

THE MINERAL INDUSTRY OF

ROMANIA

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Although Romania was a modest regional producer of copper, lead and zinc, manganese, steel and ferroalloys, and industrial minerals, the country continued to be a significant producer of petroleum and natural gas. Romania's economy remained stable in 1996. The growth rate of the gross domestic product (GDP) increased by about 4% and industrial production increased almost 10% compared with respective levels achieved in 1995 (Mining Annual Review, 1997). In 1996, industry accounted for 36% of the GDP; the private sector's share of the GDP was about 60%.

In 1996, the production of most minerals in Romania also appeared stable. The sharp curtailment of state subsidies to industry during the 1990-92 period, especially for purchases of energy that were significantly below world market prices, resulted in a sharp readjustment of production plans of most of the country's mineral industries. In 1994-96, production costs for most minerals reflected energy input prices that were more in accord with market prices for energy than those in the preceding period. Romania's entire mineral industry continued to be owned and operated by the state either as directly Government-owned entities or as state-controlled corporations or companies in the process of denationalization. (See table 1.) The information provided in table 2 lists the names of administrative bodies as well as subordinate production units of the chief branches of the country's mineral industry.

Total export trade in 1996 amounted to US\$7.7 billion, an increase of about 4% compared with that of 1995. Similarly, imports amounted to US\$9.2 billion, an increase of almost 6% compared with those of 1995. Romania traded mainly with other European countries, with the largest share of both exports and imports transacted with Germany, Italy, and France. Also, Russia was a major exporter of mineral raw material to Romania. In 1996, Romania's exports of base metals (steel and nonferrous metal products) accounted for about 25% of total exports; exports of nonmetallic mineral products accounted for 14% of total exports. Exports of chemicals and related materials accounted also for 14%. Romania's imports of base metals in 1996 accounted for 8% of total imports; those of nonmetallic mineral products, for about 31%; and those of chemicals and related materials, for more than 11% (Romanian Government, press release [Romania Economics] accessed February 26, 1996, at URL <http://www.romaniabusines.com/rom.../economics/economics.html#ECOINDIC>).

The Government's National Agency for the Privatization and Development for Small and Medium Sized Enterprises was the country's designated agency for denationalizing and privatizing state-owned industries. Formerly centrally planned state-owned

enterprises were transformed and grouped into state-owned commercial companies, joint-venture enterprises with foreign participation, and the so-called "Regies autonomes." The designation "state commercial company" included small- to mid-sized state-owned enterprises that were to be denationalized. "Regies autonomes" included utilities, such as telecommunications, electric power, 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 would be able to lease or sell some assets to increase profitability. Regulations governing foreign investment were adopted and published in 1997 (Government of Romania, 1997).

The current law on environmental protection was adopted in 1995. The sections pertaining directly to the minerals industry are articles 14, 16, and 48. Article 14 describes the obligations new and former owners carry to restore environmental quality. Article 16, relates to the proscription of imports by Romania of raw or processed waste with the exception of those categories of waste that constitute a useful secondary resource of raw materials. Article 48 establishes procedures for monitoring soil and subsoil quality, and also requires plans for territorial development, exploratory drilling, geological and hydrogeological prospecting, and mining extraction activities (Monitorul Oficial, 1995).

In 1996, Romania produced bauxite from open pit and underground bauxite mining operations at Dobresti-Oradea. Alumina was refined from domestically produced and imported bauxite at alumina refineries at Oradea and Tulcea, operated by Soc Com Alor SA Oradea (Alor) and Soc Com Alum SA Tulcea (Alum). Romania's only primary aluminum smelter was at Slatina. Operated by Soc Com Alro SA Slatina (Alro), the Slatina primary aluminum enterprise had installed capacity to produce annually 150,000 metric tons (t) of primary aluminum from 6 potlines, each rated at 25,000 metric tons per year (t/yr) (Serjeantson, 1995).

Major activities in the aluminum sector during the year included plans for reorganization with agendas for modernization and denationalization. According to an industry spokesperson, the Ministry of Industry planned to raise production of aluminum close to full capacity levels. The reorganization of the aluminum sector also included a plan to combine all the plants in the sector into one vertically integrated group. Principally, this was to include the Alor and Alum alumina refineries and the Alro aluminum smelter. In contrast to the situation in the sector in 1996, when the smelter registered significant profits and the refineries losses, it was

anticipated that a vertical integration would ensure cost savings through the coordination of production. Additionally, a privatization plan involving the vertical integration of the aluminum industry was proposed by the management of Alro (Mining Journal, 1996).

