

RUSSIA

By Interfax-CAN

Russia is one of the world's largest mineral producers. It possesses 12% of the world's oil reserves, 32% of its gas, 11% of its coal, 31% of its potassium salts, 21% of cobalt, 25% of iron, 15% of zinc, and 10% of lead reserves. It also possesses enormous reserves of nickel, gold, silver, platinum group metals and diamonds. Russia accounts for 9% of world oil production, 24% of natural gas production, 20% of nickel and cobalt production, 5%-7% of coal and iron ore production, a large portion of production of some non-ferrous and rare earth metals, palladium, platinum, diamonds, apatite and potash.

The Russian economy continues to improve and GDP last year grew by 4.2%. Production in the five key sectors (industry, agriculture, construction, transport and retail) increased by 3.9% in 2002. Industrial output rose by 3.7%, and agricultural output by 1.7%. Capital investment increased by 2.6%, cargo turnover rose 5.6%, including rail freight (+5.2%), and retail turnover was up 9.1%. Consumer inflation was 15.1% in 2002 as a whole. Foreign investment in Russia totalled US\$19.78 billion in 2002, up 38.7% year-on-year. Industry received US\$7.33 billion of this total, of which the fuel sector received US\$1.94 billion, steel US\$1.19 billion and nonferrous metallurgy US\$1.28 billion.

Russia's output of ferrous metals increased by 3.0% in 2002. The country produced 46.27 Mt of pig iron (+2.8%), 59.8Mt of raw steel (+1.3%) and 48.7 Mt of rolled products (+3.9%). Nonferrous metals output grew by 6%. Zinc production from imported raw materials increased by 5.8% and nickel output jumped by 34.0%. However, primary aluminium production from imported ores fell by 2.3%. Tungsten and molybdenum output fell by 4.5%: molybdenum concentrate production grew by 9.6% but metal output fell by 38.8%. Production of tungsten concentrate was down by 2.8% and there was a 17.8% decline in the production of tungsten metal. Rolled products output increased by 5.6% for titanium, 5.1% for copper, 11.7% for aluminium and 3.2% for brass, but fell 6.1% for bronze roll.

Russia exported ferrous metals worth US\$8.1 billion in 2002, 13.3% more than in 2001. Exports to the CIS were up 7.7% to US\$1.4 billion and exports to the rest of the world grew 15.5% to US\$6.7 billion. Exports grew in value because Russia shipped more in the way of finished metals abroad in the second half of 2002. Also, export prices for the metals grew. In addition, Russia exported more coke, pig iron, ferroalloys, steel tubes and metalware. Exports were buoyed thanks to the abolition of export duty on ferrous metals and an improvement in world markets during the second half of 2002.

In the nonferrous metals sector, Russia's exports included 278,600 t of primary nickel (+48.1%) worth US\$1.71 billion; 2.75 Mt of primary aluminium worth US\$2.86 billion and 518,500 t of refined copper worth US\$711 million.

In tonnage terms, exports of aluminium and copper fell by 10.3% and 12.4% respectively. All exports went to countries outside the CIS.

The level of new production capacity slowed during 2002. Just 2,500 t of new aluminium smelting capacity was introduced compared with 10,000 t in 2001. There was about 150,000 t/y of new copper ore mining capacity. There was around 771,000 t of new iron-ore concentrate capacity, and 140,000 t of crude steel and 1.8 Mt of finished roll, including 500,000 t of cold-rolled sheet were brought on line. Russia also introduced 1.0 Mt of new coal mining capacity (7.44 Mt in 2001), and 4.22 Mt of new coal beneficiation capacity (3 Mt in 2001).

Little progress was made with production-sharing agreements (PSAs) during 2002. Of a total of 27 PSAs, only three are actually being implemented. They include the Sakhalin 1 and Sakhalin 2 hydrocarbon projects and the Kharyaginskoye oil deposit. The other 24 PSAs have not even been negotiated.

Meanwhile, President Vladimir Putin signed a law, including two oil prospects in the Caspian, in the list of projects that may be developed under PSAs. The Yalamo-Samursky and Tsentralny blocks are located at a sea depth of 190-800 m, and located 400-450 km from Astrakhan and 180-150 km from Dagestan. Total reserves in the two blocks are estimated at about 770 Mt. Lukoil, a Russian oil major, owns the licences for both blocks. It is envisaged that capital investment for the development of the Yalamo-Samursky block will exceed US\$5.5 billion, with a payback period of 12-14 years. Over the 25 years the block is developed the state will receive US\$11 billion. If forecast reserves are proven, oil production may begin in 2007 and could total about 10 Mt/y of oil until 2025. Capital investment in the Tsentralny block is estimated at US\$11.3 billion and the planned payback period at about 20 years. Oil production may begin in 2009 and on average it is planned to produce up to 20 Mt/y until 2025.

In December 2002, the Russian parliament, the Duma, voted in favour of making the Natalkinskoye gold deposit in the Magadan region eligible to be developed under PSA. It is the region's biggest known gold deposit with a proven reserve of 245.26 t of gold. The ore has an average grade of 2.53 g/t Au, but the Russia's Institute for Mineral Economics (VIEMS) calculates that the cut-off grading to achieve a profit margin is 5.48 g/t. With this in mind, the licence-holder, Rudnik im Matrosov, intends to list some of its commercial reserves as non-commercial reserves, confirm the new data with the State Committee for Reserves and thereby win a two-year tax exemption in a bid to raise profit margins. The Duma thinks a PSA will help to raise the capital for the deposit's full-scale development. Some US\$211 million will be needed for this as well as for the introduction of processing technology to increase gold recoveries from 79.6% to 85%. Rudnik im Matrosov's shareholders include the state (38%) and employees (55.7%).

As regards mineral exploration, Russia will adopt a procedure this year whereby exploration licences will be issued only where an exploration work

programme accompanies the application. These programmes will be based on state programmes for geological exploration in potential areas, and federal and regional programmes for socio-economic development.

There are also plans to complete the draft principles of state policy towards mineral resources and subsurface resource use. This is a key document and, along with the measures to implement it, will become the basis for developing principles regarding the maintenance of Russia's mineral and raw material base, and for state regulation of the study and use of subsurface resources. Russia will also introduce a new classification for oil, gas, and gas condensate resources and reserves, based on the UN classification system.

According to the Natural Resources Ministry (NRM), Russia could potentially earn US\$10.6 billion from the development of hydrocarbon resources on the country's continental shelf. In 2003, the NRM plans to continue its programme for licensing and conducting geological exploration for hydrocarbon resources on the continental shelf of the Arctic and Far Eastern seas for 2002-2005. The programme outlines 44 sections with combined recoverable reserves of about 8,000 Mt of oil equivalent. These sections will be offered at tenders and auctions. Russian waters cover about 6.3 Mkm², which amounts to about 21% of the area of world oceans. This includes about 3.9 Mkm² of shelf and 2.4 Mkm² of deep-water areas. At least 4.3 Mkm² of this area, including 0.4-0.5 Mkm² of deep waters could potentially hold oil and gas. There are 36 discovered oil and gas deposits on the Russian shelf, including the Shtokmanov field (in the Barents Sea, with reserves of 3,200 billion m³ of gas), the Dolginskoye and Prirazlomnoye oil fields (the Pechora Sea), and the Piltun-Astokhskoye field (northeastern Sakhalin shelf). More than ten major oil and gas basins have now been discovered on the Russian shelf, and there has been preliminary exploration of seven major oil and gas areas: Northern Sakhalin, Pechora Sea, Eastern Barents, Southern Kara, Obsko-Tazovsky, North Caspian, Middle Caspian and Kaliningrad.

