THE MINERAL INDUSTRIES OF

ARMENIA, AZERBAIJAN, BELARUS, GEORGIA, KAZAKHSTAN, KYRGYZSTAN, MOLDOVA, RUSSIA, TAJIKISTAN, TURKMENISTAN, UKRAINE, AND UZBEKISTAN

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The Commonwealth of Independent States (CIS) was created in December 1991 by republics of the former Soviet Union (FSU). In the adopted declaration, the participants of the Commonwealth declared that their interaction would be based on the principles that all member states have sovereign equality and are independent and equal subjects under international law. The CIS is not a state and it does not have supranational powers (Executive Committee of the Commonwealth of Independent States, 2001, Commonwealth of Independent States, accessed June 25, 2001, at URL http://www.cis.minsk.by/english/engl_cis.html). In 2000, the members of the CIS were Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

In September 1993, the CIS states signed an agreement on the creation of an economic union "to form common economic space grounded on free movement of goods, services, labor force, capital; to elaborate coordinated monetary, tax, price, customs, external economic policy; to bring together methods of regulating economic activity and create favorable conditions for the development of direct production relations" (Interstate Statistical Committee of the Commonwealth of Independent States, [undated], About Commonwealth of Independent States, accessed June 25, 2000, at URL http://www.cisstat.com/eng/cis.htm).

In 2000, all the countries of the CIS reported an increase (in constant prices) in their gross domestic products (GDP) and in industrial output in comparison with those of 1999, with the exception of Turkmenistan for which there was no reporting (table 3).

Armenia, Azerbaijan, Georgia, and Turkmenistan (Caucasus and Caspian Littoral Countries)

The countries of this region were producers of a number of metallic and industrial minerals. Armenia had been mining one-third of the FSU's output of molybdenum. It also mined copper, copper-zinc, and native gold deposits. Significant byproduct constituents in the country's nonferrous ores include barite, gold, lead, rhenium, selenium, silver, tellurium, and zinc.

Armenia had a large industrial minerals industry and was the largest producer of perlite in the FSU. It produced a number of other industrial minerals, including clays, diatomite, dimension stone, limestone, salt, and semiprecious stones, and had a diamond-cutting industry. Armenia, however, had practically no mineral fuel production.

Azerbaijan's most significant reserves in terms of value were its oil reserves located offshore in the Caspian Sea. A large number of major foreign firms were involved in projects to develop these reserves. Azerbaijan was also a producer of alunite, alumina, aluminum, copper-molybdenum ore, iron ore, and lead-zinc ore. The country produced many industrial minerals, the most important being bromine, clays, gypsum, iodine, limestone, marble, sand and gravel, decorative building stone, and precious and semiprecious stones.

Georgia had been a major producer of manganese from the Chiatura deposit during the Soviet period, but production subsequently had fallen precipitously. The manganese was used domestically for ferroalloy production at the Zestafoni ferroalloys plant. A small amount of iron ore also was mined, and the Madneuli complex, a copper-barite polymetallic deposit, was exploited for barite, copper, and a range of byproduct minerals that included gold and silver. Lead and zinc were mined at the Kvaisi lead-zinc deposit, and arsenic was mined from the Lukhumi and the Tsansa deposits. The steel mill in Rustavi had the capacity to produce 1.4 million metric tons per year (Mt/yr) of crude steel as well as the capacity to produce coke, pig iron, sinter, rolled products, and tubes and pipes (Metal Bulletin Books Ltd., 1997, p. 131).

Georgia produced a range of industrial minerals that included bentonite, diatomite, talc, and zeolites and also mined semiprecious stones. Decorative stones for use as building materials were mined at more than 100 deposits (Georgian Investment Center, 1998, Overview of the economic sectors of Georgia—Mining, accessed July 2, 1998, at URL http://www.georgia.net.ge/gic/Sector/Mining.HTM). Many clay

deposits as well as high-quality quartz sand and sand and gravel deposits also were developed for the production of bricks and ceramic products. The country produced some coal and crude oil and had an oil refinery at Batumi. Extraction of natural gas ceased in 1997.

Turkmenistan was a leading producer of natural gas, and more than 90% of foreign direct investment went into the country's oil and natural gas sectors. Investment, however, has slowed in the past few years owing to the restrictive conditions that Turkmenistan has attached to foreign investment. Turkmenistan, however, was moving to attract additional foreign investment in order to develop its vast oil and gas resources (U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed October 25, 2001, at URL http://www.eia.doe/gov/emu/cabs/turkmen.html).

Turkmenistan has a wide variety of industrial mineral resources, which include bromine, iodine, salt, sodium sulfate, and sulfur. The Garabogaz Aylagy lagoon off the Caspian Sea was one of the world's largest sources of raw materials for the chemical industry; commercial interest in the salts of this region began at the end of the 19th century (Weisman and McIlveen, 1983, p. 1214-1215). Production from the Garabogaz Aylagy had accounted for almost 45% of the FSU's sodium sulfate production and all of its production of epsomite and medicinal Glauber's salt (Aganbegyan and Ovezgel'byev, 1998, p. 97).

The countries of the Caspian Sea region were of greatest importance to world energy markets owing to the large oil and gas reserves in this region that were beginning to be fully developed. These resources have created competition between countries concerning their ownership, among companies to get development rights, and among countries to establish export routes. The area of the Caspian Sea, which was bordered by four CIS states (Azerbaijan, Kazakhstan, Turkmenistan, and Russia) and Iran, was developing into a significant oil- and gas-exporting area. The Caucasus countries of the CIS (Armenia, Azerbaijan, and Georgia) were potentially major world oil transport centers. Proven oil reserves for the entire Caspian Sea region [estimated to be between 18 billion barrels (Gbbl) and 35 Gbbl] were comparable with those of the United States (22 Gbbl) and greater than those in the North Sea (17 Gbbl)]; undiscovered oil resources could yield another 235 Gbbl of oil. The majority of Azerbaijan's oil resources are offshore, and apparently 30% to 40% of Kazakhstan's and Turkmenistan's total oil resources also are offshore (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Natural gas reserves in the Caspian region exceeded oil reserves in comparable magnitude. Natural gas reserves accounted for almost two-thirds of the hydrocarbon resources in the Caspian Sea region. Proven gas reserves in the Caspian region are estimated to be between 243 trillion cubic feet (6.88 trillion cubic meters) and 248 trillion cubic feet (7.02 trillion cubic meters), which would be somewhat less than North American reserves of 300 trillion cubic feet (8.50 trillion cubic meters) (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

For the Caspian Sea region to be developed to its full oil and gas potential, the littoral states must first agree on the legal status of the sea in order to settle the issue of the ownership of resources. Following the collapse of the Soviet Union and the establishment of Azerbaijan, Kazakhstan, Russia, and Turkmenistan as independent states, the question of ownership and development rights in the sea has remained unresolved. No agreed-upon convention exits that delineates the littoral states' ownership of the sea's resources or their development rights. Several conflicts have arisen over claims to regions of the sea. Disputes exist concerning whether the resources in the Caspian should be shared in common by all littoral states or if the Caspian Sea should be divided into national sectors. Negotiations between the littoral states have made slow progress resolving differences. Azerbaijan, Kazakhstan, and Russia had agreed on dividing the sea by a "modified median" principle, Iran had insisted on an equal division of the sea, and Turkmenistan's position was evolving.

Division into national sectors has been the de facto solution. However, disputes have arisen over the delineation of these national sectors. For example, Turkmenistan and Azerbaijan are disputing ownership of a field called Serdar by Turkmenistan and Kyapaz by Azerbaijan. Azerbaijan protested Iran's decision to award Royal Dutch/Shell Group and Lasmo Oil Ltd. a license to conduct seismic surveys in a region that Azerbaijan considers part of its territory. Turkmenistan claims that portions of the Azeri and Chirag fields, which Azerbaijan calls Khazar and Osman, respectively, lie within its territorial waters rather than Azerbaijan's. Turkmenistan, furthermore, has insisted that development of the Azeri and Chirag fields, which is being carried out by Azerbaijan International Operating Co. (AIOC), be stopped.

Nevertheless, countries are engaged in active exploration and development programs in what they considered to be their sectors of the Caspian Sea. Azerbaijan and Kazakhstan, in particular, in conjunction with foreign firms, have made progress in offshore oil development.

Another major area of controversy that has significant economic, environmental, and geopolitical ramifications involves the proposed routing of pipelines to export hydrocarbons from this region. The issues involved the degree that Russia should control export routes by having them pass through its territory, the intent of countries to avoid routing pipelines through such potentially unfriendly countries as Iran and Afghanistan, the role of Armenia as a potential transit route owing to its conflict with Azerbaijan, and the potential environmental hazards of routing shipments by pipeline under the Caspian Sea or by tanker through the Bosporus. Such unresolved issues have obstructed the planning and construction of potential export pipelines from the region.

The so-called northern route, which was being used to transport the first oil production (early oil) from Azerbaijan, transits 80 miles [47 kilometers (km)] (through the war-torn Russian republic of Chechnya en route to the Black Sea port of Novorosiisk). Russia had announced that it would build another

pipeline that would bypass Chechnya.

A western route was also in use for early oil that passed through Georgia to the Black Sea. A major western route being proposed was the Baku-Ceyhan Pipeline route termed the main export pipeline (MEP), which would extend 1,038 miles (1,744 km) through Azerbaijan, Georgia, and Turkey and transport oil from the Caspian littoral states to Ceyhan in Turkey on the Mediterranean Sea. The pipeline could also be used to export oil from Kazakhstan's major (though not yet developed) Kashagan field in the Caspian Sea. The three countries on whose territory the pipeline would be built have affirmed their support for the project, but the oil companies that would finance the construction of the pipeline would have to agree on the economic feasibility of this project. The planned commissioning of the pipeline would be in 2004, and it would have the capacity to transport 1 million barrels per day (Mbbl/d) of crude oil (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Belarus and Moldova (Western Commonwealth of Independent States)

Belarus and Moldova each had one of the two steel minimills built in the FSU. In 2000, the volume of ferrous metals production exceeded the 1991 levels for these countries. Neither country possessed significant mineral resources except for potash in Belarus. Belarus also had a large oil refining industry that was mainly controlled by Russian companies.

Kazakhstan

Kazakhstan is the second largest country in land area after Russia to form from the republics of the FSU. It is endowed with large reserves of a wide range of minerals. Kazakhstan was a major producer of a large number of metals that included beryllium, bismuth, cadmium, chromium, copper, ferroalloys, lead, magnesium, rhenium, titanium, uranium, and zinc. It produced significant amounts of a number of other mineral products that included arsenic, barite, coal, gold, molybdenum, natural gas, oil, phosphate rock, and tungsten. Kazakhstan has commercial reserves of 3 ferrous metals, 29 nonferrous metals, 2 precious metals, 84 types of industrial minerals, and coal, natural gas, and petroleum (Zharkenov, 1997).

A large percentage of mining and metallurgical enterprises were under the control of foreign managers who, in exchange for a share of the profits as well as potential ownership rights to stock, were investing in modernizing the enterprises, increasing output and exports, decreasing costs, and upgrading technology to meet environmental standards (Zharkenov, 1997).

In November, the Government of Kazakhstan announced that it intended to sell part of its remaining shares in a number of mining and metallurgical companies, such as Aluminum of Kazakhstan OJSC, Kazkhrom Corp., Kaztsink JSC, the Sokolov-Sarbai iron ore mining enterprise, and the Ust'-Kamenogorsk titanium-magnesium plants (Mining Journal, 2001). A major portion of most of these enterprises was already controlled by foreign investors.

Kazakhstan has significant oil and gas reserves. The oil and gas industry, which was one of Kazakhstan's most attractive areas for foreign investment, was export-oriented. Coal was Kazakhstan's major source of domestic fuel. As much as 80% of the energy sector's fuel demand was met by coal. The country produced sufficient amounts of coal for domestic use and for exports to other CIS countries. There was a trend in the development of Kazakhstan's coal industry, whereby some coal mines and electric powerplants had been purchased by industrial enterprises interested in obtaining an uninterrupted supply of energy (Kazkommerts Securities, January 1998, Kazakhstan economic research, accessed May 15, 1999, at URL http://www.kazecon.kz/Kazkom/NewGuide/engl/page_4.htm).

Kazakhstan's wealth of mineral resources had spurred rapid development of the mining and mineral-processing industries. Furthermore, the country's territory was the site of military bases, the Baykonur cosmodrome, and weapons testing grounds, including nuclear weapons. All these resulted in extensive air, water, and soil pollution and natural resource depletion. Changes in the environment caused a sharp rise in population morbidity and mortality rates, serious destruction of ecosystems, desertification, and significant loss of biodiversity (Ministry of Environment and Natural Resources of the Republic of Kazakhstan, [undated], National environmental action plan for sustainable development of the Republic of Kazakhstan, accessed May 4, 1999, via URL http://www.zoo.co.uk/~z80000142/links.html). Radioactive fallout from weapons testing had spread over a territory of 304,000 square kilometers inhabited by about 1.5 million people.

Kazakhstan mined a significant percentage of uranium production in the CIS. Extracting and processing uranium ores was accompanied by the generation of radioactive waste. As a result, the situation regarding the use and burial of radioactive waste remained a pressing issue.

Owing to high international oil prices and the rebound of the Russian economy in 2000, Kazakhstan's fiscal situation improved. Significant production increases were reported in the production of practically all ferrous and nonferrous metals, coal, crude oil, and natural gas. In 2000, Kazakhstan increased practically all its mineral product exports in quantity and value compared with exports of 1999 (table 4). A large percentage of Kazakhstan's reported exports of copper, ferrous metals, ferroalloys, lead, crude oil, oil products, precious metals, and zinc went to countries outside of the CIS (table 4). The country's finances were, to a large degree, dependent on revenues from the oil and gas sector, with the price of oil being the most important factor in the mineral sector determining Kazakhstan's fiscal situation.

Kazakhstan's largest source of export earnings from countries outside the CIS after oil and oil products was steel products, including ferroalloys, followed by copper, precious metals, zinc, cotton fiber, alumina, and lead (Interfax Statistical Report, 2001d). Kazakhstan also exported substantial quantities of alumina, coal, iron ore, and lead to CIS countries and imported some coke, natural gas, and steel products from CIS countries (Interfax Statistical Report, 2001b, c).

In 1999, the mining sector produced 36% of total industrial output and 9% of the GDP. In 2000, revenues from the oil sector were estimated to compose 6.1% of the GDP (Interfax Statistical Report, 2001d). In 1999, the mining sector employed 126,000 workers, which was about 5% of the total workforce (International Monetary Fund, 2001, p. 40-41).

Kyrgyzstan, Tajikistan, and Uzbekistan (Other Central Asian Countries)

Those Central Asian countries that do not border the Caspian Sea had been primarily significant to world mineral markets as gold producers, along with the production of some other mineral products (uranium in Uzbekistan, antimony in Kyrgyzstan, and aluminum in Tajikistan).

Kyrgyzstan's mineral industry was involved in both mining and processing mineral products, mining primarily antimony, coal, gold, mercury, molybdenum, tin, and tungsten. Its metallurgical industry led the FSU in the production of two nonferrous metals, mercury and antimony, and processed rare-earth metals and uranium. Several major gold deposits are now under development. Although Kyrgyzstan produced coal and some gas and oil, it was still significantly dependent on imported energy. In recent years, Kyrgyzstan's economy has benefited greatly from gold production from the Kumtor Gold Co. joint venture with Cameco Gold Inc. of Canada.

Tajikistan mined a number of metals, including antimony, bismuth, copper, gold, lead, mercury, molybdenum, silver, tungsten, and zinc; a variety of industrial minerals; and mineral fuels, including coal, natural gas, and petroleum. The Tajik aluminum plant (Tadaz) in Tursunzade in the southwestern part of the country had a capacity to produce about 520,000 metric tons per year (t/yr) of primary aluminum; it was one the largest primary aluminum plants in the FSU, although its entire alumina supply must be imported.

The country also mined a number of metals, including antimony, bismuth, copper, gold, lead, mercury, molybdenum, silver, tungsten, and zinc; a variety of industrial minerals; and mineral fuels, including coal, natural gas, and petroleum. Tajikistan has more than 400 mineral deposits that have been explored containing 70 types of minerals. Its reserves of natural gas were reportedly 200 billion cubic feet (5.66 billion cubic meters) and its oil reserves 430 million metric tons (Mt) (Foreign Broadcast Information Service, April 5, 1998, Tajik geologists are celebrating their professional holiday—Dushanbe Radio Tajikistan transcription, accessed June 4, 2000, via URL http://fbis.fedworld.gov).

Tadaz was a major consumer of the country's electric power production, consuming about 40% of total production. After Russia, Tajikistan had the second largest hydroelectric power resources among the countries of the FSU. Hydroelectric power accounted for about 75% of total energy produced by the country and was also exported to neighboring countries (U.S. Department of Commerce, 1998).

Tajikistan reportedly possesses the largest antimony deposits in the FSU. Antimony and mercury concentrates were produced at the Anzob mining and beneficiation complex that mined the Dzhizhikrutskoye antimony and mercury deposit. The antimony concentrates were exported for further processing to the Kadamzhay antimony plant in Kyrgyzstan, the FSU's major producer of antimony metal and compounds.

Tajikistan was dependent on imported fuel. It was trying to attract investment to develop its coal resources. The country required about 2 Mt/yr of coal, and produced less than 20,000 t/yr (Interfax Mining and Metals Report, 1999b). Gold production was another important part of Tajikistan's economy, and the country had created a number of joint ventures with foreign firms to develop its gold resources. Tajikistan also has large silver resources, but there had been no large-scale development of these resources.

Uzbekistan, along with gold, produced steel and a number of nonferrous metals that include copper, lead, molybdenum, silver, tungsten, and zinc. Uzbekistan's major nonferrous-metals-producing enterprise was the Almalyk mining and metallurgical complex. Uzbekistan also produced industrial minerals, including feldspar and fluorspar, and mineral fuels, including coal, natural gas, and uranium. The country ranked among the 15 leading countries of the world in terms of size of gas reserves and was the world's eighth largest natural gas producer. Since achieving independence, Uzbekistan had increased crude oil production to the level where it was self-sufficient. Most of the country's natural gas output required processing because of its high sulfur content, and the country had one of the FSU's largest gas-processing facilities at Muborak (formerly Mubarek). Lack of adequate pipeline routes had hindered Uzbekistan exporting gas and oil to world markets. Uzbekistan also had large uranium reserves and was a large uranium producer and exporter. The country ranked seventh in the world in uranium reserves and was the world's fifth largest uranium producer in 1998 (U.S. Energy Information Administration, March 2000, Country analysis briefs—Uzbekistan, accessed December 12, 2000, at URL http://www.eia.doe.gov/emeu/cabs/uzbek.html).

Given Uzbekistan's large gold production as well as its self-sufficiency in mineral fuels, the mineral sector would remain one of the chief contributors to the country's economic development (U.S. Energy Information Administration, March 2001, Country analysis briefs—Uzbekistan, accessed September 24, 2001, at URL http://www.eia.doe.gov/emeu/cabs/uzbek.html).

Russia

Russia, which extends over 11 time zones, is the largest country in land area in the world and occupies more than 75% of the territory of the FSU. Accordingly, it possesses a significant percentage of the world's mineral resources. Russia is a major mineral producer, accounting for a large percentage of the CIS's production of a range of mineral products that include aluminum, bauxite, coal, cobalt, diamonds, mica, natural gas, nickel, oil, platinum-group metals, tin, and many other metals, industrial minerals, and mineral fuels.

Russia accounted for about 14% of the world's total mineral extraction (Razovskiy, 2001). The mineral industry was of great importance to the Russian economy. Enterprises considered to be part of the mineral and raw-material complex contributed more than 70% of budget revenues derived from exports (Malyshev, 2000). The most significant regions of the

reasons, including high taxes, which were often assessed in unexpected ways; the inability of investors to rely on the legal system; insecurity regarding licensing; a double standard often employed regarding domestic and foreign partners; the weakness of the banking system; and the inability to directly export some commodities (Dobrynin, 2001b).

Ukraine

Ukraine is the largest CIS country in land area solely in Europe. At the end of the 1980s, Ukraine mined about 5% of the world's output of mineral products (Gurskiy and Kalinin, 2000). Since the breakup of the Soviet Union, production in Ukraine's mineral sector had fallen precipitously. Based on the former importance of Ukraine's mineral industry, its successful functioning was considered to be critical for the country's economic renewal.

In 2000, Ukraine continued to be a major world producer of coal, ferroalloys, ilmenite, iron ore, manganese ore, and steel. The country had been a lesser producer of a number of other metallic mineral products that included alumina, aluminum, cadmium, germanium, secondary lead, magnesium, mercury, nickel, rutile, uranium ore, secondary zinc, zircon, and zirconium and of a large number of industrial minerals that included dolomite, graphite, kaolin, limestone fluxes, potash, quartz, salt, soda ash, and a variety of building materials. Because of the large reduction in demand that followed the breakup of the Soviet Union, Ukraine sharply reduced or ceased producing a number of these commodities.

Ukraine's mining and metallurgical industry consisted of about 300 enterprises, including 17 iron and steel mills, 7 pipe plants, 10 metals goods plants, 16 coke-chemical plants, 17 refractory production plants, 26 mining enterprises, 3 ferroalloys plants, 20 nonferrous metals plants, 35 secondary metals plants, and 30 scientific research and design organizations. The industry employed about 500,000 persons, of which 270,000 were employed at ironmaking, steelmaking, and ferroalloys enterprises (Kharakhulakh, 2001).

On July 14, 1999, the Ukrainian Parliament adopted a law entitled "Conducting an Economic Experiment at the Enterprises of Mining and Metals Companies" that pertains to iron ore mining enterprises, beneficiation plants, foundries, steel mills, pipe plants, and coke enterprises. This law provided tax benefits for mining and metal industry firms for a period from July 1999 through January 2002. The law attempted to aid Ukrainian firms to increase their working capital to upgrade production facilities and to avoid barter transactions in purchasing such critical supplies as fuel and energy (U.S. Embassy, Kiev, October 5, 1999, Ukraine—Developments in the steel and mining sectors, accessed October 27, 2001, at URL http//www.bisni.doc.gov/bisnis/isa/9910mining_ua.htm).

The major source of waste in Ukraine is the mining industry. In 1997, the volume of accumulated mineral wastes in Ukraine exceeded 30 billion metric tons (Gt). This volume included more than 26 Gt of mining wastes, more than 20 Gt of which was waste from iron ore production. It was estimated that stockpiled iron ore wastes contained at least 200 Mt of iron, 2,000 metric tons (t) of silver, 10,000 t of vanadium, and 100,000 t of germanium as well as gold and other minerals. Owing to inefficiencies in production processes, the volume of accumulated waste was expected to continue its growth by a minimum of 2% per year (Friends of the Earth Scotland, October 1998, Sustainable use of resources in Europe newsletter, accessed October 27, 2001, at URL http://www.foei.org/campaigns/SSP/SSP_SURE2.htm).

Although Ukraine's GDP has fallen by more than 60% since the breakup of the Soviet Union, the official figures overstate the fall in output since estimates for production from the informal sector range as high as 60% of total GDP. The financial crisis in Russia in 1998 caused ripple effects throughout the region, including Ukraine. The country's GDP fell by 1.9% in 1998 and by 0.4% in 1999. In late 1999, the Government increased reform efforts and achieved some success. Ukraine's economy started to show signs of recovery in late 1999. In 2000, the GDP grew by 6% compared with that of 1999, with the highest growth rates achieved in import-substituting (textiles and food) and export-oriented industries (metallurgy and chemicals). In 2000, Ukraine achieved its first reported year of positive economic growth since independence.

Ukraine's Government understood the need for a program of broad, deep structural reforms in the economy. Progress on structural reforms was mixed. By 2000, small-scale enterprise privatization was virtually completed, but improvement was needed in privatizing very large enterprises. The transparency of the privatization process also needed to be improved. The Government had created an adequate legal and institutional structure for capital-markets operation and supervision with the creation of its Securities and Stock Market Commission. Banking sector reforms had also been undertaken. Since January 1, 1998, a new accounting system compatible with international standards and new regulations were introduced that strengthened banking supervision. Energy use remained excessively high, and reform of the energy sector was needed. This sector was not financially self-sustaining and had serious problems dealing with massive nonpayment problems and inadequate cost recovery (World Bank Group, September 2000, Country brief—Ukraine, accessed July 31, 2001, at URL http://www.wbln0018.woldbank.org/ECA).

In 2000, Ukraine exported $6 billion worth of metal products, which accounted for 63% of the country's export earnings. Of the total metals exports, $4.7 billion was ferrous metals, which accounted for 40% of the country's export earnings. Because of Ukraine's large metals exports, as of June, 13 countries were conducting more than 100 antidumping investigations against Ukraine for 26 groups of commodities (Interfax Mining and Metals Report, 2001az).

Commodity Review

Amber

Russia's only amber producer, Kaliningrad Amber Works, was the world's largest amber producer and produced 441.8 t of amber in 2000 compared with 364.5 t in 1999 and 512.2 t in 1998. In 2000, the majority of amber produced was in small stones. Only about 25% of the amber produced was used in production, and the remainder was left in storage. The Kaliningrad region contains 95% of the world's amber deposits.

Kaliningrad Amber Works had licenses to develop three amber deposits. At two of these deposits, the Primorskoye and the Palmnikenskoye, it produced 42.5 t and 322 t, respectively, in 1999; at the third, the Filino deposit, work was at a standstill (Interfax Mining and Metals Report, 2001c).

Aluminum

Armenia.—The Kanaker aluminum foil plant, which is part of Armenal CJSC (a joint venture between the Government of Armenia and Siberian Aluminum Group of Russia, which owned 44% of the shares), produced 1,286 t of foil in 2000. Plans called for Armenal to increase foil output to 1,000 metric tons per month in 2001, which was to be achieved by upgrading capacity that had been idled. The foil is intended for export. In 2001, Armenia intended to obtain International Organization for Standardization (ISO) certification for its foil products (Interfax Mining and Metals Report, 2001d).

