

# 2008 Minerals Yearbook

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**COUNTRIES OF THE BALTIC REGION (ESTONIA, LATVIA, LITHUANIA), CAUCASUS REGION (ARMENIA, AZERBAIJAN, GEORGIA), CENTRAL ASIA REGION (KAZAKHSTAN, KYRGYZSTAN, TAJIKISTAN, TURKMENISTAN, UZBEKISTAN), AND EURASIA REGION (BELARUS, MOLDOVA, RUSSIA)**

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# THE MINERAL INDUSTRIES OF COUNTRIES OF THE BALTIC REGION (ESTONIA, LATVIA, LITHUANIA), CAUCASUS REGION (ARMENIA, AZERBAIJAN, GEORGIA), CENTRAL ASIA REGION (KAZAKHSTAN, KYRGYZSTAN, TAJIKISTAN, TURKMENISTAN, UZBEKISTAN), AND EURASIA REGION (BELARUS, MOLDOVA, RUSSIA)

By Richard M. Levine and Glenn J. Wallace

The countries that are covered in this report are grouped into the following four geographic regions: the Baltic region (Estonia, Latvia, Lithuania), the Caucasus region (Armenia, Azerbaijan, Georgia), the Central Asia region (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan), and the Eurasia region (Belarus, Moldova, Russia). These countries all had been republics of the Soviet Union prior to 1992, although the United States Government never recognized the incorporation of Estonia, Latvia, and Lithuania into the Soviet Union. Although many of these countries have followed quite different economic and political development paths following the dissolution of the Soviet Union (for example, the Baltic states of Estonia, Latvia, and Lithuania became members of both the European Union and the North Atlantic Treaty Organization), the development of mineral mining and processing, particularly of those minerals that are the focus of this report, originated during the Soviet era, and patterns of mineral mining, processing, shipping, and trade that were in effect during the Soviet period persist or still have a bearing on current conditions.

This report focuses on the production of a suite of metals loosely termed “rare metals” (a term for less common and more expensive metallic elements) that are currently not produced in large quantities, but which could be used in far larger amounts if the use of current technologies is expanded and new technologies to generate energy with batteries, fuel cells, nuclear reactors, solar cells, wind mills, and so forth, replace current hydrocarbon use. This report also discusses production of such elements as uranium (which is not referred to as a rare metal in this report), the future use of which could greatly increase with the expanded use of nuclear power; and other elements that could be used in emerging technologies in such fields as aerospace, alternative energy, defense, electronics, and medicine. The minerals covered in this report include cesium, gallium, germanium, hafnium, indium, lithium, niobium, platinum-group metals (PGM), rare earths, scandium, selenium, tantalum, tellurium, thallium, uranium, and zirconium. A number of these minerals, including cesium, germanium, indium, lithium, niobium, rare-earth elements, tantalum, uranium, and zirconium, can be mined from deposits in which they are the principal minerals; some of these minerals, which

also can include a number of the above cited minerals, as well as gallium, hafnium, tellurium, and selenium, are produced as byproducts from the production of bauxite, copper, lead and zinc, and uranium ores. A number of these minerals have been designated as critical and strategic by various Governments.

Other elements could possibly be added to this list now, and still others will emerge as technological developments take place. This report, however, is only an initial effort to assess production of such commodities in this part of the world. Global and country-specific data are often lacking for many of these minerals, and information is often inadequate to derive production estimates, which adds to the uncertainty regarding the potential supply of these minerals from this part of the world. Owing to a dearth of current and consistent reporting on reserves and production of these minerals in this area, information used in this report is drawn from a period that spans the Soviet era to the present. Such historical information can be indicative of a country’s resource endowment and production potential, particularly as increased demand for these minerals could make previously uneconomic deposits economic. The report is not a comprehensive assessment but rather an attempt to form a base from which to add and refine information on production and reserves as it becomes available. Ukraine, which also had been a republic of the Soviet Union, is not covered in this report. More-extensive coverage of the major mineral industries of the countries covered in this report can be found in the individual country reports of the 2007 U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Europe and Central Eurasia, which are available on the Internet at <http://minerals.usgs.gov/minerals/pubs/country>.

## BALTIC REGION (ESTONIA, LATVIA, LITHUANIA)

### ESTONIA

Estonia’s mining industry was primarily engaged in extracting oil shale, peat, and industrial minerals. Although Estonia is not rich in mineral resources, the country does have the world’s leading commercially exploited oil shale deposit. The Rakvere phosphate deposit in Estonia is one of the largest phosphorite deposits in Europe, although it had not been mined because

of environmental concerns. Estonia has some of the richest peatlands in northern Europe, including 9,836 mires that cover about 22% of Estonia's territory. In 1945, the Soviet Union started processing uranium in Factory number 7 in Estonia, which was a code name for the former Silmet Factory number 7 at that location. In 1990, AS Silmet stopped processing uranium and concentrated its activities on producing rare-earth metals and rare metals (AS Silmet, 2009).

## Production

In mid-2008, Estonia's economy fell sharply, primarily as a result of an investment and consumption slump that followed the bursting of the real estate market bubble. The gross domestic product (GDP) was estimated to have declined by 3.6% in 2008 compared with that of 2007 (U.S. Central Intelligence Agency, 2009). The decline in the GDP was reflected in the estimated decreases in cement, clay, oil shale, peat, and sand and gravel production, but production of rare-earth metals and compounds and revenues from their sales increased in 2008. Production data are in table 1.

## Structure of the Mineral Industry

Most of Estonia's mineral production facilities were privately owned. Silmet was privatized in 1997 (AS Silmet, 2008). In 2005, the Estonian Silmet Group sold its majority holding in Silmet to Zimal SA of Switzerland, which controlled the Revda loparite mine in Russia and the Solikamsk magnesium works, also located in Russia, through the Russian holding company Mineral Group (Estonian Economy, 2006).

## Commodity Review

### Metals

**Niobium and Rare-Earth Metals.**—The Silmet plant in northeastern Estonia was one of the leading rare-metals and rare-earth-metals producers in Europe. Silmet employed 527 people in 2008, which was 22 fewer than in 2007 (Estonian Investment and Trade Agency, 2009). Silmet included a factory for rare-earth-metals separation, a factory for rare-metals production, and a metallurgical factory. Output of the factory for rare-earth-metals separation included rare-earth element carbonates, hydroxides, and oxides, and rare-earth-element-bearing solutions, as well as liquid nitrogen fertilizers. The factory for rare metals products produced rare-metal hydroxides, oxides, and ammonium bifluoride. The metallurgical factory also produced metallic products, which included hydrides, metallic powders, niobium, and tantalum chips, and rare-earth-metals products, which included mischmetal, neodymium ferroboration alloys, and neodymium metal ingots. About 99% of the raw materials used in production at Silmet was imported (AS Silmet, 2009).

Silmet annually produced up to 3,000 metric tons (t) of rare-earth products and 700 t of rare-metal products (AS Silmet, 2008). Silmet had been producing rare-earth metals since the 1970s and its products included several compounds of the

light and middle group of rare-earth metals and compounds, such as cerium, lanthanum, neodymium, praseodymium, and samarium-europium-gadolinium carbonates, oxides, metals, and chloride and nitrate solutions (AS Silmet, 2009).

Silmet reportedly was one of the world's leading producers of niobium metal chips. At yearend 2007, Silmet began production of cerium carbonate 45 grade 99.9% (AS Silmet, 2007, 2008). In 2008, Silmet made a profit of 22.4 million kroons (EEK) (\$2,093,458<sup>1</sup>) compared with that of 2007 when the company lost 3.6 million kroons (\$312,290). The profit made it possible for the company to cover losses in 2007 and increase its equity to 173.5 million kroons (\$16,214,953). The company achieved its growth in sales because of growth in the physical volume of sales as well as because of higher prices for its products. Silmet's sales in European countries accounted for 236.9 million kroons (\$22,140,187), followed by the United States, 122 million kroons (\$11,401,869), and Japan, 82.4 million kroons (\$7,700,935). The company stated that by managing to double its sales of rare-earth metals, it was presenting a real alternative to Chinese products (Estonian Investment and Trade Agency, 2009; U.S. Central Intelligence Agency, 2009).

## Outlook

Estonia is expected to gain in importance as a processor of rare-earth elements as the demand for rare-earth metals increases with the development of new technologies. The country also could be of increasing importance in the development of technology for using oil shale owing to its long experience and technical expertise in oil shale mining, processing, and use.

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## LATVIA

Latvia had the Baltic States' only steel mill. Other mineral commodity production was confined to industrial minerals used in construction, peat extraction, and production of a small amount of natural gas. Latvia was not known to produce any of the rare metals and other elements listed in the introduction

<sup>1</sup>Where necessary, values have been converted from Estonian kroons to U.S. dollars (US\$) at the exchange rate of 10.7 kroons=US\$1.00 for 2008 and 11.53 kroons=US\$1.00 for 2007.

to this report. In 2008, the country's GDP decreased by an estimated 4.6% compared with that of 2007 because the country was slipping into a severe recession (U.S. Central Intelligence Agency, 2009).

Latvia's major role in the world mineral economy was as a transshipper of mineral products. The country's three main ports are Liepaja, Riga, and Ventspils, all of which mostly transited cargoes from and to the Commonwealth of Independent States (CIS) countries.

## Production

Data on mineral production are in table 2.

## Structure of the Mineral Industry

The Ports of Riga and Ventspils operated as freeports and the Port of Liepaja was part of the Liepaja Specialized Economic Zone. The country's steel mill, Liepajas Metallurgs, which was the country's main mineral industry enterprise, was a public joint stock company (Liepajas Metallurgs, 2007).

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## LITHUANIA

Lithuania's main mineral commodity production enterprises were its nitrogen fertilizer enterprise in Jonava and its petroleum refinery near Mazeikiai. The country also produced industrial mineral products, which included cement, clays, and sand and gravel, and mineral fuels, which included peat and crude petroleum. Lithuania was not known to produce any of the rare metals and other elements listed in the introduction to this report. The country's Port of Klaipeda was a major transshipment center for mineral products, and in particular, crude oil and petroleum products and fertilizers.

Lithuania had the Baltic States' only nuclear powerplant at Ignalina, which had generated more than 85% of the electric power produced in Lithuania. The reactors at the plant, however, were of the RBMK-2 model that was involved in the accident at the Chernobyl plant in Ukraine (Energy Daily, 2007). As part of its accession agreement to the European Union, Lithuania agreed to close the plant. In December 2004, it closed Unit 1, which contained 75% of the plant's electricity generating capacity. The remaining Unit 2, which accounted for 25% of Lithuania's electricity generating capacity and supplied about 70% of Lithuania's demand for electricity, was closed on December 31, 2009. Lithuania had proposed building a new nuclear powerplant to replace the Ignalina plant, with the participation of neighboring countries Estonia, Latvia, and Poland. The new proposed plant would contain two reactors, each with a capacity of up to 1,700 megawatts, and would be

built near Ignalina at Visaginas. The first of the reactors could come online in 2018 (World Nuclear News, 2010). In 2008, Lithuania's GDP grew at a rate of 3%, which was far below the 9% growth in GDP estimated to have taken place in 2007 as the country was slipping into a severe recession at yearend (U.S. Central Intelligence Agency, 2010).

## Production

Data on mineral production are in table 3.

## References Cited

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## CAUCASUS REGION (ARMENIA, AZERBAIJAN, GEORGIA)

### ARMENIA

Armenia was not known to produce any of the rare metals and other elements listed in the introduction to this report. Armenia was a major producer of molybdenum and ranked an estimated sixth in the world in mine output in 2008 (Polyak, 2010). Besides molybdenum, Armenia produced other metals, which included copper, gold, rhenium, silver, and zinc, and industrial minerals, which included cement, diatomite, gypsum, limestone, and perlite. The country produced aluminum foil using aluminum imported from Russia. The country had almost no domestic mineral fuel production and relied for electric power on a domestic nuclear powerplant and hydroelectric plants. It imported fuel for its nuclear powerplant and natural gas from Russia.

Armenia possesses significant resources of copper, gold, iron, lead, molybdenum, rhenium, and zinc. It also has resources of construction material (basalt, granite, limestone, marble, tuff, and so forth), semiprecious stones (agate, jasper, obsidian, and so forth), and other nonmetallic minerals, such as bentonite, diatomite, perlite, and zeolite. The copper, copper-molybdenum, and copper-polymetallic deposits in northern Armenia contain about 475 million metric tons (Mt) of ore. The Zangezur copper-molybdenum complex possesses large molybdenum reserves, which are concentrated in the Kadzharan deposit. Gold reserves at the Sotk gold mining complex were reportedly 80 t (Interfax Russia & CIS Metals and Mining Weekly, 2007).

### Minerals in the National Economy

In 2008, mining and quarrying comprised 12.6% of the total value of industrial production compared with 15.9% in 2007 (National Statistical Service of the Republic of Armenia, 2010, p. 243). The mining and quarrying sector employed 8,300 people

and accounted for 0.7% of the total labor force (National Statistical Service of the Republic of Armenia, 2010, p. 55, 56).