Russia is also intent on boosting its mining industry. The Chelyabinsk region has drafted a plan for the development of its mineral resource base in the period from 2003 to 2007. The plan is intended to determine the region's priorities in the development of mineral resources and industry so as to ensure sustained economic growth in the long term. It calls for comprehensive geological exploration of every mineral resource in order to determine reserves, and prepare for the development of new sites. Production in 2003-2007 is expected to grow by more than 2,000 Mt for iron ore, 600,000 t for copper-zinc sulphide ores, 200,000 t for nickel ore, 100,000 t for molybdenum ore and 30 t for gold. Chelyabinsk currently suffers annual shortages of 16 Mt of iron ore, 40,000 t of copper in concentrate and 250,000 t of chromium ore. The region has a monopoly position in Russia when it comes to production of refractory raw materials, graphite, talc, moulding materials, high-quality porcelain clay and facing materials.

The Mining Business Institute at the Urals branch of the Russian Academy of Sciences, with input from industry institutes, has completed a concept paper for the development of mining in the Sverdlovsk regions to the year 2015. The

paper targets iron-ore production in the region at 55.75 Mt in 2005, 56.55 Mt in 2010 and 56.15 Mt in 2015, respectively 15.4%, 17.1% and 16.3% more than in 2001. The regional metallurgy ministry estimates that the Sverdlovsk region will increase copper ore production by 210% by 2015, and generally maintain production of bauxite. The expected annual 3.4% growth in bauxite demand will be met by the Sredne-Timanskoye deposit. Most of the region's nickel-cobalt ores are at the Serovskoye deposit, which is being developed by Ufaleinikel. Preparations are under way to develop a new nickel-cobalt deposit.

First Mining Co., which holds a prospecting licence on the Novaya Zemlya islands (Arkhangelsk region), has received a licence to mine ores containing silver, zinc and lead. An investment of about US\$130 million will be needed. Mining is likely to start with the Pavlovskoye lead and zinc field on the Southern Island of the archipelago where reserves, as confirmed by the Russian Mineral Resources and Reserves Committee, are estimated at 1 Mt of contained lead and zinc. Exploration work will continue until September 2005.

Iron ore

Russia produced 84.24 Mt of iron ore last year, a 2.1% increase over 2001. Output of agglomerate rose by 2.7% to 4.32 Mt, iron-ore concentrate production rose by 3%, to 80 Mt and pellet output rose by 6.7% to 29.75 Mt.

Lebedinsky GOK (LGOK) produced 18.4 Mt of concentrate, up by 4.4%, and there are plans to increase production by 4.4% to 19 Mt in 2003. Production of briquettes is set to grow 10% to 1 Mt, which is the design capacity of the first phase of LGOK's briquetting plant. The company is actively using new technology based on Mexico's Hilza plant, with which LGOK has an 11-year licensing agreement to use its know-how. Gazmetall owns 81.5% of LGOK, and the Novolipetsk Metallurgical Combine holds 11.96% of stock.

Mikhailovsky GOK (MGOK), a major iron-ore producer from Russia's Kursk region, produced 15.13 Mt of commercial iron-ore, up 17% on 2001. The total includes 6.62 Mt of pellets (+20.4%). Concentrate production grew by 23.5% to 13 Mt, including 1.35 Mt of dried concentrate. MGOK plans to invest more than US\$10 million in new machinery in 2003, including three drilling rigs, three large dump-trucks and four bulldozers. Metalloinvest runs MGOK. ING Bank (Eurasia), an ING Group subsidiary, holds 40% of MGOK shares, Interfin Trade owns 5% and a large European company became owner of a blocking share (26%) in the spring of 2002.

Stoilensky GOK (SGOK), a major iron-ore producer from Russia's Belgorod region, increased output last year by 4.2% to 12.6 Mt. Concentrate production was 11.5 Mt (+4.9%) and agglomerate production was 1.47 Mt. SGOK conducted a series of upgrades at its beneficiation plant last year. The company is controlled by Metalloinvest.

Karelsky Okatysh, an iron-ore producer and member of the Severstal steel group from the Republic of Karelia, sold 6.39 Mt of iron ore pellets in 2002, up

5% from 2001. The company produced 6.95 Mt (+5%), 7.35 Mt of iron-ore concentrate (+5%) and mined 20 Mt of ore (+5%).

Magnitogorsk Metallurgical Combine (MMK), one of Russia's biggest steel mills, plans to conduct an intensive prospecting and evaluation programme at the Uitash iron-ore field in Bashkortostan. MMK, which is from the Chelyabinsk region, said it plans eventually to mine 2 Mt/y of ore, based on a probable reserve of 150-170 Mt. Only 10%-13% of MMK's ore is mined locally at present. The Government of Bashkortostan will contribute financially to the geological work at Uitash.

Aluminium

Russia is among the world's leading producers of primary aluminium, and is the biggest producer in the CIS. In 2002, production by the aluminium industry grew 1.2% year-on-year. Figures were down 4.7% for bauxite mining, but up 2.8% for alumina and 1.5% for primary aluminium. Russian Aluminium (RusAl) and SUAL (which operate the Irkutsk and Uralsky aluminium smelters) account for over 85% of Russian aluminium production.

RusAl is one of the world's three largest aluminium companies, accounting for over 70% of Russian primary output and about 10% of world production. RusAl controls the Krasnoyarsk, Bratsk, Novokuznetsk and Sayanogorsk smelters, the Achinsk alumina refinery (all in Russia) and the Nikolayev alumina refinery in Ukraine. It also operates a number of downstream units in Russia.

RusAl smelted 2.48 Mt of aluminium in 2002 (+1%), and exports and domestic sales were unchanged from 2001. Revenues, though, dipped from US\$4.1 billion to US\$3.96 billion, mainly because of a drop in world prices. Long-term increases in production will hinge on upgrading existing capacity and introducing new capacity. RusAl will expand the Sayanogorsk smelter and build a new smelter in the Irkutsk region where it plans to start building a plant in 2005 capable of producing 500,000 t/y of aluminium and 275,000 t/y of pre-baked anodes. The smelter could cost US\$1.2-2.0 billion. Other projects, for example in the Murmansk or Arkhangelsk regions, are still under consideration.

Bratsk Aluminum Smelter (BrAZ), Russia's largest, increased production of primary aluminium by 2,712 t (+0.3%) to 921,800 t in 2002. BrAZ, which is located in the Irkutsk region, modernised ten electrolytic cells in its No. 25 pothouse, increasing current efficiency by 0.25%. The smelter introduced a three-tier production management system and set targets and deviation limits for all parameters of the production process. It introduced a cryolite management system, allowing the smelter to work on more acidic electrolytes. All pothouses have been switched to a common scheme for connecting electrolytic cells to the voltage measurement and control circuit. The smelter in 2002 also completed installation of an automated system for managing technical processes in its No. 2 casting division. In the anode paste division BrAZ, using Siemens equipment, completed the automation of six charge measuring lines, launched an automated management system at the waste-

heat boiler, the first phase of an automation solution at the calcination department, and modernised six automated measuring systems for ball mills. In the ferroalloys division, BrAZ completed the introduction of an automated production management solution at the No. 1 ore-smelting furnace.

Krasnoyarsk Aluminum Smelter (KrAZ), Russia's second largest, produced about 862,000 t of primary aluminium in 2002 (+1.1%). KrAZ is planning capital spending of about US\$30 million in 2003, up 66% from about US\$18 million in 2002. In 2002, it completed construction of a dry gas purification system for its pothouses, and modernised the blended cryolite unit in its fluoride salts production division. The smelter's specialists are now working on a US\$100 million modernisation programme to the year 2006. RusAl owns about 95% of KrAZ stock.

Sayanogorsk Aluminum Smelter (SAZ) in Khakasia, Russia's third largest, produced 413,864 t of primary aluminium in 2002 (+1.7%). The smelter has secured certification to the EN ISO 9001-2000 standard. The certification was conducted by international company Det Norske Veritas (DNV). This completes the process of certifying RusAl's aluminium and alumina plants to the new version of the ISO 9001-2000 standard. The next step for SAZ will be to secure certification of its environmental management system to the ISO-14001 standard.