Azerbaijan.—Azerbaijan Aluminum Co. controls the Sumgait alumina smelter, the Gyandzha alumina refinery, the Zaglik alunite mining company, and the Dashkesan iron ore mining company. Fondel Metals International B.V. of the Netherlands was awarded a tender by the Azerbaijan Ministry of State Property to manage Azerbaijan Aluminum Co. for 25 years. The terms of the tender called for Fondel to invest a total of $3 billion, with $300 million in the first 3 years, and to raise output within 3 years of signing the contract (February 2001) to 29,000 t/yr of aluminum and between 850,000 t/yr and 1.25 Mt/yr of alumina (Interfax Mining and Metals Report, 2001f).

Kazakhstan.—Kazakhstan has two large bauxite mining enterprises, Turgayskiy and Krasnooktyabr'skiy, with a combined capacity to produce 3.5 Mt/yr of bauxite. These mines supply the Pavlodar aluminum plant with a capacity to produce more than 1 Mt/yr of alumina. Pavlodar, despite its name, does not produce aluminum (Bronevoy and Lankin, 2001). In 2000, the bauxite mines produced 3,729,000 t, which was 3.4% more than in 1999, and Pavlodar produced 1,209,000 t of alumina, which was 4.9% more than in 1999. The Turgayskiy and Krasnooktyabr'skiy bauxite mines, the Keregetas limestone quarry, and the Pavlodar alumina refinery were under the control of Aluminum of Kazakhstan, which had 10,839 employees. The Evraziiskiy Bank owned the controlling interest in Aluminum of Kazakhstan and the Government of Kazakhstan owned 31.64% (Interfax Mining and Metals Report, 2001m).

Russia.—Russia was the world's second largest aluminum producer after the United States. In 2000, Russia's aluminum production increased by 2.5%, and its exports, by 4% in comparison with those of 1999 (Interfax Mining and Metals Report, 2001ag). Its industry included 11 aluminum smelters and 5 alumina refineries. Russia produced about 40% of the alumina it required. The aluminum industry consumed about 10% of the country's total electricity consumption, and the large smelters were developed in conjunction with major hydroelectric powerplants in Siberia. About 85% of the country's bauxite and 65% of its alumina was produced in the Urals. Problems existed with the industry's inadequate raw materials base and with the need for modernization of the plants, particularly in the area of energy-saving technologies. Almost all aluminum produced in the country was exported (Sizykov, 2000).

Tajikistan.—Tadaz produced 300,000 t of aluminum in 2000, which was 70,000 t more than in 1999. Tadaz was able to increase output because there was no interruption in alumina supplies from Azerbaijan and Kazakhstan as well as no interruptions in electrical supply from the Nurek powerplant. Almost all the alumina is exported, and aluminum accounted for 55% of the country's total export revenues (Interfax Mining and Metals Report, 2001at).

Ukraine.—Ukraine's Mykolayiv refinery was among the world's largest alumina-producing plants with the capacity to produce about 1.2 Mt/yr of alumina and employing about 6,500 workers (Interfax-M&CN, 1998). Ukraine also produced a much smaller amount of alumina at the Zaporozh'ye aluminum smelter as feed for the smelter. Mykolayiv exported about 90% of its output, primarily to Russia and Tajikistan.

In 2000, the Zaporozh'ye aluminum smelter produced 103,591 t of primary aluminum, which was 7.8% less than that in 1999, with the drop in production attributed to insufficient electricity supplies. Zaporozh'ye also produced 246,450 t of alumina, which was an increase of 3.5% in comparison with that of 1999, and 6,153 t of technical silicon, which was 32.2% more than it produced in 1999. Zaporozh'ye is 93.1% state-owned, with the employees and management owning the remaining shares (Interfax Mining and Metals Report, 2001bi).

Barite

Kazakhstan.—Kazakhstan had produced more than 75% of the FSU's barite output. Barite was produced by companies mining primarily polymetallic and lead-zinc deposits, although some barite was produced at barite deposits (Daukeev, 1995, p. 116). Barite was produced at 2 barite deposits in southern Kazakhstan and 11 sulfide deposits in the central, eastern, and southeastern parts of the country (Kruse and Parchmann, 1998, p. 85). The Kargayly and Zhayrem deposits accounted for the majority of output. Barite concentrate was produced by flotation at nonferrous metallurgical enterprises and was of low quality owing to the presence of flotation reagents (Daukeev, 1995, p. 116). The main consumers for Kazakhstan's barite were oil drilling and exploration enterprises in Kazakhstan and Uzbekistan (Kruse and Parchmann, 1998, p. 85).

Kazakhstan's oil companies required 200,000 t/yr of barite. Many oil industry enterprises, however, were refusing to use Kazakhstan's barite because of its low quality (Daukeev, 1995, p. 118). These companies imported barite mainly from Turkey and Iran (Interfax Central Asia & Caucasus Business Report, July 30, 2001, Yuzhpolimetal plans to boost output, accessed September 21, 2001, via URL http://fbis.fedworld.gov).

The Yuzhpolimetall ore processing company, established in summer 1999 based on the bankrupt Shymkent lead plant, planned to produce more than 70,000 t of barite in 2001, in addition to lead, zinc, and silver. It planned to process raw

materials from ore deposits and tailing dumps of the Achisay complex (South Kazakhstan region). Yuzhpolimetall also expected to receive licenses to develop several small polymetallic and barite ore deposits in south Kazakhstan and Karaganda (Interfax Central Asia & Caucasus Business Report, July 30, 2001, Yuzhpolimetal plans to boost output, accessed September 21, 2001, via URL http://fbis.fedworld.gov).

Russia.—The projected growth in volume of oil and gas production will require the consumption of 850,000 to 900,000 t/yr of drilling grade barite by 2010. Despite large barite resources, only a small percentage of these resources is of adequate quality and economical to exploit. Existing operating facilities will not be able to produce sufficient amounts, and the country will seek to import barite, primarily from China and Kazakhstan (Aksenov and others, 2000).

Chromite

The Donskoy mining and beneficiation complex in Kazakhstan, which was part of Kazkhrom, increased its output by 8.4% in 2000 in comparison with 1999 to 2.61 Mt. The largest mine at Donskoy, the Molodezhnyy underground mine, increased output by 3% to 1.7 Mt. The Tsentral'nyy underground and the Poiskovyy open pit mines at Donskoy were commissioned in 1999. The largest consumers of chromite from Donskoy were the Aksu and Ferrkhrom ferroalloy plants in Kazakhstan, which were part of Kazkhrom, the Aktyubinsk chemicals compound plant in Kazakhstan, and ferroalloy producers in Russia. Reportedly, Kazakhstan Mineral Resource Corp. owned 28.7% of Kazkhrom, and the Government of Kazakhstan, 31.3% (Interfax Mining and Metals Report, 2001h).

Coal

Kazakhstan.—In 2000, Kazakhstan produced 75 Mt of coal, which was 28% more than in 1999. Production growth was sustainable in part owing to reduced rail transport costs. Kazakhstan planned to produce 80.5 Mt of coal in 2001 (Interfax Mining and Metals Report, 2001p).

Bogatyr Access Komir Ltd. (a subsidiary of Access Industries Inc. of the United States) was developing the Bogatyr' and Severnyy open pit mines in northern Kazakhstan and produced 35.8 Mt of coal in 2000. Euroasian Energy Corp. produced about 16 Mt at the Vostochny open pit mine in the Pavlodar region, which was 44.28% more than in 1999 (Interfax Mining and Metals Report, 2001p).

Kyrgyzstan.—In 2000, Kyrgyzstan increased coal production by about 2% to 424,900 t. The country's largest producer, Kyrgyzkomur, produced 320,700 t, which was an increase of 5% compared with that of 1999 (Interfax Mining and Metals Report, 2001w).

Russia.—In 2000, Russia's coal production increased to more than 257 Mt, which was about 6.5 Mt more compared with that of 1999 (Interfax Mining and Metals Report, 2001al). The growth in extraction was from enterprises in West and East Siberia, where output increased by 10.6 Mt. These regions produced about 75% of the country's coal. In other coal mining regions of the country, output fell by 3.1 Mt (table 6). Output of coking coal increased by 3.4 Mt compared with that of 1999 to 60 Mt, of which the Kuznetsk Basin accounted for 76.6% of production (table 6). In 2000, the country produced 83.74 Mt of brown coal and 170.2 Mt of hard coal, including 1.05 Mt of anthracite. In 2000, 89.2 Mt of coal was extracted from underground mines, which was 800,000 t more than that of 1999, and 164.7 Mt was mined from open pits, which was 6.7 Mt more than that of 1999 (Ugol', 2001a). [A discrepancy exists in the coal production numbers published by the Russian State Statistics Committee in the Interfax Mining and Metals Report and by the coal industry journal Ugol'. Both numbers are reported with the assumption that the numbers reported by Ugol' do not include all enterprises mining coal.]

The role of coal as a fuel for domestic electric energy generation was increasing. In 2000, coal accounted for 32% of the fuel used to generate electric power at thermal electric powerplants in comparison with 29% in 1999 (Ugol', 2001b).

In 2000, exports of coal increased, while deliveries to the domestic market decreased compared with those of 1999. The growth in exports went to countries outside the FSU, while there was a decrease in exports to countries of the FSU. In 2000, compared with those of 1999, imports of coal increased by 10.2 Mt (64%) to 26 Mt, which was mainly due to regional deficiencies in supply (Ugol', 2001a).

The Russian coal industry releases into the atmosphere more that 1.5 billion cubic meters per year of methane. The country was developing technology to use the methane as a source of energy. Identified coal bed methane resources were reportedly almost 50 billion cubic meters (Malyshev and Trubetskoy, 2001; table 7).

Tajikistan.—In 2000, Tajikistan produced 20,700 t of coal, which was 4,100 t (24.7%) more compared with that of 1999. The country's main coal producer Leninabadugol, which mined the Shurab field, produced 11,600 t, and its subsidiary Fan-Yagnob, 9,100 t. Leninabadugol was engaged in a joint venture with Angisht of Uzbekistan, which will provide coal to Uzbekistan's Fergana Valley. Tajikistan planned to increase production to 30,000 t in 2001. Plans called for developing the Nazarailok mining enterprise at a coalfield in Karategi Valley in eastern Tajikistan.

Tajikistan has six coalfields with proven reserves at Fan-Yagnob (Pyandzh region) totaling around 2 Gt. The Shurab brown-coal-field, one of the larger fields not far from Isfara, was the main supplier of coal for Tajikistan and various regions in Uzbekistan and Kyrgyzstan. Before the breakup of the Soviet Union, it produced up to 650,000 t/yr of coal (Interfax Mining and Metals Report, 2001au; Central Asian News, [undated], Tajikistan on line, accessed October 19, 2001, at URL http://www.can.naytov.com/ingl/july_august/td6.htm).

Ukraine.—In 2000, Ukraine mined about 81 Mt of coal, which was about 1% less than in 1999 and short of the target of 82 Mt. The country had 191 operating open pits (Interfax Mining and Metals Report, 2001ax). In 2001, the Ukrainian Government planned to close 19 unprofitable underground

mines and 2 open pits (Interfax Mining and Metals Report, 2001bb). Approximately 600,000 workers were employed in the coal-mining sector. An average miner reportedly produced about 100 t/yr of coal (U.S. Energy Information Administration, August 2000, Country analysis briefs—Ukraine, accessed November 29, 2000, at URL http://www.eia.doe.gov.emeu/cabs/ukraine.html).

More than 90% of Ukraine's coal production was from the Donets Basin. Mines in the Donets Basin were deep, with the average mine depth about 700 meters (m). A significant number of mines were more than 1,000 m deep. In all mines in the Donets Basin, methane gas posed a serious danger, and the safety risks from gas and dust were increasing. As of the mid-1990s, 80% of the coal mined from the Donets Basin required processing to be marketable, and this percentage was projected increase to 90% (Bundesanstalt fuer Geowissenschaften und Rohstoffe, 1996, p. 35-41).

Uzbekistan.—Coal production in Uzbekistan decreased to about 2.5 Mt in 2000, which was about 15% less compared with that in 1999. All coal was produced by the national coal company Ugol', which mined about 2.4 Mt of brown coal in 2000, a decrease of 15.9% compared with that in 1999, and 91,500 t of hard coal in 2000, which was an increase of 2.7% compared with that of 1999. It mined about 2.1 Mt (82.4%) by open pit mining, and the remainder, by underground mining. Ugol' developed the Angren lignite field in the Tashkent region and the Shargun hard coal deposit in the Surkhandarya region. It was exploring the Baisun hard coal field, which was also in the Surkhandarya region. Uzbekistan's total commercial reserves were reportedly about 3 Gt, of which 1 Gt was hard coal.

Ugol' mined more than 90% of its coal at the Angren field. The Angren deposit reportedly has 1.9 Gt of proven coal reserves. It was mined by an open pit and an underground mine. The Podzemgaz station at Angren mined coal seams to obtain gas by an underground gasification method. The station's capacity was 600 million cubic meters per year of gas.

Germany's Krupp Fordertechnik GmbH won a tender to upgrade the Angren open pit. Coal production at Angren would increase to 5 Mt/yr. Ubekistan's domestic coal requirement was estimated to be 4 Mt/yr (Interfax Mining and Metals Report, 2001bf).

Copper

Armenia.—The Manes-Vallex smelter in Alaverdi was established in 1997 by the Manes metallurgical plant of Alaverdi and Vallex F.M. Establishment of Liechtenstein. The smelter was constructed on the base of the Alaverdi mining and metals complex, which was closed in 1989. Vallex owned 53.7% of the Manes-Vallex stock. Elecom Co., Ltd., of Switzerland bought the 46.3% held by Manes in 1998. In 2000, Manes-Vallex produced 7,200 t of blister copper, nearly all of which was sold to Germany's Norddeutsche Affineri AG. Manes-Vallex planned to produce between 12,000 and 14,000 t of blister copper in 2001; it had the capacity to smelt 15,000 t/yr of blister copper (Interfax Mining and Metals Report, 2001g, x).

Kazakhstan.—The country's copper-producing monopoly Kazakhmys Corp. produced 394,723 t of refined copper in 2000, which was a 9% increase compared with the 361,890 t it produced in 1999. In Kazakhstan, about 90% of copper metal production capacity was being used (Interfax Mining and Metals Report, 2001l; Kozyrev and Karmanov, 2001).

Growth in production was due in part to the commissioning of new mines in the Karaganda region and in southern Kazakhstan, including the Sayak and Shatyrkol mines in the Zhezkazgan region, and also in part to increased recycling of slag (Interfax Mining and Metals Report, 2001l).

Kazakhmys consisted of mines, factories, and heating plants from the Zhezkazgan district, the Balkhash mining and metals complex (formerly Balkhashmys), combined heat plants and powerplants from Zhezkazagan and Balkhash, a copper wire rod mill, the Borly coal mining enterprise, the VostokKazMed enterprise (West Kazakhstan region), and other enterprises. It was a shareholder and cofounder of Zhezkazgangeologiya and the Kazakhmys Pension Fund, among other enterprises. Samsung Group of the Republic of Korea owned 40% of the shares of Kazakhmys; the Kazakhstani Government, 35%; employees, 20%; and investment funds, 5% (Interfax Mining and Metals Report, 2001l).

Russia.— Russia possesses about 10% of the world's copper reserves (International Copper Study Group, 1998). The majority of reserves are in copper-nickel sulfide and pyrite ores. More than 50% of reserves is in deposits already under development. Ore grades were reportedly competitive with other producing deposits in the world (Kozlovskiy and Shchadov, 1999; Novikov and Yastrzhembskiy, 1999). Approximately 70% of the country's reserves is in East Siberia; 20%, in the Urals; and 10%, in the North Caucasus (Haeusser and others, 1994, p. 9). About 65% to 70% of ore mined was from copper-nickel sulfide deposits, and the remainder, from pyrite ores.

In 2000, Russia ranked seventh in the world in mine output of copper (Edelstein, 2001). The Noril'sk complex in East Siberia, the country's major copper mining enterprise, produced more than 70% of the country's copper and was mining copper-nickel sulfide ore with an average copper content of about 5%. The remainder of the country's copper was produced at mining and metallurgical enterprises in the Urals region.

In contrast to ores mined by Noril'sk, ores in the Urals and Caucasus regions are from copper pyrite and copper-zinc pyrite deposits and not as economically competitive with other deposits in world. These are complex ores containing cadmium, copper, gold, silver, zinc, and other metals, but the total value of ore constituents is lower than that of Noril'sk ores. The copper content of these ores in the largest developed deposits does not exceed 1%, and the zinc content, 1.8%, and these deposits are almost depleted, having been worked for a long period of time (Novikov and Sazonov, 2000).

Most of the copper-producing enterprises in the Urals were consolidated into the Urals mining and metallurgical complex (UGMK). In 2000, it controlled four smelters that produced 224,300 t of blister copper and the Uralektromed refinery, which produced 311,000 t of refined copper. The UGMK was in the process of acquiring the Karabashmed smelter and the

Kyshtym refinery to complete its holdings in the Urals (CRU International Ltd., 2001).

In the Urals, growth in reserves in the near term would be in areas contiguous to existing reserves and beneath existing reserves. Underground mines were being developed beneath the Molodezhnyy, the Sibay, and the Uchali open pits owing to the depletion of reserves suitable for open pit development. Copper mines were being developed at the Aleksandrinskoye deposit, which was part of the Mednogorsk complex; the Letnyeye deposit to supply the Gai complex; and the Saf'yanovskoye deposit, which is at the Rezh nickel plant (Kozlovskiy and Shchadov, 1999; Novikov and Yastrzhembskiy, 1999).

At Noril'sk, the Oktyabr'skiy underground mine was producing almost 70% of Noril'sk's copper mine output. Almost all the remaining mine output of copper at Noril'sk came from the Komsomol'skiy and the Taymyrskiy underground mines (Piven' and others, 1999). Oktyabr'skiy planned to mine a greater quantity of cuprous ore and a lesser amount of rich ores with a high nickel content, which were being depleted. Plans called for increasing cuprous ore production at Oktyabr'skiy to 1.6 Mt/yr from 100,000 t/yr in 1999. During this same period, production of rich copper-nickel ores was to decrease to 3.4 Mt/yr from 4 Mt/yr (Piven' and others, 1999). The cuprous ores at Noril'sk are more than 40% higher in copper content than the nickel-rich ores (Natural Resources Canada, unpub. data, 1999).

Uzbekistan.—The Almalyk mining and metallurgical complex produced refined copper (cathodes), gold, and silver; metallic zinc; lead concentrate; and other products. It had the capacity to mine and process about 25 Mt/yr of ore and produce about 100,000 t/yr of refined copper. In 2000, the Government set the production target for Almalyk at 75,000 t of refined copper and also set the same target for 2001. In the first 8 months of 2000, the complex produced 46,831 t of refined copper, which was 7% less than in the same period of 1999. It also produced 46,103 t of metallic zinc, which was 1.7% more than that of 1999, and increased production of gold and silver by 0.2% and 7.9% respectively (Interfax Mining and Metals Report, 2001j).

The Uzbek Government owned 51%, and employees, 2.5% of the shares of Almalyk. In 1999, the Uzbek Property Committee tried but failed to sell 46.5% of its shares in Almalyk in a tender that did not draw any bids. Almalyk was then entered on a list of enterprises to be privatized in 2001 to 2002, and the Government was conducting talks with potential foreign investors (Interfax Mining and Metals Report, 2001bg). The Government had allowed Almalyk to export its own copper, rather than going through state-owned trade companies. The Government, however, was continuing to export Almalyk's zinc. Almalyk held the right to develop copper-molybdenum and lead-zinc deposits near the city of Omaliq (formerly Almalyk) in the Tashkent region (Interfax Mining and Metals Report, 2001j).

Diamond

Practically all Russian diamonds were mined by Almazy Rossii-Sakha Joint Stock Co. Ltd. (ALROSA) from kimberlite deposits near Mirnyy in the Sakha (Yakutiya) Republic. ALROSA was a corporation established by the Russian Government. It produced 99.8% of Russia's total diamond production and had a monopoly right to export rough diamonds. The company's production was valued at $1.623 billion in 2000 compared with $1.41 billion in 1999. The company intended to increase mine output in the coming years and was planning for the value of rough diamond output to reach $1.67 billion in 2002, $1.69 billion in 2003, $1.794 billion in 2004, and $1.934 billion in 2005. ALROSA also was increasing its diamond-cutting capabilities. In profit volume, ALROSA was among the top 10 Russian companies. It employed more than 39,000 people, or 75% of all people working in the Russian diamond industry.

ALROSA amalgamated the main links of the country's diamond industry, such as geologic exploration, capital construction, transportation, mining, ore-dressing, sorting, evaluation, diamond trade in the domestic and foreign markets, and industry-related research. It was performing surveys and exploration in six diamond regions of Yakutiya as well as in the Krasnoyarsk and Irkutsk regions. In 1999, ALROSA began geologic exploration in Arkhangel'skaya oblast', and a project in Karelia was slated to start in which ALROSA would be involved in joint diamond exploration with Australia's Ashton Mining Ltd. In 2000, ALROSA acquired from De Beers Group its 39% share of Severalmaz, which was involved in diamond mining activity in Arkhangel'skaya oblast'. ALROSA also had the diamond mining joint venture Catoca, which was operating in Angola, and was planning to start exploration in Namibia.

Additionally, ALROSA was increasing its diamond-cutting capabilities. The company was developing the Almazny Dvor project, aimed at selling exclusive jewelry and certified diamonds in Moscow (Sachs Associates, [undated], Companies—Alrosa, accessed October 4, 2001, at URL http://www.sachsforum.com/ldn_iir/ldn_sponsors.html).

ALROSA's main production unit was the Udachny mining and processing complex, which developed the Udachny and Zarnitsa diamond deposits and produced more than 80% of ALROSA diamonds; ALROSA's Mirnyy mining and processing complex developed the Mir and International diamond deposits and produced high-quality diamonds; the Aikhalsky mining and processing complex developed the Aikhal and Jubilee diamond deposits, and the Anabar placer mine developed the Anabar placer deposit (Basel Magazine, 1999; Interfax Mining and Metals Report, 1999a; Vaganov and others, 1999).

An agreement signed in the fall of 1998, which would expire in December 2001, gave ALROSA the right to sell to De Beers at least $550 million per year worth of uncut diamonds, provided that it amounted to no more than 26% of De Beers annual sales. Russia also had the right to sell on the free market 5% of its newly mined diamonds and 20% of its supplies in state reserves (Interfax Mining and Metals Report, 2001b; Russian Journal/Online, September 3, 2001, Disagreement between Russia, Debeers, accessed October 11, 2001, via URL http://www.russiajournal.com/news/index.shtml).

Ferroalloys

Kazakhstan.—Kazakhstan was the major producer of chromite in the CIS and also produced some manganese ore. Kazakhstan's two major ferroalloy plants, the Ferrokhrom and the Aksu, were part of Kazkhrom [owned by Kazakhstan Mineral Resource Corp. (28.75%) and the Kazakhstani Government (31.1%)]. In 2000, the Ferrokhrom enterprise produced 271,600 t of ferroalloys, which was a 4.5% increase compared with that of 1999. The enterprise produced high-, medium-, and low-carbon ferrochromiumsilicon. The enterprise did not make ferrosilicon in 2000, but resumed its production in 2001 (Interfax Mining and Metals Report, 2001i). The Aksu ferroalloy plant produced approximately 800,000 t of ferroalloys in 2000 compared with 734,000 t in 1999. Aksu produced ferrochrome, ferrochromiumsilicon, silicomanganese, and ferromanganese (Interfax Mining and Metals Report, 2001a).

Russia.—Russia lacked significant production of two of the major minerals used in ferroalloy production, chrome and manganese, which were produced mainly in Kazakhstan and Ukraine, respectively, during the Soviet period and subsequently. During the Soviet period, Georgia had been a significant producer of manganese, but production had fallen sharply in the past decade. Russia produced mainly electric furnace chromium and silicon ferroalloys, blast furnace ferromanganese, and ferroalloys from other metals, such as molybdenum, nickel, titanium, tungsten, and vanadium. In 2000, Russia increased production of ferroalloys by 5.6% compared with that of 1999. Production increased by 8.4% to 652,000 t of 45%-ferrosilicon and by 2.6% to 274,000 t of 60%-ferrochrome. Among the country's major ferroalloy producing enterprises, the Chelyabinsk electrometallurgical complex produced 290,000 t of ferrosilicon and 140,000 t of ferrochrome. The Kuznetsk ferroalloys plant in the Kemerovo region produced 321,500 t of 45%-ferrosilicon and the Kosaya Gora works in Tula produced 70,700 t of blast furnace ferromanganese (Interfax Mining and Metals Report, 2001aj).

Ukraine.—Ukraine was the major producer of manganese in the CIS. Ferroalloy plants in Ukraine produced only manganese and silicon ferroalloys owing mainly to a lack of domestic resources of other alloying minerals; the country imported these other ferroalloys. The Nikopol' ferroalloys plant in Ukraine specialized in the production of silicomanganese and high-carbon ferromanganese and had begun production of medium-carbon ferromanganese. The Zaporozh'ye ferroalloys plant produced manganese ferroalloys (silicomanganese, all grades of ferromanganese, and manganese metal) and silicon ferroalloys (all grades of ferrosilicon). The basic product of the Stakhanov ferroalloys plant was ferrosilicon of all grades. Previously, about 100,000 t of blast furnace ferromanganese was produced at the Konstantinovskiy and Kramatorskiy metallurgical plants, but production at Kramatorskiy ended in 1999.

The decline in steel production in Ukraine resulted in a change in the production profile of ferroalloys. Domestic demand for ferroalloys in 2000 was between 300,000 and 350,000 t for manganese ferroalloys and about 200,000 t for silicon ferroalloys, equaling about 40% of the volume of domestic ferroalloy production; the remaining production was exported to CIS countries and to other countries of the world. Within the CIS, 90% of exports went to Russia. In 2000, Russia imported 322,200 t of ferroalloys from Ukraine, of which 57.9% was silicomanganese, and 42.1%, ferromanganese. Only electric furnace ferroalloys were exported outside the CIS. Ukraine envisioned declining future exports to the CIS with the increase of domestic ferroalloy production from Kazakhstan and Russia and producing a wider assortment of ferroalloys, particularly ferrochrome, based on imported chromite and new domestic production and ferrotitanium and ferrosilicozirconium based on domestic raw materials.

