.
Sulfur:					
Elemental:					
Crude including native and byproduct		470,862	439,313	NA	NA.
Colloidal, precipitated, sublimed		376	117	—	France 66; Germany 32; Netherlands 10.
Dioxide		1,883	2,200	(2)	Sweden 2,182; Netherlands 13; Belgium-Luxembourg 5.
Sulfuric acid		283,364	262,905	NA	NA.
Talc, steatite, soapstone, pyrophyllite		83,413	85,363	NA	NA.
Vermiculite[10]		163,315	123,474	29	Republic of South Africa 41,836; Italy 33,910; Greece 20,936.
Other:					
Crude		416,016	NA		
Slag and dross, not metal-bearing		812,468	576,741	2,797	Belgium-Luxembourg 244,047; France 149,922;
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		12,283	15,474	2,444	Ireland 6,667; Trinidad and Tobago 3,520; France 2,229.
Carbon:					
Carbon black		44,334	39,686	4,021	Netherlands 12,947; France 8,727; Germany 7,907.
Gas carbon		7,076	NA		
Coal:					
Anthracite	thousand tons	634	1,140	39	Republic of South Africa 203; Netherlands 197; Germany 179.
Bituminous	do.	11,989	13,670	4,876	Australia 4,048; Netherlands 1,030.
Briquets of anthracite and bituminous coal	do.	120	146	(2)	Germany 75; Netherlands 49; Belgium-Luxembourg 14.
Lignite including briquets	do.	55	15	(2)	Germany 7; Netherlands 6; France 1.
Unspecified	do.	2,168	NA		
Coke and semicoke		304,221	[11]325,418	19,691	Belgium-Luxembourg 86,066; Netherlands 79,876; Poland 33,739.
Gas, natural:					
Gaseous	million cubic meters	5,795	3,980	(2)	Mainly from Norway.
Liquefied	thousand cubic meters	51,971	44,800	5,600	Belgium-Luxembourg 29,400; Germany 8,400.
Peat including briquets and litter		229,898	214,616	1	Ireland 177,062; Netherlands 15,070; U.S.S.R. 6,176.
Petroleum:					
Crude	thousand 42-gallon barrels	155,322	345,900	(2)	Saudi Arabia 61,904; Nigeria 12,690; Iran 11,943.
Refinery products:					
Liquefied petroleum gas	do.	16,103	14,604	568	Algeria 4,879; Saudi Arabia 2,054 Norway 1,551.

See footnotes at end of table.

TABLE 4—Continued

UNITED KINGDOM: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1990	1991	Sources, 1991	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum—Continued:					
Refinery products—Continued:					
Gasoline	thousand 42-gallon barrels	45,208	33,040	1,020	Netherlands 8,611; Algeria 7,837; Norway 4,454.
Mineral jelly and wax	do.	328	110	8	Germany 24; Netherlands 24; France 16.
Kerosene and jet fuel	do.	5,718	6,733	152	Netherlands 1,566; Italy 1,092; Belgium-Luxembourg [6]29.
Distillate fuel oil	do.	11,747	10,907	48	U.S.S.R. 4,685; Norway 1,283; Netherlands 1,141.
Lubricants	do.	7,069	10,584	48	Netherlands 5,040; Belgium-Luxembourg 1,253; Norway 707.
Residual fuel oil	do.	87,053	88,451	2,644	Libya 10,543; Netherlands 9,064; Belgium-Luxembourg 5,148.
Bitumen and other residues	do.	823	1,067	(2)	France 551; Belgium-Luxembourg 424; Netherlands 91.
Bituminous mixtures	do.	158	588	(2)	Venezuela 515; France 30; Spain 24.
Petroleum coke	do.	3,342	2,789	1,909	Belgium-Luxembourg 451; Netherlands 275.

NA Not available.
[1]Table prepared by Amy M. Burk.
[2]Less than 1/2 unit.
[3]May include vanadium.
[4]May include rhenium.
[5]Includes indium and thallium.
[6]May include other precious metals.
[7]May include high-purity silicon.
[8]Includes calcium, strontium, and barium.
[9]May include fluorine and iodine.
[10]Includes perlite and chlorite.
[11]May include gas carbon.