Novokuznetsk aluminium smelter produced 287,814 t of primary aluminium in 2002 (+2.2%).

The SUAL group includes 21 companies in Russia's aluminium sector that are managed by SUAL Holdings, including the Bogoslovsky, Uralsky, Irkutsk and Kandalaksha aluminium smelters. The group mines bauxite, and produces alumina, primary aluminium, silicon and aluminium products.

Russia's SUAL group produced 695,000 t of aluminium in 2002 (+3.2%). Alumina production increased by 49,000 t, or 2.9%, to 1.75 Mt. These figures do not include the operating results of the companies of SevZapProm - Volkhov Aluminum, Pikalevo Alumina and Volgograd Aluminum - which joined the SUAL group at the end of 2002. SUAL mining companies SUBR and Boksit Timana exceeded bauxite production targets by respectively 3.4% and 2.9%. Quartzite production rose 18.6% to over 234,000 t, thanks to an increase in customers for Cheremshansky quartzite mine.

Irkutsk Aluminum Smelter (IrkAZ) produced 275,000 t of primary aluminium in 2002 (+2%). IrkAZ plans to spend Rb303 million on modernization in 2003, 21% more than in 2002. The modernisation is part of a seven-year, US\$450 million programme (2003-2010) that will see the smelter make the switch to pre-baked anode technology and increase aluminium production 81.5% to 483,500 t/y.

Uralsky Aluminum Smelter (UAZ-SUAL) produced 92,000 t of aluminium in 2002 (+8%), the increase being due to modernisation of existing equipment

and the introduction of new technology. The smelter plans to be producing 118,000 t/y by 2005.

Boksit Timana, also a member of the SUAL group, produced 729,600 t of ore (+3.9%) at the Sredne-Timan bauxite field in the Komi republic. The Sredne-Timan field contains a proven reserve of 250 Mt of bauxite, which is 30% of Russia's entire reserves. The recovery rate for alumina from ore is 50%, and the ores are amenable to an open-pit operation. Although mine output went up only slightly, ore had been stockpiled to boost shipments to the Uralsky and Bogoslovsky works in the Sverdlovsk region and the Chelyabinsk Abrasive Plant to 841,700 t (+30%). SUAL will select a site this year for the construction in Komi of an alumina refinery costing between US\$300 million and US\$700 million with capacity of 0.7-1.3 Mt/y of alumina. In September 2002, SUAL officially opened a new 158-km rail track to the Sredne-Timan mine. The track has 10 small bridges, total length 326 m, and a 110 m rail and automobile bridge across the River Vym. Since 1997, SUAL has invested more than US\$100 million in the Sredne-Timan bauxite complex.

Nadvoitsy Aluminum Smelter in Karelia, another member of the SUAL group, will complete construction of an anode assembly division by the end of 2003 at a cost of RbR38.5 million. The project was developed by Siberian R&D Institute for the Aluminum and Electrode Industries in November 2002, and actual construction began at the end of 2002. The division will be able to assemble and disassemble 21,900 doubled anodes per year, which will provide enough anodes for two of the smelter's four pothouses.

Russia's five alumina plants produced 3.131 Mt of alumina in 2002. The Achinsk Alumina Combine, a part of RusAl, increased alumina output to 1.034 Mt in 2002 against 965,000 t in 2001, up by 7.2%.

The Sevuralboksitruda bauxite mine in the north Urals accounts for about 70% of all bauxite produced in Russia. It increased investment in 2002, principally to increase production capacity. In particular, a pile driver is being built for the Krasnaya Shapochka operation. In addition, construction has begun of a pile driver at the Novo-Kalinskaya mine, where bauxite production will begin in 2005. State shares in the company (44% of charter capital) are being trustee-managed by the management company Trastkonsaltgroup and Renova until the end of 2003. The state owns a golden share in the company.

Nickel and copper

Nickel-cobalt production fell 4.7% in 2002, with nickel output down 5.1% and cobalt production up 1.6%. In the copper industry, output fell by 0.3%, rising 15.8% for copper in concentrate but falling 2.9% for refined copper.

Norilsk Nickel Mining and Metallurgical Co. (Norilsk Nickel MMC) is the world's largest producer of nickel, cobalt and platinum group metals (PGM). Norilsk Nickel currently has more than 20% of the global nickel market, more than 50% of the palladium market, and big chunks of the markets for copper, cobalt, rhodium and a number of other metals. The company produces 91% of

Russia's nickel, 57% of its copper, 80% of its cobalt, and 95% of its PGM. The Interros group is the biggest shareholder.

In 2002, Norilsk Nickel produced 218,000 t of nickel, compared with 223,000 t in 2001, down by 2.2%, and 454,000 t of copper, compared with 474,000 t, down by 4.2%, and 4,200 t of cobalt. The company sold 11,000 t of nickel within Russia. Domestic copper sales grew by 60% to 83,000 t. The company exported 4,100 t of cobalt, selling just 9 t in Russia. It sold all of its cobalt inside Russia in 2001.

Norilsk Nickel increased nickel exports by 14% in 2002 compared with 2001 to 208,000 t, not including 60,000 t of metal used as loan collateral. Norilsk Nickel's copper exports fell by 16% to 354,000 t.

Norilsk Nickel Mining and Metallurgical Co. merged three of its Arctic mines - Komsomolsky, Mayak and Skalisty - into the unified Talnakhskoye mining division. The mines were merged in order to optimise management, increase efficiency and profits. The merger is part of the Norilsk Nickel development programme to 2015 that the company's management board approved at the end of 2002. The company's Arctic Circle branch comprises enterprises located on the Taimyr Peninsula. They account for over 75% of Norilsk Nickel's output. These enterprises include the Oktyabrsky, Taimyrsky, Komsomolsky, Zapolyarny, Mayak and Skalisty deep mines, the Medvezhii Ruchi open pit, the Norilsk and Talnakh concentrators, an agglomerating works, the Nadezhda, Nikelevy and Medny smelters, a plant for the production of platinum concentrates, a geological enterprise, the Dudinka sea port and other enterprises. Norilsk Nickel's Arctic branch produces about 85% of the company's nickel and cobalt, about 70% of its copper and more than 95% of its PGM.

In December 2002, the management board of Norilsk Nickel gave general approval to a production and technical development programme for Norilsk Nickel MMC and Kola MMC in the period to 2015. The programme calls for a fundamental restructuring of production schemes at virtually all Norilsk Nickel enterprises, the modernisation of mining and metallurgy processes, introduction of new mining and milling technologies, and construction of new beneficiation and metallurgy facilities. The new plan will also include a long-term capital spending programme for Norilsk Nickel subsidiaries. The company is now pursuing a development programme to 2010 that will cost US\$3 billion to US\$5 billion, with most of the investment going into mining and milling. The current programme does not envision the closure of any Norilsk Nickel companies: Norilsk Combine (Taimyr peninsula), Severonikel, Pechenganikel and Olenegorsk Metallurgical Combine (all in Murmansk region).

Finland's Outokumpu will complete designs for a new mill to process ore containing PGM for Norilsk Nickel Mining and Metals Co. by the summer of 2003. Russia's MekhanoBr Engineering and Finland's Outokumpu emerged as winners of a tender in the spring of last year to design the new facility. The facility, which will be able to process 7.5 Mt/y of ore, will cost something like

US\$130 million, although this may be adjusted. It will replace the No.1 concentrator (NOF-1), Norilsk Nickel's oldest mill, built in 1948. The latter is processing both rich and cuprous ores mined locally on the Taimyr Peninsula at the Talnakh and Oktyabrskoye deposits and disseminated ores mined at the Norilsk-1 deposit.