Total ferroalloy production in Ukraine had decreased to an estimated 1,380,000 t in 2000 from 2,378,000 t in 1990. During this period, production of silicomanganese decreased to 684,040 t from 1,209,000 t, ferrosilicon to 323,417 t from 594,000 t, and manganese metal to 3,500 from 37,500 t. During this period, however, production of low- and medium-carbon ferromanganese increased to 17,400 t from 3,500 t; the percentage of high-carbon electric furnace ferromanganese increased, and the percentage of blast furnace ferromanganese, ferrosilicon, and manganese metal decreased (Koval and others, 2001; U.S. Geological Survey, unpub. data, 2001).

Gold

Kazakhstan.—In 2000, Kazakhstan mined about 28 t of gold including byproduct gold, which was almost 40% greater than that of 1999. Plans called for Kazakhstan to increase nonbyproduct gold production to 17 t in 2001 from 15 t in 2000 (Moscow Interfax in English, December 15, 2000, Kazakh gold production up, accessed October 13, 2001, via URL http://fbis.fedworld.gov). In 2000, the Kazakhmys copper production association produced 4.074 t of byproduct gold in ingots compared with 2.319 t in 1999 (Interfax Mining and Metals Report, 2001l). In 2000, Kazakhstan's national zinc corporation Kaztsink produced 5.845 t of byproduct gold (Interfax Mining and Metals Report, 2001s). Two major gold mining gold mining projects [named for the deposits that were under development]—Altyn Aimak Mining and Smelting Corp. (a Kazakh corporation) and Bakyrchik Gold plc [a joint venture with Canada's Indochina Goldfields Ltd. (90%)]—were working on methods to treat ores from these deposits that have high arsenic and carbon contents (Mining Journal, 2001).

In 2000, Kazakhstan produced 11.5 t of refined gold, which was a 19% increase compared with that of 1999 (Interfax Mining and Metals Report, 2001o). Before the breakup of the Soviet Union, Kazakhstan had no gold refineries but subsequently acquired three located at the Ust-Kamenogorsk metallurgical complex; at Balkhshmys, which is part of the copper production company Kazakhmys; and at the Tselinyly mining and metallurgical complex.

Kyrgyzstan.—In 2000, Kumtor Gold Co. [a joint venture between Canada's Cameco Gold Inc. (30%) and the Kyrgyz Government-owned mining company Kyrgyzaltyn (70%)] increased its output by 10% to 21.5 t in comparison with that of 1999. Kumtor increased ore extraction by 200,000 t and

increased its gold recovery rate from ore by 2.7% in comparison with that of 1999. The gold recovery rate in 2000 was 81.5%, which was 2% higher than projected in the feasibility study (Interfax Mining and Metals Report, 2001v).

Russia.—In 2000, Russia ranked sixth in the world in gold production, with gold output increasing by 13.2% to 143 t in comparison with that of 1999 (Interfax Mining and Metals Report, 2001ai; U.S. Geological Survey, unpub. data, 2001). Of this amount, 131 t was mined as primary gold, 7 t was mined as byproduct gold, and 5 t was produced from tailings. Russia's gold holdings were about 300 t, ranking it 13th in the world in terms of gold stocks. The majority of Russia's gold reserves (73.6%) are in East Siberia and the Russian Far East, with 80% of the reserves located in lode deposits, and 20%, in placer deposits. Of the gold mined, however, 60% was from placer deposits where reserves were adequate for only another 15 to 20 years. Russia had between 500 and 700 companies that were mining less than 100 kilograms per year of gold and only 20 companies producing more than 1 t/yr of gold. One of the most prominent examples of foreign investment was the development of the Kubaka gold mine by Omolon Gold Co. in which Canada's Kinross Gold Corp. owned a 55% share of the stock (Dobrynin, 2001a).

Tajikistan.—In 2000, the Zeravshan Gold Co. [owned by Canada's Commonwealth and British Minerals (44%), the International Finance Corp. (5%), and the Government of Tajikistan (51%)] produced 2.41 t of gold at the Jilau deposit in comparison with 1.6 t in 1999. Output for 2001 was targeted to be 2.5 t (Interfax Mining and Metals Report, 2001bj).

The Darvaz joint venture [owned by the United Kingdom's Gold and Minerals Excavation Inc. (49%) and the Government of Tajikistan (51%)] produced 167.3 kilograms (kg) of gold in 2000 from the Yakhsu placer deposit, which extends 756 km along the bottom of the Yakhsu Valley and reportedly contains 25 t of gold. The joint venture did not mine gold between 1997 and 1999 because its equipment was severely damaged as a result of hostilities in that region. Plans call for the Darvaz joint venture to produce 600 kg of gold in 2001 (Interfax Mining and Metals Report, 2001av).

Uzbekistan.—Uzbekistan's explored resources of gold were estimated to be about 5,300 t. The main reserves of gold, amounting to about 3,200 t, are in the central Kyzylkum region containing the Muruntau deposit. The Muruntau gold deposit was the largest deposit of gold in Eurasia and was considered to be among the largest deposits of gold in the world. As of January 1, 1996, reserves of gold at Muruntau were reported to be 2,230 t. Undiscovered resources to a depth of 1,500 m could add another 1,800 t of gold. Muruntau's milling operation processed more than 22 Mt/yr of ore (U.S. Trade and Development Agency and State Committee of Geology and Mineral Resources of the Republic of Uzbekistan, 1996, p. 23).

The leading foreign investor in Uzbekistan's gold industry was Newmont Corp. of the United States, which had a 50% interest in the Zarafshan joint venture along with an Uzbek Government conglomerate (50%), comprising the State Committee of Geology and Natural Resources and the Navoi mining and beneficiation complex. Zarafshan processed gold bearing tailings from the Muruntau gold mining operation. When the joint venture was established, the Uzbek Government determined the raw material base for the joint venture to be 220 Mt with an average gold content of 1.4 grams per metric ton (g/t) gold.

In 2000, Zeravshan produced 15.434 t of gold compared with 16.7 t in 1999. The fall in gold production was attributed to changes in the raw material base at the joint venture because the extraction plant received material with lower gold content than in 1999. During the first stage of operations (about 5 years), the joint venture processed 60 Mt containing an average 1.6 g/t gold, with an extraction ratio of 65%. During the second stage (about 10 years), it planned to process material with a reduced gold content of 1.1 g/t gold, with an extraction ratio of 50%.

At the end of 2000, the European Bank for Reconstruction and Development granted Zeravshan a credit of $30 million to build additional leaching cushions and necessary infrastructure for extracting gold from tailings. This would enable Zeravshan to continue operating until 2015 and to increase gold production (Interfax Mining and Metals Report, 2001bk).

Iron and Steel

Moldova.—The Moldovan steel minimill in Ribnita produced 905,000 t of crude steel and 635 t of rolled steel in 2000, despite production being down for a month owing to a disruption in energy supplies. The international energy company Itera owns 75% of the shares, and the minimill exports more than 90% of its output. Investment plans call for the mill to be modernized and its capacity to be raised to 1.3 Mt/yr of crude steel and 900,000 t/yr of rolled steel (Interfax Mining and Metals Report, 2001y).

Russia.—Between 1990 and 2000, Russia's steel production had decreased to 59.1 Mt from 89.6 Mt, although during 1999 and 2000 steel production increased. Additionally, there was a significant change in steelmaking methods and products during the past decade. The amount of steel produced in open hearth furnaces declined by almost 50%, and the amount of steel produced by continuous casting increased to almost 50% of output compared with 27.4% in 1991. The production of cold-rolled sheet and coated steel increased. The country, however, produced less alloyed steel, including stainless. In 2000, open hearth furnace production accounted for 27% of steel production, oxygen converters, 58%, and electric furnaces, 15%; 49.8% of steel was produced using continuous casting. Cold-rolled sheet accounted for 31.7% of rolled output, and coated sheet, 6.9%. Alloyed steel accounted for 5.2% of finished rolled output compared with 14.1% in 1991, and stainless steel accounted for 0.2% of finished rolled output compared with 1.4% in 1991 (Brodov and others, 2001).

With the devaluation of the ruble in 1998, profitability in the steel industry improved, and in 2000, profits increased by 28%. The percentage of enterprises operating at a loss decreased to 26% in 2000 from 43.8% in 1998. About 98% of all steel production was by private enterprises, with 94% of all steelmaking enterprises privatized. The major source of investment funds for enterprises remained their own earnings.

During the past decade, practically all investment was centered in nine large steelmaking enterprises (Chelyabinsk, Cherepovets, Kuznetsk, Magnitogorsk, Nizhniy Tagil, Novolipetsk, Orsko-Khalilovo, Oskol, and West Siberian), which produced about 90% of the country's rolled output (Brodov and others, 2001).

Russia had become the leading country in the world in total volume of rolled steel exports. The volume of exports in recent years had ranged between 26 and 27 Mt/yr. Russia exported about 43% of its production of rolled finished steel output. However, much of the steel exported was of lower quality and less value-added steel. The large surge in exports was the result of the decline in domestic demand. In 2000, however, for the second consecutive year, domestic demand for steel rose, reaching 23 Mt of steel products compared with 16.9 Mt in 1999 (Bol'shakov and Tubol'tsev, 2001; Brodov and others, 2001).

Owing to Russia's large export of ferrous metals, a number of countries, including China, countries of the European Union (EU), India, and the United States, had taken action to restrict Russia's exports (Interfax Mining and Metals Report, 2001as). General agreements between Russia and the EU pertaining to steel exports have been signed since 1994. The agreement in effect in 2000 was signed in 1997 and would expire in December 2001 (Interfax Mining and Metals Report, 2001af). The United States had reduced sharply the level of Russian steel imports in recent years. In 1999, Russia signed two agreements on steel quotas with the United States, with one quota for all steel products and one for hot-rolled steel. Russia had the right to export to the United States 325,000 t of hot-rolled steel in 2000 and 465,000 t in 2001. Russia was allowed to supply the United States with 465,000 t/yr of cold-rolled steel. Owing to having met these quotas by the summer, Russia was prevented from exporting any more steel to the United States for 2000 (Interfax Mining and Metals Report, 2001ah). These accords with the United States were concluded as a means of averting an antidumping investigation. Russia was seeking to have its status changed to that of a market economy country via accession to the World Trade Organization, which Russian steelmakers believed would alter the ability of countries to levy trade restrictions on Russian steel exports (Interfax Mining and Metals Report, 2001ao).

The steel industry consumed about 10 Mt/yr of scrap. The demand for scrap would increase with the planned increase in electric steel production. Efforts were called for to regulate the scrap collection industry (Brodov and others, 2001).

Ukraine.—Ukraine's ferrous metals production increased by 17% in 2000 in comparison with that of 1999. The largest increase was for steel pipe production, which increased by 41.5% to 1.67 Mt. Production increased by 17.2% for pig iron to 25.7 Mt, and by 11% for crude steel to 31.8 Mt, which was the highest production total for crude steel achieved in the past 7 years. Coke output increased by 11.6% to 19.3 Mt, and iron ore output increased by 17% to 55.9 Mt. The quantity and quality of coking coal produced were not adequate for the needs of the steel industry, and the industry had to import more than 3.8 Mt of coking coal in 2000, with more than 3 Mt supplied by Russia (Interfax Mining and Metals Report, 2001be). In Ukraine, open hearth production accounted for 48% of all steel produced (Kozyrev and Karmanov, 2001). In 2000, continuous casting accounted for 19% of steel produced compared with 9% in 1995. Ukraine's metals industry was adversely affected by the lack of domestic markets, depreciating equipment, inadequate use of state-of-the-art technology, high energy and materials costs, and inadequate employment of technologies for pollution reduction. About 80% of all metal products produced was exported (Bol'shakov and Tubol'tsev, 2001).

As of June, more than 100 antidumping investigations had been leveled against Ukraine by 13 countries. At the end of 2000, the U.S. International Trade Commission stated that steel exports from Ukraine may be damaging U.S. industries and that duties would be imposed if it could be confirmed that subsidized steel was being dumped (Interfax Mining and Metals Report, 2001ba). Ukraine and the United States were in the process of trying to negotiate an agreement on quotas for Ukrainian steel exports to the United States (Interfax Mining and Metals Report, 2001az).

Iron Ore

Kazakhstan.—In 2000, Kazakhstan increased iron ore production by 44% compared with that of 1999 to 13.8 Mt of commercial grade ore. Iron pellet production increased by 140% to 6.641 Mt (Interfax Mining and Metals Report, 2001q). Russia had sharply curtailed imports of iron ore from Kazakhstan, and a resumption of these imports in large quantities from certain of these enterprises, such as the Lisakovskiy mining and beneficiation complex, was unlikely owing to the low iron and high phosphorus content of the ore that did not meet the current demands of Russia's steel industry (Sukhoruchenko, 2000).

Russia.—In 2000, Russia increased production of iron ore by 6.5% in comparison with 1999 to 86.63 Mt. Russia produced 81.04 Mt of iron ore concentrate and 30.76 Mt of iron pellets, which were increases of 8.8% and 4.7%, respectively, in comparison with those of 1999. The increase in output was attributed to a rise in demand from the domestic metallurgical sector (Interfax Mining and Metals Report, 2001ak).

Russia's iron ore production had not suffered as severe a decline as other metal producing sectors, maintaining production at 77% of the 1990 production level and also maintaining product quality. The stabilization of production was attributed to maintaining a constant level of exports of between 11 and 13 Mt/yr along with a sharp decrease in imports to 3 Mt/yr from 16 Mt/yr from other CIS countries. Although production levels were being maintained, a significant shift had occurred in regional levels of production and investment. Iron-ore producing enterprises in the central and northwestern economic regions of the country were producing at levels near or in excess of the 1990 production level, while enterprises in the Urals and Siberia were producing at only 65% and 59%, respectively, of 1990 production levels (Sukhoruchenko, 2000).

These production figures were reflective of investment patterns. This pattern has led to regional deficiencies in supply and increased transportation costs. The iron-ore industry was able to continue to supply metallurgical plants and maintain

export levels without difficulty owing to the decrease in domestic pig iron production. Pig iron production and the corresponding demand for iron ore, however, were projected to increase in the 2000 to 2005 period. Problems in maintaining production in the Urals and Siberia were attributed in part to a lack of resolution regarding the ownership of these enterprises (Sukhoruchenko, 2000).

To meet increased demand, a number of variants were proposed, including decreasing exports, increasing imports from Kazakhstan, increasing output at existing domestic enterprises, or developing new mining enterprises, which was considered the least realistic. To increase production at existing enterprises usually would require significant investment owing to worsening mining conditions and a need to upgrade technology and to restructure inefficient production flows. Only about one-half the needed investment funds, however, were available to accomplish these objectives (Sukhoruchenko, 2000).

Ukraine.—Ukraine's total explored iron ore reserves as January 1, 2000, were about 33 Gt, of which about 28 Gt was termed industrial reserves. These reserve categories were based on the Soviet Union's reserve classification system (Prigunov, 2001). Of these reserves, almost 70% was in the Krivyy Rih Basin and is of Lake-Superior-District-type ore (Kornienko, 1999). Rapid development of the iron ore mining industry began in the 1950s in the Krivyy Rih Basin with the commissioning of large mining and beneficiation enterprises. Production peaked in the basin in 1978 with production of 124 Mt of marketable iron ore. Production then began to decline. Since the dissolution of the Soviet Union, iron ore production in Ukraine had fallen by about 50% (Prigunov, 2001).

In 2000, iron ore production was concentrated at seven mining and beneficiation complexes in the Krivyy Rih Basin and at the Poltavskiy mining and beneficiation complex in the Kremenchug iron ore region (Prigunov, 2001). In 2000, Ukraine ranked seventh in the world in iron ore production, with marketable iron ore production increasing by 16.9% compared with that of 1999 to 55.9 Mt (Kirk, 2001; Interfax Mining and Metals Report, 2001ak). The largest iron ore producers in 2000 in the Krivyy Rih Basin were the Inguletskiy mining and beneficiation complex extracting 11,500,700 t of ore; the Yuzhniy mining and beneficiation complex, 8,345,000 t; the Novokrivorozhskiy mining and beneficiation complex, 6,002,400 t; the Severnyy mining and beneficiation complex, 5,974,700 t; the Krivbassruda production association, 5,534,200 t; and the Tsentral'nyy mining and beneficiation complex, 4,030,100 t. In the Kremenchug iron ore region, the Poltaviskiy mining and beneficiation complex extracted 6,509,000 t.

In 2000, iron ore production at the Krivbassruda production association increased by 18.2%; at the Inguletskiy mining and beneficiation association, by 6.6%; at the Novokrivorozhskiy mining and beneficiation complex, by 27.5%; at the Poltavskiy complex, by 31.1%; at the Severnyy mining and beneficiation complex, by 56.8%; at the Tsentral'nyy mining and beneficiation complex, by 9.9%; and at the Yuzhniy mining and beneficiation complex, by 5.5% compared with those of 1999 (Interfax Mining and Metals Report, 2001k).

The majority of open pits were mined at depths of between 250 and 360 m; the majority of underground mines operated at depths below 1,000 m. Mining conditions were worsening with the increasing depth of mines. Problems were becoming greater regarding the volume of overburden removal and transporting materials. Much of the transport equipment was worn out and in need of replacement. It was difficult, even with the introduction of new equipment and technology, to fully compensate for worsening mining conditions (Kovalenko and others, 1998; Prigunov, 2001).

Lead and Zinc

Kazakhstan.—Kazakhstan was the major producer of lead and zinc among the former republics of the Soviet Union and remained the largest producer of these metals among the countries of the FSU. In 2000, Kaztsink increased production to 246,500 t of zinc and 143,600 t of lead, which was respectively 7.5% and 28% more than that of 1999.

Kaztsink was created at the beginning of 1997 with the merger of three major mining and beneficiation complexes and metals plants—the Ust-Kamenogorsk lead-zinc complex, the Leninogorsk polymetallic complex, and the Zyryanovsk lead complex—all of which are located in eastern Kazakhstan. The company also included the Bukhtarma and Tekeli energy complexes and the Tekeli lead-zinc complex. Switzerland's Glencore International AG held the controlling shares of Kaztsink through its subsidiary Kazastur Zinc AG. Kaztsink planned to increase capacity at the Ust-Kamenogorsk zinc plant to 152,100 t/yr and capacity at the Leninogorsk zinc plant to 11,660 t/yr of zinc (Interfax Mining and Metals Report, 2001s).

Production of zinc in concentrate at Kazakhmys decreased to 89,900 t in 2000 from 95,800 t in 1999. Zinc was a byproduct for Kazakhmys. Kazakhmys was building a facility to produce up to 100,000 t/yr of metallic zinc at its Balkhash mining and metallurgical complex, with equipment planned to be installed starting September 2001. The smelter was to meet all environmental standards (Interfax Mining and Metals Report, 2001l).

Russia.—Russia was the second leading producer of lead and zinc in the CIS following Kazakhstan and was the main consumer of these metals in the CIS. During the Soviet era, Russia had been a net importer of both lead and zinc. Consumption of lead and zinc, however, had fallen greatly in Russia since the breakup of the Soviet Union. Domestic mine output and metal production of lead was still less than consumption levels, but zinc consumption had fallen to a degree where mine output and metal production levels were near consumption levels. In 2000, Russia produced 5.7% less lead, including secondary, and 4.2% more zinc compared with those of 1999 (Interfax Mining and Metals Report, 2001an).

The vast majority of Russia's lead was mined in the eastern part of the country, and the vast majority of its zinc was mined in the Urals. The Russian Far East accounted for 62.8% of the country's lead mined and 9.2% of its lead reserves; East Siberia, 17.7% of lead mined and 75.9% of lead reserves; the Urals, 12.6% of lead mined and 1.8% of lead reserves; West Siberia, 4.3% of lead mined and 11.1% of lead reserves; and North Caucasus, 2.4% of lead mined and 2% of lead reserves. The Urals accounted for 86.7% of the country's zinc mined and

26.5% of its reserves; the Russian Far East, 9.2% of zinc mined and 4% of zinc reserves; West Siberia, 2.1% of zinc mined and 10.5% of zinc reserves; and North Caucasus, 1.8% of zinc mined and 2.2% of zinc reserves (Yatskevich, 2000).

In 2000, new zinc smelting projects were announced at Svyatogorsk, Kirovgrad, and Uralelektromed. The Svyatogorsk smelter will produce more refined lead than zinc. A new 200,000 t/yr capacity electrolytic zinc smelter at Chelyabinsk was scheduled to be commissioned in 2001, which will replace an old 146,000 t/yr capacity smelter. The initial capacity of the new smelter will be 155,000 t/yr (CRU International Ltd., 2001).

Uzbekistan.—The Almalyk mining and metallurgical complex produced refined copper, gold, and silver, lead concentrate, metallic zinc, and other products. It had the capacity to mine and process about 25 Mt/yr of ore. In 2000, the Government target for zinc production at Almalyk was 6,300 t of zinc. In 1999, Almalyk produced 27,000 t of zinc (Interfax Mining and Metals Report, 2001bh).

Magnesium

Russia.—Russia produced magnesium at two plants, the Avisma and the Solikamsk magnesium plants, which are both in the Perm region of the Urals. In 2000, Russia's largest magnesium producer Solikamsk Magnesium Works (SMZ) increased production by 2.2% to 17,011 t of magnesium in comparison with that of 1999. SMZ increased production of rare metals by 15% to compensate for a drop in world prices for magnesium. Magnesium and its alloys accounted for 64.4%, and rare-earth and rare-metals production, 34% of SMZ's total output (Interfax Mining and Metals Report, 2001aq). SMZ was owned by the Russian Growth Fund (36%), Sozidaniye (an industrial and investment company) (14%), MINmet Financing Co. (28.88%), SMZ employees (12%), and Leviev Group of Israel (5%) (Interfax Mining and Metals Report, 2001ar).

In 2000, The Avisma titanium and magnesium complex produced 18,500 t of magnesium, which was 9% more compared with that of 1999. By the beginning of 2002, Avisma planned to be able to produce 25,000 t/yr of magnesium owing to the installation of new equipment that would boost capacity. Russia's Verkhnaya Salda Metallurgical Production Association (VSMPO), which was the world's leading producer of milled titanium products, was Avisma's biggest shareholder with 75.18%; SMZ owned 10%, and employees, the rest. In 2001, the VSMPO declared that it intended to buy all of Avisma's shares by yearend (Interfax Mining and Metals Report, 2001e).

Ukraine.—Magni LLC's Potassium and Magnesium Works [owned by Oriana (25%) and ESKO-Pivnich (75%)] at Kalush in Ukraine's Ivano-Frankov region was commissioned in 1969 and has the capacity to produce 17,000 to 18,000 t/yr of magnesium (Interfax Mining and Metals Report, 2001ac).

Manganese

Kazakhstan.—Kazakhstan has 11 identified manganese deposits with a total reserve base of 600 Mt of ore, of which 426 Mt is classified in reserve categories A, B, and C1. According to the Ministry of Energy and Natural Resources, 558.7 Mt are economic reserves. The average manganese content of the economic reserves is 20.5%, which is low grade. High-quality ore, which averages 40% manganese, is in the Kamys and Ushkatyn-III deposits, which together compose 0.2% of reserves (Uzhkenov, 1997).

In 2000, Kazakhstan ranked as the world's eighth largest producer of manganese ore in gross weight and ninth in manganese content of ore (Jones, 2001). Kazakhstan's three manganese mining enterprises were working at less than 50% of their design capacity of 2.55 Mt/yr of crude ore (Uzhkenov, 1997; Jones, 2001). The commissioning of production of ferromanganese and other manganese products, such as dioxide and chemical compounds, increased domestic demand for manganese. Reserves are considered adequate for the 21st century. Plans called for increasing current levels of output to supply domestic ferroalloy producers as well as for export (Uzhkenov, 1997).

Ukraine.—Ukraine contains about 75% of the FSU's manganese reserves (Danil'yants and others, 1999). The balansovy reserves (economic reserves according to the Soviet reserve classification system) of manganese ore in reserve categories A, B, and C1 total about 2.2 Gt. These reserves are in the Nikopol' Basin. Within the basin, the Ordzhonikidze sector (western Nikopol') accounted for 310 Mt; the Marganets sector (east Nikopol'), 280 Mt; and the Bol'shoy Tokmak deposit, 1,582 Mt (U.S. Bureau of Mines, 1994). Three types of ores—oxide, carbonate, and mixed oxide-carbonate—occur. The average grade of the oxide ore is 27.1% manganese; the oxide-carbonate ore, 25.6% manganese; and the carbonate ore, 17% manganese. Since 1975, Ukraine has been mining oxide-carbonate and carbonate ores in addition to the richer oxide ores, which are being depleted. The carbonate ores are more difficult to process and are not as suitable for producing high-grade concentrate (Bundesanstalt fuer Geowissenschaften und Rohstoffe, 1996, p. 47-48; Postolovskiy and others, 2000).

In 2000, Ukraine increased production of manganese concentrate by 38% compared with that of 1999 to 2.74 Mt (Interfax Mining and Metals Report, 2001k). Ukraine was the world's second largest producer of manganese ore by gross weight and manganese content (Jones, 2001; U.S. Geological Survey, unpub. data, 2001). However, Ukraine was producing less than 40% of the peak amount of manganese concentrate it produced in the 1980s. Ukraine had accounted for more than 85% of the manganese produced in the Soviet Union. Since the dissolution of the Soviet Union and the end of Soviet political and economic control in Eastern Europe, the demand for manganese in this region, which was the primary consuming area, had fallen sharply. The country's manganese output was consumed domestically at ferroalloy plants and steel mills, but the output of these domestic industries had also fallen sharply.

In Ukraine, the Ordzhonikidze and the Marganets mining and beneficiation complexes mined their respective sectors of the Nikopol' Basin. Both were public stock companies. At the Ordzhonikidze complex, eight open pit mines supplied ore to three beneficiation plants, and there was also an agglomeration plant. In 2000, Ordzhonikidze produced 1,824,100 t of

manganese ore, which was an increase of 29.6% compared with that of 1999 (Interfax Mining and Metals Report, 2001k). Ordzhonikidze had a design capacity to produce 3.92 Mt/yr of manganese concentrate and an actual production capacity of 2.28 Mt/yr of concentrate. Its agglomeration plant had a design capacity and actual production capacity to produce 400,000 t/yr of agglomerate (Postolovskiy and others, 2000).

The Marganets complex had five underground mines, two beneficiation plants, and a chemical beneficiation complex. In 2000, Marganets produced 917,100 t of manganese ore, which was an increase of 58.3% compared with that of 1999 (Interfax Mining and Metals Report, 2001k). Marganets had the capacity to produce between 1.1 and 1.2 Mt/yr of concentrate (Postolovskiy and others, 2000).