In early 1996, the Balli Group of the United Kingdom, a trading company, acquired a 51% interest in the Alum alumina refinery. The Balli Group indicated plans to raise the capacity of the plant to 600,000 t/yr of alumina from 300,000 t/yr by 2003 (Mining Journal, 1996b; Standish, 1997).

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. At Baia Mare, an Outokumpu flash smelter was operated by Intreprinderea Metalurgica de Metale Neferoase. The company also operated an electrolytic copper refinery and a continuous caster at Baia Mare. At Zlatna, Intreprinderea Metalurgica de Metale Neferoase operated an Outokumpu flash smelter and an electrolytic refinery to process copper concentrates (Serjeantson, 1995).

Major activity in the gold sector during the year involved the formation of a new joint stock company, Arul S.A., by Esmeralda Exploration Ltd. (Esmeralda) of Australia. Romanian participants in the joint venture included the Lead and Zinc National Corporation, Geomin S.A., the Baia Mare Institute for Mining Research and Design, and the Baia Mare Enterprise for Mining Tools and Repair. Reportedly, Esmeralda, having won the tender for the gold exploration and mining project in the Baia Mare region, planned to invest US\$5.1 million in Arul S.A. Part of the investment was to be earmarked for gold ore processing technology (Mining Journal, 1996a).

Romania continued to mine small quantities of iron ore at Hunedoara and Napoca-Cluj. However, most feedstocks of ores and concentrates for the country's steel industry had to be imported, mostly from the republics of the former Soviet Union. The major steel mills operated in Caras-Severin, Calarasi, Cluj, Galati, Hunedoara, Resita, and Targoviste.

The Government's program for the steel industry for 2002 called for total steelmaking capacity to be 11 million tons (Mt), which Government specialists considered to be necessary to meet domestic and export needs. Before the revolution of 1989, Romania's installed annual steelmaking capacity exceeded 16 Mt. The plan to modernize the steel industry involved more than 25 projects in part designed to improve the mix of products, raise production efficiency, and decrease material inputs during a 10-year period. The total cost of the restructuring of Romania's steel industry was estimated at US\$2.6 million (Metal Bulletin, 1996a).

As part of the steel industry's modernization effort, Siderurgica S.A. of Hunedoara, Romania's largest producer of long products, planned to install a continuous billet caster by

yearend. Mannesmann Demag A.G. of Germany was to provide the caster, as well as a new electric furnace by yearend 1997. With the installation of the new furnace, the production of steel at Hunedoara would increase twofold. In 1996, Siderurgica S.A. operated one blast furnace, two 400-ton open hearth furnaces, two 50-ton electric arc furnaces (EAF) and two 100-ton EAF's. The new EAF unit would replace one the existing 100-ton unit and the open hearth operations also would be phased out (Metal Bulletin, 1996c). Siderca S.A. Calarasi, one of the country's major producers of steel, became the first steel mill in Romania to obtain private financing for modernization. About US\$38 million was funded through the international finance market. Mannesmann Demag A.G. of Germany again won a contract to supply modern equipment that was to include a 4-stand rail and section mill that would produce heavy rails up to 75 kilograms per meter and heavy section up to 500 millimeters in width, a ladle furnace, and a 80-ton EAF. A new continuous caster also was to be installed to produce blooms. The EAF and continuous caster were to enter production by yearend 1997 (Metal Bulletin, 1996d).

Romania's total exports of steel in 1995 amounted to 2.33 Mt, an increase of 15% compared with that of 1994. The major importers of steel products from Romania were member countries of the European Union (EU), chiefly Germany, Greece, and Italy (Metal Bulletin, 1996a). Additional foreign commercial issues pertaining to the steel sector included the decision by the Government of Romania to rescind its ban on steel scrap, which had been a source of complaints from the EU. According to Romanian Government sources, full liberalization of scrap trade was to go into effect by December 31, 1997. Romania instituted a comprehensive ban on ferrous scrap exports in 1995 as a response to concerns of domestic steel producers when increased exports caused a major increase in domestic prices. The Independent Steel Works Association (EISA) was a major European Union-based organization to oppose protectionist measures on steel scrap by Romania and other former centrally planned economy countries (Metal Bulletin, 1996a).