Meanwhile, Russia is to declassify information about commercial nickel and cobalt reserves at deposits on the Taimyr Peninsula. The government accepted a proposal from the Natural Resources Ministry to declassify information about reserves of the Talnakhskoye and Oktyabrskoye platinum-nickel-cobalt deposits. These, together with the Norilsk-1 deposit, are Norilsk Nickel's biggest mines.

In January 2003, Severonikel, a member of the Norilsk Nickel group from the Kola peninsula, commercially launched a Rb480 million hydrometallurgical facility to produce copper. The facility will be in a position to produce 15,000 t/y of copper by the end of 2003. It will probably produce 15% of all copper produced by Kola Mining and Metals Co., which directly controls Severonikel. The facility is currently producing about 20 t/d of copper. Minproc supplied and built the facility. The company is also introducing cascade leaching to process burnt copper cinders and metallurgical dust. The new facility should greatly reduce production costs and stages of production, and also reduce environmental pollution.

Urals Mining and Metallurgical Co. (UGMK) is the second major copper producer in Russia. The holding company includes a number of the largest copper smelters in the Urals, and controls a total of 22 companies. UGMK produces 40% of Russia's copper, and exports more than 70% of output. Uralektromed, Mednogorsk Copper-Sulphur Combine, Svyatogor, the Sredneuralsk Copper Smelter, Gaisky and Uchalinsky GOKs are key enterprises of UGMK.

Uralektromed from Sverdlovsk region, operates the Safyanovskaya copper mine which is the core enterprise of UGMK. Uralektromed produced 330,864 t of refined copper in 2002 (+0.6%). Production of copper wire rod grew 42.7% to 129,665 t. Figures were down 6.9% to 5,242 t for copper powders and up 0.7% to 28,181 t for copper vitriol. Selenium output grew by 28.6% to 60 t, tellurium by 17% to 13.89 t and nickel sulphate by 5% to 904 t. Uralektromed produced 7.7 t of powder products from dispersion-hardened composite materials (+36%) and 156 t of sintered products (+10.3%). Production of gold and silver in ingots was down 6.9% and 12.1% respectively. PGM production grew by 41%. Uralektromed's polymetals division in Kirovgrad produced 58,582 t of blister copper (+ 25.7%).

UGMK plans to invest about US\$117 million in 2003 in the modernisation of its plants. The investment is being financed by the company's own resources and by loans.

Sredneuralsk Copper Works (SUMZ) in the Sverdlovsk region produced 106,253 t of blister copper in 2002 (+0.6%). Production of sulphuric acid grew

by 1.6% to 410,551 t. Production of tripolyphosphate soared by 50.8% to 36,566 t and xanthogenate by 20.3% to 5,154 t. The works has design capacity of 100,000 t/y of blister copper. SUMZ plans to reduce production of blister copper by 9.6% to 96,000 t in 2003, and plans to spend Rb84.7 million on capital construction and equipment updates, which is 13% more than what was spent in 2002.

Svyatogor, a copper smelter from Krasnouralsk, Sverdlovsk region, produced 61,491 t of blister copper in 2002, 11.3% more than in 2001. Svyatogor produced 178,436 t of copper concentrate (-0.4%). However this had a copper content of 24,580 t (+4%). Production of ferrovanadic concentrate at Svyatogor soared 388% to 17,816 t and contained 8,836 t. Sulphuric acid production grew by 1.8% to 246,022 t and nepheline coagulant by 18.7% to 48,363 t. Svyatogor, which has been part of UGMK since 2001, uses raw materials from the Uchalinsky mining and beneficiation combine, the Safyanovskoye deposit, and the Volkovsky and Turyinsky mines. In future, there are plans to begin using copper ores from new deposits: the second phase of the Volkovskoye deposit, as well as the Promezhutochny and Bashmakovsky sections of the Turyinsky mine. Svyatogor has annual design capacity to produce 70,000 t of blister copper and 260,000 t of sulphuric acid. Its beneficiation plant can process 1.5 Mt/y of ore.

Mednogorsk Copper and Sulphur Combine (MMSK) in the Orenburg region planned to produce 33,008 t of blister copper in 2002, 38.8% more than in 2001, and 45,654 t of sulphuric acid (+11.3%). MMSK has the capacity to smelt 40,000 t/y of blister and 20,000 t/y of cathode copper. It also produces by-product sulphuric acid, zinc, germanium concentrate, gold and silver.

Gaisky GOK, a copper concentrate producer, also from the Orenburg region, produced 456,490 t of copper concentrate in 2002, up 3.4% year-on-year. The copper content of the concentrate was 68,474 t (+3.4%). Zinc concentrate production, though, fell 19.2% to 17,584 t containing 7,913 t of zinc, down by 19.2%. Pyrite concentrate production fell 14.7% to 307,780 t with a sulphur content of 133,238 t. Production of iron pyrites totalled 240,000 t with a sulphur content of 116,735 t (+4.1%). Gaisky is UGMK's biggest mine. It exploits the Gaiskoye copper deposit, which contains 76% of the Orenburg region's copper reserves.

Uchalinsky GOK, a copper mining company in Bashkortostan, produced 328,967 t of copper concentrate in 2002, up 47.3% year-on-year. The concentrate contained 49,345 t of copper (+47.3%). It also contained 816.8 kg of gold (+18.2%), and 30.3 t of silver (+26.3%). Zinc concentrate production grew 11.1% year-on-year to 219,332 t. The zinc content increased 11.1% to 98,699.3 t, the gold content was up 16.5% to 568.6 kg and the silver content was up 10.3% to 20.7 t. Uchalinsky produced 4.5 Mt of ore, up 25% year-on-year. It produced 3.5 Mt of ore by deep mining, 8% more than in 2001. This was because the flanks of the Uchalinsky and Molodyozhny open pits were being adjusted. The concentrator processed 4.5 Mt of ore and most of the concentrates are fed the Svyatogor copper smelter and Chelyabinsk Electrolytic Zinc Works.

The third-largest Russian refined copper producer is Kyshtym Copper Electrolyte Works (KMEZ) in the Chelyabinsk region. In 2002, it decreased production of refined copper by 14% to 70,290 t. Copper wire rod output dipped by 2% to 8,755 t. KMEZ plans to increase production of refined copper by 5% to 80,000 t in 2003. Employees own 52% of the shares in Kyshtym, East Point Holdings Ltd of Cyprus 28% and the local Chelindbank 10%.

Karabashmed, also in Chelyabinsk, produced 42,414 t of blister copper in 2002, up 2% year-on-year. Karabashmed was established through the transfer of production assets from Karabash Copper Combine in 1998. Karabashmed plans to produce 48,000 t of blister in 2003, 13% more than in 2002. Kyshtym Copper Electrolyte Works, a refined copper producer, currently owns 80% of the shares in Karabashmed. Karabash Copper Combine still owns 14% of the shares.

Lead and zinc

In 2002, Russia's lead and zinc output grew by 2.2%. Lead in concentrate production increased by 9.6% but refined lead, including secondary lead, fell by 10.6%. Zinc in concentrate grew by 4.6% year-on-year, and production of refined zinc rose by 3%.

Chelyabinsk Zinc Works (CZW), Russia's biggest zinc producer, produced 165,796 t of zinc in 2002 (+6.6%). Sales grew by 12.6% to 115,444 t by volume but dipped 2% by value, reflecting a drop in world zinc prices. Euromin owns 59.1% and employees 5.14% of the shares.

In 2002, CZW installed a waste recycling unit supplied by Larox of Finland at a cost of US\$2 million. The unit will eliminate the discharge of dust containing lead and solid waste into the atmosphere. The works used to discharge more than 4 t/y of lead and 44 t/y of solid waste. The new technology will save the works US\$200,000 annually and will reduce annual electricity and gas consumption by 1 million kWh and 720,000-750,000 m³ respectively. The cost of the unit will be recouped within five years.