Despite some opposition to relinquishing control over the manganese producing enterprises, the Government began selling shares in an effort to greatly increase the charter capital of these enterprises. Plans called for the Ordzhonikidze and Marganets mining and beneficiation complexes to increase their charter capital in 2001 through share offerings intended to finance technical and social development (Interfax Mining and Metals Report, 2001ay, 2001bd).

Mercury

The Khaydarkan mining and metallurgical complex in the Osh region was the major producer of metallic mercury in the FSU. In 2000, it produced about 50% of its raw materials from its own mines, with the remainder coming from Russia and Tajikistan. The Khaydarkan complex mined antimony and fluorspar in addition to mercury. In 2000, it produced 554 t of metallic mercury, which was a decrease of 14% compared with that of 1999. All mercury produced in 2000 was exported to China (Interfax Mining and Metals Report, 2001t; U.S. Geological Survey, unpub. data, 2001).

Natural Gas

Azerbaijan.—In 2000, Azerbaijan's natural gas production decreased slightly to 5.6 billion cubic meters. In 1999, Azerbaijan's natural gas consumption and production were roughly equivalent to 212 billion cubic feet (about 6 billion cubic meters), but the country continued to import natural gas. This situation would change owing to the 1999 discovery of the Shah Deniz field, which was thought to be the world's largest gas discovery since 1978 and was estimated to contain between 25 trillion and 39 trillion cubic feet of natural gas. This field should produce its first gas by 2004, and Azerbaijan could become a significant net gas exporter (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Russia.—Russian experts claimed that Russia had the world's largest natural gas reserves with 33% of the world total reserves (Kozlovskiy and Shchadov, 1999; Malyshev, 2000). The U.S. Department of Energy reports Russia's gas reserves to be more than 48 trillion cubic meters (U.S. Energy Information Administration, October 1998, Country analysis briefs—Russia, accessed April 25, 1999, at URL http://www.eia.doe.gov/emeu/cabs/russia.html). Most production came from reserves in the arctic regions of West Siberia, and in particular from six fields in Tyumen' oblast'—the Urengoi, the Yamburg, the Zapolyarnoye, the Medvezh'ye, the Kharasavey, and the Bovanenko. Combined, these fields had more than three-fourths of the gas reserves in West Siberia. Gasfields in the Orenburg region in the Urals and in the Komi Republic in the European north of the country also provided for significant production (U.S. Central Intelligence Agency, 1985, p. 15).

As of 1999, Russia was the world's largest producer of natural gas (U.S. Energy Information Administration, February 2000, Russia, accessed November 15, 2000, at URL http://www.eia.doe/emeu/cabs/russia.html). Three fields—the Urengoi and the Yamburg in West Siberia and the Orenburg in the Urals—accounted for 80% of the country's natural gas production (U.S. Energy Information Administration, October 1998, Country analysis briefs—Russia, accessed April 25, 1999, at URL http://www.eia.doe.gov/emeu/cabs/russia.html).

Natural gas production was under the control of Gazprom [owned by the Russian Government (38%)] (U.S. Energy Information Administration, February 2000, Country analysis briefs—Russia, accessed November 15, 2000, at URL http://www.eia.doe/emeu/cabs/russia.html). Gazprom controlled more than 95% of Russia's natural gas production as well as its gas pipeline grid and was a major factor in the Russian economy.

In 2000, natural gas production decreased by about 8 billion cubic meters compared with that of 1999 to 584 billion cubic meters. Russian consumers, however, received 344.3 billion cubic meters, which was 6.1 billion cubic meters more than that of 1999 (Interfax Petroleum Report, 2001b). Exports of natural gas outside the CIS increased by 2.1% to 133.8 billion cubic meters (Interfax Statistical Report, 2001e). A total of 60.4 billion cubic meters of gas was pumped into underground storage, which was 7.8 billion cubic meters more than that of 1999 (Interfax Petroleum Report, 2001a).

Natural gas production was declining from peak levels achieved in the early 1990s, but the decline was very gradual. More than 60% of Russia's gas was extracted from deposits with declining output. Growth in reserves was not compensating for the amounts extracted. Depletion rates of reserves at Russia's major gas deposits were between 70% and 80%. In order to maintain production levels, it was considered necessary to develop new deposits in the polar region, on the shelf of the Arctic Sea, near Sakhalin Island, and in other areas posing economic and geographic difficulties. At the same time, it was necessary to construct more than 10,000 km of mainline gas pipelines and the corresponding infrastructure. Given Russia's export commitments and its heavy reliance on the use of gas as a domestic fuel, Russia faced the problem of potential gas shortages. Gas accounted for 62% of Russia's electricity generation (Krasnyaskiy and Shchadov, 2000).

Turkmenistan.—Turkmenistan reportedly contains more than 100 trillion cubic feet (about 3 trillion cubic meters) of proven natural gas reserves. It possesses the world's fifth-largest

reserves of natural gas as well as substantial oil resources. Most of the gasfields are in the Amu-Dar'ya Basin, with one-half the country's reserves in the Dauletabad-Donmez field. Turkmenistan also has large gas reserves in the Murgab basin, with the Yashlar deposit reportedly containing 27 trillion cubic feet (about 765 billion cubic meters) of reserves (U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed December 3, 2001, at URL http://www.eia.doe.gov/emu/cabs/turkmen.html).

In 2000, Turkmenistan increased natural gas production to 1.66 trillion cubic feet (about 47 billion cubic meters) from 788 billion cubic feet (about 22.3 billion cubic meters) in 1999. Gas production in Turkmenistan had fallen greatly since the Soviet period because the country was not able to profitably market its gas. Gas from Turkmenistan was being exported to consumers mainly through pipeline routes controlled by Russia. In 1994, the Russian Government refused to allow exported Turkmen gas to pass through Russian pipelines for export to hard currency markets but rather had to be sold to CIS countries.

A number of FSU countries had been receiving gas from Turkmenistan without being able to pay for it. Russia insisted that Turkmenistan continue to supply these countries, but Turkmenistan did not want to supply gas without getting paid. Disputes with Russia's Gazprom, which controlled the pipelines through Russia, resulted in gas shipments from Turkmenistan intermittently stopping, and Turkmenistan reduced its gas production accordingly. Production of gas fell sharply, putting the budget into deficit.

Russia and Turkmenistan were proceeding to resolve this dispute, and in 2000, Russia agreed to purchase almost 10 billion cubic meters of natural gas from Turkmenistan, rising to almost 40 billion cubic meters by 2002 (U.S. Energy Information Administration, July 2000, Country analysis briefs—Turkmenistan, accessed January 25, 2001, at URL http://www.eia.doe.gov/emeu/cabs/turkmen.html). With this Turkmen-Russian agreement on Turkmen gas exports, the country's gas exports more than doubled to 47 billion cubic meters in 2000 from 22.8 billion cubic meters in 1999. Turkmenistan planned to boost gas output to 70 billion cubic meters in 2001, although a pricing dispute with Russia was hindering Turkmenistan from achieving this goal (Interfax Petroleum Report, 2001d; U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed December 3, 2001 at URL http://www.eia.doe.gov/emu/cabs/turkmen.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Turkmenistan was working to open new gas export corridors through Iran and under the Caspian Sea into Turkey. In 1998, Turkmenistan began exporting gas to northern provinces in Iran via its first pipeline not crossing Russian territory (U.S. Department of State, January 2001, Background note—Turkmenistan, accessed October 29, 2001, at URL http://www.state.gov/r/pa/bgn/2866.htm).

For several years, Turkmenistan had been a key country in the United States-Caspian Basin energy initiative that attempted to facilitate negotiations between commercial partners and the Governments of Azerbaijan, Georgia, Turkey, and Turkmenistan to build a pipeline under the Caspian Sea and export Turkmen gas to the Turkish domestic energy market and beyond via a proposed trans-Caspian gas pipeline. The Government of Turkmenistan, however, essentially removed itself from the negotiations in 2000 by refusing all offers by its commercial partners and demanding multimillion dollar prefinancing (U.S. Department of State, January 2001, Background note—Turkmenistan, accessed October 29, 2001, at URL http://www.state.gov/r/pa/bgn/2866.htm). Other possible export routes for Turkmen gas include shipping gas to China and Pakistan. A possible pipeline carrying gas from Turkmenistan across Afghanistan to Pakistan had been considered, but construction plans had been suspended owing to the continuing civil war in Afghanistan (U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed December 3, 2001, at URL http://www.eia.doe.gov/emu/cabs/turkmen.html).

Uzbekistan.—Uzbekistan was the third largest natural gas producer in the CIS and one of the top 10 gas producing countries in the world. Since becoming independent, Uzbekistan increased its gas production to about 55.6 billion cubic meters in 2000 from 42.8 billion cubic meters in 1992. The country's gas reserves are estimated to be 66.2 trillion cubic feet (almost 1.9 trillion cubic meters), with the richest gas district in the Uzbek section of the Ustyurt region. To offset declining production at some older fields, such as Uchkir and Yangikazen, Uzbekistan was speeding up development at existing fields, such as the Kandym and Garbi fields, as well as planning to explore for new reserves (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/ cabs/caspian.html).

Nickel

In 2000, Russia, which was the world's largest producer of nickel, increased output of refined nickel by 4%. The Russian joint-stock company RAO Noril'sk Nickel, which had metal mines and production facilities in East Siberia and on the Kola Peninsula, produced about 96% of the country's nickel and 20% of the world's output of nickel from mixed sulfide ore. The country's remaining nickel was produced from laterite deposits in the Urals. In 2000, Noril'sk mined 5.6% more ore in comparison with that of 1999, but the grade of nickel in the ore was decreasing. In 2000, Noril'sk mined 4.3% more nickel and produced 4.6% more electrolytic nickel and 48.6% more carbonile nickel compared with that of 1999 (Norilsk Nickel, June 14, 2001, Annual report 2000, accessed July 12, 2001, via URL http://www.nornik.ru/english/press/rep.htm).

Noril'sk's Oktyabr'skiy underground mine was producing about 55% of Noril'sk's nickel mine output in East Siberia. Almost all the remaining mine output of nickel at Noril'sk comes from two other underground mines—the Komsomol'skiy, which produced about 25% of the remaining

output, and the Taymyrskiy, about 15% (Piven'and others, 1999).

Nickel production had fallen by almost 40% from the peak levels of the late 1980s. Problems existed with maintaining adequate reserves. The majority of reserves are in areas adjacent to existing producing deposits or at depths below existing reserves (Kozlovskiy and Shchadov, 1999). At the Oktyabr'skiy mine, nickel-rich ores were being depleted. Plans called for production of nickel-rich ores to decrease to 3.4 Mt/yr in 2002 from 4 Mt/yr in 1999, and the production of cuprous ores at Oktyabr'skiy was to increase to 1.6 Mt/yr from 100,000 t/yr during this same period (Piven'and others, 1999). The nickel-rich ores have almost five times as much nickel as do the cuprous ores (Natural Resources Canada, unpub. data, 1999).

Noril'sk was planning to maintain production levels for nickel through the development of two new mines, the Skalisty and the Glubokiy. At Skalisty, some mining had begun in 1997, and the mine was projected to have the capacity to produce 2 Mt/yr of ore. The mine was being developed as a deeper extension of the Oktyabr'skiy mine, and its ores were said to be equal to those of Oktyabr'skiy in nickel content. At the Glubokiy, development had not begun. Its ores were reportedly similar in nickel content to those of the Skalisty mine (Piven' and others, 1996; Sinitsin, 1997, p. 29; Fleming UCB Research, 2000).

Petroleum

Azerbaijan.—Azerbaijan's oil production increased to 14.1 Mt in 2000 compared with 13.8 Mt in 1999 (Interfax Statistical Report, 2001a). Azerbaijan had signed a number of production-sharing agreements with foreign investors to develop both its offshore and onshore deposits. The oil industry accounted for between 70% and 80% of total foreign investment in Azerbaijan. Foreign direct investment increased to $827 million in 1999 from $15 million in 1993, equaling about 20% of Azerbaijan's GDP. Crude oil and oil refinery product exports accounted for more than 70% of Azerbaijan's exports, and oil-related revenue composed nearly 50% of budget revenues.

Most of Azerbaijan's oil was produced offshore in the Caspian Sea. A large percentage of Azerbaijan's oil production was from the Gunashli field, 60 miles (36 km) off the Azeri coast, with a significant percentage coming from the shallow-water section of the Gunashli field. The country's proven oil reserves as well as large undiscovered resources in offshore Caspian fields brought a large number of major international investors to Azerbaijan. Since 1996, more than $3.4 billion had been invested in the country's oil sector, and the President of State Oil Co. of Azerbaijan said that investments in the Azerbaijani oil sector were expected to be between $2 billion and $2.5 billion in 2001.

Azerbaijan had signed 21 joint ventures (JVs) and production-sharing agreements (PSAs) with 33 companies from 15 countries. Not all of these projects had been successful, with several JVs and PSAs shutting down owing in part to projects announcing disappointing drilling results. Restrictions on the ability of JVs to export their oil directly also hampered development at some fields. To increase development, in 2000, Azerbaijan decided to abolish JVs and convert them to PSAs.

Oil production from the country's first PSA, AIOC, began in November 1997. In September 1994, in what was described as the deal of the century, AIOC signed an $8-billion 30-year contract to develop three fields (Azeri, Chirag, and the deepwater portions of Gunashli), with total reserves estimated to be between 3 and 5 Gbbl. Since 1997, almost all of Azerbaijan's production increases have come from AIOC. Azerbaijan's big production surge in the next decade is expected to come from further development of these three fields. AIOC was operated by British Petroleum plc of the United Kingdom. Full-scale development of the AIOC project, however, would depend on a decision regarding export options, including whether oil would be exported via the proposed Baku-Ceyhan pipeline.

In 2000, Azerbaijan's net oil exports totaled 155,000 barrels per day (bbl/d) (about 7.7 Mt). Azerbaijan's only export routes were the Baku-Novorossiisk pipeline (northern route) and the Baku-Sup'sa pipeline (western route), both of which transported Azerbaijan's early oil from AIOC facilities to Black Sea coast ports. Oil products were exported by rail in tank cars to Georgia's Black Sea ports. In September, Azerbaijan attempted to increase its oil exports by switching its power-generating facilities from a fuel oil to gas. Problems with gas supplies during the winter of 2000 to 2001, however, reduced Azerbaijan's oil export potential because fuel oil was needed domestically.

Azerbaijan's options for increasing oil exports depend to a large extent on the construction of new pipelines. Several oil export pipelines from the Caspian Sea region have been under consideration with growing support for the proposed Baku-Ceyhan pipeline, a $2.7-billion 1-Mbbl/d-capacity pipeline that would export Azerbaijani (and perhaps Kazakhstani) oil along a 1,040-mile route from Baku via Georgia to the Turkish Mediterranean port of Ceyhan. Azerbaijan strongly supported the MEP from Baku to Ceyhan, but Iran, Russia, and Ukraine, among others, were proposing alternative oil export routes for Azerbaijan (U.S. Energy Information Administration, May 2001, Country analysis briefs—Azerbaijan, accessed October 31, 2001, at URL http://www.eia.doe.gov/cabs/azerbjan.html).

Kazakhstan.—Kazakhstan was developing its oil resources with the participation of international companies. This participation has taken the form of JVs, PSAs, and exploration/field concessions. In 2000, Kazakhstan's oil production increased to 35.3 Mt compared with 30.1 Mt in 1999 (Interfax Statistical Report, 2001a). Almost one-half of its output came from three large onshore fields (Tengiz, Uzen, and Karachaganak). In addition, preliminary drilling in Kazakhstan's offshore sector of the Caspian Sea resulted in what appeared to be a giant find at the Kashagan field and raised the possibility that Kazakhstan could become one of the world's largest oil producers (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

In 1993, Chevron Corp. concluded a joint venture in

Kazakhstan to create the Tengizchevroil company to develop the Tengiz oilfield, which was estimated to contain recoverable oil reserves of between 6 and 9 Gbbl (about 800 Mt to 1.2 Gt). Tengizchevroil produced about 9.4 Mt (190,000 bbl/d) in 1999 and 10.4 Mt in 2000. Production was planned to increase to 12 Mt in 2001 (Interfax Petroleum Report, 2001c). Because of the commissioning of the Caspian Pipeline Consortium's Tengiz-Novorosiisk export pipeline, it was possible to increase production. Additional export pipelines would be needed. With adequate transit capabilities to export, the Tengizchevroil joint venture could reach peak production of 750,000 bbl/d (more than 37 Mt/yr) by 2010 (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/ cabs/caspian.html).

Russia.— In 2000, Russia was the world's third largest producer of crude oil and ranked among the world's leaders in oil exports and reserves (Sagers, 2001). Crude oil production in Russia increased by about 7% in comparison with that of 1999 to 325 Mt. Russian exports of crude oil and petroleum products to countries outside the CIS increased by 9.9% and 8.4%, respectively, to 127.6 Mt and 59.4 Mt (Interfax Statistical Report, 2001e). The major Russian oil companies had a profitable year owing to higher oil prices on the world market, and the industry was able to invest in production development (Interfax Petroleum Report, 2001b). In 2000, Russian oil refineries refined 174.5 Mt of crude oil, which was 5.7 Mt more than that of 1999, and produced more gasoline and diesel fuel.

In 1993, Russia began a program, designed in two phases, to privatize the oil sector. The first phase involved establishing several large vertically owned joint-stock companies (VIC), and the second phase, which was ongoing as of yearend 2000, involved auctioning off large shares of stocks in these companies. The Russian oil sector included 11 large VICs, which accounted for almost 90% of total national crude oil production and almost 80% of refinery throughput. These 11 major VICs ranked by level of crude oil production in 2000 were OAO Lukoil, Yukos Oil Co., JSC Surgutneftegaz, Tyumen' Oil Co., JSC Tatneft, JSC Sibneft, Rosneft Oil Co., Slavneft Oil and Gas JSC, Bashneft Oil Co., OAO Sidanco, and Onanko (Sagers 2001; U.S. International Energy Administration, December 2000, Country analysis briefs—Russia, accessed August 2, 2001, at URL http://www.eia.doe.gov/emeu/cabs/russia.html). In 2000, 132 enterprises were producing oil in Russia, but the majority was small and producing less than 1 Mt/yr (Sagers, 2001).

Tyumen' oblast' in West Siberia, a mature oil producing region where production levels had reached a plateau, accounted for about two-thirds of national production. The Volga and Urals regions, also mature regions, were the next two largest producing regions, but each produced only about 20% of the amount produced in Tyumen. Russia's level of oil production in the future would depend on how long the country could maintain the current level of output in West Siberia until new reserves are put into production in areas that include East Siberia, the Timan-Pechora and Sakhalin regions, and the Russian sector of the Caspian Sea (Sagers, 2001).

Phosphate Rock

The majority of the country's phosphate reserves was in the form of apatite ore on the Kola Peninsula that averaged about 14% phosphorous pentoxide (P_2O_5) (Kozlovskiy, 1984; Gabrielyants and others, 1991, p. 69). Phosphate rock also was produced at a number of sedimentary deposits that contain lower grade phosphate rock; more than 250 small phosphate rock deposits were deemed to be potentially useful for producing phosphate flour for local agricultural use (Timchenko, 2000).

The Apatit Production Association on the Kola Peninsula was the country's major source of phosphate raw material in the form of apatite concentrate. Apatite was also mined with iron ore at the Kovdor deposit on the Kola Peninsula and from the Kingisepp mining and beneficiation complex in Leningradskaya oblast'. Enterprises that developed the Bryansk and the Verkhnekamsk sedimentary ore deposits had the capacity to produce phosphate rock that yields about 700,000 t/yr of P_2O_5, which was used in the production of phosphate flour. In addition, phosphate rock production from the Vyatskoye-Kamskoye deposit was used in the production of yellow phosphorous. Owing to the inability of domestic farmers to pay for fertilizer, the production of phosphate fertilizer materials from nonapatite sources had been sharply curtailed (Timchenko, 2000).

The Kola Peninsula produced more than 90% of the country's phosphate output. All phosphate raw material exports from Russia were of apatite concentrate from the Kola Peninsula. In 2000, the Apatit Production Association was in its 71st year of existence and remained one of the world's major producers of phosphate raw material in the form of apatite concentrate; it also produced nepheline syenite, which is used as a raw material for aluminum production. The association consisted of four mining enterprises, an apatite-nepheline beneficiation complex consisting of two plants, and auxiliary facilities. Its holdings extend 70 km from west to east and 30 km from north to south. Its products were shipped domestically throughout the country by rail and exported through the ports of Murmansk and Kandalaksha. The association has 11 explored deposits of apatite-nepheline ore, with total ore reserves of more than 3.6 Gt. Of the explored deposits, six were under development by two open pit and two underground mining enterprises.

The problems confronting Apatit were the decreasing quality of the ore and more complicated mining and hydrological conditions owing to the increasing depth of the mines. The percentage of ore mined by open pit methods was projected to decrease to 55% in 2005 and to 30% by 2015 from 65% in 2000. Production at Apatit had stabilized after going through a period of severe decline in the 1990s, with production reviving in the past 3 years. Plans called for maintaining apatite concentrate production in a range from 9 to 9.5 Mt/yr, which would require attracting investment to maintain existing production capacities and to prepare new horizons for underground mining (Fedorov, 2000; Timchenko, 2000).

Apatit was producing two brands of concentrate—the standard, with a P_2O_5 content of not less than 39%, and a super

brand, with a P_2O_5 content of not less than 40%. Up to 59% of total output was consumed domestically, 11% was exported to other CIS countries, 9% was exported to the Baltic States, and the remaining 21% was exported to other countries of the world (Fedorov, 2000).

Platinum-Group Metals

In 2000, Russia was the world's second largest producer of platinum-group metals (PGMs) after South Africa but the world's largest palladium producer because there is a higher ratio of palladium to platinum in Russian ores than in South African ores (U.S. Geological Survey, unpub. data, 2001). Noril'sk Nickel mined more than 95% of the country's PGM output from mixed sulfide ores at its deposits in East Siberia. In 2000, Noril'sk mined 5.6% more ore in comparison with that of 1999, and the PGM content in the ore mined increased. In 2000, Noril'sk increased PGM production by 10% compared with that of 1999 (Interfax Mining and Metals Report, 2001ad).

Despite an expected decrease in the mining of nickel-rich ores at the Oktyabr'skiy mine, Noril'sk's mine output of PGMs was projected to increase. The Oktyabr'skiy mine produced almost 60% of the country's PGM output. Although plans called for production of nickel-rich ores at Oktyabr'skiy to decrease to 3.4 Mt/yr in 2002 from 4 Mt/yr in 1999, the production of cuprous ores at Oktyabr'skiy was to increase to 1.6 Mt/yr from 100,000 t/yr during the same period (Piven' and others, 1999). The cuprous ores have almost as much PGMs as do the nickel-rich ores (9.8 g/t versus 10.8 g/t) (Bond and Levine, 2001). The increase in cuprous ore production would increase PGM production levels, and a further increase in PGM production would be derived from increasing production of low-sulfide disseminated ores at the Medvezhiy Ruchey open pit and the Zapolyarnyy underground mines. These low-sulfide disseminated ores, which are lower in copper and nickel content than other ore types at Noril'sk, have a PGM content (9 g/t) almost equal to that of the cuprous and nickel-rich ores (Bond and Levine, 2001). In addition, plans called for the development of two new mines—the Glubokiy and the Skalisty—with nickel-rich ores that had a high PGM content. The Skalisty mine began operations in 1997, and plans called for it to reach capacity production of 2 Mt/yr by late 2001 or 2002. At the Glubokiy mine, development had not begun and it would take approximately 5 years thereafter to commence production (Piven' and others, 1996; Sinitsin, 1997, p. 29; Fleming UCB Research, 2000).

At the Komsomol'skiy and the Mayak mines, the two oldest underground mines of Noril'sk, output had been decreasing and had shifted to mining primarily cuprous ores. Plans originally called for extraction at these two mines to cease by 2003. Based on a new technological assessment, however, plans called for the Komsomol'skiy mine to continue mining cuprous ores and also, in part, to begin mining disseminated ores. In part, these two oldest mines were to be financially revived through a reorganization that linked them with the new Skalisty mine that was being developed to mine nickel-rich ore. In 1998, the separate status of these three mines was eliminated, and they were merged into the Komsomol'skiy mining enterprise, which included the Komsomol'skiy, the Mayak, and the Skalisty mines. Financial projections for the Komsomol'skiy mining enterprise for the period from 2000 to 2010 showed a more than sixfold increase in the value of output from the Skalisty mine, a 20% increase in the value of output from the Komsomol'skiy mine, and the value of output from the Mayak mine remaining at about its 2000 level (Kozhiyev and Sabanov, 2001). The Komsomol'skiy mining enterprise employed 2,150 workers. At the time of the merger, the three mines employed 2,700 workers (Abramenko, 2001). Thus, if production took place according to the plan, then the level of copper, nickel, and PGM output would increase slightly at these two older mines and significantly at the Skalistiy mine by 2010.

PGM output also will increase owing to a plan to process tailings with a high PGM content at the Noril'sk concentrator starting in 2001. Foreign firms were being solicited to provide new technology to process these tailings. The tailings, which accumulated at the Noril'sk concentrator over the course of decades, reportedly have an average PGM content of 8 g/t and contain about 600 t of PGM (Bond and Levine, 2001).

In the Murmansk region on the Kola Peninsula, PGM reserves reportedly totaled 1,040 t in the Pana tundra intrusion. This would make the site comparable in quantity of reserves to that of the Stillwater deposit in the United States. Murmansk geologists were to devote their efforts in 2001 to assessing the possibility of putting the eastern Pana section into commercial production.

According to the Russian Academy of Sciences, the Pana intrusion is a series of shallow seams containing PGM metals. Geologists discovered seven seams extending more than 10 km in length. Two seams, the upper and lower seams, reportedly have gradings up to 50 g/t platinum and palladium. The average PGM gradings are reportedly 17.4 g/t (Interfax Mining and Metals Report, 2001z).