Generally low-grade lead and zinc ore was produced at underground mines in the Baia Mare, Borsa, Certej, and Rodna Districts, grading from 0.4% lead and 0.6% zinc to 1.0% lead and 1.2% zinc. 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 proved to be uneven. Metal recovery in concentrate reportedly has ranged between 50% and 75% for lead and zinc. Smelting and refining of lead and zinc from domestic and imported ores and concentrates was carried out at the Imperial Smelter at Copsa Mica, with capacities to produce about 42,000 t/yr lead and 66,000 t/yr zinc.

Romania produced a broad range of industrial minerals that, among others, included barite, bentonite, diatomite, feldspar, graphite, gypsum, kaolin, and limestone, which were produced at about 60 deposits throughout the country. The need to modernize Romania's economy and infrastructure has increased the demand for many of these commodities.

Before 1996, Romania operated eight cement plants that produced cement and cement asbestos at Alesd, Bicaz, Cimpulung, Deva, Fiena, Medgidia, Targu-Jiu, and Turda. Additionally, two plants at Hoghiz and Brasov produced plates and tubes of cement asbestos. These enterprises also produced refractory bricks and were engaged in other commercial operations such as melting of basalt and sorting limestone. After 1989, the cement industry was reorganized into seven companies: Romcim SA, with plants at Alesd, Medgidia, Hoghiz, Targu-Jiu, Oradea, and Aghires; Moldocim SA Bicaz; Cimus SA Campulung Muscel; Casial SA Deva; Romcif SA Fieni; Cimentul SA Turda; and Prescon SA Brasov.

At the start of 1996 Romania's total installed cement producing capacity amounted to more than 17 million tons per year (Mt/yr), of which 94% was based on the dry process and 6% on the wet process. In 1996, Romania's total cement production amounted to just more than 6.8 Mt or about 40% of capacity. Annual exports of about 2.4 Mt have helped to maintain operations during the post 1989 period of economic transition, which has been marked by a fall in domestic demand. However, demand in the near term was expected to improve as Romania's GDP was forecasted to grow annually by 4%, at least through the 1997 to 2000 period (Albulescu, 1996).

Romania produced a wide variety of mineral fuels that included coal, natural gas, and petroleum in quantities that were sufficient to meet domestic needs. Romania was among the world's oldest petroleum producers. The country reached its apogee of natural gas and petroleum output in 1976, when 14 Mt of petroleum and 1.33 trillion cubic feet were produced. From 1976 to 1989 Romania's output of both commodities declined by more than 40%. The decline was attributed to depletion as well as to outdated oilfield technology (BBC, 1994). Petroleum and natural gas industry spokespersons have indicated that total recoverable reserves of petroleum at deposits currently under exploitation in Romania amounted to 206 Mt, an amount that would be sufficient for about 30 years at a production rate of about 6.5 Mt/yr. But it was also believed that additional, significant resources of both natural gas and petroleum could be found in structures at depths greater than 3,000 meters. Romania's oil refineries had the capacity to process more than 33 Mt/yr of petroleum.

Romania's inland system of ways and communications comprised 85,978 kilometers (km) of railroads, highways, and inland waterways. The railroad system included 10,860 km of

1,435-meter (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 comprised 35,970 km of paved roads, 27,729 km of roads surfaced with gravel and crushed stone, and 9100 km of unsurfaced roads. The country's inland waterways (Danube River) comprised 1,724 km with riverine ports at Giurgiu, Drobeta-Turnu Severin, and Orsova. Sea ports on the Black Sea were Braila, Constanta, Galati, and Mangalia. Romania's merchant fleet consisted of 262 ships with a total weight of 5,207,580 deadweight tons. Additionally, crude petroleum was carried in 2,800 km of pipeline, refined products in 1,429 km of pipeline, and natural gas in 64,000 of pipeline.

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 minerals industry. However, the rationalization of Romania'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.