In October 2002, CZW launched a state-of-the-art smelter which will eventually produce up to 200,000 t/y of zinc. The works plans to register the Special High Grade (SHG) zinc (99.995% Zn) that the new smelter will produce on the London Metals Exchange. So far, the works has only produced High Grade (HG) zinc (99.98% Zn), which is not traded on the LME.

By 2008, CZW plans to invest US\$58 million in upgrades. The money will be spent on pre-electrolysis capacity and infrastructure which should raise capacity to 180,000 t/y. CZW will provide the bulk of the capital, with the balance of financing secured through loans, including credits from the European Bank for Reconstruction and Development, which has granted a six-year, US\$12 million loan.

In 2002, GMK Dalpolimetall boosted production of lead and zinc concentrates, and arranged to borrow Rb200 million from Sberbank. The money will be

spent on upgrades in the period 2003-2006. The first targets are the smelter at Rudnaya Pristan, and re-equipping of the company's mines. GMK Dalpolimetall is a federal monopoly and produces more than 70% of Russia's lead concentrates and more than 14% of its zinc concentrates. Its main business is the mining and production of polymetallic ores, refined zinc, bismuth and lead. AO Dalpolimetall owns 51% and ZAO Svintsovy Zavod owns 49% of the shares in GMK Dalpolimetall.

Elektrum, a mining and metals company in Russia's Far East, has unveiled a project to build a facility for processing polymetallic ores, including lead-zinc concentrates. The project will cost an estimated US\$23.5 million. The project calls for building a metals plant in Elektrum's hometown of Dalnegorsk, on the premises of Bor (a major producer of boron products), close to sulphuric acid production. The plant will use the latest waste-free, liquid bath smelting technology.

The main advantage of the new technology is its ability to process and recover all the metals within the polymetallic concentrates, including copper, tin, gold and silver, as well as lead and zinc. Elektrum was set up in September 1994 to mine and process polymetallic ores in Primorye. Its founders were Bor, Dalpolimetall, Khrustalny Tin Mining Co., local mining company Vostok, the Krasnorechensk Logging Co., the administrative committee of the Nakhodka free economic zone, and the Primorye division of Sberbank.

Tin

In 2002, Russia's tin production slumped by 27.5%. Tin-in-concentrate production slumped by 36% although refined output, including secondary tin, posted a slight increase of 0.9%.

The Novosibirsk Tin Combine (NOK), Russia's biggest tin producer, increased tin output by 1% in and overall output of all types of tin products totalled 5,115 t. There was no effort to raise output and the production of some products was halted altogether because of low prices on the nonferrous metals market.

NOK owns 52% of the shares in Dalolovo, in Russia's Primorye territory; 50% of Tianshanolovo; and 51% of Khinganskoye Olovo, which is in the Jewish Autonomous Region in Russia's Far East. Russia's ZAO Edsib owns 19.9% of NOK shares, ZAO FK Sibelfin 15.5%, ZAO Sibirskaya Mnogoprofilnaya Kompaniya 19.9%, ZAO Depositary and Clearing Center 15.8%, ZAO CS First Boston 6.5% and OOO Valensia 8.1%.

Titanium

Russia does not mine titanium-containing ores and has to import ilmenite concentrates from Ukraine. Russia does, however, possess several titanium deposits, both alluvial and lode, and some of them are being prepared for commercial development, but a severe lack of finance is a problem. The ilmenite-rutile deposits closest to being commercially developed are at Turganskoye (Tomsk region), Tarskoye (Omsk region), the eastern section of

the Tsentralnoye deposit (Tambov region) and the Itaman section of the Lukoyanov deposit.

Russia's Verkhnyaya Salda Metallurgical Production Association (VSMPO), one of the world's leading titanium producers, exported 10,520 t of titanium products in 2002, down about 10-20% from 2001. VSMPO sells about 70% of the company's output under long-term contracts to companies such as Boeing, Airbus Industries, General Electric Aircraft Engines and Rolls-Royce. However, domestic shipments last year jumped by 45% to 4,280 t. The main Russian customers were military aviation companies, particularly the Komsomolsk-na-Amure Aviation Production Association (KnAAPO) and the Irkut research and production association (formerly Irkutsk Aviation Industrial Association, or IAPO), as well as producers of aircraft engines. Thanks to the increase in shipments to the domestic market, titanium production last year remained about the same as in 2001. VSMPO expects to export 10,000 - 11,000 t of product in 2003, and ship about 5,000 t to the Russian market.

Recently, VSMPO signed a five-year contract to supply components for the Airbus A-380 chassis with Goodrich Corp. of the US. Over the past several years, VSMPO has supplied foreign aircraft manufacturers with US\$27 million worth of goods annually, principally Boeing.

VSMPO owns 75% of Avisma Titanium-Magnesium Combine, one of the world's largest producers of titanium sponge (about 30% of world production). It produces high-grade titanium sponge used in ship-building, power engineering, aerospace and the manufacture of oil and chemicals industry equipment. In 2002, AVISMA's profits decreased due to a global reduction in demand for titanium, and higher electricity prices.

Meanwhile, Russian oil major Lukoil plans to take part in the construction of the Yarega Mining and Chemicals Combine in the Komi Republic to process oil-titanium ore. The research institute Giredmet, at the request of Lukoil division Prominvest, is now developing a project to build the first phase of the combine, with a capacity of 600,000 t/y of titanium ore. According to a study on investment in the comprehensive development of the Yarega oil-titanium deposit undertaken done by Russian institutes headed by the National Aluminium-Magnesium Institute (VAMI), the cost of construction is estimated at Rb16.2 billion. The delivery timetable would be 2003-2010.

The project calls for the construction of a titanium mine and beneficiation complex to produce concentrate, and a plant to make titanium dioxide. The main shareholder in the Yarega oil-titanium company is Lukoil, which is now extracting oil at the Yarega field. Yarega is the only deposit in Russia with a combination of oil and titanium. Tests conducted in 2002 showed that Yarega ores could yield titanium slag with a titanium content of more than 80% that could then be used in metallurgy and in the paints and varnishes industry. Yarega is estimated to hold 50% of Russia's titanium ore reserves.

The launch of mining at the Lukoyanov titanium-zirconium mineral sands deposit in Russia's Nizhny Novgorod region could be postponed for one year.

In 2002, the licence-holder Geostar was supposed to have completed the technical blueprint for construction of a mining and beneficiation combine to produce zirconium, rutile and ilmenite-chromite-haematite concentrates. Construction was scheduled to begin in 2003. But Geostar will only complete the construction blueprint towards the end of 2003. The Lukoyanov deposit is one of the largest titanium-zirconium deposits in Russia, and the richest in terms of zirconium content. The beneficiation process could also produce moulding, glass and construction sands. The project will cost about US\$30 million, and the Nizhny Novgorod bank, Garantia, which owns 80% of Geostar, plans to use its own funds and loans from other Russian banks. It was originally intended to build the combine by 2006, and to mine at an initial rate of 480,000 t/y of sand and produce 30,000 t/y of concentrate, with the annual mining rate eventually rising to 2.0 Mt.

Magnesium

Magnesium is produced in Russia by AVISMA and the Solikamsk Magnesium Plant (SMZ) from the Perm region in the Urals. Production of magnesium and its alloys grew by 4.7% in 2002.

SMZ is the largest magnesium producer and this year it plans to complete an ambitious refurbishment of its production facilities for rare-earth metal carbonates that is expected to boost output dramatically. The overhaul began in 2001, and since then production of rare-earth metal carbonates has amounted to 50 t/mth and output this year is set to jump to 300 t/mth. SMZ also plans to increase production of magnesium alloys, for which there is strong demand. SMZ is now developing new technology to produce new types of alloys - an alloy of magnesium and rare-earth products, tantalum and niobium.