Potash

Belarus.—In 2000, Belarus was the world's second largest producer of potash after Canada (U.S. Geological Survey, unpub. data, 2001). In the 1980s, Belarus was producing more than 5 Mt/yr, calculated based on potassium oxide (K_2O) content, but following the breakup of the Soviet Union, production had fallen to 1,946,700 t K_2O by 1993. A program was then undertaken to raise the quality of potash to world standards to increase exports to world markets. In 2000, production was almost 3.8 Mt K_2O, which was a decrease compared with the more than 4.5 Mt K_2O production in 1999.

Potash mining was conducted by the Belaruskaliy production association, which operated the Soligorsk mining complex located in Minskaya voblasts. Soligorsk was developing additional mining capacity intended to compensate for depleting reserves and to lower mining costs (Louis, 2001).

In 2000, Belarus exported more than 80% of its potash output, with most exports going to consumers in the CIS. Belarus itself was the second largest consumer of potash in the CIS, after Russia.

Russia.—In 2000, Russia was the world's third largest potash producer (U.S. Geological Survey, unpub. data, 2001). Russian reserves were reported to be about 1.8 Gt K_2O (Searls, 2001).

All potash production was from the Verkhne Kamsk deposit in the Urals, which contained about 96% of the country's reserves (Timchenko, 2000). Production came from two enterprises, the Silvinit and the Uralkaliy, which mined the Verkhne Kamsk deposit. Verkhne Kamsk sylvinite ore is hosted by a large halite zone with carnallite zones and sylvinite zones (Troitsky and others, 1999, p. 101).

The country was estimated to have the production capacity potentially to produce 6.3 Mt K_2O (Russian Mining, 2000). The Silvinit enterprise had increased its capacity by 100,000 t/yr K_2O, and no change in capacity occurred at JSC Uralkaly (Louis, 2001).

Growth in production was based on growth of exports because domestic demand remained quite low. The goal of increasing exports was being facilitated by improvements at Latvia's Baltic Sea port facilities at Riga and Ventspils and in the Black Sea facilities at Illichivs'k in Ukraine, which were the major shipping ports for Russian potash (Louis, 1998).

Tin

The Novosibirsk tin smelting complex, Russia's biggest tin producer, produced 5,200 t of tin in 2000, which was a 36% increase in production compared with that of 1999. In 2001, Novosibirsk planned to increase revenues by increasing output for a series of new products, including pure lead and bismuth. A new division for these was started in late 2000, and by the beginning of 2001, Novosibirsk had produced 308 t of pure lead and 15 t of pure bismuth, with production slated to increase in 2001 by 207% and 200% respectively. Novosibirsk planned to buy 85% of its concentrates from tin mines it owned by 2002. In 1999, Novosibirsk acquired 52% of the shares in Dalolovo (established to develop the Solnechnyy deposit in Primor'ye); 50%, in Tianshanolovo (Kyrgyzstan); and 51%, of Khinganskoye olovo (Jewish Autonomous District). It also owned 15% of Deputatskolovo (Yakutiya) and was trustee of the state-owned 11% of this company for 3 years.

In 2001, Novosibirsk planned to buy 2,750 t of tin concentrate from Deputatskolovo, which would be 7.8% more compared with that of 2000. Deputatskolovo increased concentrate production owing to an investment program that provided $5 million to $6 million. Commercial mining at Tianshanolovo was to begin in 2001, and Novosibirsk planned to deliver 350 to 400 t of concentrate from this mine in 2001. Novosibirsk also expected to buy 350 t of concentrate from Dalolovo in 2001. Novosibirsk had invested $1 million to rehabilitate Dalolovo, buying bulldozers, excavators, loaders, and other machinery. Dalolovo was set up to develop the Solnechnoye tin deposit, which the Solnechnyy mining and beneficiation complex had developed. Dalolovo's main owners were Novosibirsk (52%) and Solnechnyy and the Khabarovsk territorial administration (7.17%).

Novosibirsk's owners included Russia's Sibirskaya Mnogoprofilnaya Kompaniya, FTK SibElfin, and ED-SIB-A, which owned 18%, 15%, and 14% of the shares, respectively. Other holders included Depositary and Clearing Center and ZAO CS First Boston (Interfax Mining and Metals Report, 2001ae).

Titanium

Kazakhstan.—The Ust'-Kamenogorsk titanium and magnesium complex in Oskemen (formerly Ust'-Kamenogorsk) was the country's sole producer of titanium sponge and magnesium. In 2000, titanium sponge production decreased slightly compared with 1999 to 8,280 t (Interfax Mining and Metals Report, 2001r).

The Ust'-Kamenogorsk titanium and magnesium complex was commissioned in 1965 and restructured in 1993 as a joint-stock company. It is located in northeastern Kazakhstan where many of the country's major metallurgical enterprises are based. The enterprise employed nearly 4,000 people and specialized in the production of titanium sponge and magnesium.

The enterprise had received international certification for its titanium sponge. In 1999, the Ust'-Kamenogorsk plant received ISO 9002 certification for its titanium sponge. It had its own quality-control system operated in conjunction with some of the world's leading aerospace companies. The enterprise produced and sold under prepaid contracts. The company's main titanium sponge consumers were Specialty Metals Co. S.A. of Belgium (a key shareholder in the company) and Chori Co. Ltd. of Japan. It also sold sponge to other companies in Europe, Japan, and the United States. Specialty Metals held 65.67% of the enterprise's shares and the Kazakhstani Government held 15.5%. The Government planned to sell part of the 15.5% of its state-held shares in 2001. TMP Ltd. of the United Kingdom performed most trade activity for the company.

The enterprise had used imported raw materials since it was opened but was developing its own raw material base for titanium. In 2000, Ust'-Kamenogorsk created Satpayevsk Titanium Mining Ltd. for this purpose. The Ferrokhrom enterprise (part of Kazkhrom Group) owned the Shokash titanium field, which had 17 Mt of reserves, and planned to produce 100,000 t/yr of concentrate there. This would enable Ferrokhrom to produce titanium slag for use by Ust'-Kamenogorsk.

Ust'-Kamenogorsk ended 2000 with a net profit despite a drop in production and sales from 1999 (Moscow Interfax in English, October 15, 2001, Ust'-Kamenogorsk plant fully recovers from 1999 crisis in first half, accessed October 24, 2001, via URL http://fbis.fedworld.gov). In 2000, the Ust'-Kamenogorsk complex had almost completely overcome the consequences of the 1999 crisis when titanium prices plunged. In 1999, the enterprise produced about 27% less titanium compared with that of 1998 as consumers backed out of contracts due to a drop in production in the industries that used titanium products and a resulting increase in supply over demand. The company increased magnesium production to help offset the drop in sales of titanium (Moscow Interfax in English, October 15, 2001, Ust-Kamenogorsk titanium magnesium combine, accessed October 24, 2001, via URL http://fbis.fedworld.gov).

Russia.—In 2000, production of titanium sponge increased by about 25% at the Avisma titanium-magnesium plant in the Perm region of the Urals. Avisma was the country's only major titanium sponge producer. Plans called for titanium sponge production to increase by 16% in 2001 compared with that of

2000 owing to increased sales to the VSMPO, which was the world's leading producer of milled titanium products and Avisma's biggest customer (Interfax Mining and Metals Report, 2001e).

In 2000, titanium accounted for 80.1% of the VSMPO's output; aluminum, 10.7%; ferrotitanium, 5.6%; and steel, 3.1%. Such products as bars, tiles, and sheets accounted for 80% of sales. The VSMPO sold 65% to 70% of its output under long-term contracts with major companies, such as Boeing Co., Airbus Co., General Electric Aircraft Engines, and Rolls-Royce plc. The VSMPO planned to increase sales by 53% to 12,000 t in 2001 compared with those of 2000. The VSMPO's titanium exports rose by 27% to 7,860 t and by 12% in value in 2000 compared with those of 1999. The VSMPO also planned to increase milled titanium supplied to Boeing to between 530 and 590 t in 2001. The establishment at the end of 2000 of the VSMPO's U.S. operations, a production center in Los Angeles, would help increase sales. The VSMPO intended to open another center in February 2001 on the U.S. eastern seaboard where some of the major aircraft manufacturers had suppliers. The new centers were building up buffer stocks of the VSMPO products. Urgent orders were coming in as titanium prices climbed. The VSMPO took 45 days to ship its metal from Russia, but with the production centers, it could deliver in a more timely manner to its customers (Interfax Mining and Metals Report, 2001ap, bh).

About 38% of shares in the VSMPO was owned by Verkhnaya Salda Union, about 12% was owned by company employees, and about 40% was held by nominal shareholders CS First Boston and Depositary and Clearing Center (Moscow). The other 10% were held by small shareholders in stakes of less than 1%.

Ukraine.—The Zaporozh'ye titanium-magnesium complex in Ukraine had the capacity to produce 20,000 t/yr of titanium sponge during the Soviet era. Ukraine's Government was trying to reorganize the complex and was seeking investors for joint ventures to upgrade the complex and promote its products for export (Interfax Mining and Metals Report, 2001aw). In the late 1990s, production had ceased and then resumed. The plant, however, was producing far less than it did in the Soviet era.

Uranium

Kazakhstan.—Kazakhstan's national nuclear company Kazatomprom produced 1,740 t of uranium in 2000, and planned to produce about the same amount in 2001. It supplied uranium under long-term contracts to Belgium, Japan, and the United States. Kazatomprom was the country's sole producer, exporter, and importer of uranium. It controlled the geological prospecting outfit Volkovgeologiya (90% share); the Ul'ba metallurgical plant, which produced beryllium and tantalum metal (90% share); and the Central, Stepnoye, and No. 6 mines. These mines are located in the Suzak District of southern Kazakhstan, where 48% of the country's uranium reserves are located (Interfax Mining and Metals Report, 2001n).

In the 1980s, as a part of the Soviet Union, Kazakhstan was producing between 4,500 and 5,000 t/yr of natural uranium. All mining methods—open pit, conventional, and in situ leaching (ISL)—during this period were used at 12 mines, which formed 4 major complexes. Uranium reserves reportedly were estimated to be 900,000 t, of which 600,000 t could be mined by ISL methods. Starting in the mid-1990s, all uranium was mined in Kazakhstan using ISL methods.

In 2000, five deposits were under development—Uvanas, Eastern Mynkuduk, Kanzhugan, and Northern and Southern Kara-Murun. Remaining in situ reserves in these deposits are reportedly about 80,000 t. Kazatomprom was participating in two joint ventures with Cameco Corp. and Cogema Group at the Inkai and Moyun-Kum deposits, respectively. These deposits reportedly contain 200,000 t of confirmed uranium reserves. Joint-venture development of the Inkai and Moynkum deposits was limited to test mining. Owing to unfavorable market conditions, operations at the Inkai deposit and the central part of the Mynkuduk deposit were suspended.

A joint venture that included Kazatomprom, Russia's Ministry of Atomic Energy, and Kyrgyzstan's Kara Balta mining complex was formed to start mining the Zarechnoye uranium deposit in Kazakhstan by yearend 2001. The joint venture was projected to produce about 500 t/yr of uranium concentrate in the next few years. Zarechnoye was explored during the Soviet era, and experimental mining took place, but the deposit was not commissioned. The deposit reportedly contains proven reserves of 14,500 t and probable resources of 4,500 t of uranium.

Kyrgyzstan.—Uranium mining ceased in Kyrgyzstan in the mid-1980s. The Kara Balta mining and processing enterprise in Kyrgyzstan was still one of the FSU's largest uranium processing plants. It was controlled by Kyrgyzstan's Defense Ministry. It produced yellowcake from concentrates from Kazakhstan. It was engaged in a joint venture with Kazakhstan and Russia to produce yellowcake for Russia from the Zarechnoye deposit in Kazakhstan.

Russia.—The Streltsovskiy uranium ore district in Russia includes more than 10 uranium deposits suitable for open pit and underground mining. The Priargunskiy mining complex developed these deposits for many years and had mined in total about 100,000 t of uranium. Estimated remaining uranium reserves total 170,000 t with an average ore grade of 0.18% uranium. In 2000, Priargunskiy mined five deposits by underground methods with output for the year 2000 reaching about 2,500 t uranium. Priargunskiy did not plan to increase production.

Russia did not produce enough uranium to meet its consumption requirements. It consumed between 5,000 and 6,000 t/yr of uranium and was relying on stockpiles. Russia planned to increase the capacity of its nuclear reactors by 50% by 2010 and by more than 450% by 2050. Russia's uranium shortfall could reach about 10,000 t/yr by 2010. Because its stockpiles would be depleted in the coming years, Russia was planning to make up for shortfalls by participating in uranium development projects at home and abroad (Dzhakizhev, 2001; Interfax Mining and Metals Report, 2001am).

Tajikistan.—Uranium mining ceased in Tajikistan in the mid-1980s.

Ukraine.—All deposits in Ukraine are low grade. The Vostochnyy mining and processing enterprise had been mining and processing ores from the Vatutin, Michurin, and Central deposits for many years. This ore contains 0.1% or less uranium and was mined from deep shafts. In 2000, production was 600 t and was expected to gradually decrease in quantity. According to forecasts, Ukraine would most likely cease uranium mining by the year 2010 (Dzhakishev, 2001).

Uzbekistan.—Total uranium reserves in Uzbekistan reportedly are about 185,000 t, of which approximately 114,000 t can be developed by ISL methods. Uzbekistan also reportedly has resources of about 240,000 t that have not been completely delineated, of which 190,000 t are regarded as the sandstone type. The State Committee for Geology and Mineral Resources listed 27 uranium deposits, most of which are in the Kyzyl Kum Desert, reportedly containing proven reserves of 55,000 t of uranium (Interfax Mining and Metals Report, 2001aa).

Since 1995, mining was no longer conducted by open pit and conventional methods. In 2000, the deposits under development—Ailendy, Beshkak, Ketmenchi, Sabyrsay, South and North Bukinay, Syrgali, and Uchkuduk—were being mined by ISL methods. Resources of these deposits constitute approximately 30% of total sandstone deposits (Dzhakishev, 2001).

Mining was conducted primarily by the Navoiy mining and metallurgical complex, the country's largest gold and uranium producer. In the mid-1980s, during the Soviet period, Navoiy used to produce 3,000 to 3,500 t/yr of low-enriched uranium. By the mid-1990s, Navoiy was producing less than 1,500 t/yr. In recent years, production had increased. In 1999, Navoiy produced more than 2,100 t of uranium, which was about 8% more than it produced in 1998 and about 5% more than it produced in 2000. All production was exported (Dzhakishev, 2001; Interfax Mining and Metals Report, 2001aa, ab).

Navoiy planned to preserve existing capacity and to create additional capacity to mine uranium. Navoiy planned to produce 2,300 t in 2001. In 2000, Navoiy started to mine the major Syrgaly uranium deposit in central Kyzyl Kum. The deposit was slated to produce its first 100 t of uranium in 2001. Ore mined by Navoiy was processed at the No. 1 hydrometallurgical plant in Navoiy. In recent years, Navoiy invested more than $10 million in its uranium mining capacity, buying new drilling rigs and submersible pumps among other equipment (Interfax Mining and Metals Report, 2001aa).

Zirconium

Russia.—The Kovdor mining and beneficiation complex, which is a producer of apatite, baddeleyite, and iron ore concentrates from the Murmansk region, planned to produce 6,000 t of baddeyeyite concentrates in 2001. Kovdor was Russia's only domestic producer of zirconium raw materials. Kovdor's owners were the (Russian) property fund (24.8%), the Murmansk regional government (21.13%), the Tavricheskiy commercial bank (more than 10%), the Severstal steel works (Kovdor's biggest consumer) (4.8%), and MDM Group (36%) (Interfax Mining and Metals Report, 2001u).

Ukraine.—The Vol'nogorsk State mining and metallurgical complex produced zirconium and rutile concentrates from Ukraine's Dnepropetrovsk region. It was the only producer of zirconium ore in the FSU. In 2000, Vol'nogorsk exported about 75% of its output, 20% of which went to the CIS and the rest to Bulgaria, Germany, Italy, Poland, Romania, the United States, and other countries. The complex, established in 1961, specialized in mining and processing titanium-zirconium ores and was on a list of enterprises not to be privatized (Interfax Mining and Metals Report, 2001bc).

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TABLE 1
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
ARMENIA						
Metals:						
Copper:						
Concentrate, Cu content e/		9,100 r/	9,000 r/	9,200 r/	9,600 r/	14,000
Blister		--	5,000	3,000	5,000 e/	7,231 3/
Gold e/	kilograms	244 3/	500	350 r/	400 r/	400
Molybdenum, concentrate, Mo content		1,800	1,800 e/	2,500 e/	5,403 r/	6,044
Silver	kilograms	626	1,000	1,000	1,200 e/	1,300
Zinc, concentrate, Zn content		820 e/	830 e/	825 e/	879 r/	528 3/
Industrial minerals:						
Cement	thousand tons	282	297	300 r/	287	219 3/
Clays, bentonite (powder)		2,750	2,750 e/	3,000 e/	3,493 r/	2,807 3/
Limestone	thousand tons	1,800	1,700	1,700	1,700 e/	1,700
Perlite e/		6,000	6,000	35,000	35,000	35,000
Salt		26,400	26,000 e/	24,911	26,955	30,000 3/
AZERBAIJAN 4/						
Metals:						
Aluminum:						
Alumina		1,000 r/	12,900	6,600	76,100 r/	200,000
Aluminum, primary		800 r/	4,800 r/	3,386 r/	1,278 r/	2
Alunite		100,000 e/	50,000	--	--	NA
Iron ore, marketable		3,900 r/	2,200	6,600	-- r/	--
Steel:						
Crude		24,607 r/	24,600 r/	24,000 r/ e/	24,500 r/ e/	25,000
Rolled		2,000	20,000	3,000	NA	NA
Pipes		3,100	13,000	3,100	100 r/	NA
Ingots and castings		NA	NA	8,292	381	846 3/
Industrial minerals:						
Caustic soda		33,200 r/	23,400 r/	21,000 r/	20,800 r/	30,000
Cement		223,000	314,800	201,000	171,400 r/	200,000
Iodine e/	kilograms	300,000 r/	300,000 r/	300,000 r/	300,000 r/	300,000
Gypsum e/		55,000 r/	60,000 r/	60,000 r/	60,000 r/	60,000
Mineral fertilizers		1,900 r/	5,700 r/	600 r/	40 r/	NA
Salt		2,500 e/	2,500 e/	3,518 r/	2,978 r/	3,801 3/
Sulfuric acid		31,000	52,500	24,000 r/	24,000 r/	24,000
Mineral fuels and related materials:						
Natural gas	thousand cubic meters	6,304,000	5,963,900	5,590,000	6,000,000	5,600,000 3/
Natural gas plant liquids	42-gallon barrels	2,190,000	2,555,000	2,555,000	2,555,000	2,560,000 3/
Petroleum, crude		9,100,300	9,027,000	11,420,000	13,800,000	14,100,000 3/
BELARUS						
Metals, steel:						
Crude	thousand tons	886	1,220	1,412	1,449 r/	1,623 3/
Rolled	do.	770 r/	1,072 r/	1,250 r/	1,300	1,400 3/
Pipes		18,900 r/	30,700 r/	47,200 r/	50,000 r/ e/	55,000
Industrial minerals:						
Cement	thousand tons	1,467	1,876	2,035	1,998 r/	1,847 3/
Nitrogen, N content of ammonia	do.	678 r/	590	685	765 r/	730
Potash, K_2O equivalent	do.	2,716 r/	3,247	3,451 r/	4,553 r/	3,786 3/
Salt 5/		230,500 r/	297,100 r/	355,200 r/	344,318 r/	310,741 3/
Sulfur e/		25,000	20,000	20,000	20,000	20,000
Sulfuric acid	thousand tons	549	698	640 r/	650 r/ e/	650
Mineral fuels and related materials:						
Natural gas	million cubic meters	249	246	252	256 r/	257 3/
Peat:						
Horticultural use		533,000	253,000	99,000	100,000	100,000
Fuel use		2,847,000 r/	2,768,000	2,035,000	3,090,000 r/	2,023,000 3/
Total		3,380,000	3,021,000	2,134,000	3,190,000	2,123,000
Petroleum:						
Crude	thousand tons	1,860	1,822	1,830	1,840 r/	1,841 3/
Refined	do.	12,400	11,900 r/	12,000 e/ r/	12,000 e/ r/	12,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
GEORGIA						
Metals:						
Copper, mine output, Cu content		5,100	4,100	6,000 e/	7,200	8,000
Gold	kilograms	500 e/	700 r/ e/	700 r/ e/	2,043 r/	2,924 3/
Iron and steel:						
Ferroalloys, electric furnace: e/						
Ferromanganese		7,600	4,000	10,000	11,297 3/	6,670 3/
Silicomanganese		7,000	16,600	35,000	26,249 3/	20,458 3/
Total		14,600	20,600	45,000	37,546 3/	27,128 3/
Steel:						
Crude		84,870	104,242	50,000 e/	NA r/	49,500 3/
Finished products, rolled		60,000	100,000	40,000	10,000	1,000 3/
Lead, mine e/		200	200	200	200	200
Manganese ore, marketable		50,000 r/ e/	30,000 r/ e/	50,000 e/	47,900 r/	59,100 3/
Silver	kilograms	NA	NA	NA	29,487	33,884 3/
Industrial minerals:						
Barite e/		20,000	20,000	20,000	15,000	15,000
Cement		84,700	90,600	200,000	342,200 r/	347,700 3/
Clays, bentonite		13,000	12,000 r/	11,000 r/ e/	9,891 r/	7,084 3/
Zeolites		7,300	6,000	NA	NA	NA
Mineral fuels and related materials:						
Coal		6,100	4,200	14,700	12,000 r/	7,000 3/
Natural gas	thousand cubic meters	3,000	--	--	--	100,000 3/
Petroleum:						
Crude		127,000	143,000	119,200	91,300 r/	109,500 3/
Refined		NA	NA	NA	56,500	24,500
KAZAKHSTAN						
Metals:						
Aluminum:						
Alumina	thousand tons	1,083	1,095	1,085	1,158 r/	1,217 3/
Bauxite		3,345,900 r/	3,416,000 r/	3,436,800	3,606,500	3,729,600 3/
Arsenic trioxide e/		1,500	1,500	1,500	1,500	1,500
Beryllium, metal		100 e/	100 e/	100 r/ e/	220 r/	431 3/
Bismuth, metal e/		50	50	50	55	55
Cadmium, metal		567 r/	745 r/	1,622 r/	1,246 r/	257 3/
Chromite		1,190,000	1,798,300	1,602,700	2,405,600 r/	2,606,600 3/
Cobalt, mine output, Co content e/		300	300	300	300	300
Copper:						
Mine output, Cu content		250,100 r/	316,166	338,600 r/	373,500 r/	430,200 3/
Metal:						
Smelter, undifferentiated		245,000	315,960	350,000 e/	383,457 r/	413,859 3/
Refined, primary		267,100	301,000	324,900	361,890 r/	394,723 3/
Gold:						
Mine output, Cu content	kilograms	12,500 e/	18,700 e/	18,100 r/ e/	20,236 r/	28,171 3/
Metal, refined	do.	9,000 e/	9,700 e/	8,900	9,655 r/	11,529 3/
Iron and steel:						
Iron ore, marketable		13,000,000 r/	13,132,600 r/	8,692,900 r/	9,616,700 r/	13,828,500 3/
Metal:						
Pig iron		2,536,000	3,040,000 r/	2,594,000	3,438,082 r/	4,010,261 3/
Ferroalloys:						
Ferrochromium		352,000	600,000	535,000 r/	731,563 r/	799,762 3/
Ferrochromiumsilicon		69,759 r/	48,000	33,550 r/	49,282 r/	55,634 3/
Ferromanganese		620	1,425	1,242	--	NA
Ferrosilicon		119,000 e/	133,000 e/	92,000 r/ e/	140,263	133,269 3/
Silicomanganese		60,175 r/	55,000 e/	57,000 r/ e/	78,495 r/	102,719 3/
Other		10,000	9,000	8,000 r/	9,000 r/ e/	9,000
Total		611,554 r/	846,425 r/	726,792 r/	1,008,603 r/	1,100,384
Steel:						
Crude		3,142,000	3,900,000	3,089,000	4,105,111 r/	4,799,008 3/
Finished, rolled		2,200,000	3,000,000	2,519,000	3,186,000	3,700,000 3/
Lead:						
Mine output, Pb content		29,000 r/	28,400 r/	30,000	34,200 r/	39,300 3/
Metal, smelter, primary and secondary		67,289 r/	81,974	118,632	160,000	185,800 3/