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

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996
METALS					
Aluminum:					
Bauxite, gross weight	175,000	186,000	184,100	175,000 r/	175,200
Alumina, calcined, gross weight	280,000	293,000	301,576	322,774 r/	258,535
Ingot including alloys:					
Primary	112,000	116,000	119,600	140,500 r/	140,872
Secondary	6,710	3,700	2,814	3,446 r/	3,654
Total	118,710	119,700	122,414	143,946 r/	144,526
Bismuth, mine output, Bi content e/	50	40	40	40	40
Cadmium metal, smelter e/	10	10	4	5	5
Copper:					
Mine output, Cu content	24,700	25,300	26,034	24,520 r/	24,310
Metal:					
Smelter:					
Primary	23,400	25,200 e/	23,499	23,355 r/	32,565
Secondary e/	1,000	1,000	1,000	1,000	1,000
Total	24,400	26,200	24,499	24,355	33,565
Refined: e/					
Primary	21,000	22,000	22,113	22,013 r/	28,323 3/
Secondary	3,080	3,000	4,600 3/	5,000	5,000
Total	24,080 3/	25,000 3/	26,713 3/	27,013 3/	33,323 3/
Gold, mine output, Au content e/ kilograms	3,700 3/	4,000	4,000 3/	4,000	4,000
Iron and steel:					
Iron ore:					
Gross weight thousand tons	1,229	855	951	565 r/	650 e/
Metal content do.	180	130	198	147 r/	175
Metal:					
Pig iron do.	3,111	3,189	3,496	4,203	4,025
Ferroalloys:					
Ferrochromium	6,980	3,910	3,885	15,053	9,650
Ferrosilicon	23,300	23,600	28,385	19,320	
Ferromanganese	27,100	16,400	31,295	28,410	20,150
Ferrosilicomanganese	28,200	22,000 e/	35,215	57,149	78,590
Silicon metal e/	430 3/	400	300	300	300
Steel, crude thousand tons	5,376	5,446	5,800	6,557 r/	6,082
Semimanufactures:					
Pipes and tubes do.	449	414	472	546 r/	594
Rolled products do.	3,865	4,092	4,510	4,959 r/	4,472
Lead:					
Mine output, Pb content	16,697	16,929	23,838	23,194 r/	18,712
Smelter, primary	13,900	9,000 r/	12,000 e/	12,000	12,000
Refined:					
Primary	14,400	11,800	22,000 e/	22,000 e/	20,000
Secondary	1,750	5,610	4,000 e/	4,000 e/	4,000
Total	16,150	17,410	26,000 r/	26,000	24,000
Manganese:					
Ore, gross weight thousand tons	100	125	137	130	150
Concentrate: 4/					
Gross weight do.	15	15	108	104	104
Mn content do.	4	4	28	27	26
Silver, mine output, Ag content	73	70	70	60	60
Zinc:					
Mine output, Zn content	25,813	28,017	35,357	34,730	30,945
Metal, smelter, primary and secondary	11,600	14,100	18,500	18,000 e/	15,000
INDUSTRIAL MINERALS					
Barite, processed	118,100 r/	12,050 r/	29,274 r/	18,169 r/	12,541
Cement, hydraulic thousand tons	6,271	6,240	6,676	6,842 r/	6,858
Clays: e/					
Bentonite:					
Run of mine	120,000	120,000	100,000	100,000	100,000
Marketable	50,000	50,000	41,056 3/	42,277 r/ 3/	43,540