TABLE 5

UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aggregate	ARC Ltd. (Hanson PLC, 100%)	50 quarries in various locations	50,000
Do.	Foster Yoeman Ltd.	Glensanda quarry at Oban	15,000
Aluminum, primary	British Alcan Aluminium Ltd.	Fort William, Kinlochleven, and Lynemouth	175
Do.	Angelesy Aluminium LTD. (RTZ Corp. Ltd., 51%; Kaiser Aluminum & Chemical Corp., 49%)	Holyhead, Wales	113
Aluminum, secondary	Trent Alloys Ltd. (Cookson Group, 100%)	North Cave, Humberside	30
Do.	Deeside Aluminium Ltd.	Clwyd, Wales	45
Ball clay	Watts, Blake, Bearne & Co. PLC	Various operations in north and south Devon	500
Celestite	Bristol Minerals Co. Ltd.	Yate, Avon	30
Cement	Aberthaw & Bristol Channel Portland Cement Co. Ltd.	East Aberthaw, Glamorgan and Rhoose, Glamorgan	1,000
Do.	Blue Circle Industries PLC	Main plants at Couldon, Dunbar, Hope, Northfleet, Weardale, and Westbury	11,300
Do.	Castle Cement Ltd. (Aker Norcem AS, 50%; Indus AB Euroc, 50%)	Main plants at Ketton, Ribblesdale, Pades, and Pitstone	4,000

See footnotes at end of table.

TABLE 5—Continued

UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
China clay (kaolin)	ECC Group PLC	Mines and plants in Devon	3,000
Copper	IMI Refiners Ltd.	Refinery at Walsall West Midlands	80
Ferroalloys	British Steel PLC	Teesside, Cleveland	80
Do.	Murex Ltd.	Rainham, Essex	25
Do.	London and Scandinavian Metallurgical Co. Ltd.	Rotherham, South Yorkshire	30
Fluorspar	Laporte Industries	Mill at Stoney Middleton Mines in Derbyshire	70
Gypsum	British Gypsum Ltd.	Mines in Midlands, Cumbria, and Sussex	3,500
Lead, refined	Britania Refined Metals Ltd.	Northfleet, Kent	165
Lead, secondary	H. J. Enthoven and Son Ltd. [Billiton (U.K.) Ltd., 100%]	Darley Dale, Derbershire	60
Lead, smelter	Pasminco Ltd.	Avonmouth, Avon	40
Natural gas billion cubic feet	Amoco Ltd., British Petroleum Ltd., Esso (U.K.) Ltd.; Phillips Petroleum Co. PLC, Shell (U.K.) Ltd.	North Sea gasfields	1,250
Nickel, refined	INCO Europe Ltd. (INCO Ltd., Canada)	Clydach, Wales	30
Petroleum, crude million 42-gallon barrels per day	Amoco Ltd., British Petroleum Ltd., Chevron Ltd., Esso (U.K.) Ltd., Occidental Petroleum Co. Ltd., Shell (UK) Ltd., Texaco Ltd., Unocal, Inc.	North Sea oilfields	2.1
Petroleum, refined do.	British Petroleum Ltd., Conoco Ltd., Mobil Oil Co. Ltd., and others	11 refineries in various locations	2.3
Platinum-group metals	Johnson Matthey PLC	Enfield (London) and Royston, Cambridgeshire	20
Do.	INCO Europe Ltd. (INCO Ltd., Canada)	Acton (London)	6
Potash	Cleveland Potash Ltd.	Boulby Mine, Yorkshire	500
Salt, rock	Imperial Chemical Industries PLC	Mines at Winsford, Chesire	3,000
Do.	Irish Salt Mining & Exploration Co.	Carrick Fergus, Northern Ireland	300
Sand and gravel	TMC Pioneer Aggregates Ltd.	Chelmsford, Essex	1,000,000
Silica sand	Hepworth Minerals and Chemicals Ltd.	Operations in Cambridgeshire, Cheshire, Humberside and Norfolk	6,000
Steel	British Steel PLC	4 Integrated steel-works in Gwent, South Humberside and Cleveland	16,000
Talc	Alex Sandison & Sons Ltd.	Unst, Shetland Islands	15
Do.	Shetland Talc Ltd. (Anglo European Minerals Ltd., 50%; Dalriada Mineral Ventures Ltd., 50%)	Cunningsburg, Shetland Islands	35
Tin, ore	Carnon Consolidated Tin Mines Ltd.	South Crofty Mine, Cornwall	1,800
Do.	Geevor PLC	Geevor Mine, Cornwall	1,600
Titanium, sponge	Deeside Titanium Ltd.	Plant at Deeside, Clyde	5
Zinc, smelter	Pasminco Ltd.	Avonmouth, Avon	90