Mineral products, however, provided a large portion of Armenia's export revenue earnings. In 2008, total exports were valued at about \$1.057 billion. Exports of goods and services accounted for \$986 million, of which the category precious metals and products accounted for 30.5%; nonprecious metals and products made of them, 28.5%; and mineral products, 13.9% (National Statistical Service of the Republic of Armenia, 2010, p. 423-515). Armenia's main export partners were the European Union, Iran, Israel, Russia, and the United States (Hovhannisyanyan, 2009, p. 6).

## Production

In 2008, the volume of output in the mining sector decreased by 0.2% compared with that of 2007, and the extraction of metallic ores decreased by 0.5%. The value of the extraction of nonmetallic ores increased by 3.6%. At current prices, the value of output in the mining sector decreased by 17.7% compared with that of 2007, of which the value of output in the metals mining sector decreased by 20.1%, but the value of output in the nonmetallic mining sector increased by 13.9% (National Statistical Service of the Republic of Armenia, 2010, p. 237-240). In 2008, the volume of output of metallic products was mixed regarding increases and decreases compared with that of 2007, as the reported production of copper concentrate increased by 6.8% and that of molybdenum concentrate increased by 4.2%, but production of zinc concentrate decreased by 14.7%; ferromolybdenum, by 10.9%; blister copper, by 6.8%; and aluminum foil, by 4.6%. In the industrial minerals sector, reported production of salt increased by 7.2% and that of cement increased by 6.6%, but caustic soda production decreased by 18.4% and gypsum production decreased by 15.9%. Data on mineral production are in table 4.

## Structure of the Mineral Industry

Table 5 is a list of major mineral industry facilities.

## Commodity Review

### *Mineral Fuels and Related Materials*

**Uranium.**—In April 2008, the Government of Armenia and the Russian company Atomredmetzoloto signed an agreement to develop uranium mining throughout Armenia. The agreement resulted in the formation in 2008 of the joint-venture Armenian-Russian Mining Co. The Armenian Government issued a 5-year license to Armenian-Russian Mining to explore uranium fields in Armenia. Reported estimates of the country's uranium reserves have ranged from 10,000 to 60,000 t of uranium. The hills in the Syunik region, which are located 340 kilometers (km) south of the Armenian capital of Yerevan, were a prime target for exploration because the region had been a known source of uranium since Soviet times. Armenian-Russian Mining stated that it would start prospecting in the hills near the villages of Katnarat, Lernadzor,

and Pukhrut. If sufficient amounts of uranium are discovered, development could commence. Plans called for the uranium to be enriched at Angarsk in Kazakhstan. The joint venture's goal was to meet Armenia's uranium needs for its nuclear powerplant completely (Avagyan, 2008; Interfax, 2009).

Local residents and environmentalists raised concerns about the dangers to health and safety associated with uranium mining because an accident that resulted in fatalities occurred when uranium was mined in this region in the 1970s. Another cause for concern was the proximity of the projected exploration area to Shikahogh, which is Armenia's largest national park and which is located less than 50 km from the proposed exploration area (Harutiunian, 2008; Interfax, 2009).

## Outlook

Uranium mining could commence in Armenia, depending on the results of the exploration being conducted. If the results are positive for uranium development and if other issues, including environmental issues, are resolved, Armenia could commence developing uranium mining, which would reduce or eliminate its dependence on uranium imports. Uranium processing, however, would be conducted outside the country in Kazakhstan.

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## AZERBAIJAN

Azerbaijan produced a range of metals and industrial minerals, including such metals as alumina, aluminum, iron ore, and steel. Its major importance as a world mineral producer, however, was based on its oil extracting industry. The country had been a significant oil producer for more than a century, but the focus since independence in 1991 had been on developing offshore resources in the Caspian Sea. In 2008, oilfield and gasfield development was concentrated in two projects—the Azeri-Chirag-Guneshli (ACG) offshore oilfields and the

Shah-Deniz offshore gas condensate field (State Oil Company of Azerbaijan, 2008).

Azerbaijan was not known to produce any of the rare metals and other elements listed in the introduction to this report, but reportedly does possess less than 1% of the indium reserves and about 8% of the gallium reserves of the countries of the former Soviet Union (FSU) (Infomine Research Group, 2007).

### **Minerals in the National Economy**

In 2008, the mining and quarrying sector accounted for 52.5% of the GDP compared with 53.6% in 2007. Within the mining and quarrying sector, the oil and gas extraction subsectors accounted for almost the entire sector's contribution to the GDP. In 2008, the value of output in the extractive sector grew by 5.3% compared with the value in the previous year whereas in 2007, the sector grew at a rate of 29.1%. In 2008, the mining and quarrying sector employed 45,000 people and accounted for 1.1% of the labor force (State Statistical Committee of the Republic of Azerbaijan, 2009).

### **Production**

In 2008, production increased for most products in the mineral sector. Construction sand production increased by 78% compared with that of 2007, and iron ore production increased by 59.7%; natural gas production, by 50.9%; steel pipe production, by 9.7%; salt production, by 3.9%; and crude oil production, by 3.2%. Alumina production, however, decreased by 10.6%. Data on mineral production are in table 6.

### **Structure of the Mineral Industry**

Table 7 is a list of major mineral industry facilities in Azerbaijan.

### **Outlook**

Azerbaijan has an alumina refinery. Reserves of gallium in aluminum raw materials give the country the potential to produce gallium.

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## **GEORGIA**

During the Soviet period, a range of mineral commodities were mined in Georgia, including arsenic, barite, bentonite, coal, copper, diatomite, lead, manganese, zeolite, and zinc,

among others. The country's metallurgical sector produced ferroalloys, steel, and steel pipes. Production of a number of these mineral commodities ceased or was sharply curtailed following the dissolution of the Soviet Union, but investment in mineral development in the post-Soviet period often centered on restoring or increasing production in these industries. Georgia was not known to produce any of the rare metals and other elements listed in the introduction to this report.

Georgia's main role in the world mineral supply was serving as a transport route for oil and gas shipments out of the Caspian region to world markets. Three of the new large oil and gas export pipelines that have been or were being constructed in the Caspian region pass through Georgia. These include the Baku-Tbilisi-Ceyhan (BTC) oil transport pipeline, the Baku-Tbilisi-Erzurum (BTE) gas transport pipeline (also called the South Caucasus Pipeline), and the Baku-Supsa (also called the Western Early Oil Route) pipeline.

### **Minerals in the National Economy**

In 2008, the mining and quarrying sector accounted for 6.9% of total industrial output compared with 7.7% in 2007 (Ministry of Economic Development of Georgia, 2009, p. 158). Mining of metal ores accounted for 4.1% of total industrial output compared with 4.2% in 2007. The manufacture of metals accounted for 16.3% of total industrial output compared with 10.3% in 2007, and the manufacture of other nonmetallic mineral products accounted for 10.6% of total industrial output compared with 10.2% in 2007. In 2007 (the latest year for which data were available), the mining and quarrying sector employed 0.3% of the total labor force (Ministry of Economic Development of Georgia, 2009, p. 43). In 2008, 4,300 people were employed in mining and quarrying compared with 4,500 people in 2007, of which 1,600 were employed in mining metallic ores in 2008 compared with 1,500 in 2007 (Ministry of Economic Development of Georgia, 2009, p. 154).

### **Production**

In 2008, the estimated production of most metals and industrial minerals and fuels was estimated to have remained stable. Production data for 2008 for most mineral commodities generally were not available at the time of the preparation of this report and data in table 8 are estimated based on fragmentary information or general economic data.

### **Structure of the Mineral Industry**

Table 9 is a list of major mineral industry facilities.

### **Outlook**

Production in the mineral industry was reviving and the country could increase considerably its production of copper, gold, manganese concentrates and ferroalloys, and other mineral products. Georgia has been able to attract a limited number of foreign investors, and future prospects for mineral development

will depend to some degree on the country being able to attract additional foreign investment.

## Reference Cited

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## CENTRAL ASIA REGION (KAZAKHSTAN, KYRGYZSTAN, TAJIKISTAN, TURKMENISTAN, UZBEKISTAN)

### KAZAKHSTAN

Kazakhstan ranked second only to Russia among the countries of the FSU in the quantity of its mineral production. It is endowed with large resources of a wide range of metallic ores, industrial minerals, and fuels, and its metallurgical sector is a major world and (or) regional producer of a large number of metals from domestic and imported raw materials. Its mining sector produced asbestos, bauxite, chromite, cesium, copper, germanium, gold, indium, iron, lead, manganese, rare-earth elements, scandium, and zinc in ores. Its metallurgical sector had produced such metals as arsenic, beryllium, bismuth, cadmium, copper, ferroalloys, gallium, indium, lead, magnesium, molybdenum, niobium, rare-earth metals, rhenium, scandium, selenium, steel, tantalum, tellurium, titanium, and zinc. The country produced industrial minerals, such as asbestos, barite, and phosphate. The country was a significant regional producer of such mineral fuels as coal, natural gas, and oil, and was one of the world's leading uranium producers.

### Minerals in the National Economy

In 2008, the volume of production in Kazakhstan's mineral extraction industry increased by 2.1% compared with that of 2007. The volume of output in the energy and fuel extraction sector increased by 5.5% compared with that of 2007 but the volume of output in the mining sector (excluding the extraction of fuel and energy raw materials) decreased by 0.7%. The volume of output in the metallurgical sector decreased by 3.8%, including a decrease in the volume of output in the ferrous metallurgical sector of 13.7%, but the volume of production in the nonferrous metallurgical sector increased by 3.6%. In 2008, the value of industrial production accounted for 32.2% of the value of the GDP. In 2007 (the latest year for which data were available), the mineral extraction industry produced about 57% of the value of industrial production in current prices. In 2008, the mining sector employed about 4.6% of the total labor force (Agency of Statistics of the Republic of Kazakhstan, The, 2009, 2010). From 2003 to 2008, Kazakhstan attracted large net foreign direct investment inflows, which equaled 8% of the GDP; most of this investment was in the hydrocarbon sector (Robobank, 2009).

### Government Policies and Programs

The Government of Kazakhstan has a major role in overseeing foreign investment and Government officials at the

highest levels have screened major foreign investment proposals (U.S. Department of State, 2007). On September 27, 2007, Kazakhstan's Senate approved a bill "amending the law on subsurface resources and their use," which gives the Government a greater ability to change contracts. The bill includes a statement that in actions by holders of subsurface deposits where a potential exists for the development of circumstances that could "lead to essential changes of the economic interests of Kazakhstan, creating a threat to national security," the Government has the right to demand changes in the terms of the contract. The bill also states that the Government can annul contracts "if within a period of up to two months after receiving notification the resource user does not provide its written consent to begin talks on changing the terms of a contract or refuses to hold talks; if within a period of up to four months from receipt of the resource user's consent to talks no agreement has been reached; and if in a period of up to six months from the attainment of agreement on restoring Kazakhstan's economic interests the parties do not sign the contract amendments" (Interfax Russia & CIS Oil and Gas Weekly, 2007). The President of Kazakhstan signed the bill into law on October 24 (Reuters, 2007).

### Production

In 2008, output decreased for a number of major mineral commodities produced in Kazakhstan, including copper and lead metal. Estimated or reported production, however, increased for other major mineral commodities, such as alumina, barite, bauxite, bismuth, chromite, gallium, refined gold, gypsum, manganese ore, natural gas, crude oil, phosphate rock, salt, sulfur, titanium sponge, uranium, and zinc. Data on mineral production are in table 10.

### Structure of the Mineral Industry

Eurasian Natural Resources Corp. (ENRC) was a mining and metals group with more than 60,000 employees. The ENRC controlled Aluminium of Kazakhstan, the Kazchrome chromite mining and ferroalloys production enterprise, the Kazmarganets (formerly Zhairam) manganese mining and beneficiation complex, and the Sokolovsko-Sarbay Mining and Production Union (SSGPO), which was the main supplier of iron ore to Russia's Magnitogorsk Iron and Steel Works. In 2007, ENRC announced the completion of the acquisition of a controlling interest in the Serov Group and certain related entities in Russia; the Serov Group was Russia's only chromite producing enterprise and the Group also included a ferroalloy producer in eastern Russia (Eurasian Natural Resources Corp., 2008).

Kazakhmys, which was the country's leading copper producer, was a United Kingdom-registered copper mining company whose main assets were located in Kazakhstan. The headquarters were located in London and the headquarters of its main subsidiary, Kazakhmys Corp., were located in Dzhezkazgan, Kazakhstan. In October 2005, the company was listed on the London Stock Exchange. Glencore International AG, which was headquartered in Switzerland, owned or controlled (via subsidiaries) 99% of the shares in Kazzinc JSC, which was the country's leading integrated lead and zinc

producer. Kazzinc also produced copper, gold, silver, and other byproduct metals (Kazakhmys PLC, 2007).

All the country's major oilfield and gasfield developments since achieving statehood in 1991 were by projects in which foreign companies and Kazakhstan state-owned firms have had forms of joint ownership. The country's uranium industry was controlled by Kazatomprom National Atomic Co., which was a holding company whose major activity was uranium mining; it also engaged in geologic exploration and metallurgy, as well as scientific support and staff training, and social support. Kazatomprom's stock was 100% held by the Government, and the company employed more than 25,000 people. Kazatomprom was an importer, exporter, and transporter of uranium and other products used in the nuclear power industry (Interfax Russia & CIS Metals and Mining Weekly, 2007).