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996
INDUSTRIAL MINERALS--Continued					
Clays e/--Continued:					
Kaolin:					
Run of mine	200,000	200,000	150,000	150,000	145,000
Marketable	60,000	60,000	47,566 3/	49,024 3/	45,200
Diamonds, synthetic industrial	thousand carats	--	-- e/	--	--
Diatomite	14,500	9,970	34,858	49,790 r/	60,420
Feldspar	27,700	87,700	31,123	30,920 r/	35,229
Fluorspar e/	15,000	15,000	15,000	15,000	15,000
Graphite	2,300	3,160	2,335	2,179 r/	2,931
Gypsum e/	thousand tons	800	100	111 r/	72
Lime	do.	1,946	1,738	1,763 r/	1,712
Nitrogen, N content of ammonia	do.	1,421	1,328	--	1,000 e/
Pyrites, gross weight	do.	965	560	350	250 e/
Salt:					
Rock salt	do.	966	808	892	669 r/
Other	do.	1,590	1,380	1,310	1,820 r/
Total	do.	2,556	2,188	2,202	2,489 r/
Sand and gravel	do.	4,000	4,400	831	901
Sodium compounds, n.e.s.:					
Caustic soda	do.	372	330	298	383 r/
Soda ash, manufactured, 100% Na ₂ CO ₃ basis	do.	452	371	449	504 r/
Sulfur: e/					
S content of pyrites	do.	385	225	148	97 r/
Byproduct, all sources	do.	200	200	200	200
Total e/	do.	585	425	348	298
Sulfuric acid	do.	572	527	491	477
Talc	do.	6,330	9,000	8,952	9,976
MINERAL FUELS AND RELATED MATERIALS					
Carbon black	do.	27,000	27,400	19,325	21,555
Coal:					
Run of mine:					
Anthracite and bituminous	thousand tons	5,620	5,760	6,748	6,356 r/
Brown	do.	622	601	450	571 r/
Lignite	do.	35,000	36,100	36,000	36,385 r/
Total	do.	41,242	42,461	43,198	43,312 r/
Washed (produced from above):					
Anthracite and bituminous:					
For coke and semicoke production	do.	1,030	465	444	349
For other uses	do.	3,070	3,760	921	800 e/
Brown	do.	610	573	--	--
Lignite	do.	33,700	35,000	39,182	39,979
Total	do.	38,410	39,798	40,547	41,128
Coke:					
Metallurgical	do.	2,648	2,403	2,664	3,164 r/
Other	do.	260	198	--	220 r/
Total	do.	2,908	2,601	2,664	3,384 r/
Fuel briquets (from brown coal) e/	do.	400	70	71	-- r/
Gas, natural, Gross					
Associated	million cubic meters	7,000 e/	7,000 e/	1,499	1,410 r/
Nonassociated	do.	15,100 e/	14,300 e/	18,099	17,606 r/
Total	do.	22,100 e/	21,300 e/	19,598	19,016 r/
Petroleum:					
Crude:					
As reported	thousand tons	6,620	6,680	6,737	6,717 r/
Converted	thousand 42-gallon barrels	49,600	50,600	50,460	50,270
Refinery products e/	do.	95,000	95,000	115,200	145,000 r/

e/ Estimated. r/ Revised.

1/ Includes data available through December, 1997.

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; 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: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Soc Com Alor SA	Plant at Oradea, near Hungarian border	250
Do.	Dept. of Nonferrous Metals	Plant at Tulcea, Danube Delta	270
Aluminum, primary	Alro SA (Slatina Aluminium Enterprise)	120 kilometers west of Bucharest	270
Barite	Ministry of Industry	Ortra mine, Rosia Montana, southwest of Cluj	100
Bauxite	do.	Oadea-Dobresti Mining Complex, near Hungarian border	350
Cement	Ministry of Industry	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 Industry	Valea Jiului Mining Complex, near Hunedoara	10,400
Lignite	Ministry of Industry, 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)	Dept. of Nonferrous Metals	Baia mare, Baia-Sprie, and Cavnic mines, northwest area near Ukraine's border; Rosia Montana, Noud, Borsa Balan, and Lesul-Ursului mines--in east-west arc along Carpathian range; Rosia Pieni mines; and Moldova Noua mines, southwest near Danubian border with Yugoslavia	180
Metal	Ministry of Industry, Metallurgical enterprise for Nonferrous Metals	Baia Mare, in northwest near Ukraine's and Hungary's borders	35
Do.	do.	Zlatna smelter, Apuseni, in northwest Romania	13
Ferroalloys	Ferom-Joint Stock Co.	Complex at Tulcea	280
Iron ore	Ministry of Industry	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 Ukraine's and Hungary's borders	24
Do.	do.	Balan Mine, 50 kilometers southwest of Piatra Neamt	10
Lead metal	Metallurgical Enterprise for Nonferrous Metals	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.	Ministry of Industry, Dept. of Energy	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, refined	do. Ministry of Industry, Dept. of Energy	Refineries at Brazil, Pitesti, Onesti, Barcau, Borzesti, Brasov, Cimpina, Darmanesti, Oradea, Ploesti, Teleajen, and Navodari	664,000
Steel	Ministry of Industry; Sidex S A Galati	Danube River, north of Brail, near the Ukrainian border	10,000
Do.	Siderurgica SA Hunedoara	West-central Romania, near Calan	4,000
Do.	CSR SA Resita	Southwestern Romania, about 20 kilometers southwest of Caransebes	1,200
Do.	Siderica SA Calarasi	Near the Bulgarian border close to the Danube	600
Zinc in ore	Ministry of Industry, Baia Mare	Baia Mare, near Ukraine's and Hungary's borders	60
Zinc metal	Ministry of Industry, Metallurgical Enterprise for Nonferrous Metals	Imperial Smelter at Copsa Mica, Tirnava River, central Romania	66