TABLE 6

UNITED KINGDOM: RESERVES OF MAJOR MINERAL COMMODITIES IN 1992

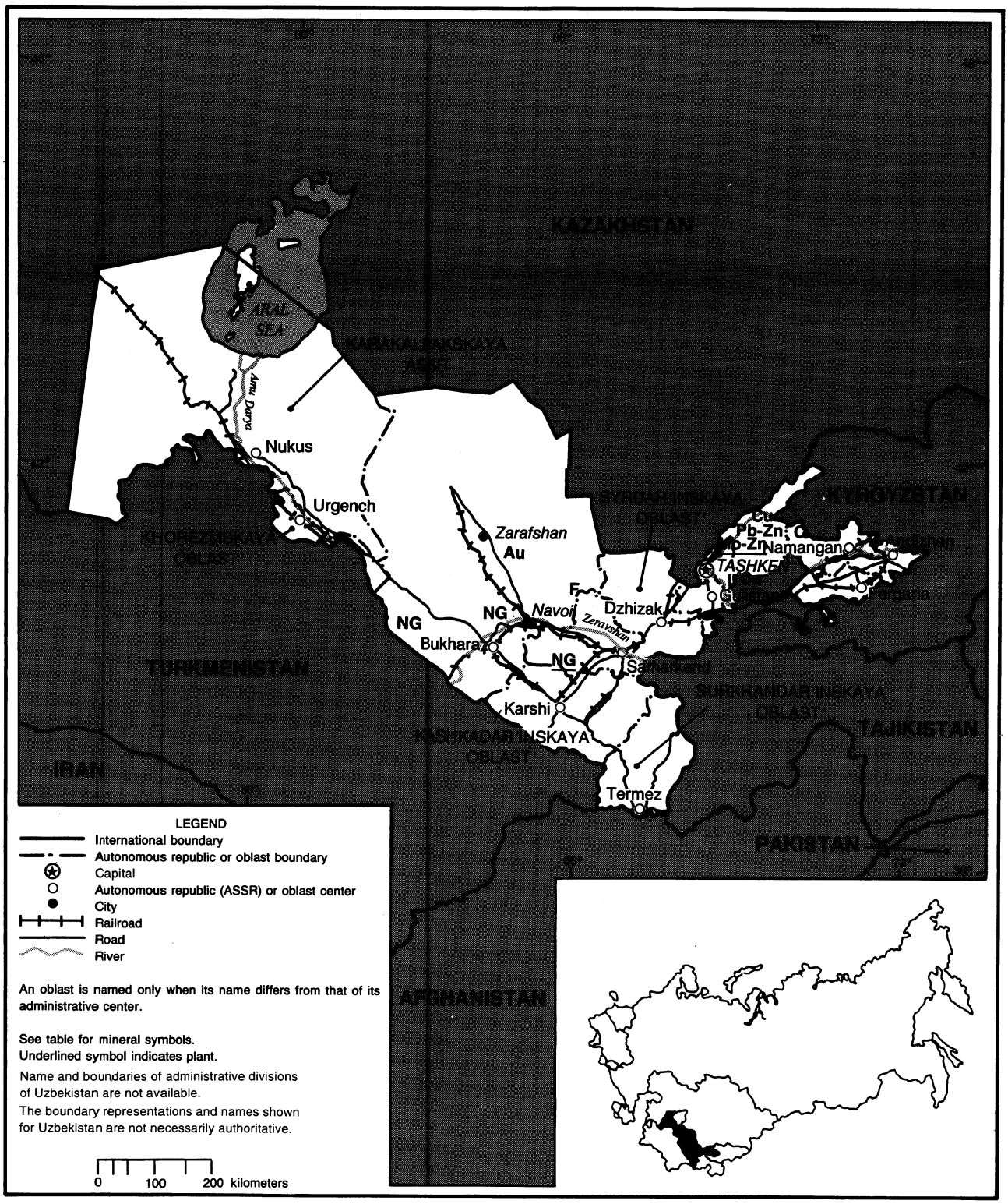
(Million metric tons unless otherwise specified)