## Mineral Trade

In 2008, the value of Kazakhstan's exports increased by 49.1% compared with that of 2007, and the value of imports increased by 15.7% (Reuters, 2009). In 2008, metals accounted for 15% of the value of exports, and other mineral products, which were primarily oil and gas, accounted for 73%. Metals accounted for 17% of imports, and other mineral products, 16%. Energy cooperation with China was helping Kazakhstan diversify its exports and helping China to secure access to energy in Central Asia. In April 2009, China and Kazakhstan concluded an agreement whereby China extended to Kazakhstan a \$10 billion loan in exchange for oil (Robobank, 2009).

## Commodity Review

### Metals

**Cesium.**—In the early 1990s (the only period for which information was available), it was reported that Kazakhstan was mining about 25% of the cesium produced in the CIS. All cesium processing took place in Russia (Akyzbekov and others, 1995, p. 123).

**Gallium.**—Kazakhstan reportedly possesses about 6% of the total gallium reserves in the FSU; total gallium reserves in the FSU reportedly exceed 10,000 t. Kazakhstan, along with Ukraine, were two of the major producers of metallic gallium in the FSU. Gallium was produced at ENRC's alumina refinery in Pavlodar (Infomine Research Group, 2007). ENRC reportedly produced 40% of the world's gallium output (Eurasian National Resources Corp., 2007).

**Germanium.**—In 1991 (the only year for which data were available), Kazakhstan mined 17% of the germanium extracted in the Soviet Union (Akyzbekov and others, 1995, p. 102).

**Indium.**—Kazakhstan possesses about 12% of the indium reserves in the FSU. Indium reserves in the FSU reportedly total more than 5,000 t. In Kazakhstan, indium was produced as a byproduct of lead and zinc production by Kazzinc, which had the processing capacity for producing metallic indium. Indium production in Kazakhstan was estimated to be less than 500 kilograms per year (kg/yr) (Infomine Research Group, 2007). In the early 1990s (the latest period for which data were available),

Kazakhstan produced 3.5% of the indium output in the CIS (Akyzbekov and others, 1995, p. 102).

**Lithium.**—Kazakhstan was not known to be producing lithium, but had identified lithium reserves in the rare-metal ores of the Belogorsk mining and metallurgical complex. Lithium was not extracted from the ores and was contained in wastes from producing tantalum concentrates (Akyzbekov and others, 1995, p. 43).

**Niobium and Tantalum.**—Kazatomprom's Ulba metallurgical plant in Oskamen produced niobium products in the form of ingots, ligatures, powder, rolled products, and wire (Kazatomprom National Atomic Co., 2010). Kazatomprom also controlled the country's tantalum production. Kazatomprom's tantalum production complex was also located at the Ulba metallurgical plant. The Ulba enterprise was one of the world's leading tantalum production enterprises. It had a complete production cycle for reprocessing tantalum-niobium-bearing feedstock and producing finished products. Kazatomprom did not have its own tantalum resources and purchased tantalum concentrate. Kazatomprom had formed a strategic plan to develop its tantalum production sector, which included construction of a capacitor production plant and production of high-capacity tantalum capacitor powders (Kazatomprom National Atomic Co., 2009a).

Kazakhstan had produced small amounts of niobium and tantalum from domestic deposits during the Soviet era and shortly after the dissolution of the Soviet Union. The country's tantalum-niobium pegmatite deposits are located in the east of the country. In central Kazakhstan, byproduct reserves of niobium oxide were confirmed in one bismuth-molybdenum-tungsten deposit at Karaoba. During the processing of ore from this deposit, 44% of the niobium oxide was recovered in tungsten and tin concentrates. The Belogorskiy mining and beneficiation complex in eastern Kazakhstan mined the Bakennoye, the Belogorskoye, and the Yubileynoye niobium-tantalum deposits. The crude ore was processed at the mines into cassiterite-tantalum concentrate, which was sent for further processing for the production of marketable tantalum and tin concentrates. Tantalum and niobium concentrates were sent to the Ulba metallurgical plant, which produced fluorotantalites and fluoroniobates. The tantalum was used by the defense industry and the niobium products were stockpiled. The average tantalum oxide content of the deposits in ores that were mined was 52 grams per metric ton (g/t) which was considered too low to be an active reserve. Other proven reserves of the Belogorskiy complex had a low tantalum oxide content of between 70 and 80 g/t and required underground extraction and thus were not considered active reserves. Identified resources that occur in the region of the Belogorskiy complex within 300 meters (m) of the surface, however, reportedly have the potential to be economic and require further exploration (Daukeev, 1995, p. 82-85).

**Rare Earths.**—Kazakhstan had been mining the Melovoye rare-earth-metals deposit on the Mangyshlak Peninsula, which was one of the three rare-earth-metal deposits that had produced rare-earth metals in the Soviet Union. Kazakhstan had a manufacturing plant that produced rare-earth-metals end products in Irtysh in eastern Kazakhstan; it processed rare-earth-metal chlorides from the Solikamsk magnesium plant



in Russia (Vereschagin and others, 2006). In 1990 (the latest year for which information was available), Kazakhstan produced an estimated 97 t of rare-earth metals, which was 1% of the rare-earth metals produced in the Soviet Union. Of this 97 t, 30 t was neodymium, 25 t was samarium, 16 t was cerium, 13 t was praseodymium, 6 t was lanthanum, 4 t was gadolinium, and 3 t was europium (Akyzbekov and others, 1995, p. 124).

In 2009, Kazatomprom and Sumitomo Corp. of Japan agreed to undertake recovering rare-earth elements from uranium ore residues. By yearend 2009, a joint venture was to be formed to produce rare-earth concentrates from uranium tailings from open pit mines. Plans called for processing the concentrate at the Ulba metallurgical plant. The tailings were reportedly rich in such rare-earth elements as dysprosium and neodymium. The project was considered advantageous because of lower development costs, a quicker startup time, and less environmental impact from using tailings. Furthermore, Kazatomprom could supply significant infrastructure and engineering support. It was envisaged that the new rare-earth-metals production venture's entry into the dysprosium market would provide the world market with another source of this rare-earth element besides China. The joint venture would be the second between Kazatomprom and Sumitomo (the two companies had also formed a joint venture to produce uranium) (Lui, 2009).

**Scandium.**—During the Soviet era, scandium production in the Soviet Union was about 10 metric tons per year (t/yr), which made the Soviet Union by far the world's leading scandium producer. More than 90% of the scandium was produced in Kazakhstan. Scandium during the Soviet era was obtained from uranium ore at the Prikaspiskiy mining and metallurgical complex (now AO Kasko), which produced up to 9 t/yr of aluminum-scandium alloys, scandium fluoride, and scandium oxide, but production ceased during the early 1990s when the uranium ore was depleted. The Ust'-Kamenogorsk metallurgical plant also extracted scandium by processing titanium chlorite wastes at an experimental unit. Scandium reserves had been identified at the Nura-Taldy beryllium deposit and the Akchatauskoye and the Karaobinskoye tungsten deposits in Kazakhstan (Akyzbekov and others, 1995, p. 118; Bykhovskiy and others, 2007; Kurkov and Kotova, 2007).

**Selenium and Tellurium.**—Kazakhstan produced refined selenium and tellurium. Tellurium was produced at Kazzinc, and production was estimated to be between about 17 t/yr to 18 t/yr (Kul'chintskiy and Naumov, 2010). Information on the production of selenium, which is generally produced from anode slimes generated in the electrolytic refining of copper, was not adequate to estimate selenium production.

**Thallium.**—In the early 1990s, Kazakhstan reportedly was mining about 95% of the thallium produced in the CIS. Thallium production was centered at the Ust'-Kamenogorsk lead-zinc complex (Akyzbekov and others, 1995, p. 43).

### ***Mineral Fuels and Related Materials***

**Uranium.**—According to Kazatomprom, Kazakhstan reportedly hosts about 19% of the world's explored uranium reserves, or about 1.6 Mt of uranium. The uranium deposits

are grouped into the following six uranium provinces: the Chu-Sarysu uranium ore province, where the Kanzhugan, the Moinkum, and the Uvanas Mines were in operation; the Syrdarya uranium ore province, where the Northern Karamurun and the Southern Karamurun Mines were in operation; the Northern Kazakhstan uranium ore province, where the Vostok Mine and the Stepnogorsk mill were in operation; the Caspian uranium ore province, where uranium production had been mothballed since the collapse of the Soviet Union; the Balkhash uranium ore province, where uranium mining had been discontinued after the major deposits were depleted during the Soviet era; and the Ili uranium ore province, where uranium occurs mainly in uranium-coal deposits and where no uranium was produced (Kazatomprom National Atomic Co., 2009b).

In 2008, Kazakhstan produced 8,521 t of uranium (U content), which was more than 28% greater than in 2007. Plans called for increasing uranium production by 2009 to about 12,000 t, which would make Kazakhstan the world's leading uranium producer. The commissioning of new mines was proceeding on schedule (Interfax Russia & CIS Metals and Mining Weekly, 2009). Kazakhstan had established joint ventures with a number of companies from different countries to mine its uranium reserves, which included a joint venture with Russia to mine uranium in Kazakhstan, enrich it in Russia, and design and build nuclear powerplants to be sold to other countries (Interfax Russia & CIS Metals and Mining Weekly, 2007).

### **Outlook**

Kazakhstan's long-term mineral development prospects remain promising, and Kazakhstan is poised to become the world's leading uranium producer. Kazakhstan is also a leading producer of ores from which rare metals could be extracted as byproducts. Production growth has been taking place in practically all sectors of the mineral industry and is expected to continue in the next decade.

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## KYRGYZSTAN

During the Soviet period, Kyrgyzstan's mining industry was based on the extraction of antimony, mercury, rare-earth elements, and uranium, and it was the main producer of mined mercury and of mercury and antimony metal in the Soviet Union. In 2008, production of antimony and mercury was conducted at a much lower level and production of uranium and rare earths had ceased. The Kyrgyz Chemical Metallurgical Plant in Orlovka, although it had ceased its uranium mining operations, reportedly had continued to produce scandium, thorium, and zirconium into the 1990s, but no recent reports of production of these minerals had been located that would

indicate that production was still taking place. The Kara-Balta mining and metallurgical complex, which used to process uranium until the collapse of the Soviet Union, had switched to processing as much as 25 t/yr of gold and silver. As of 2009, Kara-Balta was again processing uranium.

Kyrgyzstan does not possess large oil and gas reserves, but did produce some oil and gas. Coal mining had been conducted there since the early 1900s when Kyrgyzstan was the main supplier of coal in the Central Asia region, but coal production was no longer substantial and provided less than 25% of the country's coal consumption. Following the dissolution of the Soviet Union, the country's leading mineral sector became the gold mining sector with the development of the Kumtor gold deposit by Canada's Cameco Corp., which concluded an agreement for the development of Kumtor with the Kyrgyz Government in 1994. In 2004, all Cameco's assets in Kyrgyzstan were transferred to Centerra Gold Inc. of Canada.

## Production

In 2008, production in the metals sector was estimated to have remained at about the same level as in 2007, except for gold production, which was reported to have increased by about 85%. Production in the industrial minerals sector was estimated to have remained at about the 2007 level; production of cement, however, which was reported, decreased slightly, and production of lime, which was also reported, decreased by 34% compared with production in 2007. In 2008, production in the fuel sector was reported to have increased for all mineral fuels. Coal production increased by about 38% compared with that of 2007 but was still far below production levels attained at the time of the dissolution of the Soviet Union. Production data are in table 12.

## Structure of the Mineral Industry

Centerra Gold Inc. owned 100% of the Kumtor gold mine through its wholly owned subsidiary Kumtor Gold Co. Besides Centerra Gold, the country's main mining enterprises were the Kadamzhay antimony mining and metallurgical complex, the Makmalzoloto gold mining complex, and the Khadarkan mercury mining and metallurgical complex. The Makmalzoloto gold mining enterprise was managed by the Kyrgyzaltyn Joint Stock Co., which was wholly owned by the Government of Kyrgyzstan.

## Commodity Review

### Metals

**Rare Earths.**—Open pit mining of rare earths had taken place in Kyrgyzstan at the Aktyuzskiy open pit at the Kutessai II deposit from 1960 through 1992. Aktyuzskiy was closed in 1995, although the majority of rare-earth reserves still remained. During the time of its operation, 22,100 t of rare earths was mined, and remaining reserves in the categories B1, C1, and C2 were assessed to be 51,500 t of rare-earth metals in ores with an average rare-earth content of 0.25%. Of the remaining rare-earth

reserves, 54.5% was of the cerium group and 43.7% was of the yttrium group. The ratio of yttrium in the ore to the other rare metals averaged 1:3. The rare-earth metals concentrates had been sent for processing to a chemical-metallurgical plant at the mining-metallurgical complex. The complex had produced up to 120 types of rare-earth-metal products, which included oxides of the yttrium group, oxides of lanthanum and neodymium, dioxides of cerium, and rare-earth alloys. During the beneficiation process, besides rare-earth-metals concentrates, lead and molybdenum concentrates also were produced and sold. In 1995, the chemical-metallurgical plant was privatized and transformed to produce high-purity silicon (Zubkov, 2007).