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
KAZAKHSTAN--Continued						
Metals--Continued:						
Magnesium		9,000 e/	8,972	9,000 e/	11,031 r/	10,380 3/
Manganese ore:						
Crude		470,000 r/	400,000	634,100	944,000 r/	1,201,900 3/
Marketable		300,000 r/	230,000 e/	399,000	563,000	720,000
Molybdenum, mine output, Mo content		100 e/	100 e/	100 e/	155 r/	215 3/
Nickel, mine output, Ni content e/		7,000	7,000	-- r/	-- r/	3,000
Silver:						
Mine output, Ag content		467,700	690,000 e/	726,321	904,644 r/	927,110 3/
Metal, refined		380,000 e/	390,000 e/	535,800	654,606	670,000
Tin, mine output, Sn content		NA r/	NA r/	NA r/	119,643 r/	218,863 3/
Titanium, metal		12,500	13,000 e/	12,000 e/	8,767 r/	8,280 3/
Vanadium, mine output, V content e/		900	900	1,000	1,000	1,000
Zinc:						
Mine output, Zn content		159,400 r/	224,051	224,300 r/	270,300 r/	322,100 3/
Metal, smelter, primary and secondary		170,081 r/	188,996	240,728	249,327	262,570 3/
Industrial minerals:						
Asbestos, all grades		128,700	182,000 r/	155,400	139,300	233,200 3/
Barite, concentrate		94,100 r/	30,900 r/	9,000 r/	51,200 r/	--
Boron e/		50,000 r/	45,000 r/	40,000 r/	40,000 r/	40,000
Cement		1,120,000	661,000	600,000	837,800 r/	1,175,000 3/
Clay, kaolin e/		40,000	50,000	60,000	70,000	70,000
Phosphate rock		1,700 e/	1,000 e/	100 e/	68 r/	33 3/
Sulfur: e/						
Pyrites		71,000	--	--	--	--
Byproduct:						
Metallurgy		139,000	139,000	212,000 r/	245,000 r/	300,000
Natural gas and petroleum		515,000	778,000 r/	933,000 r/	1,070,000 r/	1,200,000
Total		725,000	917,000 r/	1,150,000 r/	1,320,000 r/	1,500,000
Mineral fuels and related materials:						
Coal		76,800,000	72,600,000	69,800,000	58,377,600 r/	74,872,400 3/
Natural gas	thousand cubic meters	6,500,000	8,100,000	7,900,000	9,945,900 r/	11,541,900 3/
Natural gas plant liquids		203,100	159,600	42,100	33,400	NA
Petroleum, crude:						
Gravimetric units		23,000,000	25,800,000	25,900,000	26,735,800 r/	30,647,900 3/
Converted, volumetric units e/	42-gallon barrels	169,000,000	190,000,000	190,000,000	197,000,000 r/	225,000,000
Refinery products e/		11,000,000	9,200,000 3/	8,000,000	5,700,000	NA
Uranium concentrate, U content		1,320	1,000	1,074 r/	1,367 r/	1,740 3/
KYRGYZSTAN						
Metals:						
Antimony:						
Mine output, Sb content e/		1,200 r/	1,200 3/	150 r/	100 r/	150
Metal and compounds		6,002	4,401	1,298	1,320	1,505 3/
Gold e/	kilograms	1,500	17,400 3/	22,000	20,000	22,000
Mercury:						
Mine output, Hg content e/		500	550	250	300	257 3/
Metal		584	610 r/ e/	620 r/	646 r/	554 3/
Molybdenum		NA	NA	225 e/	250	250
Industrial minerals:						
Cement		544,000 r/	658,000 r/	709,400	386,300	452,900 3/
Fluorspar concentrate		2,767 r/	4,176	3,200 r/ e/	2,997 r/	3,000
Rare earths, rare-earth oxide equivalent:						
Compounds	kilograms	NA	NA	NA r/	15,200 r/	6,800
Metals	do.	NA	NA	4,680 r/	5,159 r/	7,736 3/
Mineral fuels and related materials:						
Coal		409,000	521,500	432,400	417,000 r/	424,900 3/
Natural gas	million cubic meters	26	24	18	25	32 3/
Petroleum, crude		84,300	84,800	78,300	77,000 r/	77,100 3/

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 p/
MOLDOVA					
Metals, crude steel	646,000 r/	810,000 r/	718,000	796,000	905,000 3/
Industrial minerals:					
Cement	40,400 r/	121,800	74,000	50,000	222,000 3/
Gypsum	12,700	14,400	19,800 r/	18,500 r/	32,100 3/
Lime	19,900 r/	9,900	12,700 r/	5,200 r/	3,100 3/
Sand and gravel cubic meters	324,000	346,700	248,300	317,700	277,000 3/
Mineral fuels and related materials, peat e/	463,000 r/ 3	475,000	475,000	475,000	475,000
RUSSIA					
Metals:					
Aluminum:					
Ore and concentrate:					
Alumina	2,105,000	2,400,000	2,465,000	2,657,000	2,850,000
Bauxite e/	3,300,000 r/	3,350,000 r/	3,450,000 r/	3,750,000 r/	4,200,000
Nepheline concentrate, 25% to 30%	1,300,000	940,000	889,000 r/	772,000 r/	814,000 3/
Metal, smelter, primary	2,874,236	2,906,020	3,004,728	3,146,232 r/	3,245,000
Antimony, mine output, Sb content (recoverable) e/	6,000 r/	6,000 r/	4,000 r/	4,000 r/	4,500
Arsenic, white e/	1,500	1,500	1,500	1,500	1,500
Beryllium, beryl, cobbed, 10% to 20% BeO e/ 6/	1,000	1,000	1,000	1,000	1,000
Bismuth, mine output, Bi content e/	50	50	35	50	50
Cadmium metal, smelter	730	790 e/	800 e/	900 e/	925
Chromium, chrome ore, marketable e/	96,700 3/	150,000	130,000	100,000	100,000
Cobalt: e/					
Mine output, recoverable Co content	3,300	3,300	3,200	3,300	3,600
Metal, refined	4,200	4,100	3,500	3,600	4,400
Copper:					
Ore, Cu content, recoverable	523,000	505,000 e/	500,000	530,000 e/	570,000
Metal:					
Blister: e/					
Primary	550,000	535,000	510,000	540,000	580,000
Secondary	20,000	35,000	40,000	158,000 r/	200,000
Total	570,000	570,000	550,000	698,000	780,000
Refined:					
Primary	543,000	535,000	543,000	600,000 r/	640,000
Secondary	57,000	65,000	77,000 r/	150,000 r/	200,000
Total	600,000	600,000	620,000	750,000	840,000
Gold, mine output, Au content kilograms	123,300	124,000 e/	114,900	125,870	143,000 3/
Iron and steel:					
Iron ore, 55% to 63% Fe	72,100,000 r/	70,900,000 r/	72,343,000 r/	81,311,000 r/	86,630,000 3/
Metal:					
Pig iron	36,061,000	37,327,000	34,827,000	40,854,200 r/	44,618,100 3/
Direct-reduced iron	1,500,000	1,730,000 e/	1,550,000	1,880,000	1,900,000
Ferroalloys: e/					
Blast furnace:					
Ferromanganese	67,000 3/	47,100 3/	65,000 r/ 3	90,000	70,700 3/
Ferrophosphorus	2,300 3/	3,600 3/	3,500	3,500	3,500
Spiegeleisen	7,000	7,000	7,000	7,000	7,000
Electric furnace:					
Ferrochromium	135,000	247,000	203,000 3/	249,000 3/	274,000 3/
Ferrochromiumsilicon	5,000	5,000	4,000	4,500 r/	4,500
Ferronickel	75,000 3/	40,000	30,000	33,000 r/	35,000
Ferrosilicon	460,000	510,000	496,000 3/	601,000 3/	652,000 3/
Silicon metal	40,000	40,000	40,000	40,000	40,000
Other	40,000	40,000	40,000	40,000	40,000
Total	831,000	940,000	889,000 r/	1,070,000 r/	1,130,000
Steel:					
Crude	49,193,000	48,499,300	43,821,800	51,524,100 r/	59,097,500 3/
Finished, rolled	39,000,000	37,800,000	35,134,000	40,900,000	46,900,000 3/
Pipe	3,600,000	3,500,000	2,816,000	3,004,000 r/	4,385,000 3/
Lead:					
Mine output, recoverable Pb content	23,000	16,000	13,000	13,000 e/	13,300
Metal, refined, primary and secondary e/	30,000	52,000	36,000	62,000 r/	59,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
RUSSIA--Continued						
Metals--Continued:						
Magnesium: e/						
Magnesite		1,000,000	1,040,000	851,845 3/	900,000	1,000,000
Metal, including secondary		35,000	39,500	41,500	45,000	45,000
Manganese, mine output, Mn content e/		10,000	21,000	21,000	22,000	23,000
Mercury e/		50	50	50	50	50
Molybdenum e/		2,000	2,000	2,000	2,400	2,400
Nickel: e/						
Mine output, recoverable Ni content		230,000	260,000	250,000	260,000	270,000
Nickel products, including ferronickel		190,000	230,000	227,000	238,000	248,000
Platinum-group metals: e/						
Platinum		25,000 r/	25,000 r/	25,000 r/	27,000 r/	30,000
Palladium		80,000	80,000	80,000	85,000	94,000
Other		3,500	3,500	3,500	3,700	4,100
Total		109,000 r/	109,000 r/	109,000 r/	116,000 r/	128,000
Silver e/	kilograms	400,000	400,000	350,000	375,000	370,000
Tin: e/						
Mine output, recoverable Sn content		8,000	7,500	4,500	4,500	5,000
Metal, smelter:						
Primary		9,000 r/	6,700 r/	3,000 r/	3,400 r/	4,700
Secondary		1,000 r/	1,000 r/	500 r/	400	500
Total		10,000 r/	7,700 r/	3,500 r/	3,800 r/	5,200
Titanium sponge e/		20,000	21,000	22,000	24,000	30,000
Tungsten concentrate, W content e/		3,000	3,000	3,000	3,500	3,500
Vanadium metal e/		11,000	9,000	9,000	9,000	9,000
Zinc: e/						
Mine output, recoverable Zn content		126,000 3/	121,000	115,000	132,000	136,000 3/
Metal, smelter, primary and secondary		172,000	189,000	192,000	221,000 r/	230,000
Zirconium, baddeleyite concentrate, averaging 98% ZrO_2		5,080	5,745	6,293	6,800	6,500
Industrial minerals:						
Asbestos, grades I-VI		615,000 e/	710,000 e/	600,000 r/ e/	674,699 r/	752,200 3/
Barite e/		70,000 3/	60,000	60,000	60,000	60,000
Boron e/		1,000	1,000	1,000	1,000	1,000
Cement, hydraulic		27,800,000	26,700,000 r/	26,000,000 r/	28,400,000 e/	32,400,000 3/
Clays, kaolin (concentrate)		50,000 r/	50,000 r/	50,000 r/	40,600 r/	45,000
Diamond: e/						
Gem	carats	10,500,000 r/	11,200,000	11,600,000 r/	11,500,000	11,600,000
Industrial	do.	10,500,000	11,200,000	11,600,000 r/	11,500,000	11,600,000
Synthetic	do.	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
Total	do.	101,000,000	102,000,000	103,000,000	103,000,000	103,000,000
Feldspar e/		45,000	45,000	40,000	45,000	45,000
Fluorspar, concentrate 55% to 96.4% CaF_2		NA r/	6,200 r/	120,200 r/	153,800 r/	187,600
Graphite e/		6,000 r/	6,000 r/	6,000 r/	6,000 r/	6,000
Gypsum		1,534,000	559,000	609,400	650,000 r/	700,000
Iodine e/	kilograms	250,000	250,000	280,000	300,000	300,000
Lime, industrial and construction		7,822,000	7,626,000	7,000,000 e/	7,000,000 e/	8,000,000
Lithium minerals, not further specified e/		2,000	2,000	2,000	2,000	2,000
Mica e/		100,000	100,000	100,000	100,000	100,000
Nitrogen, N content of ammonia		7,900,000	7,150,000	6,500,000 e/	7,633,100 r/	8,735,000
Phosphate rock (P_2O_5 content): e/						
Apatite concentrate, 37% to 39.6%		2,900,000	3,300,000 r/	3,735,000 r/	4,161,000 r/	4,150,000 3/
Sedimentary rock, 19% to 30%		300,000	300,000 r/	300,000 r/	300,000 r/	300,000
Total		3,200,000	3,600,000	4,040,000 r/	4,460,000 r/	4,450,000
Potash, marketable K_2O equivalent e/		2,620,000 r/	3,400,000	3,500,000	4,200,000	3,700,000
Salt, all types		2,100,000	2,100,000	2,200,000 r/	3,200,000 r/	3,200,000
Sodium compounds, n.e.s., carbonate		1,500,000	1,700,000	1,600,000 e/	NA	NA
Sulfur: e/						
Native		70,000	50,000	50,000	50,000	50,000
Pyrites		400,000	400,000	254,000 r/	300,000 r/	350,000
Byproduct, natural gas		3,000,000	2,950,000	3,940,000 r/	4,410,000 r/	4,900,000
Other		325,000	350,000	411,000 r/	510,000 r/	600,000
Total		3,800,000	3,750,000	4,660,000 r/	5,270,000 r/	5,900,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
RUSSIA--Continued						
Industrial minerals--Continued:						
Sulfuric acid		5,650,000 e/	6,100,000	5,840,000	208,000 r/	184,000
Talc e/		100,000	90,000	79,000 3/	90,000 r/	100,000
Vermiculite e/		30,000	25,000	25,000	25,000	25,000
Mineral fuels and related materials:						
Coal:						
Anthracite		17,300,000 r/	13,600,000 r/	10,400,000 r/	9,900,000 r/	1,050,000 3/
Bituminous		149,700,000 r/	146,400,000 r/	142,700,000 r/	155,800,000 r/	172,060,000 3/
Lignite		90,000,000	85,200,000 r/	78,800,000	83,400,000	83,740,000 3/
Total 7/		257,000,000 r/	245,000,000 r/	232,000,000 r/	249,000,000 r/	256,850,000 3/
Coke, 6% moisture content		25,300,000	25,600,000	23,600,000	28,100,000 e/	60,000,000
Gas, natural, marketed	million cubic meters	601,000	571,000	591,400	592,000 r/	584,000
Natural gas plant liquids	42-gallon barrels	67,525,000	71,175,000	80,300,000	84,315,000	NA
Oil shale		2,000,000 e/	2,000,000 e/	1,715,000	1,950,000 e/	1,676,000
Peat, fuel use		1,500,000 r/	2,100,000 r/	1,700,000 r/	2,000,000 r/	2,000,000
Petroleum:						
Crude in:						
Gravimetric units		301,000,000	306,000,000	303,300,000	305,000,000 e/	325,000,000
Volumetric units e/	thousand 42-gallon barrels	2,220,000	2,250,000	2,230,000	2,240,000	2,390,000
Refinery products 8/		183,000,000	178,000,000	164,000,000 r/	169,000,000 e/	174,000,000
Uranium concentrate, U content e/		2,000	2,000	2,000	2,000 r/	2,500
TAJIKISTAN 9/						
Metals:						
Aluminum, primary		198,300	206,400 r/	196,300 r/	229,100 r/	300,000
Antimony, Sb content of concentrate e/		1,000	1,200 3/	1,500	1,800	2,000
Bismuth, mine e/		5	5	5	5	5
Gold	kilograms	1,100 r/ e/	2,550	3,000	2,700 e/	2,700
Lead, Pb content of concentrate e/		800	800	800	800	800
Mercury, Hg content of concentrate e/		45	40	35	35	40
Silver, Au content of concentrate	kilograms	NA	NA	5,000	5,000 e/	5,000
Tungsten concentrate, W content e/		50	--	--	--	--
Industrial minerals:						
Cement		50,000	36,400	17,700	30,000	50,000
Fluorspar e/		9,000	9,000	9,000	9,000	9,000
Gypsum e/		30,000	26,000	31,700	35,000	35,000
Mineral fuels and related materials:						
Coal		20,000	17,000	16,000	16,600 r/	20,700
Natural gas	thousand cubic meters	35,200	41,600	32,400	40,000	40,000
Petroleum, crude		30,000	26,000	19,400	20,000 e/	20,000
TURKMENISTAN						
Industrial minerals:						
Bentonite e/		50,000	50,000	50,000	50,000	50,000
Bentonite powder		33	250	250 e/	250 e/	250
Bischofite		3,230	90	90 e/	100 e/	100
Cement e/		450,500 3/	450,000	450,000	450,000 r/	450,000
Epsomite		14,250	NA	NA	NA	NA
Ferrous bromide (51% Br)		255	83	80 e/	85 e/	85
Gypsum e/		169,577 3/	85,000 r/	100,000 r/	100,000 r/	100,000
Iodine	kilograms	34,600	87,100	90,000 e/	150,000 r/ e/	150,000
Lime		9,000	16,000	15,000	16,000 r/ e/	16,000
Nitrogen, N content of ammonia		69,500	60,700	75,000 e/	75,000 r/ e/	75,000
Salt		255,738	216,500	215,000 e/	215,000 r/ e/	215,000
Sodium sulfate		30,820	56,552	55,000 e/	60,000 e/	60,000
Sulfur		8,112	9,227	9,000 e/	9,000 r/ e/	9,000
Mineral fuels and related materials:						
Natural gas	million cubic meters	35,200	17,300	14,000 e/	22,800 e/	47,000
Natural gas plant liquids	42-gallon barrels	4,380,000	6,205,000	6,205,000	6,205,000	NA
Petroleum, crude		4,300,000	4,700,000	6,500,000 e/	7,800,000 r/ e/	7,350,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
UKRAINE						
Metals:						
Alumina		1,000,000 e/	1,080,000 e/ r/	1,291,000	1,230,000	1,360,000
Aluminum:						
Primary		90,000 e/	100,500	106,700	115,425 r/	119,290 3/
Secondary		NA	NA	71,164	110,940	128,952 3/
Cadmium, metal e/		25	25	25	25	25
Germanium e/		22	22	22	22	NA
Iron and steel:						
Iron ore, marketable		47,600,000	53,000,000 e/	50,758,000 r/	47,769,100	55,883,200 3/
Metal:						
Pig iron		18,143,000	20,561,000	20,840,000	23,009,800 r/	25,698,700 3/
Ferroalloys: e/						
Blast furnace:						
Ferromanganese		100,000	125,000	112,400 3/	57,800 3/	85,400 3/
Spiegeleisen		2,500	2,500	2,500	-/ r/ 3	5,400 3/
Electric furnace:						
Ferromanganese		170,000	160,000	150,000	199,539 3/	252,679 3/
Ferronickel		8,300 3/	--	--	--	--
Ferrosilicon		250,000	300,000	222,511 3/	243,600 3/	323,417 3/
Silicomanganese		600,000	560,000	485,560 3/	498,905 3/	684,040 3/
Other		25,000	25,000	20,000	25,000	25,000
Total		1,160,000	1,170,000	993,000	1,020,000 r/	1,380,000
Steel:						
Crude		22,100,000	25,600,000	23,461,000	27,390,000 r/	31,780,000 3/
Finished, rolled		17,045,000	19,525,000	17,776,000	19,300,000	22,500,000 3/
Pipe		2,001,300	1,844,300	1,519,300	1,175,000	1,670,000 3/
Lead, refined (secondary)		21,000 e/	11,000 e/	9,000 e/	9,902 r/	15,034 3/
Magnesium, primary		10,000 e/	10,000 e/	5,043 r/	3 r/	NA
Manganese:						
Marketable ore		3,070,000	3,040,000	2,226,000	1,984,800 r/	2,740,600 3/
Mn content e/		1,040,000	1,030,000	755,000	675,000	930,000
Metal		NA	NA	NA	NA	NA
Mercury e/		30	25	20	NA	NA
Nickel, mine output, Ni content of FeNi produced e/		500	--	--	--	--
Silicon e/		1,000	1,000	1,000	1,000	NA
Titanium:						
Ilmenite concentrate, 42% TiO		NA r/	NA r/	507,435 r/	536,542 r/	576,749 3/
Rutile concentrate, 95% TiO e/		50,000	50,000	50,000	49,000 r/	58,600 3/
Metal, sponge e/		--	1,200 r/	4,000 r/	4,000 r/	NA
Zinc, metal, secondary e/		2,000	2,000	--	--	--
Zirconium concentrates e/		55,000 r/	65,000 r/	65,000 r/	69,000 r/	75,000
Industrial minerals:						
Cement		5,017,000	5,098,000	5,591,200 r/	5,828,100 r/	5,311,400 3/
Clays: e/						
Bentonite		300,000	300,000	300,000	300,000	300,000
Kaolin		250,000	250,000	201,670 3/	221,526 3/	225,000
Diamond, synthetic e/	carats	8,000,000	8,000,000	8,000,000	8,000,000	8,000,000
Graphite		5,000 e/	5,000 e/	5,104 3/	7,461 3/	7,431 3/
Nitrogen, N content of ammonia		3,300,000	3,400,000 e/	3,300,000 e/	4,514,500 r/	4,351,400 3/
Potash, K_2O content e/		76,000	60,000 3/	35,000	35,000	30,000
Salt, rock		2,800,000 e/	2,500,000 e/	2,500,000 e/	2,185,300 r/	2,286,500 3/
Sulfur, native e/		168,000 3/	100,000	97,000	80,000	80,000
Mineral fuels and related materials:						
Coal:						
Hard	thousand tons	NA	NA	41,750	45,216	40,983 3/
Brown	do.	NA	NA	1,409	1,184	1,067 3/
Coking	do.	NA	NA	32,608	35,424	38,940 3/
Total	do.	70,500	76,900	75,767 r/	81,824 r/	80,990 3/
Coke		14,800,000	15,000,000 e/	13,956,700	17,309,700 r/	19,362,600 3/
Natural gas	thousand cubic meters	18,408,000	18,131,000	17,967,000	18,092,100	17,847,100 3/
Natural gas plant liquids	42-gallon barrels	5,475,000	9,490,000	9,125,000	8,395,000	NA
Peat e/		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
UKRAINE--Continued						
Mineral fuels and related materials--Continued:						
Petroleum:						
Crude:						
As reported	gravimetric tons	4,097,100	4,131,200	3,894,800	3,797,900 r/	3,692,900 3/
Converted e/	42-gallon barrels	30,100,000	30,400,000	28,600,000	27,900,000	27,200,000
Refinery products		13,477,000	12,833,000	13,510,000	13,500,000 e/	NA
Uranium concentrate, U content e/		500	500	500	500	600 3/
UZBEKISTAN						
Metals:						
Aluminum, secondary e/		2,500	2,700 3/	3,000	3,000	3,000
Copper:						
Mine output, Cu content		NA r/	NA r/	NA r/	91,600 r/	91,800 3/
Metal: e/						
Blister:						
Primary		75,000	80,000	89,930 3/	72,000	75,000
Secondary		5,000	5,000	5,000	5,000	5,000
Total		80,000	85,000	94,930 3/	77,000	80,000
Refined		100,000	110,000 r/	94,900 r/	77,000 r/	80,000
Gold	kilograms	72,000 e/	81,700 e/ r/	80,000	66,028 r/	62,276 3/
Lead, mine output, Pb content		10,000 e/	-- 10/	-- 10/	-- 10/	-- 10/
Molybdenum, mine output, Mo content e/		500	500	350 r/	350 r/	350
Silver, mine output	kilograms	70,000 e/	70,000 e/	70,000 e/	88,700 r/	89,900
Steel:						
Crude		444,000	365,000 r/	344,000	343,000 e/	420,000 3/
Rolled		390,000	350,000	322,000	300,000	400,000
Tungsten, mine output, W content e/		300	250	200	-- r/	-- 3/
Zinc:						
Mine output, Zn content		12,000 e/	-- 10/	-- 10/	-- 10/	-- 10/
Metal, smelter, primary e/		45,000	53,000	52,000	27,000 3/	18,000
Industrial minerals:						
Cement		3,300,000	3,300,000	3,400,000	4,471,000 r/	3,521,000 3/
Clays, kaolin e/		5,500,000	5,500,000	5,500,000	5,500,000	5,333,000 3/
Feldspar		NA r/	NA r/	NA r/	300 r/	4,300 3/
Fluorspar		90,000 e/	90,000 e/	80,000 e/	-- r/	--
Graphite e/		60	60	60	60	60
Iodine e/	kilograms	--	--	500	2,000	2,000
Mineral fertilizers		1,000,000	955,000	976,000	900,000	NA
Nitrogen, N content of ammonia		950,000	950,000	875,000	790,000 e/	810,000
Phosphate rock, gross weight e/	thousand tons	--	--	100	150	300
Sulfur, byproduct: e/						
Metallurgy		145,000 3/	165,000	170,000 3/	175,000	180,000
Natural gas and petroleum		250,000 3/	250,000	275,000 3/	280,000	280,000
Total		395,000 3/	415,000	445,000 3/	455,000	460,000
Mineral fuels and related materials:						
Coal		2,844,000	3,130,000	2,950,000	3,033,000 r/	2,556,000 3/
Natural gas	million cubic meters	49,000	51,200	54,800	55,600	55,600 3/
Natural gas plant liquids	42-gallon barrels	18,250,000	16,425,000	16,425,000	16,425,000	16,425,000 3/
Petroleum and gas condensate		7,624,000	7,891,000	8,100,000	8,100,000	NA
Uranium, mine output, U content		1,459	1,764	2,000	2,159	2,054 3/

e/ Estimated. p/ Preliminary. r/ Revised. NA Not available. -- Zero.
1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.
2/ Table includes data available through November 2001.
3/ Reported figure.
4/ For some metals, including copper, gold, lead, molybdenum, silver, and zinc, and for a number of industrial minerals that Azerbaijan had produced, there was not sufficient information to derive production estimates or to determine if production had ceased.
5/ Includes byproduct salt from potash production.
6/ It appears that Russia in the mid-1990s stopped mining beryl ore. It was reported that in 1998 there was no production of beryllium ore.
7/ Total coal production numbers rounded.
8/ Not distributed by type and therefore not suitable for conversion to volumetric units. Data include all energy and nonenergy products but exclude losses.
9/ Tajikistan produces a number of other mineral commodities not listed in the table for which information is inadequate to make estimates.
10/ Mining operations appear to have been curtailed sharply or to have ceased.