Gold

Russia produced 170.87 t of gold in 2002, 11% more than in 2001 (the figure included primary production, by-product output and recoveries from scrap). Gold mine production grew by 12% or 17.16 t to 158.63 t, by-product output fell by 12.6% or 1.408 t to 9.75 t, and gold recovery from scrap jumped by 37% or 679 kg to 2.493 t.

Some 600 companies produced gold in Russia in 2002, but just 27 contributed more than half the total. The biggest producers included Polyus, Omolon Gold Co., Buryatzoloto and mines controlled by MNPO Polimetall. The great majority of Russian gold companies produce less than 100 kg/y.

Banks bought almost all the gold produced in Russia in 2002 and just five banks - Sberbank, Vneshtorgbank, Bank of Moscow, Alfa Bank and Nomos Bank - purchased about 62%.

Russia's top-five gold producing regions in 2002 were Magadan, Krasnoyarsk territory, Yakutia, Irkutsk and Khabarovsk territory.

Magadan produced 32.836 t compared with 30.43 t in 2001. The 2002 total included 18.49 t of lode gold (15.887 t) and 14.34 t of placer gold (14.55 t).

The region's biggest producer, the Omolon Gold Co. joint venture, produced 12.51 t at the Kubaka mine, down 995 kg owing to an accident at the open pit in June. The Julietta mine, which went on stream towards the end of 2001, produced 3.43 t. Rudnik im Matrosov produced 985 kg at the Natakinskoye lode, 3 kg more than in 2001; Nelkobazoloto produced 625 kg at the Shkolnoye lode (+16 kg); and Agat produced 482 kg of lode gold at the Agatovskoye field (+140 kg). Serebro mined 313 kg at the Lunnoye deposit and Susumansky GOK 169 kg at the Vetrensky mine. The Kolyma refinery in the Magadan region received 34.21 t of gold, of which 30.9 t came from 180 local producers and the balance from 28 producers in Yakutia, Chukotka and the Koryak autonomous district. The refinery also produced 60 t of silver ingots.

Gold-mining companies in Yakutia produced 17.8 t of gold in 2002, 10.6% more than in 2001. Production of placer gold continued to dominate, accounting for 65% of the region's total output. However, vein gold deposits make up 75% of Yakutia's total gold reserves. In light of the depletion of the mineral resource base, Yakutia last year approved a programme to develop the gold-mining industry and production of nonferrous metals for 2002-2006. The main goal of the programme is to ensure growth of profitable gold mining. The programme is expected to boost gold output from the planned 18.2 t this year, to 26.4 t in 2006. There are plans to build experimental-commercial production facilities to develop the Sardana, Verkhne-Menkeche and Prognoz polymetallic deposits and, next year, there are plans to launch operations in the Nizhne-Yakokitskoye orefield in the Aldan district (OOO Seligard) and in the Chaidakhskoye orefield (ZAO Inagli). Plans to build a mining complex at the Kuranakhskoye orefield are also under consideration. A new gold recovery mill is supposed to be opened in 2004-2005. Efforts are under way to attract investment into the development of the Nezhdaninskoye gold lode.

Russia's Irkutsk region produced 16.05 t of gold in 2002, 1.6% more than in 2001. Lenzoloto holding company mined 9.25 t, up 11.4% year-on-year. The company's Lensib, Svetly and Nadezhdinskoye units produced 1.07 t, 1.58 t and 1.03 t respectively. The Vitim and Lena prospects produced 2.18 t and 1.12 t respectively. Lode-gold producers, Pervenets and Vysochaishy, produced 243 kg and 170 kg respectively. All told, 47 enterprises mine gold in the region.

The Krasnoyarsk territory produced 29.31 t (+54%); the Khabarovsk territory produced 15.25 t (+13.3%); the Sverdlovsk region 7.72 t (+28.5%); and the Amur region 12.18 t (unchanged from 2001). Production fell only in Chukotka, by 25.1% to 4.78 t.

Polyus Gold Co. in Krasnoyarsk territory, now wholly-owned by Norilsk Nickel, mined 25.08 t of gold in 2002, and is targeting about 26 t in 2003. Within the next four or five years, it aims to be producing up to 100 t/y. Polyus plans over the next four to five years to raise US\$1 billion for mining projects. The money would be spent upgrading existing gold mining and milling capacity and developing new gold deposits.

Buryatzoloto, one of Russia's biggest gold producers, mined 4.77 t of gold, 4% more than in 2001. Its operations are in Buryatia, the internal Russian republic where it is based. At the Irokinda mine, production grew 11% to 2.53 t. However, production fell by 1% to 2.13 t at the Zun-Holba mine and by 23% to 106 kg at the Leninsky Kochei placer, mainly because of declining ore grades. This year, Buryatzoloto plans to sustain gold production at about 4.7 t.

In February 2003, the Irkutsk regional administration and the Russian Ministry of Natural Resources reached agreement in principle to conduct a tender this year for the right to develop Sukhoi Log, the biggest gold lode on the Eurasian landmass. Sukhoi Log, which is in the Bodaibo district of the Irkutsk region, had its reserves listed in 1977 as just over 1,000 t of gold with ores averaging 2.7 g/t Au. The ores also contain platinum, palladium and rhodium. The PGM ores are estimated to average 1.45 g/t Pt, the richest ores averaging 2.42 g/t.

Koryakgeoldobycha (KGD) in the Kamchatka region acquired the controlling interest in KamGold, which holds the licence to the big Aginskoye gold-silver deposit on the Kamchatka Peninsula. In September, KGD completed the acquisition of 50% of the shares in KamGold from Canada's Kinross Gold and now controls the company. KGD has obtained approval from the Ministry of Natural resources to defer the start date of the Aginskoye project until 2004. By 2005, KGD aims to be achieving full capacity of 3.5 t/y of gold. The mill will produce dore bullion. The Aginskoye field is in the central part of the Sredinny mountain range in the Bystrinsky district of the Kamchatka region. It contains 26.2 t of C1 and 59.1 t of C2 reserves of gold (Russian classification system), and 11.2 t of C1 and 2.4 t of C2 silver. KamGold was set up as a joint venture in which Kinross Gold owned half the shares and several Russian companies, mostly from Kamchatka, owned the other 50%.

Canada's High River Gold Mines Ltd intends to mine the Berezitovoye gold-polymetallic deposit in joint venture with Buryatzoloto. High River entered into an agreement with Khaikta Mining Co. Ltd to purchase a 100%-interest in Berezitovoye in July 2002. The project is expected to produce at least 100,000 oz (3.1 t/y). High River also plans additional exploration around the periphery of the deposit. The Berezitovoye gold-polymetallic deposit was discovered in 1932 and is located 60 km northwest of Takhtamygda on the Trans-Siberian railway. It contains 14.1 Mt of B+C1 reserves averaging 3.05 g/t Au, 14.31 g/t Ag, 0.93% Zn and 0.57% Pb. Russian geologists estimate the deposit contains about 43 t of gold and 225 t of silver.

Silver

More than 90% of silver in Russia is produced as a byproduct of nonferrous metals production, Norilsk Nickel being one of the country's biggest producers. Virtually no primary silver deposits are being developed and only one has been explored in detail - Dukat in Magadan. Dukat contains proven reserves of 14.3 Mt of ore at an average grade of 655 g/t Ag and 1.39 g/t Au, of which 10.3 Mt average 667 g/t Ag and 1.4 g/t Au. The field contains about 15,000 t of silver and at least 35 t of gold.

Russia's biggest silver-producing regions are the Krasnoyarsk territory, Bashkortostan, Chelyabinsk region, Orenburg region and Primorye territory, which are home to the major nonferrous metals producers. Over the past decade Russia has cut silver production by 60%.