### ***Mineral Fuels and Related Materials***

**Uranium.**—The Mailuu-Suu district in Jalal-Abad Province in southern Kyrgyzstan was a significant Soviet uranium mining area where more than 10,000 t of uranium was produced between 1946 and 1967. Nimrodel Resources Ltd. of Australia had leases in the Mailuu-Suu area. On July 17, 2007, Nimrodel Resources completed the acquisition of 100% of Linia Prava Uranium (LPU). LPU (a joint stock company registered in Kyrgyzstan) held a 90% interest in four exploration licenses granted for Batken Oblast in the southern Fergana Valley in southwestern Kyrgyzstan. The licenses covered an area of more than 3,800 square kilometers (km<sup>2</sup>) that LPU had been exploring actively since 2005. In January 2008, LPU acquired a license to explore a 48-km<sup>2</sup> portion of the Mailuu-Suu district. The area of the license included 23 tailings dams, 5 nonworking mines, and 13 waste material sites. Geologic surveying was to be conducted around the five mines to investigate prospective uranium in the region. A program to drill tailings also was to be carried out in March and April 2008. Mineralogical and metallurgical testing would then be done to develop parameters for a production plant (Nimrodel Resources Ltd., 2009).

Monaro Mining NL of Australia had eight exploration licenses in Kyrgyzstan that were prospective for uranium. These projects included the Aramsu, the Djurasay, the Gavassai, the Hodjaakan, the Naryn, the Sumsar, the Sogul, and the Utor licenses. In January 2008, Monaro signed a memorandum of understanding with Chinese resources group Sinosteel Corp. for Sinosteel to take over exploration of Monaro's Kyrgyzstan projects; under the agreement, Sinosteel could eventually own up to 60% of two new uranium mines in the country. A number of other companies, including Canada's Uranium One Inc., were also actively exploring for uranium (World Nuclear Association, 2009).

During the Soviet era, Kyrgyzstan had mined uranium from deposits at Kyzyl-Dzhar that were associated with gold, at the Mayli-Suu enterprise located north of Osh at Orlovka, and from deposits of uranium associated with lignite at Issyk Kul, Kadzhi-Say, and Min-Kush. The Kara-Balta mining and metallurgical complex, which had an annual uranium production capacity reported as 3,600 t of uranium, had processed uranium concentrate from deposits in Kyrgyzstan and Kazakhstan for use in Soviet nuclear powerplants. In addition to uranium, the Kara-Balta plant also refined gold and processed other metal ore and possessed a large

hydrometallurgical facility near Bishkek (Wise Uranium Project, 2010).

After Kyrgyzstan gained independence in 1991, uranium mining in the country was halted, and the Kara-Balta plant ceased processing uranium because of a lack of raw material. The Kara-Balta plant did not process uranium again until 1994 when it reached an agreement with the Government of Kazakhstan to process uranium concentrate from the Stepnoye and the Tsentral'noye mining directorates in Kazakhstan into about 450 t/yr of U<sub>3</sub>O<sub>8</sub>. In 2000, the Russian Ministry of Atomic Energy restored ties with the Kara-Balta plant, and in July 2000, Kyrgyzstan agreed to a joint-venture arrangement with Kazakhstan and Russia in which uranium concentrate from Kazakhstan's Zarechnoye deposit would be processed at Kara-Balta and supplied to the Russian nuclear industry. In 2004, Kazakhstan stopped supplying uranium to Kara-Balta, which again caused uranium processing there to cease (Nuclear Threat Initiative, 2002).

The Government of Kyrgyzstan had tried several times unsuccessfully to sell the Kara-Balta plant in 2005 and 2006. In March 2007, the Kyrgyz Government accepted a tender from a Russian resources investment group, Renova, for its 72% stake in the Kara-Balta complex. In October 2008, the Kazakhstan-based Eurasian Development Bank (EDB) agreed to provide \$150 million to the Kara-Balta complex to develop the mill and secure 50 years of tailings accumulation. In 2008, the Kara-Balta mill produced about 800 t of uranium; production was eventually planned to increase to 2,000 t/yr (World Nuclear Association, 2009).

Radioactive waste in uranium tailings ponds in Kyrgyzstan posed a significant health threat. The European Union, Russia, and the United States provided assistance to help Kyrgyzstan come up with solutions to its uranium waste problem. Russia began allocating funds to Kyrgyzstan for the rehabilitation of tailings dumps of uranium wastes (Nuclear Threat Initiative, 2010).

### **Outlook**

Kyrgyzstan, which in the past mined and processed uranium and rare earths, still has remaining resources of these minerals, which investors are seeking to develop. The country's rare-earth resources are primarily of the heavy yttrium group of rare-earth elements, which are considered essential for many technical applications being developed. The country has maintained its uranium processing capability, and it is possible that, with adequate investment, its rare-earth processing capability could be restored to production.

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## TAJIKISTAN

Tajikistan's mineral industry had been mining mineral ores and producing mineral products, which included aluminum, antimony, arsenic, boron, celestite, cement, coal, construction materials, fluorspar, gold, lead and zinc, mercury, molybdenum, natural gas, petroleum, salt, semiprecious and decorative stones, silver, strontium, tin, tungsten, and uranium. Production of some of these mineral commodities had been greatly reduced or had ceased since the dissolution of the Soviet Union. The Tajikistan Aluminum Co. (TALCO) aluminum smelter [formerly the Tajikistan Aluminum Smelter (TadAZ)] was the country's only large-scale production enterprise in the mineral sector.

Tajikistan reportedly has reserves in commercial concentrations of rare metals, such as gallium, germanium, indium, selenium, tellurium, and thallium (Orifov, 2001). The Zavershan region of Tajikistan reportedly has indicators of a number of rare metals, which include lithium, lanthanum, niobium, ytterbium, yttrium, and zirconium, and further exploration is needed to determine the parameters of these manifestations (Ibrozhim and others, 2009). In the early 1990s, Tajikistan reportedly was mining about 0.5% of the thallium produced in the CIS (Akylbekov and others, 1995, p. 121).

The Vostokredmet plant in Chkalovsk was established in 1945 and was known as the Leninabad mining and chemical complex until 1992. Chkalovsk's enterprises had been processing not only Tajikistan's uranium ore, but also uranium from Kazakhstan, Kyrgyzstan, and Uzbekistan. During the Soviet era, Vostokredmet produced yellowcake for the Soviet nuclear power and defense industries and processed up to 1 million metric tons per year (Mt/yr) of uranium ore. In the Soviet era, the city of Chkalovsk had been one of centers of the uranium processing industry and Tajikistan was concerned about the safety of a large number of uranium tailings dumps. Radioactive waste was stored in tailings dumps that did not meet appropriate safety rules and were situated in immediate proximity to residential areas and rivers; the dumps would require a large amount of funds to remediate (Wise Uranium Project, 2010).

Tajikistan was the world's third ranked producer of hydroelectric power after the United States and Russia. Hydroelectric power accounted for more than 75% of the country's total energy output. Nonetheless, the country's energy consumption per capita was among the lowest in the CIS, and the country had suffered severe energy shortages, particularly during cold winter periods when water flow from rivers is diminished (Najibullah, 2007, 2008). Tajikistan's large hydroelectric power generation potential was estimated to be 500 billion kilowatt hours per year, which would rank

Tajikistan second among the countries of the FSU after Russia in hydroelectric potential and eighth in the world. However, Tajikistan was using only 6% to 7% of its hydroelectric power resources (Khasanov, 2009).

## Minerals in the National Economy

Tajikistan had not engaged in major development of its mineral resources and had largely untapped hydroelectric power potential. The country lacks access to international capital markets and relied almost exclusively on concessional financial assistance from international financial institutions and bilateral donors. The country's economy depended heavily on the production and export of aluminum and cotton, and exports of these commodities decreased in 2008 because of the decline in global demand. Exports of aluminum provided about 50% of the country's export revenue (World Bank, The, 2008).

## Production

Data on mineral production are in table 14.

## Structure of the Mineral Industry

Besides the TALCO aluminum smelter, only a few metal mining enterprises were still operating in 2008. These included the Anzob mining and beneficiation complex, which mined and processed reserves of the Dzhikrutskoye antimony-mercury deposit, and the Adrasman mining and beneficiation complex, which developed copper-bismuth and lead-silver ores. The main output of the Adrasman complex included concentrate with a lead content of 43% and a silver content of 5.943 g/t. The country also had enterprises engaged in gold mining and the extraction of coal, natural gas, and oil. Table 15 is a list of Tajikistan's major mineral industry facilities.

## Outlook

Tajikistan has significant mineral resources awaiting development, which include a large number of rare metals, rare-earth elements, and uranium, which could be of interest for future development. The country still suffers from a lack of infrastructure and at times severe energy shortages, which are impediments to mineral development. The development of needed infrastructure and hydroelectric power sources will be an important factor in future mineral development.

Developing hydroelectric energy was considered key for future economic growth because of the country's need to import oil and natural gas from neighboring countries and the high energy consumption of the country's aluminum smelter. Tajikistan imported a significant portion of its hydrocarbon fuel requirements from Uzbekistan. Other CIS countries, such as Kazakhstan and Turkmenistan, provided much of the remainder of the country's imported hydrocarbons (Embassy of Tajikistan to Pakistan, undated).

Foreign countries were interested in participating in developing Tajikistan's uranium resources. Russia was considering assisting Tajikistan to develop its uranium

deposits as well as proposing to assist in geologic prospecting in Tajikistan with the aim of the subsequent extraction and possible processing of uranium (Wise Uranium Project, 2010). China's Guangdong Corp. expressed an interest in projects to develop uranium deposits in Tajikistan, and the Government of Tajikistan has agreed to allow Indian companies to explore uranium deposits (New Europe, 2008; Upadhy, 2009).

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## TURKMENISTAN

Although Turkmenistan produces a wide range of industrial minerals, its major mineral resources are its oil and gas reserves, and the country is a leading regional natural gas producer. Turkmenistan has several of the world's largest gasfields, which include the Dauletabad (brought into production in 1982) and the Shatlyk (brought into production in the early 1970s). Turkmenistan has two oil refining centers—the Turkmenbashi complex of oil refineries and the Seydi oil refinery.

The country's leading nonfuel mineral enterprises were the Arpaklenskiy barite-witherite and the Cheleken ozokerite enterprises, the Gaurdak sulfur plant, the Karabogazsulfate association, the Kara-Kum sulfur plant, and the Oglanly bentonite

mining enterprises. One of the leading enterprises that extracted chemical raw materials was the Karabogazsulfate association, which recovered salts from the Kara-Bogaz-Gol lagoon off the Caspian Sea. The association produced magnesium and sodium salts, such as bischofite, Caspian Sea salt, epsomite, Glauber's salt, and sodium sulfate. In the western part of the country, iodine-bromine brines were extracted at the Boyadagskoye, the Cheleken, and the Nebitdag deposits and then processed at the Cheleken and the Nebitdag iodine-bromine plants.

Turkmenistan was not known to produce any of the rare metals and other elements listed in the introduction to this report. The Seroye deposit, which is located about 250 km to the northeast of Turkmenistan's capital city of Turkmenbashi, had been the site of the first uranium mining enterprise in Central Asia, but the ore there was depleted. The deposit, which was discovered in 1952, began production in 1955. The uranium content of the ore ranged from 0.001% to 20% with an average uranium content of 2%. The deposit was worked for about 10 years by underground mining methods and then by open pit until the reserves were depleted (Odekov and others, 2001).

## Production

Production data and other information regarding mineral production in Turkmenistan for most mineral commodities except natural gas and oil have not been available for a number of years. Consequently, mineral production data in table 16 are estimated based on past levels of production.

## Structure of the Mineral Industry

All mineral production enterprises were state owned and all deposits were being developed by enterprises subordinate to the state and its ministries. Based on a law passed in 1992, foreign firms were permitted to establish joint ventures only with state-owned companies. This law was changed in late 2007 to allow foreign investors the right to fully or partially own enterprises, as well as movable property and real estate. Ownership rights can be purchased from individuals and from legal entities registered in Turkmenistan (Interfax Russia & CIS Metals and Mining Weekly, 2007).

## Outlook

The projections by the Chairman of Turkmengaz of almost doubling gas production to 120 billion cubic meters in 2010 and then more than tripling production to 240 billion cubic meters by 2030 would require the country to attract sufficient foreign investment. Turkmenistan stated that it is interested in broad international cooperation to implement large investment projects in Turkmenistan's sector of the Caspian Sea on a production-sharing-agreement basis. Such projects would involve not only gasfield and oilfield development, but also construction of gas transport facilities, rehabilitation of existing gas and oil wells, modernization of refining facilities, and supplying updated equipment and technology (Interfax Russia & CIS Oil and Gas Weekly, 2008).

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## UZBEKISTAN

Although Uzbekistan was a significant regional producer of a number of mineral commodities, including natural gas and nonferrous metals, it was a major world producer of two mineral commodities—gold and uranium. Minerals were extracted from more than 400 mines, open pits, and oil and gas wells. The two leading mineral production enterprises in the country were the Almalyk and the Navoi mining and metallurgical complexes. The Almalyk mining and metallurgical complex was the country's leading producer of copper and a host of byproduct metals, which included gold, rhenium, selenium, silver, sulfur, and tellurium. Production of these byproduct metals comprised 40% of the value of Almalyk's output (Rakhimov and Alimkhodzhayev, 2001; Mavlyanov and others, 2007; Interfax Russia & CIS Metals and Mining Weekly, 2008).