Commodity		Reserve[e]
Clays:		
Ball clay		300
Fire clay		15,000
Kaolin (china clay)		2,000
Coal (all)	billion metric tons	3
Fluorspar	thousand metric tons	2,000
Natural gas	billion cubic meters	1,265
Petroleum, crude		1,790
Potash (K_2O content)	thousand metric tons	25,000
Tin (Sn content)	do.	90
Tungsten (W content)	do.	20

[e]Estimated.

UZBEKISTAN

AREA 447,400 km² **POPULATION 21.6 million**



THE MINERAL INDUSTRY OF

UZBEKISTAN

By Richard M. Levine

Uzbekistan was the third most populous state of the former U.S.S.R. and the fourth largest in land area. It is better positioned financially than most other former Soviet republics because of its mineral wealth. It is one of the world's largest producers of gold with output, reportedly, in the range of 80 tons per year, which is a significant source of foreign currency earnings. Uzbekistan is a large producer of natural gas and also produces coal, nonferrous metals, oil, and uranium. Although Uzbekistan was facing many of the uncertainties associated with the breakup of the former U.S.S.R., it was cushioned somewhat more than some of the other former republics because of its mineral wealth.

GOVERNMENT POLICIES AND PROGRAMS

Uzbekistan was negotiating with foreign investors to develop some of its major mineral industries and had worked out an agreement with the Newmont Mining Corp. of the United States to participate in the development of its major gold deposit at Muruntau. The Uzbek Government also had developed a program to attract foreign investment in its construction materials industry to lessen dependence on imports from former republics.

PRODUCTION

Uzbekistan was a major producer of gold, natural gas, and nonferrous metals. The nonferrous metals industry included the mining of bismuth, copper, molybdenum, tin, tungsten, and lead and zinc, and the production of copper and zinc metals at the Amalyk mining and metallurgical complex and tungsten metal at the Chirchik metals plant. Uzbekistan produced mineral fuels including coal, gas, oil, and uranium and had one of the former U.S.S.R.'s largest gas processing facilities at Mubarek. Uzbekistan also produced significant quantities of industrial minerals including feldspar and fluorspar as well as a range of minerals for the construction industry. *(See table 1.)*

STRUCTURE OF THE MINERAL INDUSTRY

In 1992 the major mineral-producing enterprises in Uzbekistan were state owned, although as with all former Soviet republics, plans were being formulated and enacted for some forms of privatization. *(See table 2.)*

COMMODITY REVIEW

Feldspar.—Uzbekistan produced more than 100,000 tons of feldspar annually, which was about one-third of the output of the former U.S.S.R. Uzbekistan's feldspar reserves, reportedly, were 37 million tons. Feldspar deposits are located in Samarkand and Toshkent oblasts and the Karakalpak republic.

Gold.—The President of Uzbekistan, in an interview with German journalists, stated that his country was producing 80 metric tons of gold per year and that there were plans to develop new gold fields, introduce new mining equipment at existing operations, and build a new plant to produce gold bars. The President reportedly told Japan's Deputy Minister of Finance that Uzbekistan planned to double gold extraction in the near future. Uzbekistan reportedly has between 2,500 and 3,000 metric tons of gold reserves, of which 1,000 tons is economic reserves. The major increase in gold production is planned to come from the Kauldy deposit where the ore reportedly averages 9 to 20 grams per ton and also from the Kokpatasskoe deposit where development already has begun. Gold production also will be significantly increased by employing leaching technology to the large dumps at Uzbekistan's major gold field, the Muruntau deposit. The Newmont Mining Corp. of the United States is engaged in a joint venture in Uzbekistan to process the material in these dumps. The European Bank for Reconstruction and Development announced that it intends to help finance the Newmont joint venture.