Serebro planned to mine about 65 t of silver and 500 kg of gold in 2002 at the Lunnoye deposit in Russia's Magadan region, which the company began working commercially at the end of 2001. The Lunnoye deposit borders the Omsukchansky and Srednekamsky districts of Magadan region in the mountain-taiga zone of northeast Russia. The deposit has reserves of 3,010 t of silver and 14.7 t of gold.

The company is considering a feasibility study this year for the development of the Arylakh deposit with a view to starting mine construction in 2004. Serebro has also completed a recalculation of reserves at Arylakh property, from 1,666 t averaging 50 g/t Ag to 965 t at 200 g/t Ag.

Omsukchan Mining and Geological Co., a Canadian-Russian joint venture, produced 3.49 t of gold and about 44 t of silver at the Julietta mine in the Magadan region in 2002. This year, the mine is expected to produce 3.5 t of gold and 40 t of silver. Mining and milling at Julietta began in October 2001. Exploration spending last year totalled US\$1.5 million and a similar amount is budgeted for 2003. Bema Gold Corp. owns about 79% of Omsukchan Mining and Geological Co., the remainder being held by Dukat Mining and Geological Co. of Magadan.

GMK Dalpolimetall, a lead-zinc producer in Russia's Far Eastern Primorye territory, has started to process ore mined at the Maiminovskoye silver-polymetallic deposit. The deposit contains about 20 Mt of ore averaging 250 g/t, and includes high-grade zones averaging as high as 1,000 g/t, the highest silver grades in Primorye.

Bema Gold Corp. plans to invest more than US\$8 million in 2003 in geological exploration at the Kupol gold and silver deposit in Chukotka, having signed a definitive agreement in December 2002 enabling it to acquire, in stages, 75% of the shares in Chukotka Mining and Geological Co. which holds the Kupol licence.

Chukotka will own the remaining 25%. According to preliminary estimates by Russian geologists, the deposit contains about 30 t of gold and 300 t of silver but Bema believes the property could hold much larger gold and silver reserves that could be exploited by both open-pit and underground mining.

Platinum group metals

Russia is the world's biggest producer of platinum group metals (PGM), providing over 70% of palladium and 20% of global platinum supply and a considerable volume of rhodium.

Norilsk Nickel produces most of Russia's PGM. The key facility of the group, Norilsk Combine, produces PGM concentrates which are refined into bullion

at the Krasnoyarsk nonferrous metals plant. Norilsk Nickel produces around 40%-60% of the world's PGM. Palladium and rhodium account for around 80% of the company's PGM sales, and platinum for 20%.

Krastsvetmet maintained refining of Norilsk Nickel's gold and PGM at the same level as in 2001. The Krasnoyarsk Gulidov Nonferrous Metals Plant is the largest Russian processor of platinum concentrates and producer of PGM ingots and powders, rhodium powder, iridium, ruthenium, osmium and also a number of other precious metals. In 2002, the plant introduced a production line for precious metal compounds. The facility is capable of producing any range and any quality of compounds. The plant will produce rhodium and palladium nitrates, platinum and palladium chlorides and other compounds used to make catalysts. The project is part of a modernisation programme that began in 2000.

Koryakgeoldobycha (KGD) in the Kamchatka region, is Russia's second biggest platinum producer and mined more than 3 t of placer platinum in the 2002 season. KGD produced 3.85 t of platinum in 2001. KGD mines the Likhterinavoian group of platinum placers, which includes the Likhterinavoian, Ledyanoi and Penisty placers.

Consolidated Puma Minerals of Canada reported encouraging results from its ongoing exploration programme on the East Pansky property in the Kola Peninsula in northwestern Russia. The exploration in 2002 was focused on two zones, South Pechempak and Churozerski. Results to date have significantly increased the strike length of both zones and confirm their potential to host large, high-grade PGM and gold deposits. At South Pechempak, samples yielded grades in excess of 10 g/t PGM+Au, with some averaging as high as 14.83 g/t PGM+Au. At Churozerski, samples averaged more than 10 g/t PGM+Au, with some as high as 39 g/t PGM+Au. Assays for this project are carried out by the Geological Institute in Apatity and by the Kola Geological Information Laboratory Centre, also in Apatity. Duplicate samples are sent to SGS Lakefield Research Ltd in Canada. Puma intends to continue a programme of surface sampling, geophysics and drilling in 2003. The company acquired a 90% interest in Kola Mining and Geology Co. in May 2002.

Meanwhile, the Russian Government intends to liberalise the market for PGM by adopting measures designed to ease restrictions on PGM exports and by ensuring that there is a proper liaison between government agencies and PGM producers. A plan has been approved to set up a company in which the US subsidiary of Russia's state-owned marketing agency Almazjuvelirexport, will hold a 49% interest and Norimet, a UK subsidiary of Norilsk Nickel, will hold 51%.

At the suggestion of the Finance Ministry, the Russian Government might move to declassify information on volumes, sales and exports of PGM.

Meanwhile, Norilsk Nickel still has no plans to resume sales of palladium on the spot market, which were halted in 2001. The company has repeatedly

announced plans to sign long-term supply contracts for PGM with many leading automobile companies that use PGM in catalytic converters. Norilsk Nickel has already signed a long-term contract with Japan's Mitsubishi and General Motors for the delivery of platinum, palladium and rhodium.

Diamonds

Almasy Rossi-Sakha (Alrosa) accounts for nearly 100% of rough diamond production in Russia and for around 20% of the world total. Alrosa produced rough diamonds worth US\$1,378 million in 2002, 17% less than in 2001. Mine output fell because open-pit reserves are being depleted. The Mir, Aikhal and Internatsionalny open pits are already exhausted, and the Udachnaya open pit, which provides 65% of Alrosa's diamonds, is nearing the end of its mine life. However, a new generation of underground mines will offset the declining open-pit production.

Alrosa plans to mine diamonds worth US\$1,560 million in 2003, slightly less than it had targeted in 2002. Output is expected to rise at the Nyurba, Mirny and Aikhal mines, and a new mill at Nyurba is expected to yield diamonds worth US\$150 million.

On July 22, 2002, Russia's first underground diamond mine at the Internatsionalnaya diamond pipe went into operation. The mine will have a life of 30 years at a sustained extraction rate of 500,000 t/y. High gem-quality diamonds will be produced and ore will be processed at the Mirny mining and beneficiation plant 20 km from the pipe. Internatsionalnaya was mined by an open pit for eight years until 1981. It was mothballed after the pit reached a depth of 286 m. The deep mine at the pipe has been under construction since 1976, but progress has been interrupted because of financial and technical constraints.

Alrosa is considering downsizing its five-year investment programme. It had planned to invest US\$2 billion in its business in the period from 2003 to 2007, of which US\$700 million was to be borrowed.

Severalmaz holds the licence to develop the big Lomonosov diamond field in Russia's Arkhangelsk region and plans to start test-mining in the second half of 2003. Alrosa owns 71.9% of the shares in Severalmaz and the Arkhangelsk Region Property Committee owns 25.63%. Alrosa expects the first commercial diamonds to be recovered in 2004 by which time a 600,000 t/y capacity mill will be operating on a seasonal basis. The mill should eventually become an all-year operation with capacity to treat 1 Mt/y of ore. An investment of US\$110 million to US\$130 million will be required next year for the mill to achieve full capacity in 2006.

Fleming Family & Partners of the UK, acting as consultant to an investment consortium, the Alrosa Investment Group, signed a memorandum of understanding on the possible joint financing of the Lomonosov project at the end of last year. It will cost an estimated US\$350 million to bring a mine into operation. Discovered in the 1980s, the Lomonosov deposit contains six kimberlite pipes - among them Arkhangelskaya, Karpinsky-1, Karpinsky-2,

Pioneer and Lomonosov. The field contains a recoverable US\$12,000 million worth of diamonds, and more than half the diamonds are thought to be of gem quality.