Uzbekistan reportedly has about 115,000 t of lithium oxide reserves contained in 20.2 Mt of ore with a grade of 0.57% concentrated in volcanogenic deposits of lithium carbonaceous tuffaceous aleurolite in the Shavazsay deposit in Toshkent Viloyati. Byproduct components in the ore reportedly include 8,900 t of rubidium oxide and 3,200 t of cesium oxide. The deposit could be developed by open pit mining. Development could take place with the recovery of 78% of the lithium salts and would include byproduct production of potash and potassium sulfate and wastes that could be used in the production of cement (Mavlyanov and others, 2007).

Four porphyry copper deposits in the Almalyk area (the Dalneye, the Kal'mayr, the Kyrzyta, and the Sary Cheku) were assessed to contain 13,228 t of selenium and 1,098 t of tellurium. These four deposits were part of the Almalyk mining and metallurgical complex (United States Trade and Development Agency, 1996, p. 29). The country's copper deposits also contained indium. According to assessments made in 2001, reserves at copper deposits that were being mined were reportedly considered adequate for 50 years. The large Dalneye copper deposit, which had not been developed, reportedly had significant amounts of selenium and tellurium in the ore. The Khandiza lead-zinc deposit, which was planned for development, reportedly contained among its numerous ore constituents indium and selenium that were considered potentially economic (Rakhimov and Alimkhodzhayev, 2001).

### Minerals in the National Economy

Mineral exports were a major source of revenue for Uzbekistan's Government. Gold was Uzbekistan's second leading foreign exchange earning commodity and was

unofficially estimated to provide about 20% of the country's export earnings. The country also exported other mineral products, which included mineral fertilizers, nonferrous metals (copper and zinc), natural gas, silver, and uranium (U.S. Department of State, 2008).

### Production

In 2008, mineral production generally remained at about its 2007 level, but significant decreases were reported in the production of lignite and petroleum and gas condensate. Data on mineral production are in table 18.

### Structure of the Mineral Industry

Table 19 is a list of Uzbekistan's major mineral industry facilities.

### Commodity Review

#### *Mineral Fuels and Related Materials*

**Uranium.**—According to the 2007 Organization for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA) & International Atomic Energy Agency (IAEA) Red Book, Uzbekistan has 111,000 t of uranium in reasonably assured resources plus inferred resources at \$130 per kilogram of uranium (U). According to the Uzbekistan State Committee for Geology and Mineral Resources (Goskomgeo), in 2008, the country's explored and estimated uranium reserves were reported to be 185,800 t (World Nuclear Association, 2010).

The Navoi mining and metallurgical complex (NMMC), which was part of the Uzbekistan state holding company Kyzylkumredmetzoloto, undertook all uranium mining in Uzbekistan. Before 1992, Uzbekistan exported all uranium that it mined and milled to Russia. Since 1992, Uzbekistan, through Nukem Inc., exported all uranium production to the United States and other countries. In 2008, Korea Electric Power Corp. (Kepco) of the Republic of Korea signed agreements to purchase 2,600 t of uranium during a 6-year period to 2015 (World Nuclear Association, 2010).

NMMC began mining uranium and gold at the end of the 1950s in the desert region of Central Kyzylkum Province. Uranium mining was conducted by underground mining until 1990 and by open pit mining until 1994, but since then, uranium extraction by the in situ leach (ISL) method had become the only mining method used. During the Soviet era, Uzbekistan provided the Soviet Union's military-industrial complex with the majority of the uranium that it used. The country's annual production peaked at 3,800 t of uranium in the mid-1980s. Uranium production activities were centered in five company towns constructed for this purpose: Navoi, Nurabad, Uchkuduk, Zafarabad, and Zarafshan, which had a combined population of some 500,000 people. By 2005, however, employment in the uranium industry was reduced to about 7,000 (World Nuclear Association, 2010).

In 1971, the Central mining district #5 at Zafarabad near Navoi was established by an entity in Bukhara Province, but became part

of NMMC in 1993. Mining using the ISL method took place at the Bukinay group of uranium deposits. The mines included the Beshkak, the Lyavlyakan, the North Bukinai, and the South Bukinai, and the Tokhumbet Mines. Resources in the Central District reportedly totaled 52,000 t of uranium (World Nuclear Association, 2010).

The Northern mining district was established 300 km north of Navoi to mine uranium at the Uchkuduk deposit. Mining by underground and open pit methods had taken place since 1961. Ore was treated at a central plant in Navoi. Since 1965, the ISL method had been used at the Kendykijube and the Uchkuduk deposits. The remaining resources were reportedly 51,000 t of uranium. Sulfuric acid production, which was used in the ISL method, also took place in the district, probably in conjunction with copper smelting (World Nuclear Association, 2010).

In 1964, the Southern mining district at Nurabad in Samarkand Province was developed to mine the Sabirsay uranium deposit. Mining was conducted by underground mining methods until 1983. Since then, uranium extraction had been done using the ISL method. Other mines in the district included the Ketmenchi, the Shark, and the Ulus Mines. Resources in the Southern district reportedly total 13,000 t of uranium (World Nuclear Association, 2010).

Resources in the Zarafshan or eastern mining district, which is located about 160 km north of Navoi, are reportedly 50,000 t of uranium. In this district, mining took place at the Sugraly deposit using underground mining and the ISL method until mining ceased in 1994. NMMC had a joint venture with Areva of France to redevelop the Sugraly deposit, which had reported resources of 38,000 t of uranium, but this agreement appeared to have lapsed. Sugraly was described as a thick deposit with complex mining and geologic conditions and a high carbonate content (World Nuclear Association, 2010).

NMMC also mined the Chauly uranium deposit, but mining there appeared to have switched to extracting phosphorites. NMMC also started mining the major new Northern Kanimekh deposit, which is located northwest of Navoi. Ore at the Northern Kanimekh deposit occurs at a depth of 260 to 600 m, and 77% of the uranium reserves occur at a depth of between 400 and 500 m. A startup uranium mining facility at Northern Kanimekh was commissioned in November 2008 and was expected to achieve full capacity in 2012. NMMC also started constructing a pilot plant for in situ leaching at the Alendy and the Yarkuduk deposits (World Nuclear Association, 2010).

NMMC was scheduled to start developing mines at the Meilysai and the Tutlinskaya Ploshchad deposits in 2009. By the end of 2012, NMMC planned to invest \$165 million in upgrades to expand existing mining and processing capacities, renew its stock of processing equipment, and develop as many as seven new mines. Authorities in Uzbekistan planned to hold open auctions for the development of seven uranium deposits located in the country. Tenders were to be ready by March 2010 (Wise Uranium Project, 2009).

By developing these deposits, the country hoped to increase uranium production by 50% by 2012. The country was also expanding sulfuric acid production as part of its plans to increase uranium production up to 2012, as increased sulfuric acid would be necessary to increase uranium extraction. Early in

2009, however, the President of Uzbekistan said that the world economic crisis would slow all development (Wise Uranium Project, 2009; World Nuclear Association, 2010).

## Outlook

Uzbekistan has a host of rare-metal resources, which could be of increasing importance if technologies are adopted in increasing measure in the world economy to replace the use of hydrocarbons as fuel. Foreign investors would likely be needed to play an active role for future development of Uzbekistan's critical resources, such as lithium and uranium.

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## EURASIA REGION (BELARUS, MOLDOVA, RUSSIA)

### BELARUS

Belarus was not known to produce any of the rare metals and other elements listed in the introduction to this report. Belarus had a number of mineral production enterprises, including a steel minimill, a nitrogen production enterprise, two oil refineries, and a potash mining enterprise. The country's only mineral production enterprise that played a major role in world markets was its potash production enterprise. An oil pipeline that passes through Belarus transported about 70 Mt/yr of Russian oil to Europe, and a gas pipeline that passes through Belarus was a significant export route for gas from Russia to Europe.

### Minerals in the National Economy

In 2008, the fuel sector accounted for 21.5% of the value of the country's industrial production; the chemical and petrochemical sector, 12%; the ferrous metallurgical sector, 4.1%; and the construction materials sector, 3.7%. In 2007 (the latest year for which data were available), the mining sector

accounted for 2% of industrial production and the nonferrous metallurgical sector accounted for 0.2% (Ministry of Statistics and Analysis of the Republic of Belarus, 2008, p. 340-360; Interfax Russia & CIS Statistics Weekly, 2009). Belarus exported a large percentage of its mineral output, including 1.9039 Mt of ferrous metals products in 2008 compared with 1.8573 Mt in 2007; 15.2 Mt of petroleum refined products in 2008 compared with 15.1 Mt in 2007; and 3.7972 Mt of potash in 2008 compared with 4.354 Mt in 2007. The country imported 21.5 Mt of crude oil in 2008 compared with 20.0 Mt in 2007 and 2.5168 Mt of petroleum products in 2008 compared with 908,000 t in 2007 (National Statistical Committee of the Republic of Belarus, 2009).

## Production

In 2008, the value of output in the mining sector increased by 4.3% compared with that of 2007; that of the fuel sector increased by 11.1%; the ferrous metals sector, by 9.7%; and the chemical and petrochemical sector, by 6.7%. For the country's major mineral product, potash, production decreased very slightly in 2008 compared with that of 2007, as did the production of refined petroleum products. Crude steel production, however, increased by 11.4%, finished rolled steel production increased by 12.7%, and cement production increased by 10%. Data on mineral production are in table 20.

## Structure of the Mineral Industry

The Belneftekhim State Concern for Oil and Chemistry, which included among its many enterprises the country's oil production, refining, and transport facilities and potash production enterprise, was the leading concern in the country. It consisted of 50 organizations, including the Republican unitary enterprise (RUE) Production Amalgamation Belaruskali, which mined the Starobin deposit, and practically all enterprises that produced chemical products. The founders of the Belarus Potash Co., which supplied potash from Belaruskali and the Russian firm Open Joint Stock Company (OJSC) Uralkali to world markets, were Belaruskali and Uralkali (Republican unitary enterprise Production Amalgamation Belaruskali, 2007; Open Joint Stock Company Uralkali, 2010).

In accordance with a decree issued on January 28, 2006, the President of Belarus established the production association Belarussian Steel Works (BSW) as a noncommercial organization made up of enterprises subordinate to the Ministry of Industry, including the Rechitsa Hardware Plant. BSW controlled the country's steel minimill and also managed the Republic of Belarus' shares in the Mogilev Steel Works, which produced steel pipe (Official Internet Portal of the President of the Republic of Belarus, The, 2006).

## Outlook

Belarus is expected to continue to be a major supplier of potash to world markets. The program for the development of Belaruskali for the period 2006-12 addresses development of ore reserves and is based primarily on the construction of a

new mine in the Krasnoslobodski area, as well as on renovating out-of-date equipment. A main direction will be a continuous and steady increase in the quality and consumer properties of fertilizers to make them more competitive on the world market. Because it possesses a sufficient raw materials base, a high production potential, and highly qualified personnel, Belaruskali is expected to be a major world potash supplier for many decades to come (Republican unitary enterprise Production Amalgamation Belaruskali, 2007).

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## MOLDOVA

Moldova had a small mineral industry that was primarily engaged in the mining and production of industrial minerals and products, including cement, clays, dimension stone, gypsum, limestone, industrial sand, and sand and gravel. Moldova's steel minimill in Ribnita, the Moldova Steel Works, had the capacity to produce more than 1 Mt/yr of crude steel and 960,000 t/yr of rolled products. Moldova was not known to produce any of the rare metals and other elements listed in the introduction to this report. Moldova was dependent on imports for practically all its coal, natural gas, and oil supplies, which came mainly from Russia (U.S. Central Intelligence Agency, 2009). The country's main mineral resources were of industrial minerals to produce construction materials and for use in the cement, chemical, glass, and food processing industries. Small deposits of iron ore, natural gas, and oil had been explored but were not economic to produce.

## Production

In 2008, the GDP was estimated to have increased by 7.2% compared with that of 2007. At yearend, the country was experiencing the effects of the economic downturn that extended into 2009 (U.S. Central Intelligence Agency, 2009). This economic downturn was reflected in mineral production, as estimated steel production decreased by about 11% and estimated cement production decreased by about 6% compared with that of 2007. Data on mineral production are in table 22.



## Structure of the Mineral Industry

Practically all mineral production enterprises were stock companies that had the participation of foreign enterprises (Zhalalite and others, 2007). Table 23 is a list of Moldova's major mineral industry facilities.

## Outlook

The mineral industry of Moldova is likely to continue to be centered on the production of industrial minerals and steel. The country has very limited resources of hydrocarbons and iron ore, and its only significant mineral resources are of industrial minerals used in the cement, chemical, construction materials, food processing, and glass industries. For Moldova to significantly increase production of industrial minerals would require the country to significantly increase its investment in exploration, which would probably require establishing additional cooperative projects with foreign partners (Zhalalite and others, 2007).