Silver.—Geologists from Uzbekistan reported preparing three veined silver deposits for industrial exploitation in the central Kyzylkum region. Previously Uzbekistan produced byproduct silver. The silver ores also contain cobalt, gold, nickel, and platinum-group metals that can be extracted as byproducts. Based on these reserves, silver production in Uzbekistan reportedly has the potential to triple in the near future.

Strontium.—Plans call for the development of a celestine ore deposit in the Surkhandarinskaya region of southern Uzbekistan to extract strontium; development will be by open pit mining, with foreign funding being sought for this project. Strontium in the former U.S.S.R. had been produced in Kazakhstan, Russia, and in very small amounts in Ukraine.

Reserves

Uzbekistan has a diverse range of

mineral resources. Metals include bismuth, copper, gold, iron, lead-zinc, molybdenum, silver, strontium, tin, and tungsten; industrial minerals include bentonite, feldspar, fluorspar, graphite, kaolin, salt, and talc; and fuels include coal, natural gas, petroleum, and uranium. Reserve figures, however, for many of these commodities are not yet available.

Table 3 lists available reserve figures or estimates, which are mostly for industrial minerals. Reserves in Uzbekistan were assessed according to the Soviet classification system, which is not comparable to the system used in the United States. The economic criteria used in this system were designed for a centrally planned economy that did not account for production costs in the same way as in a market economy system. Minerals classified in this system as reserves would not necessarily correspond to the Western definition of reserves (i.e., material economically exploitable under present market prices with existing technology). For a full explanation of the Soviet reserve classification system, refer to the reserve section in the chapter on Russia. *(See table 3.)*

INFRASTRUCTURE

Uzbekistan is bordered by Kazakhstan to the north, Turkmenistan to the south, and Kyrgyzstan and Tajikistan to the east. The landlocked country contains a portion of the Aral Sea, the world's fourth largest inland sea, which is in the process of drying up as a result of one of the world's worst environmental catastrophes. The drying up of the Aral Sea is causing serious economic and health problems. Agricultural lands and the population of portions of Uzbekistan are being affected by salts and contaminants blown from the dry sea bottom and also by climatic changes resulting in a hotter, dryer climate less favorable for agriculture. The Aral Sea is fed by two major rivers: the Amudarya, which flows through Uzbekistan, and the Syrdarya, which flows through Kazakhstan. A significant portion of the waters from these rivers was being diverted for irrigation, which was one of the instigating causes for the drying up of the Aral Sea. As of 1990, Uzbekistan had 3,460 km of railroads, not including industrial lines, and 78,400 km of highways, of which 67,000 km was hard surfaced. The country also has an extensive gas pipeline network, and natural gas provides about two-thirds of the country's energy.

OUTLOOK

Uzbekistan is in a position to maintain a favorable trade balance because of its large gold output and reserves and because it supplies a significant portion of its own energy consumption. The mineral industry will contribute even more to Uzbekistan's economy as gold production increases to possibly double its current level. Still, many of Uzbekistan's other mineral industries are faced with problems similar to those in other former Soviet republics. Its nonferrous metals industries and industrial minerals industries are facing shrinking markets in the states of the former U.S.S.R. as well a breakdown in the former system that supplied parts and equipment as well as subsidies to these mineral industries. These industries must now assess their ability to compete on world markets, and in particular it will be necessary to assess energy and transport costs in determining the viability of these mineral industries.

TABLE 1
UZBEKISTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES

(Metric tons unless otherwise specified)

Commodity	1992
Bismuth	15
Cement	6,000,000
Coal	5,500,000
Copper:	
Metal content of ore	80,000
Blister	75,000
Refined	77,000
Feldspar	100,000
Fluorspar	100,000
Gold	80
Lead, metal content of ore	22,000
Natural gas billion cubic meters	41,000
Petroleum, crude	2,500
Steel, crude	800
Tungsten, W content of ore	300
Zinc:	
Metal content of ore	60,000
Metal, smelter output	65,000