Cencan SA, a De Beers subsidiary, has invested US\$2.7 million to acquire 64% of the shares in Canada's Archangel Diamond Corp. (ADC), the company that intends to develop the Verkhotina diamond field in Russia's Arkhangelsk region. Cencan is subscribing an additional 28 million common shares in ADC at US\$0.064 per share and is purchasing 17.3 million shares held by Task Holdings Ltd. According to a memorandum signed in 1994, Russia's Arkhangelskgeoldobycha (AGD), which holds a licence to develop Verkhotina, was to transfer the licence to the joint venture Almazny Bereg, formed with ADC, if diamonds were discovered. AGD has refused to hand the licence over and has been in a court battle with ADC for the past few years. The largest AGD shareholders are Lukoil with 74.1% and Rosneft with 25.5%.

Meanwhile, Russia is paying more attention to developing its diamond-cutting industry. Kristall of Smolensk, Russia's biggest producer of cut diamonds, sold US\$245 million worth in 2002, 11.4% more than in 2001. The main suppliers of rough diamonds to Kristall are Alrosa and De Beers' Diamond Trading Co. Some diamonds are also bought from the state repository Gokhran. Kristall exports 99% of its output, and has trade representatives in New York, Antwerp, Los Angeles, Tel Aviv, Hong Kong and London. Alrosa produced and sold US\$116.3 million worth of cut diamonds in 2002, 11% less than in 2001. This year, the company is targeting cut diamond sales of US\$129.5 million.

Coal

Russia's current commercial coal reserves exceed 200,000 Mt, about half of which are bituminous and 38,000 Mt coking coal. The deposits are characterised by complex mining and geological conditions, such as faulted and flooded seams, high gas content and risk of explosion, a tendency to ignite and a significant proportion of reserves within inclined seams.

Russia produced about 253 Mt of coal in 2002, a drop of 6.0% from 2001. Output of coking coal fell by 4.7% to 62.9 Mt. Coal exports and domestic sales totalled 234 Mt, 18 Mt less than in 2001, with exports amounting to 51 Mt, 9.0 Mt more than in 2001. Coal imports fell by 5.8 Mt to 20.5 Mt. Russian consumers received 203 Mt of coal, including imports, compared with 237 Mt in 2001.

The government has unveiled a list of coal-sector companies in which shares will be put up for sale in 2003. The list includes: Vakhrushevugol, Sverdlovsk region (38.41% of the shares); Vorkutaugol, Komi Republic (38.41%); Primorskugol, Primorye territory (36.3%); Uralugol, Khabarovsk territory (38%); and Kuznetskugol, Kemerovo region (11.6%). Companies from the list in which shares were offered but not sold in 2002 include: Vostsibugol, Irkutsk region (13.72%); Dalvostugol, Amur region (39.3%); Chelyabinskugol, Chelyabinsk region (42.27%); Inta Coal Co., Komi Republic (60.5%); OAO Sokolovskoye, Kemerovo region (55.4%); Yegozovskaya, a deep mine in

Kemerovo region (35%); and Krasnokamenskaya, also a deep mine in Kemerovo region (5%).

Oil

The Russian oil industry holds a prominent place in the global economy, with proven reserves of 9%-12% of the world total according to various estimates. Extractable oil reserves of around 19,000 Mt (138,100 million barrels) are spread over 1,900 oilfields, of which only 170 can be classified as major fields (where the bulk of resources are located).

Production of oil and gas condensate in Russia in 2002 amounted to 379.63 Mt, up 9% from 2001 and the highest production result since 1992. Most oil was produced by Lukoil (75.49 Mt), Yukos (69.88 Mt), Surgutneftegaz (49.2 Mt), Tyumen Oil Co. (37.5 Mt), and Sibneft (26.32 Mt).

Exports to countries outside the CIS in 2002 increased to 150 Mt, of which 20 Mt were exported by rail and 125 Mt by pipeline. Exports to the CIS in 2002 amounted to 34 Mt.

This year, the Natural Resource Ministry is to hold an auction for the licence to develop the Talakan oil and gas condensate field in Yakutia. The Talakan field has C1 recoverable oil reserves of 105.45 Mt and C2 reserves amounting to 18.132 Mt. C1 gas reserves amount to 43.53 billion m³, with C2 reserves of 19.63 billion m³. C1 gas condensate reserves amount to 375,000 t.

Natural gas

Gas production in Russia in 2002 amounted to 595.3 billion m³, 2.4% more than in 2001. Gazprom increased production to 523.8 billion m³, mainly as a result of putting the giant Zapolyarnoye gas-oil condensate field on stream, and efforts to sustain output at existing fields. Zapolyarnoye has yielded nearly 44 billion m³ of gas since it went on stream in October 2001. From 2005, the field is expected to produce 100 billion m³ annually.

Vertically integrated oil companies produced 34.8 billion m³ of gas in 2002. Of these, the main producers last year were Surgutneftegaz (13.3 billion m³), Rosneft (6.45 billion m³), and Lukoil (4.27 billion m³). Other oil and gas companies produced a total of 36.5 billion m³.

A feasibility study for the Kovykta gas condensate project in the Irkutsk region will be ready by June 2003. Kovykta gas condensate field holds 1,882 billion m³ of C1+C2 gas reserves, 90 Mt of condensate, and 2.3 billion m³ of helium. Gas production is planned at some 38 billion m³/y to supply domestic consumers and 36.9 billion m³/y for export.

Other

TVEL, a leading world producer of nuclear fuel, has launched Russia's first plant capable of separating tantalum-niobium concentrate. The plant is in the settlement of Pervomaisk in the Shilka district of the Chita region and is a division of the Zabaikalsky mining and concentrating plant. The hydrometallurgical plant at Pervomaisk cost more than US\$10.5 million to

build and will be capable of producing up to 40 t/y of tantalum and 60 t/y of niobium.

Lermontovskaya Mining Co. in Russia's Far Eastern Primorye territory produced 1,700 t of tungsten concentrate in 2002, 13.3% more than in 2001. The company mines and processes tungsten ores in the north of the territory's Pozharsky district, 20 km from Bikin railway station. The open-pit operation began in 1987.

Russia's proven geological uranium reserves are estimated at 165,000 t, of which 56.4% are commercially viable. Over the period 2010-2020, it is estimated that Russian nuclear power plants will consume 6,800 t of natural uranium, and that the country will export 10,100 t/y.

Selected Mineral Production in Russia ('000 t except where specified)

Commodity	1997	1998	1999	2000	2001	2002
Aluminium						
Alumina	2,380	2,465	2,687	2,889	3,091	3,178
Bauxite	3,988	4,092	4,513	5,000	4,805	4,579
Metal (primary)	2,906	3,010	3,149	3,247	3,302	3,352
Copper (refined)	640	656	737	824	871	844
Gold (t)	123	114	126	143	155	171
Iron and Steel						
Iron ore	70,800	72,300	81,500	86,600	82,499	84,200
Pig iron	37,300	34,800	40,100	44,600	44,980	46,270
Steel	48,400	43,800	51,500	59,100	58,970	59,800
Rolled stock	37,800	34,100	40,900	46,000	47,109	48,700
Pipe	3,476	2,842	3,300	4,833	5,404	5,115
Lead						
metal	47	33	55	52	60	54
Tin						
metal	9	4	4	5	5	5
Zinc						
metal	190	196	231	241	249	256
Coal	229,182	246,600	249,516	258,000	269,000	253,000
Gas, natural (Mm³)	571,000	591,400	576,400	584,200	550,830	595,300
Petroleum (crude)	296,859	293,933	304,994	323,300	336,990	366,000

Source: the State Statistics Committee, the Ministry of Trade and Industry, Interfax-CNA's estimates.