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## RUSSIA

Russia was one of the world's leading mineral producing countries. In 2008, Russia was a globally and (or) regionally leading producer of such mineral commodities as aluminum, arsenic, asbestos, bauxite, boron, cadmium, cement, coal, cobalt, copper, diamond, fluorspar, gold, iron ore, lime, magnesium compound and metals, mica flake and scrap and sheet, natural gas, nickel, nitrogen, oil shale, palladium, peat, petroleum, phosphate, pig iron, potash, rhenium, silicon, steel, sulfur, tin, titanium sponge, tungsten, and vanadium.

The current demand for rare-metal products in Russia was far below that of advanced industrial countries. Rare metals in Russia are consumed mainly in finished products that the country imports, such as automobiles, cell phones, chemicals, color televisions, personal computers, and steel pipes. The raw material base for rare metals that was established in the Soviet period for the most part was not expected to be adequate to meet future domestic production needs as Russia increases its manufacturing and expands its high-technology manufacturing sector. Many enterprises that were mining and processing deposits of these elements at the beginning of the 1990s were not profitable and stopped production. The majority of the deposits of these minerals that could be of industrial significance had been licensed, but had not been reactivated or developed. In addition, enterprises that were processing ores containing these elements in countries outside Russia's borders, including Estonia, Kazakhstan, Kyrgyzstan, Ukraine, and Uzbekistan, ceased producing these minerals; however, a few, such as the Ulba metallurgical plant in

Oskamen, Kazakhstan, which had ceased producing tantalum and niobium metal, and the Silmet plant in Estonia, which produced rare-earth metals and rare metals, resumed production of these metals (Kremnetskiy and others, 2009).

## Minerals in the National Economy

According to official Russian data, in 2008, the category mining and quarrying accounted for about 8.7% of the country's GDP in current prices. The mining and quarrying sector accounted for 15.5% of foreign direct investment (FDI), and FDI in the extraction of fuel minerals accounted for more than 91% of FDI in the mining and quarrying sector (Federal'naya sluzhba gosudarstvennou statistiki, 2009).

According to other analyses, the Russian official statistics do not accurately reflect the value of mineral production to the national economy. The mineral raw material sector, which includes mineral extraction and processing, produced about 30% of the country's GDP and contributed about 70% of the country's budget revenues in 2006 (the latest year for which an analysis of the mineral sector's economic contribution to the GDP and budget revenues was available) (Chanturiya, 2007). Analyses from the International Monetary Fund (IMF) and the World Bank have estimated that the oil and gas sector accounted for about 20% of the country's GDP in about the same period. For the same period, the metallurgical sector was estimated to have accounted for about 5% of the GDP and 15% of exports. Russia's oil and gas sector accounted for 64% of Russia's export revenues in 2007 and 30% of all FDI in the country (U.S. Energy Information Administration, 2007).

Russia ranked among the lower 20% of mineral extracting countries in its per capita consumption of metals in 2007 (the latest year for which data were available) (Chanturiya, 2007). Domestic consumption of mineral products, however, was increasing (Parkhomenko, 2007). The growth in domestic demand was because of increased demand in the domestic machine manufacturing, transport, and fuel sectors. Owing to the need of these sectors for high-quality metals or a specific assortment of such products not produced domestically, industries still imported a percentage of these metal products (Nekrasov, 2007).

## Government Policies and Programs

Amendments proposed to Russia's law on the use of subsurface resources, which were ratified on January 31, 2007, and further amended in 2008, set criteria for deposits containing strategic commodities and limited the rights of foreigners to invest in a controlling stake in such deposits if the deposits had not yet been developed with foreign participation. Among the list of strategic deposits were deposits containing lithium, niobium, PGM, uranium, and the yttrium group of rare earths (Interfax Russia & CIS Metals and Mining Weekly, 2008).

It has sometimes been assumed by analysts in Russia that the country could continue to meet its demand for rare metals with imports. Because rare metals are used in many sectors vital to defense, however, the Government was expressing national security concerns about being dependent on imports for rare

metals and was prompting domestic development of these minerals. Furthermore, the Government considered that these minerals could become a source of export earnings (Interfax Russia & CIS Metals and Mining Weekly, 2008; Kremnetskiy and others, 2009).

## Production

The value of output in the mining and quarrying sector in constant prices in 2008 increased by 0.2% compared with that of 2007. The value of the extraction of fuel minerals decreased by 0.2%, but that of nonfuel minerals increased by 1.5% (Federal'naya sluzhba gosudarstvennou statistiki, 2009). In 2008, production decreased compared with that of 2007 for a number of metals in ore and concentrate, for the production of metals, and for industrial minerals. Estimated production of cobalt and lead metal and reported production of cement, palladium, and platinum decreased by more than 10% compared with that of 2007. Estimated production of bismuth, fluor spar, lead ore, and zinc metal, however, and reported production of gold and coal increased by more than 10%. Crude oil production remained at about the 2007 level, but production of coal, natural gas, and uranium increased. Data on mineral production are in table 24.

## Structure of the Mineral Industry

At the end of 2007, Russia had 16,100 enterprises engaged in mining and quarrying, which was an 8.7% increase compared with the number of enterprises active in the previous year (Federal'naya sluzhba gosudarstvennou statistiki, 2008). Russia had more than 100 large mining and beneficiation and metallurgical enterprises that mined and processed ferrous and nonferrous metals (Chanturiya, 2007; Linyev and others, 2007). Russia, however, had only a few enterprises engaged in mining and processing rare metals. Among the rare-metals processing enterprises that had ceased operations since the Soviet era were the Moscow polymetallic plant, which had produced rare-earth metals; the Klyuchevskiy ferroalloys plant, which had produced ferroniobium; the Pyshminskiy experimental plant Giredmeta, which had produced rare-earth metals; and the Krasnoyarsk and the Novosibirsk plants, which had produced lithium. Furthermore, a number of enterprises that were located in other former republics of the Soviet Union that mined rare metals or processed rare-metal ores mined in Russia had ceased operations. Since the 1990s, these included zirconium mining operations in Ukraine; the Kutesay II rare-earth mining operation in Kyrgyzstan; rare-earth mining in Kazakhstan; the Ulba metallurgical plant in Kazakhstan, which had produced niobium and tantalum metal; the Silmet rare-earth-metals plants in Estonia, and a number of other metallurgical facilities in Ukraine and Uzbekistan. The Silmet and Ulba plants have since resumed processing rare metals.

Russian uranium production was controlled by Corporation TVEL. TVEL supplied the entire fuel requirement to 73 nuclear powerplants in Russia, to 30 research reactors in Russia and abroad, and to ship-propulsion reactors of the Russian fleet. TVEL also supplied uranium to 13 countries, which included

Armenia, Bulgaria, China, the Czech Republic, Finland, Hungary, Lithuania, Slovakia, and Ukraine. TVEL held 17% of the world's nuclear fuel market. It included enterprises that mined and processed uranium.

## Mineral Trade

As a result of facility closures and production disruptions, even with a low level of consumption, Russia was importing a large number of rare metals in 2008, although the Soviet Union had been a major exporter of rare metals to world markets. In 2008, among the rare metals that are the subject of this report, Russia imported ores containing cesium, lithium, rare-earth elements of the yttrium group, and zirconium, and finished products that included niobium metal and rare-earth metals of the yttrium group. Domestic production was not sufficient to meet the demand for cerium and tantalum finished products, which Russia imported (Kremnetskiy and others, 2009).

## Commodity Review

### Metals

**Cesium.**—In the early 1990s (the only period for which information was available), Russia reportedly mined about 25% of the cesium produced in the CIS. All cesium processing took place in Russia (Akyzbekov and others, 1995, p. 123).

**Gallium.**—In recent years, Russia had produced between 10 and 13 t/yr of gallium, consumed up to 1 t/yr, and exported about 10 t/yr. In 2008, however, Russia exported only 4.3 t of gallium (Naumov, 2010). Gallium reserves in Russia reportedly exceed 9,000 t. Russia possesses more than 90% of the gallium reserves of the FSU (excluding Estonia, Latvia, and Lithuania). During the Soviet era, most of the processing capacity for producing metallic gallium existed outside of Russia in Kazakhstan and Ukraine, although Russia had the capacity to produce metallic gallium at the JSC Achinsk alumina plant, OOO Galliy, and the JSC Pikalevo alumina plant. Projections for 2010 estimated that gallium production in the countries of the FSU could increase to 47 t/yr. Russia exported gallium mainly to Germany, Japan, the Netherlands, Slovakia, the United Kingdom, and the United States (Infomine Research Group, 2007).

**Germanium.**—Russia produced between 5 and 6 t/yr of germanium (calculated in metal content), consumed up to 500 kg/yr of germanium metal and 600 kg/yr of germanium oxide ( $\text{Ge}_2\text{O}_3$ ), and exported between 4 and 5 t/yr of germanium metal and up to 2 t/yr of  $\text{Ge}_2\text{O}_3$  (Naumov, 2010). Germanium was produced at FSUE Germanium, which was founded in 1991 based on the germanium production facilities at the Krasnoyarsk nonferrous metals plant. Germanium was the only large-scale germanium producer in Russia. It produced germanium from different materials, which included ashes from coal burning, germanium concentrates containing 2% or more germanium, production waste, and secondary raw material of different origins. Germanium employed about 180 people and exported more than 80% of its products (FSUE Germanium, 2010a-e).

**Indium.**—In Russia, indium reserves are present mainly in deposits of copper-zinc-pyrite and tin ores. In Russia, zinc and indium are extracted from chalcopyrite deposits in the Ural Mountains, where 75% of the country's zinc concentrates are produced. Indium is also obtained from lead-zinc ores in deposits in southern Siberia and the Maritime Province in the Russian Far East where the indium content averages 14.7 g/t. Indium reserves have been identified in 61 deposits in the country (Naumov, 2008).

Indium reserves in the countries of the FSU reportedly have been estimated to be more than 5,000 t, with Russia possessing 76% of those total reserves (Infomine Research Group, 2007). Up until the mid-1990s, indium was being produced at the Novosibirsk tin complex, the Chelyabinsk zinc plant, and the Elektrotsink plant in Vladikavkaz. High-purity indium (99.99%) also was being produced at the Podol'sk chemical-metallurgical plant. In 2007, indium was being produced only at the Chelyabinsk and the Elektrotsink plants. The Chelyabinsk plant had the capacity to produce from 3 to 6 t/yr of indium, and the Elektrotsink plant had the capacity to produce up to 6 t/yr. In 2008, Russia exported 4.7 t of indium, of which 750 kilograms (kg) was secondary indium produced from recycled material. Primary indium was produced only at the Chelyabinsk plant, which was producing between 4 and 5 t/yr of indium; the remaining indium was produced from recycled material (Naumov, 2008, 2009).

**Lithium.**—In the mid-1980s, the Soviet Union was producing about 10 t/yr of lithium calculated in carbonate equivalent, and was the world's second ranked lithium producer following the United States. It was mining low-grade ore from the Zavitsinskoye deposit, which had an average lithium oxide content of 0.6%. After the dissolution of the Soviet Union, this deposit was not profitable for Russia to mine under market economy conditions and production ceased. Russia occupies a leading position in the world in lithium reserves, which are located primarily in pegmatite deposits in two regions. One region is the Kola Peninsula, which has reserves of about 7 Mt of lithium oxide, and the other is the Sayanakh region, which has reserves of 1 Mt of lithium oxide (Kurkov and Kotova, 2007).

Programs had been drawn up to restart production at the Zavitsinskoye deposit and at the Achikanskiy sector near the Etykinskoye deposit, which has a content of between 0.7% and 0.8% lithium oxide. Decisions about the future development of lithium reserves will depend on changes in the use of lithium in the 21st century and technological developments for processing lithium (Kurkov and Kotova, 2007).

**Niobium (Columbium).**—The country's niobium reserves are located in 22 known deposits. Russia reportedly ranked second in the world to Brazil in its quantity of reserves of niobium pentoxide. More than 65% of the reserves are located in East Siberia and 30% are located in Murmansk Oblast'. Among the country's large niobium deposits are the Beloziminskoye and the Bol'shyegtagninskoye carbonatite deposits in Irkutsk Oblast', which have ore with an average Nb<sub>2</sub>O<sub>5</sub> content of up to 1%. The ore in the Tomtor deposit in the Sakha (Yakutiya) Republic was assessed to have a Nb<sub>2</sub>O<sub>5</sub> content of up to 7% and a rare-earth element content of up to 9% (Mashkovtsev and others, 2009).

Despite having considerable niobium reserves, Russia produced only a small amount of niobium in 2008 and had been importing annually up to 1,000 t for its metallurgical industry. The only enterprise that mined niobium was the Karnasurt mining enterprise, which was subordinate to AO Sevredmet, which mined the Lovozerskoye loparite deposit on the Kola Peninsula. The concentrate was processed at the Silmet rare-earth-metals processing plant in Estonia (Kremnetskiy and others, 2009).

A number of mining enterprises had produced niobium during the Soviet period but closed following its dissolution; these included those mining the Orlovskoye tantalum-niobium deposit, the Zavitsinskoye beryllium-lithium-niobium and tantalum deposit, and the Etykinskoye tantalum-niobium deposit in Chita Oblast'; the Vyshnevogorskoye niobium deposit in Chelyabinsk Oblast'; and the Tatarskoye niobium deposit in Krasnoyarsk Krai (Kremnetskiy and others, 2009).