TABLE 2
UZBEKISTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity*
Bismuth	Ustarasayskoye deposit	Chatkalo-Kuraminskiy Region	20.
Coal	Central Asian coal association mining Angren brown coal deposit	Angren Region	6,000,000.
Copper, metal content of ore	Almalyk mining-metallurgical complex	Kalmakyrskoye, Sarychekinskoye deposits	100,000.
Metal	Almalyk refinery	Almalyk	100,000.
Feldspar	Karichasayskoye and other deposits	Deposits in Samarkand and Toshkent oblasts and Karakalpak Republic	120,000.
Fluorspar	Agata-Chibargatinskoye, Naugiskenskoye deposits	East of Tashkent	NA.
Gold	Muruntau deposit	Navoi oblast	85.
Kaolin	Central Asian coal association	Angren deposit	7,000,000.
Lead-zinc, metal content of ore	Almalyk mining and metallurgical complex	Uchkulachskoye deposit	60,000 (lead).
Do.	do.	do.	80,000 (zinc).
Zinc metal	Almalyk refinery	Almalyk	120,000.
Molybdenum	Almalyk mining and metallurgical complex	Kalmakyrskoye, Sarychekinskoye deposits	NA.
Natural gas liquids	Mubarek gas processing plant	Mubarek	1,200,000.

See footnotes at end of table.

TABLE 2
UZBEKISTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1992

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity[e]
Petroleum and natural gas billion cubic meters	More than 40 oil and gas deposits and more than 15 gas deposits under exploitation	Oil deposits in Fergana and Surkhandarinskaya oblast, major gas deposits: Dzharkakskoye, Gazlinskoye, Mubareksoye, and Shurtanskoye	45 (natural gas).
Do. do.	do.	Oil deposits: Khaudagskoye, Uchkyzylskoye, Kokaytinskoye in Surkhandarinskaya oblast; Palvantashskoye, Yashiy Alamyshikskoye, Sharikhan-Khodzhiabadskoye in Fergana oblast	3,000,000 (petroleum).
Tin	Karnabskoye, Lapasskoye deposits	Karnab Region	NA.
Tungsten, W content of ore	Sargardonskoye, Oygaingskoye, Lyangarskoye, Karatyubinskoye deposits	Koytash, Uga, Lyangar regions	500.
Tungsten, metal	Chirchik metals plant	Chirchik	NA.
Sulfur	Mubarek gas processing plant	Mubarek	2,000,000.
Uranium	Navoi mining complex	Navoi oblast	NA.

[e]Estimated. NA Not available.

TABLE 3
UZBEKISTAN: RESERVES OF MINERAL COMMODITIES FOR 1992

(Thousand metric tons unless otherwise specified)

Commodity	Quantity
Bentonite	3,900
Coal:	
Bituminous	53,000
Brown	2,000,000
Copper, ore, 0.4% Cu	1,100,000
Feldspar	37,000
Gold	1
Graphite	2,300
Kaolin	46,000
Lead, ore, 1.0% Pb	80,000
Potash, K_2O content	93,500
Salt	8,870,000
Sodium sulfate	65,900
Tungsten, W content of ore	35
Zinc, ore, 1.2% Zn	80,000