TABLE 2
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
ARMENIA			
Aluminum, rolled and foil	Kanaker aluminum plant	K'anak'err	25,000
Copper:			
Mine output, Cu content	Facilities:	Located at:	30,000 4/
	Kapan mining directorate	Kapan	
	Shamlugh mining directorate (not in operation)	Shamlugh	
	Akht'ala mining directorate (not in operation)	Akht'ala	
	Zangezur copper-molybdenum complex mining Kadzharan deposit	Kadzharan	
	Agarak copper-molybdenum mining and processing complex	Agarak	
Blister	Manes and Vallex joint stock company	Alaverdi	15,000
Diamonds, cut stones	Aghavni diamond cutting works	Nor Geghi	NA
Do.	Amma group diamond cutting works	Artashat	NA
Do.	Andranik diamond cutting works	Nor Hachyn	NA
Do.	Diamond Company of Armenia (DCA)	Yerevan	NA
Do.	Lori diamond cutting works	Nor Hachyn	NA
Do.	Lusampor	Melik'gyugh	NA
Do.	Punji diamond cutting works	Yerevan	NA
Do.	Sapphire diamond cutting works	Nor Hachyn	NA
Do. thousand carats	Shoghakan gem cutting plant	do.	120
Gold kilograms	Companies:	Located at:	2,000 4/
	Zod mining complex (mining ceased in 1997)	Zod	
	Megradzor deposit (mining ceased in 1997)	Megradzor	
Do. do.	Ararat gold processing and tailings recovery plant	Ararat	1,000
Molybdenum, mine output, Mo content	Complexes:	Located at:	8,000 4/
	Zangezur copper-molybdenum complex mining Kadzharan deposit	Kadzharan	
	Agarak copper-molybdenum mining and processing complex	Agarak	
Perlite thousand tons	Aragats-Perlite mining and beneficiation complex	Aragats Lerrnagagat'	200
Zinc, mine output, Zn content	Kapan mining directorate	Kapan	NA
AZERBAIJAN			
Aluminum	Sumgait smelter	Sumqayit	55,000
Alumina	Gyandzha refinery	Ganca	100,000
Alunite ore	Zaglik alunite mining directorate	Zaylik	600,000
Cement	Plants:	Located at:	1,000,000 4/
	Karadagly cement plant	Karadagly	
	Tauz cement plant	Tovuz	
Iodine and bromine	Baku, Karadagly, Neftechala plants	Process oil well brines at plants in Baku, Karadagly, and Neftechala	NA
Iron ore, marketable	Dashkasan mining directorate	Dashkasan region	1,000,000
Natural gas, processing	Karadagly plant	Near Baku	NA
Petroleum and natural gas: 5/			
Crude petroleum and gas condensate	State Oil Company of Azerbaijan (SOCAR) for natural gas production	Production from 37 onshore deposits, including deposits on the Ashperon Peninsula and in the Izhnekurin Valley	8,000,000
Do.	do.	Production from 17 onshore fields with about 45% of natural gas produced from the Bakhar field and 50% of crude petroleum produced from the Gunashli field	8,000,000
Natural gas million cubic meters	Companies	Production from:	8,000 4/
	State Oil Company of Azerbaijan (SOCAR) for natural gas production	Seventeen onshore fields with about 45% of natural gas produced from the Bakhar field and 50% of crude petroleum produced from the Gunashli field	
	Azerbaijan International Operating Co. (AIOC) for oil production	Thirty seven onshore deposits that include deposits on the Ashperon Peninsula and in Izhnekurin Valley	

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
AZERBAIJAN--Continued			
Petroleum, refined	Azernefteyag (formerly Baku) refinery	Baku	12,000,000 6/
Do.	Azernefteyagandzhah (formerly Novo-Baku) refinery	do.	10,000,000 6/
Steel:			
Crude	Azerboru production amalgamation	Sumqayit	800,000
Rolled	do.	do.	700,000
Pipe, tubes	do.	do.	540,000
BELARUS			
Cement	Volkovysk and Krichevskiy plants	Wawkavysk, Mahilyowskaya Voblasts'	2002,000
Diamonds	Kristall plant	Homyel'skaya Voblasts'	NA
Nitrogen, N content of ammonia	Grodno "Azot" Association	Hrodna region	1,000,000
Peat, fuel use	Production at 37 enterprises producing mainly briquets	All regions of country	5,000,000 7/
Petroleum:			
Crude	Belarusneft Association	Southeastern part of country	2,000,000
Refined	Mazyr refinery	Mazyr	16,000,000 8/
Do.	Naftan refinery	Navapolatsk	8,450,000 8/
Potash, K_2O equivalent	Belaruskaliy Association	Salihorsk area	5,000,000
Steel:			
Crude	Belarus electric steelworks	Zhlobin	1,400,000
Pipe	Mahilyow metallurgical works	Mahilyowskaya Voblasts'	80,000
GEORGIA			
Arsenic:			
As content of ore	Deposits: Lukhumi deposit Tsana deposit	Located at: Racha Svanetiya	2,000 4/
Metal and compounds	Racha mining and chemical plant	Racha	NA
Do.	Tsana mining and chemical plant	Ts'ana	NA
Barite	Chordskoye deposit	Onis Raioni (Onskiy Rayon)	70,000
Bentonite	Gumbrskoye and Askanskoye deposits	Gumbra, Askana regions	200,000
Cement	Rust'avi cement plant	Rust'avi	1,500,000
Coal	Tkibuli-Shaorskoye, Tkvarchelskoye deposits	Tqibuli, Tqvarch'eli, Akhalts'ikhis Raioni regions	300,000
Copper, Cu content of ore	Madneuli complex	Marneulis Raioni	12,000
Diatomite	Kisatibskoye deposit	K'isat'ibi region	150,000
Ferroalloys:			
Ferromanganese	Zestafoni plant	Zestap'onis Raioni	100,000
Silicomanganese	do.	do.	250,000
Manganese sinter	do.	do.	250,000
Gold	Kvartsit joint venture	Madneuli deposit	3
Lead-zinc:			
Pb content of ore	Kvaisi deposit	Kvaisi	1,200
Zn content of ore	do.	do.	3,000
Manganese, marketable ore	Chiat'ura complex	Chiat'ura	200,000
Petroleum:			
Crude	About 60 wells accounting for 98% of output	Mirzaani, Zemo T'elet'i, Sup'sa regions	200,000
Refined	Batumi refinery	Bat'umi	NA
Steel, crude	Rust'avi steel mill	Rust'avi	1,400,000
KAZAKHSTAN			
Alumina	Pavlodar aluminum plant	Pavlodar	1,250,000
Arsenic trioxide	Chimkent polymetallic enterprise and other nonferrous metallurgical enterprises	Shymkent	3,500
Asbestos	Complexes: Dzhetygara complex Chilisay complex	Located at: Qostanay Aqtobe phosphorite basin	1,000,000 4/
Barite	Facilities: Karagaylinskiy and Zhayrem mining and beneficiation complexes Tujuk Mine Achisay polymetallic complex	Located at: Karagayly, Khrebet; Zhayrem deposit Almaty Kentau region	300,000 4/
Bauxite	Turgayskiy and Krasnooktyabrskiy bauxite mining complexes	Central Kazakhstan	4,000,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
KAZAKHSTAN--Continued			
Beryllium, metal	Ul'ba metallurgical plant	Oskemen	NA
Bismuth, metal	Facilities:	Located at:	70
	Ust-Kamenogorsk lead-zinc metallurgical plant	Oskemen	
	Leninogorsk lead smelter	Leninogorsk	
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 parts 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, Cu content	Balkhash	Zhezkazgan region	200,000
Do.	Zhezkazgan	do.	250,000
Do.	Irtysh	Ertis region	10,000
Do.	Leninogorsk	Leninogorsk region	15,000
Do.	Zhezkent	Zhezkent region	25,000
Do.	Zyryanovsk mining and beneficiation complexes	Zyryanovsk region	5,000
Do.	East Kazakhstan copper-chemical complex	East Kazakhstan region	10,000
Metallurgy, metal	Balkhash	Zhezkazgan region	150,000
Do.	Zhezkazgan	do.	250,000
Do.	Irtysh smelting and refining complex	Ertis region	40,000
Blister	Ust-Kamenogorsk plant	Oskemen	37,100
Refined	do.	do.	6,600
Ferroalloys:			
Ferrochrome:			
High-carbon 60%	Aktybinsk plant	Aqtobe	200,000
Medium-carbon 60%	do.	do.	200,000
Ferrosilicon	Aksu plant	Aksu	700,000
Ferrosilicochrome	do.	do.	700,000
Ferrochrome, high-carbon	do.	do.	500,000
Silicomanganese	do.	do.	90,000
Gallium	Pavlodar aluminum plant	Pavlodar	NA
Gold	Byproduct of polymetallic ores and native gold mining	Byproduct gold colocated with nonferrous metals mining	30
Iron and steel:			
Pig iron	Ispat-Karmet Steelworks	Karaganda	5,000,000
Steel, crude	do.	do.	6,300,000
Iron ore, marketable	Sokolovsko-Sarbay and Lisakovskiy mining and metallurgical complexes	Qostanay	000,26,0
Lead:			
Mining, recoverable Pb content of ore	Achisay	Kentau and Karatau regions	40,000
Do.	Akchatau	Zhezkazgan region	10,000
Do.	Irtysh	Oskemen region	10,000
Do.	Karagayly	Karagayly region	20,000
Do.	Leninogorsk	Leninogorsk region	60,000
Do.	Tekeli	Tekeli and Taldyqorghan regions	20,000
Do.	Zhezkent	Semey region	NA
Do.	Sary-Arkapolimetal	Zhayrang region	20,000
Do.	Zyryanovsk complexes	Zyryanovsk region	20,000
Do.	East Kazakhstan copper-chemical complex	East Kazakhstan region	NA
Refined	Ust-Kamenogorsk plant	Oskemen	250,000
Do.	Shymkent	Shymkent	NA
Manganese, crude ore	Companies:	Located at:	2,550,000 4/
	Atasurda	Atasu	
	Kazakmarganets	Zhezdy	
	Sary-Arkapolimetal	Zhayrang region	
Molybdenum:			
Mining, recoverable content of ore	Facilities:	Located at:	6,000 4/
	Kounrad Mine	Balqash complex	
	Karaobinskoye deposit	Karaoba region	
	Sayak deposit	Sayaq (Sayak) region	

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
KAZAKHSTAN--Continued			
Molybdenum--Continued:			
Metal	Akchatau molybdenum metal plant	Zhezkazgan region	NA
Natural gas million cubic meters	Companies:	Located at:	12,000 4/
	Aktyubinskmunaigaz	Aqtobe	
	Embamunaigaz	Emba district	
	Huricane Kumkol Munai	Aral Sea region	
	Karachaganak field	Northwestern Kazakhstan	
	Mangistaumunaigaz	Mangghhyshlaq Peninsula	
	Tengizchevroil joint venture	Tengiz deposit	
	Uzenmunaigaz	Uzen deposit	
Petroleum:			
Crude	Companies:	Located at:	32,000,000 4/
	Aktyubinskmunaigaz	Aqtobe	
	Embamunaigaz	Emba district	
	Huricane Kumkol Munai	Aral Sea region	
	Karachaganak field	Northwestern Kazakhstan	
	Mangistaumunaigaz	Mangghhyshlaq Peninsula	
	Tengizchevroil joint venture	Tengiz deposit	
	Uzenmunaigaz	Uzen deposit	
Refined, crude oil throughput	Atyrau refinery	Atyrau	5,200,000
Do.	Pavlodar refinery	Pavlodar	8,100,000
Do.	Symkent refinery	Shymkent	7,900,000
Phosphate rock	Companies:	Located at:	10,000,000 4/
	Karatau production association	Zhambyl and Shymkent regions	
	Chilisay mining directorate	Aqtobe phosphorite basin	
Rare metals (columbium, indium, selenium, tellurium)	Aktau complex	Aktau	NA
Do.	Belogorsky rare metals plant	Belogorskiy	NA
Do.	Chimkent polymetallic plant	Shymkent	NA
Do.	Ust-Kamenogorsk lead-zinc plant	Oskemen	NA
Do.	Akchatau mining and beneficiation complex	Zhezkazgan region	NA
Rhenium	Balkhash copper mining and metallurgical complex	do.	NA
Silver, refined	Facilities:	Located at:	800 4/
	Ust-Kamenogorsk	Zhezkazgan region	
	Leninogorsk	Leninogorsk	
	Chimkent metallurgical plants	Shymkent	
Tantalum	Yermak ferroalloy plant	Aksu	NA
Tin	Akchatau mining and beneficiation complex	Akzhaik deposit, Zhezkazgan region	700
Titanium, metal	Ust-Kamenogorsk titanium-magnesium plant	Oskemen	35,000
Uranium, U content	Facilities:	Located at:	3,500 4/
	Stepnogorsk	Stepnogorsk	
	Shevchenko	Aqtau	
	Taboshara	Taboshara	
	Prikaspiskiy ore enrichment center	Aqtau	
	Tselinny chemical complex	Stepnogorsk	
Zinc, metal	Leninogorsk	Leninogorsk	106,500 9/
Do.	Ust-Kamenogorsk plant	Oskemen	215,000 9/
KYRGYZSTAN			
Antimony:			
Sb content of ore	Kadamzhay and Khaydarkan complexes	Kadamzhayskiy Rayon, Khaydarkan regions	2,400
Metal	Kadamzhay metallurgical complex	Kadamzhayskiy Rayon	20,000
Cement	Kantskiy cement plant	Kant	1,500,000
Coal	Seven underground mines, five open pits	Southern, central, and northeastern parts of the country	2,200,000
Fluorspar, concentrate	Khaydarkan mining and metallurgical complex	Khaydarkan deposit	5,000
Gold:			
Au content of ore	Makmalzoloto	Makmal deposit	3
Do.	Kumtor Gold Company	Kumtor deposit	22
Do.	Solton-Sary Mine	Naryn	NA
Refined	Kara Balta refinery	Chuy Oblasty	22

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
KYRGYZSTAN--Continued			
Mercury:			
Hg content of ore	Khaydarkan mining and metallurgical complex	Khaydarkan deposit	700
Metal	do.	Khaydarkan	1,000
Molybdenum, for nonmetallurgical uses	Molibden Joint Stock Company	Chuy Oblasty	NA
Natural gas million cubic meters	Kyrgyzazmunayzat	Approximately 300 wells, major deposits: Changyr-Tash, Izbaskentskoye, Mayluu-Suu, Chigirchik Pereval, Kara-Agach, Togap-Beshkenskoye, Susashoye	100 4/
Petroleum	do.	do.	150,000
Rare earths:			
Concentrates, gross weight	Kyrgyz mining complex	Ak-Tyuz deposit	14,000
Compounds and metals, rare-earth oxide equivalent	Kyrgyz chemical and metallurgical plant	ovkaOrl	8,000
Uranium, unprocessed	Kara Balta complex	Chuy	NA
MOLDOVA			
Oil and natural gas:			
Oil	Redeco Moldova oil and gas company	Valeni oil field	100,000
Natural gas thousand cubic meters	do.	Victorovca gas field	5,000
Steel, crude	Moldova Steel Works minimill	Ribnita, Transnistria region	1,000,000
RUSSIA			
Alumina	Achinsk	Achinsk in East Siberia	900,000
Do.	Bogoslovsk	Ural'skiye Gory	0150,000
Do.	Boksitogorsk	European north	200,000
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	do.	do.	20,000
Do.	Uralsk	Kamensk	70,000
Do.	Bogoslovsk	Krasnotur'insk	162,000
Do.	Novokuznetsk	Novokuznetsk	284,000
Do.	Kandalaksha	Kola Pennisula	62,500
Do.	Nadvoitsy	Nadvoitsy in Karelia	68,000
Do.	Volgogard	Volgogradskaya Oblast'	168,000
Do.	Irkutsk	Sher'kovo, near Irkutskaya Oblast'	262,000
Do.	Krasnoyarsk	Krasnoyarskiy Kray	850,000
Do.	Bratsk	Bratsk	900,000
Do.	Sayansk	Sayanogorsk	400,000
Antimony:			
Sb content of concentrate	Deposits: Sarylakh deposit Sentachan deposit	Located at: Ust'-Nera region Northeastern Sakha (Yakutiya) Republic	6,000 4/
Compounds and metals	Ryazsvetmet plant	Ryazanskaya Oblast'	NA
Apatite, concentrate	Khibiny apatite asociation	Kola Peninsula	15,000,000
Do.	Kovdor iron ore mining association	do.	700,000
Asbestos	Kiyembay	Orenburgskaya Oblast'	500,000
Do.	Tuvaasbest	Tyva	250,000
Do.	Uralaasbest	Central Ural'skiye Gory	1,100,000
Bauxite	North-Urals mining company	Severoural'sk region	NA
Do.	South-Urals mining company	South Ural'skiye Gory	NA
Do.	Severnaya Onega Mine	Northwest region	800,000
Boron, boric acid	Bor Association	Maritime territory	140,000
Do.	Amur River complex	Far East	8,000
Do.	Alga River chemical complex	do.	12,000
Chromite	Saranov complex	Saranovskiy	200,000
Coal	Donets (east) Basin	Rostovskaya Oblast'	30,000,000
Do.	Kansk Achinsk Basin	East Siberia	50,000,000
Do. thousand tons	Kuzntesk Basin	West Siberia	160,000
Do.	Moscow Basin	Moscow region	15,000,000
Do.	Neryungri Basin	Sakha (Yakutiya) Republic	15,000,000
Do.	Pechora Basin	Komi Republic	30,000,000
Do.	South Yakutia Basin	Sakha (Yakutiya) Republic	17,000,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies	Location	Annual capacity e/
RUSSIA--Continued				
Cobalt:		Noril'sk Nickel	Noril'sk, Kola Peninsula	4,000
Do.		Rezh, Ufaleynikel, and Yuzhuralnikel enterprises	South Ural'skiye Gory	4,000
Do.		Tuva cobalt	Khovu-Aksy in Tyva	NA
Copper:				
Cu content of concentrate		Buribai enterprise	Buribay region	5,000
Do.		Gai complex	Gai region	40,000
Do.		Kirovgrad complex	Kirovgrad region	12,000
Do.		Krasnoural'skiy complex	Krasnoural'skiy region	12,000
Do.		Noril'sk complex	Noril'sk region	400,000
Do.		Sredneuiralsk complex	Ekatrinenburg region	12,000
Do.		Uchali complex	Uchalinskiy Rayon	40,000
Do.		Urap complex	Stavropol'skiy Kray	7,000
Metal		Kirovgrad (smelting)	Kirovgrad	150,000
Do.		Krasnoural'skiy (smelting)	Krasnoural'skiy	60,000
Do.		Kyshtym (refining)	Kyshtym	70,000
Do.		Mednogorsk (smelting)	Mednogorsk	40,000
Do.		Noril'sk (smelting and refining)	Nori'lsk	500,000
Do.		Psysh (refining)	Psysh	350,000
Do.		Severonikel (smelting)	Monchegorsk	20,000
Do.		Sredneuiralsk (smelting)	Revda	140,000
Diamonds:				
Gem	thousand carats	Almazy Rossii-Sakha Association (ALROSA)	Aykhal, Mirnyy, Udachnaya areas of Sakha (Yakutiya) Republic	12,000
Industrial	do.	do.	do.	12,000
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	Lipetskaya Oblast'	NA
Do.		Serov ferroalloy plant	Serov	NA
Do.		Tulachermet Scientific and Industrial Association	Tula	NA
Do.		Chelyabinsk electrometallurgical plant	Chelyabinskaya Oblast'	450,000
Do.		Chusovoy iron and steel plant	Chusovoy	NA
Do.		Klyuchevsk ferroalloy plant	Dvurechensk	160,000
Fluorspar		Abagaytuy	Transbaikalia	NA
Do.		Kalanguy	do.	NA
Do.		Kyakhtinsky	do.	NA
Do.		Usugli	do.	NA
Do.		Yaroslavsky	Far East	NA
Gold	kilograms	Mining regions:	Located at:	200,000 4/
		Yakut-Sakha	Sakha (Yakutiya) Republic	
		Buryat	Buryatiya Republic	
		Magadan	Magadanskaya Oblast'	
		Krasnoyarsk	Krasnoyarskiy Kray	
		Maritime	Maritime territory	
		Tuva	Tyva	
Iron ore		Kursk Magnetic Anomaly (KMA), containing the following enterprises:	Located at:	50,000,000 4/
		Mikhailovka	Zheleznogorsk	
		Lebedi and Stoilo	Gubkin	
Do.		Northwest, containing the following enterprises:	Located at:	22,000,000 4/
		Olenegorsk	Olenegorsk	
		Kostomuksha	Kostomuksha	
		Kovdor	Kola Peninsula	