A current Russian development program envisioned processing 12,000 t/yr of loparite ore from Lovozerskoye at the OAO Chepetskiy machinery manufacturing plant, which would result in production of 3,900 t/yr of titanium dioxide, 873 t/yr of niobium pentoxide, 472 t/yr of neodymium oxide, 310 t/yr of zirconium dioxide, 280 t/yr of lanthanum oxide, 61 t/yr of tantalum pentoxide, and 56 t/yr of praseodymium oxide (Kurkov and Kotova, 2007). The Katuginskoye deposit in Chita Oblast' was projected to be a significant supplier of niobium after 2010. The largest and most significant prospective source of niobium was the Tomtorskoye deposit on the Taymyr Peninsula in East Siberia, which had an average contained niobium oxide content of 6.71%. The first stage of a planned mining enterprise to develop this deposit was projected to produce 10,000 t/yr of ore with reserves adequate to maintain production for about 100 years (Kurkov and Kotova, 2007; Mashkovtsev and others, 2009).

**Platinum-Group Metals.**—In 2008, Russia was the world's second ranked producer of platinum-group metals (PGM) following South Africa, and these two countries combined produced more than 80% of the world's PGM output. Because of differences in the composition of the ores in Russia and South Africa, Russia was the world's leading palladium producer and second ranked platinum producer whereas South Africa ranked first in platinum production but second in palladium production. Russia's production of PGM, unlike that of South Africa's, was a byproduct of mining mixed sulfide ores by OJSC MMC Norilsk Nickel. Norilsk Nickel mined ores mainly in East Siberia, but also on the Kola Peninsula. Ores were mined primarily for their nickel content, but the ores also were rich in copper, cobalt, gold, PGM, and other ore constituents. A small amount of PGM in Russia was mined from placer deposits that produced primarily platinum.

Russia also ranked second to South Africa in PGM reserves; the combined reserves of the two countries constituted more than 95% of the world's PGM reserves. South Africa's PGM reserves, however, were estimated to be more than 10 times greater than Russia's. Data on Russia's PGM reserves had been a state secret, but a change in the law in 2005 enabled Norilsk Nickel to publish data on its PGM reserves. Data for Norilsk Nickel's mineral resources and ore reserves as of December 31, 2007, were reported and are based on the

results of an independent technical audit performed by Micon International Company Ltd. (Micon) between March and October 2008. The audit was conducted in accordance with the principles of the Joint Ore Reserves Committee (JORC) Code of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists, and the Minerals Council of Australia at all Norilsk Nickel's deposits on the Taymyr and the Kola Peninsulas (OJSC MMC Norilsk Nickel, 2010).

Published data indicate that total PGM proven and probable reserves for Norilsk Nickel's deposits in East Siberia (Polar Division) for the six PGMs (iridium, osmium, palladium, platinum, rhodium, and ruthenium) was 80,610,000 troy ounces (about 2,500 t), of which 61,098,000 troy ounces (about 1,900 t) was palladium and 15,932,000 troy ounces (about 496 t) was platinum. Norilsk Nickel's PGM proven and probable reserves on the Kola Peninsula were reported to be 301,000 troy ounces (about 9.4 t), of which 153,000 troy ounces (about 4.8 t) was palladium and 125,000 troy ounces (about 3.9 t) was platinum. According to this audit, total measured and indicated resources of PGM at the Polar Division was 187,243,000 troy ounces (about 5,824 t), of which 139,144,000 troy ounces (about 4,328 t) was palladium and 39,783,000 troy ounces (about 1,237 t) was platinum. An additional 88,148,000 troy ounces (2,742 t) of inferred PGM resources was reported at the Polar Division, of which 67,344,000 troy ounces (about 2,095 t) was palladium and 17,199,000 troy ounces (about 534 t) was platinum. On the Kola Peninsula, total measured and inferred PGM resources were reported to be 1,042,000 troy ounces (about 32 t), of which 646,000 troy ounces (about 20 t) was palladium and 344,000 troy ounces (about 10.7 t) was platinum. An additional 461,000 troy ounces (about 14.3 t) of inferred PGM resources was reported on the Kola Peninsula, of which 283,000 troy ounces (about 8.8 t) was palladium and 159,000 troy ounces (about 4.9 t) was platinum (OJSC MMC Norilsk Nickel, 2010).

In 2008, output at Norilsk Nickel's operations in Russia, which produced more than 95% of the country's PGM, totaled 2,701,500 troy ounces (84 t) of palladium, which was about 11% less than it produced in 2007, and 632,000 troy ounces (19.7 t) of platinum, which was about 13% less than it produced in 2007 (OJSC MMC Norilsk Nickel, 2009).

Because PGM production takes place as a byproduct of nickel production and as a byproduct or coproduct (along with other ore constituents) of Norilsk Nickel's mixed sulfide ore, future production of PGM would be tied to market factors, such as the market price for nickel, PGM, and other ore constituents, which include cobalt, copper, gold, and silver.

Barrick Gold Corp. ABX of Canada estimated at the end of 2006 that its Fedorova Tundra deposit in the Murmansk region contains measured and indicated resources of 1.1 million troy ounces (about 34 t) of palladium and 300,000 troy ounces (about 9 t) of platinum and inferred resources of 1.3 million troy ounces of palladium (about 40 t) and 300,000 troy ounces (about 9 t) of platinum. Barrick later stated that continued exploration might double the size of the reserves (Interfax Russia & CIS Metals and Mining Weekly, 2009). Barrick planned to mine the deposit to produce concentrate, which would be processed at Norilsk Nickel's Severonikel plant on the Kola Peninsula. Production was scheduled to commence in 2010, and output was

projected to be 150,000 t/yr of concentrate that was expected to contain 98 g/t of PGM (Interfax Russia & CIS Metals and Mining Weekly, 2009).

**Rare Earths.**—Reserves of rare earths were located in 14 deposits but were being mined only at the Lovozerskoye deposit on the Kola Peninsula. Rare-earth elements comprise 32% of the loparite ore. The largest source of rare-earth metals resources are the apatite-nepheline ores on the Kola Peninsula, which contain more than 60% of the country's resources; this ore, however, was not being processed for rare-earth metals. Other deposits include the Seligdarskoye apatite deposit in the Sakha (Yakutiya) Republic, which contains almost 23% of the country's reserves, and the Ulug-Tanzekskiy and the Yeregskoye oil-bearing sandstone deposits, which contain rare-earth metal reserves, also in the north of the Sakha (Yakutiya) Republic (Kurkov and Kotova, 2007).

JSC Sevredmet enterprise, which is located in the mountainous part of the Lovozero district, produced loparite concentrate, which is a raw material for the production of rare-earth metals, niobium, and tantalum. Before the collapse of the Soviet Union, this company satisfied between 75% and 80% of the country's demand for rare-earth metals and 80% of its demand for niobium. At the Lovozero deposit, the Kaarnasurt Mine had been in operation since 1951, and the Umbozero Mine, since 1984.

In 1990, the Soviet Union produced 744 t of rare-earth-metal oxides and 25,400 t of loparite concentrate. Following the dissolution of the Soviet Union, rare-earth-metal consumption practically ceased. By 1998, the Sevredmet enterprise faced serious difficulties owing to a large decrease in product sales—the production of loparite concentrate was only 1,000 t in 1998. With the dissolution of the Soviet Union, Russia lost its sources of yttrium and the yttrium group of metals, which were mined and processed mainly in Kyrgyzstan (Vereschagin and others, 2006; Kurkov and Kotova, 2007).

Production from the Lovozerskoye deposit was almost 98% of the cerium group. Loparite concentrate produced from loparite ore from Lovozero, which is a titanite-niobate-tantalite compound of rare earths, was the basic raw material processed by the rare-earth-metal enterprise at the JSC Solikamsk magnesium plant. The plant processed loparite concentrate to produce rare-earth chlorides, carbonates, hydroxides, and oxides and niobium, tantalum, and titanium. Chlorides were sent to the Irtysh plant in Kazakhstan for further processing (Vereschagin and others, 2006).

By 2008, Russia's production of loparite concentrate was between 9,000 t/yr and 10,000 t/yr. The Solikamsk magnesium plant produced about 2,500 t/yr of carbonate and oxide rare-earth compounds. Deliveries to the domestic market from Solikamsk were only about 12 to 13 t/yr. Russia did not produce a number of rare-earth metals, for which it depended on imports (Naumov, 2010).

Loparite concentrates from Lovozero were also processed at the Silmet plant in Estonia. The potential exists to implement or restart rare-earth-metal production at enterprises of the Russian Federal Agency for Atomic Energy and Non-Ferrous Metals, which include the Siberian Integrated Works in Seversk in the Tomsk region, the Production Association Mayak in Ozersk in the Chelyabinsk region, and the JSC Uralredmet in

Verkhnyaya Pyshma. In 2008, Russian enterprises that produced rare-earth-metal end products were using imported raw materials (Vereschagin and others, 2006).

The richest source of rare-earth ores in Russia is the Tomtorskoye deposit on the Taymyr Peninsula. The rare earths of the cerium and samarium subgroups comprise 11.96% of the ore and those of the yttrium subgroup comprise 0.84%. The yttrium oxide content of the ore is between 0.5% and 0.8%. An economic assessment of this deposit determined that it would be economic to mine even at the small production level of 100,000 t/yr of ore. Much effort also was being directed towards exploring compact rare-earth deposits of the yttrium group, and success was reported in discovering such deposits in the Primorskiy Kray (Vereschagin and others, 2006; Kurkov and Kotova, 2007; Kremnetskiy and others, 2009).

**Scandium.**—In 2007 (the latest year for which data were available), Russia was not known to be producing scandium. Russia's annual demand for scandium after 2010 was estimated to be between 1.6 and 2 t. Scandium reserves are located in four deposits, one of which is a bauxite deposit in Sverdlovsk Oblast' and three of which are tin deposits in Chita Oblast' and Khabarovsk Kray. The country has many other potential sources of scandium, which include production as a byproduct of uranium ore and recovery from wastes produced during the magnetic separation of iron-vanadium ores (Kurkov and Kotova, 2007).

**Selenium.**—Russia produced about 140 t/yr of selenium, consumed between 50 and 60 t/yr, and exported between 80 and 100 t/yr (Naumov, 2010). In Russia, selenium was produced at the Kyshtym copper smelter, which produced between 3 and 4 t/yr; by Norilsk Nickel, which produced up to 80 t/yr; and by the Ural Mining and Metallurgical Co., which produced between 80 and 90 t/yr (Kul'chitskiy and Naumov, 2010a).

**Tantalum.**—In recent years, Russia reportedly produced between 39 and 40 t/yr of tantalum pentoxide, consumed between 1 and 2.5 t/yr, and exported between 37 and 39 t/yr (Naumov, 2010). Russian tantalum consumption in 2007, however, was reported to be about 10 t/yr from imported tantalum (Kurkov and Kotova, 2007). Reserves of tantalum occur in 21 deposits and almost all these deposits also contain niobium. Tantalum was being mined from the Lovozerskoye deposit on the Kola Peninsula. Tantalum mining at the Etykinskoye deposit of the Zabaykal'skiy mining and beneficiation complex had practically ceased. It would not likely be possible to satisfy future Russian tantalum demand by mining these two deposits. The Lovozerskoye and the Zabaykal'skiy mining enterprises were either on the verge of being unprofitable or were unprofitable. Russia did not have any enterprises that produced metallic tantalum and had depended on tantalum metal produced at the Ulba metallurgical plant in Kazakhstan. The most prospective deposit for tantalum development was considered to be the Katuginskoye deposit in Chita Oblast' (Kurkov and Kotova, 2007).

**Tellurium.**—In 2008, Russia produced between 33 and 35 t/yr of tellurium, consumed up to 10 t/yr, and exported between 20 t/yr and 25 t/yr (Naumov, 2010). In 2008, Russia was producing about 35 t/yr of tellurium. The Ural Mining and Metallurgical Co. produced more than 30 t/yr and Norilsk

Nickel produced less than 3 t/yr (Kul'chitskiy and Naumov, 2010b).

**Thallium.**—In the early 1990s, it was reported that Russia was mining about 4.5% of the thallium produced in the CIS. Thallium production in the CIS was centered in Kazakhstan (Akylbekov and others, 1995, p. 112).

**Zirconium.**—Russia reportedly ranked fourth in the world in zirconium reserves, with about 8.5% of world reserves. Russian reserves of zirconium termed economic under the reserve classification system that had been used in the Soviet Union and then Russia (balansovye zapasy) were located in 11 deposits, of which 6 were placer deposits and 5 were hard rock deposits. About 70% of the country's zirconium reserves are located in Siberia (Kurkov and Kotova, 2007).

The country's only domestic source of zirconium production was 7,000 t/yr of baddeleyite concentrate produced as a byproduct from apatite-magnetite ores at the Kovdor mining and beneficiation complex on the Kola Peninsula. The concentrate had a low zirconium content, and the extraction rate of the metal was also quite low, amounting to about 17%. The concentrate was exported mainly to Japan and Norway (Shevelyev and Tokhtas'yev, 2006; Kurkov and Kotova, 2007).