MAP SYMBOLS

Commodity	Symbol
Alunite	Alu
Alumina	Al
Aluminum	AL
Andalusite	And
Antimony	Sb
Arsenic	As
Asbestos	Asb
Asphalt	Asp
Barite	Ba
Bauxite	Bx
Bentonite	Bent
Beryllium/beryl	Be
Bismuth	Bi
Bitumen (natural)	Bit
Boron	B
Bromine	Br
Cadmium	Cd
Calcium/calcite	Ca
Carbon black	CBl
Cement	Cem
Cesium	Cs
Chromite	Cr
Clays	Clay
Coal	C
Cobalt	Co
Columbium (niobium)	Cb
Copper	Cu
Corundum	Cn
Cryolite	Cry
Diamond	Dm
Diatomite	Dia
Dolomite	Ds
Emerald	Em
Emery	E
Feldspar	Feld
Ferroalloys	FA
Ferrochrome	FeCr
Ferromanganese	FeMn
Ferronickel	FeNi
Ferrosilicon	FeSi
Fertilizer	Fz
Fluorspar	F
Gallium	Ga
Garnet	Gt
Gemstones	Gm
Germanium	Ge
Gold	Au
Graphite	Gr
Gypsum	Gyp
Indium	In
Iron and steel	Fe
Iron ore	Fe
Jade	Jade
Kaolin	Kao
Kyanite	Ky
Lapis lazuli	Laz
Lead	Pb
Lignite	Lig
Lime	Lime
Limestone	Ls
Liquefied natural gas	LNG
Liquefied petroleum gas	LPG
Lithium	Li
Magnesite	Mag
Magnesium	Mg
Manganese	Mn
Marble and alabaster	Marb
Marl	Ma
Mercury	Hg
Mica	M
Molybdenum	Mo
Natural gas	NG
Natural gas liquids	NGL
Nepheline syenite	Neph
Nickel	Ni
Nitrates	Nit
Nitrogen (ammonia plants)	N
Ochre	Oc
Oil sands	OSs
Oil shale	OSh
Olivine	Ol
Opal	Opal
Peat	Peat
Perlite	Per
Petroleum, crude	Pet
Petroleum refinery products	Pet
Phosphate	P
Pig iron	Pig
Pigments, iron	Pigm
Platinum-group metals	PGM
Potash	K
Pozzolana	Pz
Pumice	Pum
Pyrite	Py
Pyrophyllite	Pyrp
Quartz or quartzite	Qtz
Rare earths	RE
Rhenium	Re
Salt	Salt
Sand and gravel	S/Gvl
Sandstone	Ss
Selenium	Se
Sepiolite, meerschaum	Sep
Serpentine	Serp
Shale	Sh
Silicon	Si
Sillimanite	Slm
Silver	Ag
Soapstone	So
Soda ash, trona	NaAsh
Sodium sulfate	$NaSO_4$
Stone	St
Strontium	Sr
Sulfur	S
Talc	Tc
Tantalum	Ta
Tellurium	Te
Thorium	Th
Tin	Sn
Titanium (rutile or ilmenite)	Ti
Titanium dioxide (processed)	TiO_2
Tungsten	W
Umber	Um
Uranium	U
Vanadium	V
Vermiculite	Vm
Wollastonite	Wo
Yttrium	Y
Zinc	Zn
Zircon	Zr

MAP LEGEND

Symbol = Mine, including beneficiation plants, wells

Circled Symbol = Group of producing mines or wells

Underlined Symbol = Processing plant or oil refinery, including smelters and metal refineries

(Symbol) = Undeveloped significant resource

UNITS OF MEASURE AND ABBREVIATIONS

Unit of Measure

a =	year
° API =	American Petroleum Institute gravity
bbl =	barrel(s)
cal =	calorie(s)
c =	centi (prefix)
cm =	centimeter(s)
m^3 =	cubic meter(s)
d =	day(s)
dwt =	ton(s), deadweight
G =	giga (prefix)
GW =	gigawatt(s)
GW•h =	gigawatt hour(s)
g =	gram(s)
g/mt =	gram(s) per metric ton
ha =	hectare(s)
k =	thousand
kcal =	kilocalorie(s)
kg =	kilogram(s)
kL =	kiloliter(s)
km =	kilometer(s)
km^2 =	square kilometer(s)
kmt =	thousand metric ton(s)
kV =	kilovolt(s)
kW =	kilowatt(s)
kW•h =	kilowatt hour(s)
L =	liter(s)
M =	mega (prefix)
MW =	megawatt(s)
MW•h =	megawatt hour(s)
m =	meter(s)
M =	million
Mmt =	million metric ton(s)
m^2 =	square meter(s)
mt =	ton(s), metric
SCE =	standard coal equivalent
V =	volt
W =	watt
W•h =	watt hour

Abbreviation

APEC =	Asia and Pacific Economic Cooperation
API =	American Petroleum Institute
ASEAN =	Association of Southeast Asian Nations
EC =	European Community
EFTA =	European Free Trade Association
FTA =	Free Trade Agreement
GATT =	General Agreement on Tariffs and Trade
GDP =	gross domestic product
GNP =	gross national product
LNG =	liquefied natural gas (methane)
LPG =	liquefied petroleum gas (propane-butane)
NAFTA =	North American Free Trade Agreement
OECD =	Organization for Economic Cooperation and Development
OPEC =	Organization of Petroleum Exporting Countries
UN =	United Nations
UNDP =	United Nations Development Program