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies	Location	Annual capacity e/
RUSSIA--Continued				
Iron ore--Continued:		Siberia, containing the following enterprises:	Located at:	18,000,000 4/
		East:		
		Korshunovo	Zheleznogorsk	
		Rudnogorsk	Rudnogorsk	
		West:		
		Abakan	Abaza	
		Sheregesh	Sheregesh	
		Tashtagol	Tashtagol	
		Teya	Vershina Tei	
Do.		Urals, containing the following enterprises:	Located at:	22,000,000 4/
		Akkermanovka	Novotroitsk	
		Bakal	Bakal	
		Goroblagodat	Kushva	
		Kachkanar	Kachkanar	
		Magnitogorsk	Magnitogorsk	
		Peshchanka	Rudnichnyy	
Lead-zinc, recoverable content of ore:				
Lead, recoverable Pb content of ore		Atay mining and benefication complex	Altay mountains region, South Siberia	2,000
Do.		Dalpolymetal mining and benefication complex	Maritime territory	20,000
Do.		Nerchinsk polymetallic complex	Chitinskaya Oblast'	7,000
Do.		Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	5,000
Do.		Salair mining and benefication complex	Kemerovo Oblast'	2,000
Zinc, recoverable Zn content of ore		Atay mining and benefication complex	Altay mountains region, South Siberia	1,000
Do.		Dalpolymetal mining and benefication complex	Maritime territory	25,000
Do.		Nerchinsk polymetallic complex	Chitinskaya Oblast'	12,500
Do.		Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	14,000
Do.		Salair mining and benefication complex	Kemerovo Oblast'	10,500
Lead, metal		Dalpolymetal lead smelter	Rudnaya in the Maritime District	20,000
Do.		Elektrozinc lead smelter	Vladikavkaz in North Caucasus	30,000
Magnesite		Satka deposit	Chelyabinskaya Oblast'	3,800,000
Magnesium, metal (for sale)		Avisma plant	Berezniki	22,000
Do.		Solikamsk plant	Solikamsk	21,500
Mica		Aldan	Sakha (Yakutiya) Republic	NA
Do.		Karel	Karelia	NA
Do.		Kovdor	Kola Peninsula	NA
Do.		Mam	Irkutsk complex	NA
Molybdenum		Dzhida tungsten-molybdenum mine	West Transbaikalia	NA
Do.		Sorsk molybdenum mining enterprise	Sorsk region	NA
Do.		Tyrnyauz tungsten-molybdenum mine	North Caucasus	NA
Do.		Shakhtaminskoye molybdenum mining enterprise	Chitinskaya Oblast'	NA
Natural gas	million cubic meters	Komi Republic	Komi Republic	8,000
Do.	do.	Noril'sk area	Noril'sk area	5,500
Do.	do.	North Caucasus	North Caucasus	6,000
Do.	do.	Sakhalin	Far East	2,000
Do.	do.	Tomsk Oblast	West Siberia	500
Do.	do.	Tyumen Oblast including:	do.	575,000
		Medvezhye field		(75,000)
		Urengoi field		(300,000)
		Vyrngapur field		(17,000)
		Yamburg field		(170,000)
Do.	do.	Urals	Ural'skiye Gory	45,000
Do.	do.	Volga	Volga region	6,000
Do.	do.	Yakut-Sakha	Sakha (Yakutiya) Republic	1,500
Nepheline syenite		Apatite complex	Kola Pennisula	1,500,000
Do.		Kiya-Shaltyr Mine	Goryachegorsk region, east Siberia	NA
Nickel:				
Ni in ore		Noril'sk Nickel Association	Noril'sk region, Kola Peninsula	300,000
Do.		Yuzhuralnikel company and Ufaleynikel Company	South Ural'skiye Gory	20,000
Metal:				
Smelting		Noril'sk Nickel Association	Noril'sk	160,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Nickel--Continued:			
Metal--Continued:			
Smelting--Continued:	Noril'sk Nickel Association	Pechenga	50,000
Do.	do.	Monchegorsk	50,000
Refining	do.	do.	100,000
Do.	do.	do.	140,000
Ni products and Ni in FeNi	Rezh, Ufaleynikel, Yuzhuralnikel enterprises	South Ural'skiye Gory	65,000
Oil shale	Leningradslanets Association	Slantsy region	5,000,000
Petroleum	European Russia, Astrakhan	North Caspian Sea basin	700,000
Do.	European Russia, Bashkortostan	Ural'skiye Gory	28,000,000
Do.	European Russia, Checheno-Ingush Republic	Southern Caucasus	4,500,000
Do.	European Russia, Dagestan	North Caucasus	700,000
Do.	European Russia, Kaliningrad Oblast	Baltic coast	1,800,000
Do.	European Russia, Komi Republic	Northwest	15,000,000
Do.	European Russia, Krasnodar Kray	North Caucasus	2,000,000
Do.	European Russia, Orenburg Oblast	Ural'skiye Gory	13,000,000
Do.	European Russia, Perm Oblast	do.	12,000,000
Do.	European Russia, Samara	Volga region	16,000,000
Do.	European Russia, Saratov Oblast	do.	1,500,000
Do.	European Russia, Stavropol Kray	North Caucasus	2,000,000
Do.	European Russia, Tatarstan	Volga region	40,000,000
Do.	European Russia, Udmurt Republic	Ural'skiye Gory	9,000,000
Do.	East Siberia, Tomsk Oblast	Tomskaya Oblast'	11,000,000
Do. thousand tons	West Siberia, Tyumen Oblast:	Tyumenskaya Oblast'	300,000
	Kogolym field		(34,000)
	Krasnoleninskiy field		(12,000)
	Langepas field		(30,000)
	Megion field		(18,000)
	Nizhnevartovsk field		(70,000)
	Noyabrsk field		(37,000)
	Purneftegaz field		(12,000)
	Surgat field		(48,000)
	Uray field		(8,000)
	Varegan field		(10,000)
Do.	Sakhalin Island	Sakhalin Island	2,500,000
Phosphate rock	Kingisepp complex	Leningradskaya Oblast'	NA
Do.	Lopatino, Yegorevsk deposits	Moscow Oblast'	NA
Do.	Polpinskoye deposit	Bryanskaya Oblast'	NA
Do.	Verkhnekamsk deposit	Ural'skiye Gory	NA
Phosphate rock, apatite concentrate	Khibiny Apatit Association	Kola Peninsula	20,000,000
Do.	Kovdor iron mining complex	do.	700,000
Platinum-group metals:			
Ore	Nori'lsk Nickel Association	Noril'sk region	135
Metals	Krasnoyarsk refinery	Krasnoyarskiy Kray	NA
Potash, K_2O equivalent	Uralkaliy	Verkhnekamsk deposit	3,000,000
Do.	Silvinit	Solikamsk-Berezniki regions of Ural'skiye Gory	2,000,000
Silver	Dukat Mine, cobyproduct and byproduct of gold and nonferrous metals mining	Magadanskaya Oblast'	1,000
Soda ash	Achinsk plant	East Siberia	595
Do.	Berezniki plant	Ural'skiye Gory	1,080
Do.	Pikalevo plant	Leningradskaya Oblast'	200
Do.	Sterlitamak plant	Sterlitamak	2,135
Do.	Volkhov plant	Leningradskaya Oblast'	20
Steel, crude	Amurstal	Komsomol'sk-na-Amure	1,600,000
Do.	Asha	Asha	450,000
Do.	Beloretsk	Bashkirskoye	380,000
Do.	Chusovoy	Chusovoy	570,000
Do.	Elektrostal	Moscow	314,000
Do.	Gorky	Nizhniy Novgorod	78,000
Do.	Gur'yevsk	Gur'yevsk	160,000
Do.	Karaganda	Karaganda	6,300,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Steel, crude--Continued:	Lipetsk	Lipetskaya Oblast'	9,900,000
Do.	Lys'va	Lys'va	350,000
Do.	Magnitogorsk	Magnitogorsk	12,600,000
Do.	Mechel (Chelyabinsk)	Chelyabinskaya Oblast'	7,000,000
Do.	Nizhniy Tagil	Nizhniy Tagil	8,000,000
Do.	Nizhniy Sergi	Nizhniye Sergi	300,000
Do.	Nosta (Orsk-Kahlilovo)	Novotroitsk in Orenburgskaya Oblast'	4,600,000
Do.	Novosibirsk	Novosibirskaya Oblast'	100,000
Do.	Omutninsk	Omutninsk	210,000
Do.	Oskol Electric Steel	Staryy Oskol	1,450,000
Do.	Petrovsk-Zabaykal'skiy	Petrovsk-Zabaykal'skiy	426,000
Do.	Revda	Revda	281,000
Do.	Salda	Sverdlovskaya Oblast'	1,900
Do.	Serov A.K.	Serov	1,000,000
Do.	Serp i Molot	Moscow	70,000
Do.	Severskiy	Polevskoy in Sverdlovskaya Oblast'	825,000
Do.	Severstal (Cherepovets)	Cherepovets	14,000,000
Do.	Sibelektrostal	Krasnoyarskiy Kray	110,000
Do.	Sulin	Sulin	280,000
Do.	Taganrog	Taganrog	925,000
Do.	Tulachermet-Scientific and Industrial Association	Tula	18,400
Do.	Verkh-Isetskiy	Ekatrinenburg	132,000
Do.	Volgograd	Volgogradskaya Oblast'	920,000
Do.	Vyksa	Vyksa	540,000
Do.	West Siberian	Novokuznetsk	900,000
Do.	Zlatoust	Zlatoust in Chelyabinskaya Oblast'	1,200,000
Do.	Zuznetsk	Novokuznetsk	740,000
Talc	Onotsk deposit	Irkutskaya Oblast'	NA
Do.	Kirgiteysk deposit	Krasnoyarskiy Kray	NA
Do.	Miass deposit	Chelyabinskaya Oblast'	NA
Do.	Shabrovsk deposit	Sverdlovskaya Oblast'	NA
Tin	Khinganskoye olovo mining and beneficiation complex	Khabarovskiy Kray	NA
Do.	Solnechnyy mining and beneficiation complex	do.	NA
Do.	Iultin mining and beneficiation complex	Magadanskaya Oblast'	NA
Do.	Khrustalnyy mining and beneficiation complex	Maritime territory	NA
Do.	Deputatskolovo mining and beneficiation complex	Sakha (Yakutiya) Republic	NA
Do.	Pevek mining and beneficiation complex	Magadanskaya Oblast'	NA
Do.	Novosibirsk smelter	Novosibirskaya Oblast'	NA
Do.	Podol'sk smelter	Podol'sk	NA
Do.	Ryazan smelter	Ryazanskaya Oblast'	NA
Titanium, metal	Berezniki plant	Berezniki	40,000
Do.	Moscow plant	Moscow	NA
Do.	Podol'sk plant	Podol'sk	NA
Tungsten:			
W content of concentrates	Antonovogorsk	East Transbaikalia	NA
Do.	Balkan	Northeast of Magnitogorsk, Ural'skiye Gory	NA
Do.	Belukha	East Transbaikalia	NA
Do.	Bom-Grokhom	West Transbaikalia	NA
Do.	Dzhida	do.	NA
Do.	Iultin	Magadanskaya Oblast'	NA
Do.	Lermontov	Maritime territory	NA
Do.	Solnechnyy	Southern Khabarovskiy Kray	NA
Do.	Tyrnyauz	North Caucasus	NA
Do.	Promorye	Maritime territory	NA
Metal	Nalchik plant	Caucasus	NA
Uranium, U content	Priargunskiy mining and chemical enterprise	Krasnokamensk	3,000
Vanadium:			
Ore	Kachkanar iron mining complex	Ural'skiye Gory	NA
Metallurgical processing facilities	Chusovoy and Nizhniy Tagil plants	do.	17,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Zinc:			
Zn content of ore	Bashkir copper-zinc complex	Sibai in southern Ural'skiye Gory	5,000
Do.	Buribai copper-zinc mining complex	Buribai in southern Ural'skiye Gory	1,500
Do.	Gai copper-zinc mining and beneficiation complex	Gai in southern Ural'skiye Gory	25,000
Do.	Kirovgrad copper enterprise	Kirovgrad in central Ural'skiye Gory	1,200
Do.	Sredneuralsk copper complex	Revda in central Ural'skiye Gory	5,000
Do.	Uchali copper-zinc mining and beneficiation complex	Uchalinskiy Rayon in southern Ural'skiye Gory	90,000
Metal	Chelyabinsk electrolytic zinc plant	Chelyabinskaya Oblast'	146,000
Do.	Elektrozink plant	Vladikavkaz in North Caucasus	100,000
TAJIKISTAN			
Aluminum	Tajik aluminum plant (TadAZ)	Tursunzade	520,000
Antimony	Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	2,000
Do.	Isfara hydrometallurgical plant	Isfara	500
Bismuth	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	25
Do.	Isfara hydrometallurgical plant	Isfara	500
Coal	do.	do.	300,000
Do.	Shurabsk brown coal	Shurab region	NA
Do.	Fan-Yagnob hard coal deposits	Pyandzh region	50,000
Copper	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	NA
Fluorspar, concentrate	Takob mining and beneficiation complex	Takob and Krasnye Kholmy deposits	60,000
Gold kilograms	Tajikzoloto mining-beneficiation complex, Pamir Artel	Darvazy, Rankul placer deposits, placers in central and southern parts of country	5,000
Do. do.	Zeravshan Gold Co.	Jilau and Taror deposits	2,500
Do. do.	Darvaz joint venture	Yakhsu field	2,000
Do. do.	Aprelevka joint venture	Aprelevka deposit	200
Do. do.	Vostokredmet refinery	Chkalovsk	NA
Lead	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	2,500
Mercury	Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	150
Natural gas and petroleum thousand cubic meters	Sixteen oil-gas deposits under exploration that include Ravatskoye, Ayritanskoye, and Madaniyatskoye	Fergana depression	200,000 4/
Do. do.	Shaambary, Beshtentyakskoye, Chki-Belskoye, and Uzunkhorskoye	Southern Tajik depression	200,000 4/
Silver	Adrasman mining and beneficiation complex	Bolshoy-Kanimansur deposit	NA
Vanadium, pentoxide	Vostokredmet plant	Chkalovsk	350,000
Uranium, U content	Adrasman, Maylisu, Taboshar, Usugai deposits	Northern Tajikistan	NA
Do.	Vostokredmet plant	Chkalovsk	NA
Zinc	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	NA
TURKMENISTAN			
Ammonia thousand tons	Maryzoat Association	Mary region	400,000 9/
Bromine and iodine:			
Bromine	Cheleken plant	Cheleken region	4,740 9/
Do.	Nebitdag plant	Vyshka, Stantsiya	2,370 9/
Iodine	Cheleken plant	Cheleken region	355 9/
Do.	Nebitdag plant	Vyshka, Stantsiya	255
Cement	Buzmeyin cement plant	Buzmeyin	1,000,000 9/
Clay, bentonite	Oglanly Mine	Oglanly region	100,000 9/
Gypsum	IA Turkmenmineral	Mukry, Tagorin deposits	300,000 9/
Do.	Wastes from Gaourdak sulfur deposit	Gaurdak, Gora	400,000 9/
Natural gas and petroleum:			
Natural gas million cubic meters	Achakskoye, Gygyrlinskoye, West Shatlykskiye, North and South Naipskiye, Daulatabad-Donmezskoye	Onshore in eastern and southwestern parts of country and offshore in Caspian Sea	00090,
Petroleum:			
Crude	Barsa-Gelmesskoye, Burunskoye, Cheleken, Gograndagskoye, Kamyshldzhinskoye, Korturtepinskoye, Kum Dag, Kuydzhikskoye, Okaremskoye	Onshore in southeastern part of country and offshore in the Caspian Sea	5,500,000 4/
Refined	Chardzhouskiy Ka refinery	Chardzhouskiy Rayon	6,000,000
Do.	Turkmenbashi refinery	Turkmenbashi	5,000,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
TAJIKISTAN--Continued			
Sodium sulfate	Karabogazsulfate Association	Bekdash	400,000 9/
Sulfur	IA Turkmenmineral	Gaurdak, Gora deposit	340,000 9/
UKRAINE			
Alumina	Mykolayiv refinery	Mykolayivs'ka Oblast'	1,200,000
Do.	Zaporozh'ye (Dneprovsk) refinery	Zaporiz'ka Oblast'	245,000
Aluminum, primary	Zaporozh'ye (Dneprovsk) smelter	do.	120,000
Coal:			
Hard thousand tons	Donets coal basin with about 225 mines produces more than 90% of Ukraine's coal	Donets'ka, Dnipropetrovs'ka, Luhans'ka Oblasts'	130,000 4/
Do.	Lviv-Volynskiy Basin produces remainder from 18 mines	Western Ukraine	6,000,000 4/
Brown	Dneprovskoye Basin	Central Ukraine	7,000,000
Ferroalloys:			
Ferrochrome	Zaporozh'ye plant	Zaporiz'ka Oblast'	NA
Ferromanganese	do.	do.	NA
Do.	Nikopol' ferroalloys plant	Nikopol'	250,000
Ferrosilicon	do.	do.	200,000
Do.	Stakhanov plant	Luhans'ka Oblast'	NA
Silicomanganese	do.	do.	1,200,000
Do.	Zaporozh'ye plant	Zaporiz'ka Oblast'	160,000
Graphite	Zavalyevskiy graphite complex	Zavalyevskiy deposit	40,000
Iron ore:			
Underground mining	Krivbassruda production association with 16 mines	Kryvyy Rih Basin	15,000,000
Do.	Eksplutatsionnaya Mine of the Zaporizhzhskiy iron ore complex	do.	3,500,000
Open pit mining	Yuzhniy, Novokrivorozhskiy, Tsentralnyy, Severnyy, Inguletskiy, Poltaviskiy, and Kamysh-Burunskiy mining and beneficiation complexes	do.	90,000,000 4/
Kaolin	Prosyanovskoye mining and beneficiation complex	Dnipropetrovs'ka Oblast'	NA
Lead, secondary	Ukrtsink plant	Kostyantynivka	70,000
Magnesium	Zaporozh'ye plant	Zaporiz'ka Oblast'	10,000
Do.	Magnii concern	Kalush	18,000
Manganese:			
Ore, marketable	Mining and beneficiation complexes: Ordzhonikdze, Marganets Tavricheskiy (under development)	Basins: Nikopol' Bol'shoy Tokmak	6,000,000 4/
Metal	Zaporozhye plant	Zaporiz'ka Oblast'	40,000
Sinter	Nikopol' ferroalloys plant	Nikopol	3,000,000
Mercury	Nikitovskiy mining and metallurgical complex	Donets'ka Oblast'	120
Nickel, Ni content in FeNi	Pobuzhhskiy mining and beneficiation complex, comprising three open pit mines and smelter	Pobugskoye Basin	7,000
Potash, K_2O equivalent	Khlorvinil production association, Stebnik potash plant	Pricarpathian region	300,000
Steel, crude	Alchevsk plant	Alchevs'k	4,500,000
Do.	Azovstal plant	Mariupol'	4,000,000
Do.	Dneprospetssstal	Zaporiz'ka Oblast'	1,400,000
Do.	Dneprovsk plant	Dniprodzerzhyns'k	3,850,000
Do.	do.	Dnipropetrovs'ka Oblast'	1,900,000
Do.	Donetsk plant	Donets'ka Oblast'	1,300,000
Do.	Il'yich plant	Mariupol'	7,300,000
Do.	Kirov plant	Makeyevka	4,000,000
Do.	Kryvy Rih plant	Kryvyy Rih	10,650,000
Do.	Zaporozh'ye plant	Zaporiz'ka Oblast'	2,300,000
Sulfur	Sera production association	Rozdol mining complex mines: Rozdol, Soroks, Zdhidalchev deposits; Yarvorov complex mines: Nemirov-Yazov deposits in Lvivs'ka and Kyyivs'ka Oblasts'	1,500,000 4/

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
UKRAINE--Continued			
Titanium:			
Ilemenite concentrate	Complexes: Irshanskiy mining and beneficiation complex Verkhnedneprovskiy mining and metallurgical complex	Located at: Irsha Valley Verkhnedneprovsk region	600,000 4/
Rutile	do.	do.	60,000
Metal	Zaporozh'ye plant	Zaporiz'ka Oblast'	6,000
Uranium	Zheltye Vody complex	Northern part of Kryvyy Rih Basin	NA
Zinc, secondary	Ukrtsink plant	Kostyantynivka	25,000
Zirconium:			
Ore, zircon	Verkhnedneprovskiy mining and metallurgical complex	Verkhnedneprovsk region	100,000
Metal and compounds	Pridneprovskiy chemical plant	Dnipropetrovs'ka Oblast'	NA
Do.	Kharkiv physical-technical institute	Kharkivs'ka Oblast'	NA
UZBEKISTAN			
Bismuth	Ustarassay deposit (depleted)	Qoba and Kuraminskiy Khrebet regions	NA
Clay, kaolin	Angren deposit	Angren region	8,000,000
Coal	Central Asian Coal Association (mining): Angren brown coal deposit	do.	6,000,000
Do.	Baysunskoye and Shargunskoye deposits	Surkhandarya region	1,000,000 4/
Copper:			
Mine output, Cu content	Almalyk mining and metallurgical complex at the Kalmakyr, Sarycheku deposits	Toshkent Wiloyati	100,000
Metal	Almalyk refinery	Olmaliq	130,000
Feldspar	Karichasayskoye and other deposits	Deposits in Samarqand and Toshkent Wiloyati regions; Karakalpakstan (Kara-Kalpakskaya ASSR)	120,000 4/
Fertilizers	Ammophos production association	Olmaliq	NA
Do.	Azot production association	Farghona	NA
Do.	Elektrokhimprom production association	Chirchiq	NA
Do.	Kokand superphosphate plant	Qo'qon	NA
Do.	Naviazot production association	Nawoiy Wiloyati	NA
Do.	Samarkand chemicals plant	Samarqand	NA
Fluorspar	Agata-Chibargata, Aurakhmat, Kengutan, Kyzylbaur, Naugarzan, Nugisken deposits	East of Toshkent Wiloyati	150,000
Gold kilograms	Muruntau deposit	Navoiy region	85,000
Lead, mine output, Pb content	Almalyk mining and metallurgical complex; Altyn-Topkan and Uchkulach deposits	Uchkulach deposit in Toshkent Wiloyati; Altyn-Topkan deposit in Kurama mountain range in Tajikistan (in March 1999, Altyn-Topkan transferred to control of Tajikistan)	00 40,0
Molybdenum:			
Mine output, Mo content	Almalyk mining and metallurgical complex; Kalmakyr, Sarycheku deposits	Toshkent Wiloyati	900
Metal	Uzbek refinery and hard metals plant	Chirchiq	NA
Natural gas liquids	Mubarek gas processing plant	Muborak	2,500,000
Petroleum and natural gas:	More than 160 oil and gas deposits; 92 deposits under exploration:	Bukhan-Khiwa, Sukhandarya Oblast, southwest Gissarak, and Ustyurtskiy regions and Farghona Valley	
Natural gas million cubic meters	Major deposits: Gazli, Kandym, Shurtan, Kokdumalak		70,000 4/
Petroleum:			
Crude	Major deposits: Kokdumalak and Mingbulak		9,000,000 4/
Refinery products	Fergana oil refinery	Farghona region	8,800,000
Do.	Bukhara oil refinery	Bukhoro	2,500,000
Steel, crude	Bekabad steel mill	Bekabad	1,100,000
Sulfur	Mubarek gas processing plant complex	Muborak	2,000,000
Tungsten:			
Mine output, W content	Deposits: Koytash deposit Ingichka deposit Ugat deposit	Located at: Northeastern Uzbekistan Zirabulak Mountains Northern Uzbekistan	1,200 4/

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
UZBEKINSTAN--Continued			
Tungsten--Continued:			
Metal	Uzbek refractory and hard metals plant	Chirchiq	NA
Uranium, U content	Naviazot mining and metallurgical complex	Navoiy region	3,000

e/ Estimated. NA Not available.
1/ Table includes data and information available through October 2001.
2/ Estimated data are rounded to no more than three significant digits.
3/ Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepencies in the names of enterprises and that of locations.
4/ Capacity estimates are totals for all enterprises that produce that commodity.
5/ For a listing of production-sharing agreements for oil and gas development, refer to the USACC Investment Guide to Azerbaijan, United States-Azerbaijan Chamber of Commerce (USACC), Washington, DC.
6/ Capacity for crude petroleum distillation.
7/ Total peat for fuel use production.
8/ Crude throughput.
9/ Reported figure.

TABLE 3
COMMONWEALTH OF INDEPENDENT STATES:
GROSS DOMESTIC PRODUCT AND
INDUSTRIAL OUTPUT IN 2000 1/

Country	Gross domestic product	Industrial output
Armenia	106.0	106.4
Azerbaijan	111.4	106.9
Belarus	106.0	108.0
Georgia	101.9	106.1
Kazakhstan	110.5 2/	114.6
Kyrgyzstan	105.0	106.0
Moldova	101.9	102.3
Russia	108.0 3/	109.0
Tajikistan	108.3	110.3
Turkmenistan	NA	NA
Ukraine	106.0	112.9
Uzbekistan	104.2	106.4

NA Not available.
1/ Output as a precentage of those in 1999 in constant prices.
2/ Data for January-September.
3/ Production of output in the basic branches of the economy economy (industrial, agricultural, construction, transportation, and trade).

Source: Voprosy Statistiki [Questions of Statistics], 2001, Ekonomika stran sodruzhestva nezavisimykh gosudarstv v 2000 godu [The economies of the countries of the Commonwealth of Independent States in the year 2000]: Voprosy Statistiki, no. 4, p. 6.

TABLE 4
KAZAKHSTAN: SELECTED EXPORTS AND IMPORTS, BY COMMODITY

(Metric tons unless otherwise specified)

		1999	2000	1999-2000 percentage change
Exports:				
Aluminum oxide and hydroxide		1,159,316	1,356,400	117
To non-CIS countries		--	--	--
To CIS countries		1,159,316	1,356,400	117
Coal		16,150,503	25,679,300	159
To non-CIS countries		189	300	159
To CIS countries		16,150,314	25,679,000	159
Copper, refined and alloys		354,505	393,500	111
To non-CIS countries		354,414	393,400	111
To CIS countries		90	100	111
Ferroalloys		722,479	845,300	117
To non-CIS countries		715,299	836,900	117
To CIS countries		7,179	8,400	117
Ferrous metal, flat roll including tinplate		2,913,125	3,262,700	112
To non-CIS countries		2,801,415	2,969,500	106
To CIS countries		111,738	293,200	262
Iron ore		3,491,438	5,341,900	153
To non-CIS countries		--	--	--
To CIS countries		3,491,438	5,341,900	153
Lead		110,284	155,500	141
To non-CIS countries		89,917	108,800	121
To CIS countries		20,393	46,700	229
Oil:				
Crude and gas condensate		23,668,387	29,348,800	124
To non-CIS countries		16,644,219	21,304,600	128
To CIS countries		7,024,214	8,044,200	115
Oil products		900,089	1,008,100	112
To non-CIS countries		768,087	883,300	115
To CIS countries		132,008	124,800	95
Precious metals	value, thousands	$286,194	$383,500	134
To non-CIS countries	do.	$286,194	$383,500	134
To CIS countries	do.	--	--	--
Zinc, unprocessed		207,321	232,200	112
To non-CIS countries		204,685	227,200	111
To CIS countries		2,604	5,000	192
Imports:				
Coke and semicoke		671,923	698,800	104
From non-CIS countries		26,703	98,800	370
From CIS countries		645,161	600,000	93
Ferrous metal, pipe		116,478	267,900	230
From non-CIS countries		29,177	58,500	201
From CIS countries		87,250	209,400	240
Ferrous metal, rail products		45,942	31,700	69
From non-CIS countries		500	400	80
From CIS countries		45,362	31,300	69
Natural gas	million cubic meters	2,775,132	4,218,200	152
From non-CIS countries	do.	--	--	--
From CIS countries	do.	2,775,132	4,218,200	152
Oil products		611,606	1,180,400	193
From non-CIS countries		31,122	42,700	137
From CIS countries		580,459	1,137,700	196

-- Zero.

TABLE 5
RUSSIA: SELECTED EXPORTS, BY COMMODITY

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999 r/	2000
Aluminum, primary	2,619,400	2,710,200	2,795,100	3,127,600	3,184,400
To non-CIS countries	2,617,300	2,706,800	2,790,400	3,119,100	3,173,200
To CIS countries	2,100 r/	3,400	4,700	8,500	11,200
Coal, hard	26,258,900	23,092,900	23,477,700	28,185,200	43,422,800
To non-CIS countries	20,866,100	19,703,200	18,224,200	22,249,100	37,317,000
To CIS countries	5,392,800	3,389,700	5,253,500	5,936,100	6,105,800
Copper, refined	529,600	534,500	550,900	638,800	645,400
To non-CIS countries	527,400	533,600	550,300	636,400	642,400
To CIS countries	2,200	900	600	2,400	3,000
Ferroalloys	285,500	342,600	335,600	413,600	406,100
To non-CIS countries	274,300	334,100	322,300	394,700	381,100
To CIS countries	11,200	8,500	13,300 r/	18,900	25,000
Iron ore and concentrates	11,256,800	11,772,600	13,828,300	11,129,600	19,219,700
To non-CIS countries	7,890,800	8,393,100	10,145,000	7,765,800	9,105,700
To CIS countries	3,366,000	3,379,500	3,683,300 r/	3,363,800	10,114,000
Natural gas thousand cubic meters	198,514,000	200,858,000	200,618,000	205,354,500	193,849,900
To non-CIS countries do.	128,028,000	120,871,000	125,044,000	131,066,000	133,810,000
To CIS countries do.	70,486,000	79,987,000	75,574,000	74,288,500	60,039,900
Nickel	167,200	221,900	214,200	211,200	197,300
To non-CIS countries	166,900	221,600	214,100	210,900	196,800
To CIS countries	300	300 r/	100	300	500
Petroleum, crude	125,952,800	126,846,800	137,107,700	134,917,000	144,518,500
To non-CIS countries	105,376,700	109,775,100	117,934,200	116,131,400	127,632,700
To CIS countries	20,576,100	17,071,700	19,173,500	18,785,600	16,885,800
Petroleum refinery products	57,006,100	61,308,100	53,797,000	56,882,900	61,874,800
To non-CIS countries	54,875,800	59,102,400	51,187,100	53,864,900	58,394,500
To CIS countries	2,130,300 r/	2,205,700	2,609,900	3,018,000	3,480,300
Pig iron	2,109,400	2,455,100	2,540,300	2,927,100	3,695,100
To non-CIS countries	2,043,300	2,397,400	2,451,000	2,794,100	3,554,600
To CIS countries	66,100	57,700	89,300	133,000	140,500

r/ Revised.

TABLE 6
RUSSIA: EXTRACTION OF COAL BY ENTERPRISES OF THE MINISTRY OF ENERGY IN 2000

(Metric tons)

	1999	2000	1999-2000 percentage change 1/
Coal extraction by enterprises of Minenegro:			
By economic regions:			
Central	899,000	762,000	(15.2)
Far East	29,210,000	28,125,000	(3.7)
North Caucasus	10,075,000	9,709,000	(3.6)
Northern	19,594,000	18,818,000	(4.0)
Siberian:			
Eastern	70,012,000	75,538,000	7.9
Western	109,017,000	114,100,000	4.7
Total	179,029,000	189,638,000	5.9 2/
Urals	7,512,000	6,805,000	(9.4)
Grand total	246,319,000	253,857,000	3.1 2/
By basins:			
Donetsk	10,074,000	9,709,000	(3.6)
Kansk-Achinsk	19,204,000	18,403,000	(4.2)
Kuznetskzy	108,511,000	113,640,000	4.7
Pechora	36,428,000	39,863,000	9.4
Total	174,217,000	181,615,000	4.2 2/
Coal extracted:			
From underground mines	88,373,000	89,191,000	0.9
From open pits	157,942,000	164,666,000	4.3

See footnotes at end of table.

TABLE 6--Continued
RUSSIA: EXTRACTION OF COAL AS ENTERPRISES OF THE MINISTRY OF ENERGY IN 2000

(Metric tons)

	1999	2000	1999-2000 percentage change 1/
Extraction of coking coal, by basins:			
Donetsk	207,000	216,000	4.3
Kansk	43,710,100	45,875,300	5.0
Pechora	8,494,700	8,877,800	4.5
South Yakutsk	4,116,200	4,920,400	19.5
Total	56,528,000	59,889,500	5.9 2/

1/ Percentage in parentheses indicate a decrease.
2/ Not an accumulated summation.

Source: Ugol' [Coal], 2001, Kratkiye itogi raboty ugol'noy promyshlennosti Rossil za 2000 god [Summary results of the work of the Russian coal industries in 2000]: Ugol', no. 3, p. 55-59.

TABLE 7
RUSSIA: PROGNOSTICATED METHANE RESOURCES IN COAL SEAMS AT MAJOR BASINS AND DEPOSITS

(Million cubic meters)

	Total resources	At fields of operating mine
Kuznetsk	13,085,000	211,500
Pechora	1,942,000	26,400
Donetsk	1,178,000	495,000
Of which, eastern Russian section	(97,000)	(2,200)
Burenskiy	312,000	--
Apsatskiy	55,000	55,000
Sakhalin	48,000	4,200
Partizanskiy	22,000	6,800
Total 1/	16,642,000	798,900

-- Zero.
1/ Total includes Russian and non-Russian sections of the Donetsk Basin.

Source: Ugol' [Coal], 2001, Ugol'naya promyshlennosti Rossil na poroge: v nache XXI veka [The Russian coal industry at the threshold and in the beginning of the 21st century]: Ugol', no. 2, p. 16-20.