The country's atomic energy industry's demand for zirconium was 100 t in 2002, but the demand was projected to increase to 1,400 t in 2010. The most prospective hard-rock deposit was deemed to be the Katuginskoye complex rare-earth-chryolite-zirconium-niobium-tantalum deposit in the north of Chita Oblast' in the Baikal-Amur Mainline (BAM) railroad region. This deposit was considered adequate to supply fully the atomic energy industry's needs for zirconium as well as for niobium and tantalum and to partially supply its demand for yttrium. Mining of this deposit, if it were to be developed, would not take place until 2010 (Kurkov and Kotova, 2007; Kremnetskiy and others, 2009).

### *Mineral Fuels and Related Materials*

**Uranium.**—In Russia, uranium mining and processing was conducted by enterprises of TVEL, which included the JSC Priargunsky Industrial Mining and Chemical Union in Chita Oblast', JSC Dalur in the Kurgan region, and JSC Khiagda in the Republic of Buryatiya. Priargunsky mined uranium by underground methods, and the other two enterprises employed in situ leaching. Priargunsky was among the five leading uranium mining enterprises in the world. TVEL also included enterprises that produced component parts and fuel assemblies. These enterprises included Mashinostroitelny Zavod (Electrostal, Moscow Region), Novosibirsk Chemical Concentrates Plant (Novosibirsk), and Chepetsky Mechanical Plant (Glazov, Udmurtia). TVEL employed about 40,000 people (Corporation TVEL, 2009).

In 2006, under an initiative launched by the Russian President, a course was set for increasing nuclear power generation's share to 25% of the country's energy generation capacity by 2030. This would involve building of up to 40 new nuclear reactors in Russia (Corporation TVEL, 2009).

Priargunsky could increase uranium production by more than 50% to 5,000 t/yr by 2014-15. Plans called for Priargunsky to

develop the Sixth and Eighth Mines. The Sixth Mine would be the main source of uranium and was projected to produce 1,000 t/yr; the Eighth Mine was projected to produce 800 t/yr. With production from these two mines, Priargunsky could produce 5,000 t/yr. It would require considerable investment to commission these new mines and also to implement associated measures to protect the environment (Interfax Russia & CIS Metals and Mining Weekly, 2007).

Russia established the JSC Uranium Mining Co. (UMC), which received state registration on November 20, 2006. UMC was established for the purpose of consolidating in Russia and abroad financial, industrial, and natural resources to increase mining and reprocessing of natural uranium to meet the growing demands of the Russian nuclear industry (Corporation TVEL, 2009).

Two leading nuclear Russian companies, TVEL and JSC Tenex, became founders with equal shares of UMC. UMC planned to develop current deposits, prospect for uranium, and create joint uranium mining companies in the CIS and other countries. UMC's activity was to be carried out in three stages. The first stage would involve strategic development planning, the second stage would involve the transfer of uranium mining enterprises' shares for asset management, and the third stage would involve the transfer of mining assets to UMC. By 2020, UMC planned to increase uranium mining to 28,800 t/yr. Output from Priargunsky was projected to be 5,000 t/yr; Khiagda, 2,000 t/yr; and Dalur, 1,000 t/yr. The Elkonsky group of deposits would be developed to provide an additional 5,000 t/yr of uranium. The remaining supply of uranium was planned to be mined at new uranium deposits in the Republic of Buryatiya and in Chita Oblast', as well as at new joint ventures abroad (Corporation TVEL, 2009).

According to Russia's Federal Programme of Development of Nuclear Industry and Nuclear Power Complex of Russia for 2007-2009, nuclear power capacity was expected to increase by 3 gigawatts per year through 2015. The country's total demand for uranium, including uranium for export, was forecasted to grow to 36,000 t/yr by 2020 (Corporation TVEL, 2009).

Russia reportedly has 615,000 t of discovered uranium ore reserves and prospective resources of 830,000 t. The main deposits are concentrated in the Elkonsky, the Streltsovsky, the Vitimsky, and the Zauralsky regions. Not only Russian production, but also production of other countries, including Kazakhstan, Ukraine, and Uzbekistan, was expected to be used to meet Russia's demand for uranium (Corporation TVEL, 2009).

## Reserves and Resources

Russia had discovered more than 20,000 mineral deposits, of which about 40% was in commercial production. A major problem facing Russia's rare-metals industry was the lack of deposits that are of suitable quality for industrial development. Issues involve not only the grade of the ore, but also that many discovered deposits are located in inaccessible locations and (or) with conditions that pose difficult technological problems for mining and processing. The length of time it would take to recoup the capital investment to develop a rare-earth-metal deposit of the yttrium group, even for the best deposits (which have already been licensed), has not made them attractive

investments. If development only of those ores that were certain to be profitable was to take place, then reserves would not be adequate to meet projected consumption until 2020. This situation also applies to cesium, indium, lithium, niobium, and rare-earth deposits of the cerium group and the yttrium group (Kurkov and Kotova, 2007; Kremnetskiy and others, 2009).

## Outlook

Based on reported assessments by the Russian Ministry of Natural Resources, Russia will be able to meet its projected level of demand in the year 2020 for the majority of rare metals and also have adequate supplies for export based on its level of reserves for the next 100 years and even, in some cases, for the next 1,000 years. This optimistic assessment is based on adequate investment being made available to develop these resources, which appears likely only if the price for these minerals increases to a point where it would be profitable to develop these deposits or if the Government decides for reasons of national security to subsidize the development of these deposits.

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TABLE 1  
BALTIC REGION—ESTONIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2004	2005	2006	2007	2008	
<b>Cement:</b>						
Clinker	113,100	88,800	65,100	302,700	324,000	
Portland, other	614,600	726,000	848,900	937,400	806,000	
<b>Clays:</b>						
For brick	cubic meters	136,600	151,800	231,400	214,000 <sup>e</sup>	138,106
For cement	do.	31,600	37,200	56,700	51,900 <sup>e</sup>	33,494
Coal, lignite	thousand metric tons	13,989	14,588	14,188	16,647	16,193
Coke, electrode		35,380 <sup>r</sup>	37,195 <sup>r</sup>	32,659 <sup>r</sup>	39,916 <sup>r</sup>	35,380
Crushed stone used for concrete aggregates, for roadstone and for other construction use		--	--	8,298,400	8,855,800	7,891,000
<b>Dolomite:</b>						
For building	cubic meters	323,400	261,700	378,300	356,000 <sup>e</sup>	329,634
For finishing	do.	1,300	2,000	1,660	2,720 <sup>e</sup>	2,519
For industry (technological limestone)	do.	171,900	155,300	128,540	210,000 <sup>e</sup>	194,447
Fuel oil		338,500	367,400	389,200	436,600	444,800
Gravel, pebbles, shingle and flint	cubic meters	NA	597,100	410,300 <sup>r</sup>	1,229,900 <sup>r</sup>	717,000
Lead, metal, secondary		3,000	7,000 <sup>e</sup>	9,000	10,000	10,000
Lime		34,000	37,000	39,700	43,500	59,400
<b>Limestone:</b>						
For building	cubic meters	1,547,000	1,922,000	2,343,800	2,750,000 <sup>e</sup>	2,627,741
For cement	do.	430,500	335,100	340,300	480,000 <sup>e</sup>	458,661
For industry (technological limestone)	do.	93,900	86,300	87,600	126,000 <sup>e</sup>	120,398
Niobium, metal, chips		NA	NA	NA	NA	NA
Nitrogen, N content of ammonia		83,844	78,912	73,158	66,746	78,912
Oil shale	thousand metric tons	11,736	12,349	14,004 <sup>r</sup>	16,393 <sup>r</sup>	15,907
<b>Peat:</b>						
For fuel		768,800 <sup>r</sup>	1,034,000	1,206,800 <sup>r</sup>	964,000	705,100
Briquets		279,000	378,000	506,800	475,000	213,400
Rare-earth metals <sup>e</sup>		3,000	3,000	3,000	3,000	3,000
Sand and gravel	cubic meters	3,131,000	3,227,200	4,214,200	5,275,900	4,750,800
Silica sand (technological sand)	do.	49,800	53,800	--	--	--
Sulfuric acid	kilograms	31	NA	5	NA	NA
Tantalum, metal, chips		NA	NA	NA	NA	NA

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. Do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>In addition to the commodities listed, Estonia produces sulfur for which information is inadequate to derive estimates.



TABLE 2  
BALTIC REGION—LATVIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons)

Commodity <sup>2</sup>	2004	2005	2006	2007	2008
Cement:					
Clinker	252,685	NA	NA	NA	NA
Other <sup>e</sup>	283,647 <sup>3</sup>	280,000	280,000	300,000 <sup>f</sup>	310,000
Common clays and shales for construction use	208,391	NA	NA	NA	NA
Crushed rock	414,305	586,607	137,023	937,030	507,591
Dolomite, crude (excluding calcined, crushed dolomite aggregate)	810,137	1,675,882	1,688,643	5,730,865 <sup>f</sup>	2,305,065
Gravel, pebbles, shingle and flint of a kind used for concrete aggregates; for road metalling or for railway and other ballast	3,070,709	2,817,287	3,824,965	5,759,249	6,011,735
Gypsum	225,742	220,000 <sup>e</sup>	230,000	230,000 <sup>f,e</sup>	230,000 <sup>e</sup>
Limestone	443,987	420,000 <sup>e</sup>	NA	NA	NA
Peat	823,938	829,865	931,103	820,996	923,404
Sand and gravel	1,875,494	3,242,199	2,132,779	4,284,684 <sup>f</sup>	2,222,504
Silica sand, industrial	6,700	18,300	12,600	13,000 <sup>e</sup>	12,000 <sup>e</sup>
Steel, crude <sup>e</sup>	553,684 <sup>3</sup>	550,000	550,000	550,000 <sup>f</sup>	550,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>f</sup>Revised. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>In addition to the commodities listed, natural gas was also produced, but available information is insufficient to estimate production.

<sup>3</sup>Reported figure.

TABLE 3  
BALTIC REGION—LITHUANIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
Cement	753,069	832,076	1,065,367	1,105,365	1,075,581
Common clays and shales for construction use	228,100	289,465	385,275	384,850	624,470
Crushed granite	874,000	891,000	874,000	846,000	810,000
Crushed stone used for concrete aggregates, for roadstone and for other construction use	NA	4,752,041	5,247,978	6,401,662 <sup>f</sup>	6,896,987
Dolomite, crude (excluding calcined, crushed dolomite aggregate)	NA	7,196	10,455	2,131	4,752
Granules, chippings and powder of stones, excluding marble	NA	4,316	10,390	21,885	15,538
Limestone	1,385,600	1,242,200	1,776,300	1,754,000	1,625,089
Peat:					
Horticultural use	367,900	536,000	471,000 <sup>f</sup>	307,000 <sup>f</sup>	521,000
Fuel use	51,000	68,000	50,000	15,000	15,000 <sup>e</sup>
Petroleum:					
Crude	301,900	216,634	180,894	154,449	127,658
Refinery products	7,682,600	8,518,500	7,709,800	5,263,500	8,814,800
Sand and gravel:					
Construction sands	2,784,000	3,689,217	4,342,743	5,085,839 <sup>f</sup>	5,055,172
Gravel, pebbles, shingle and flint	3,051,000	3,345,185	3,290,568	4,095,713 <sup>f</sup>	4,414,239
Silica sand, industrial	58,300	46,500	42,600	45,400	38,000
Sulfur	67,094	74,277	61,135	42,618	73,870
Sulfuric acid kilograms	1,019,000	713,200	730,253	747,494	686,629

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>f</sup>Revised. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

TABLE 4  
CAUCASUS REGION—ARMENIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
<b>METALS</b>					
Aluminum, foil	193 <sup>r</sup>	--	945	12,256	11,694
<b>Copper:</b>					
Concentrate, Cu content <sup>c</sup>	17,700	16,256 <sup>2</sup>	18,000	17,600	18,800
Blister, smelter, primary	9,470	9,881	8,791	6,954	6,480
<b>Ferroalloys:</b>					
Ferromolybdenum	-- <sup>r</sup>	2,260 <sup>r</sup>	4,865	5,977	5,323
Ferrotungsten	NA	8	42	45	45 <sup>e</sup>
Gold, mine output, Au content kilograms	2,100	1,400	1,400	1,400 <sup>e</sup>	1,400 <sup>e</sup>
<b>Molybdenum:</b>					
Concentrate, Mo content	2,950 <sup>e</sup>	3,000 <sup>r,e</sup>	3,900 <sup>r</sup>	4,080 <sup>r</sup>	4,250 <sup>p</sup>
Metal	NA	270	487	500	520
Rhenium <sup>e</sup> kilograms	1,000	1,200	1,200	1,200	1,200
Silver <sup>e</sup> do.	4,000	4,000	4,000	4,000	4,000
Zinc, concentrate, Zn content	1,927	3,196	4,454	4,924	4,200 <sup>e</sup>
<b>INDUSTRIAL MINERALS</b>					
Barite	561	590	600	600	600
Caustic soda	2,800	6,200	4,166	5,484	4,476
Cement thousand metric tons	501	605	625	722	770
<b>Clays:</b>					
Bentonite	40,000	38,000	37,000	40,000	40,000
Bentonite, powder	561	732	720	1,129	1,100 <sup>e</sup>
Diamond, cut thousand carats	263	222	184	123	120 <sup>e</sup>
Diatomite	200	190	180	200	200 <sup>e</sup>
Gypsum	51,400	44,200	43,700	54,600	45,900
Limestone thousand metric tons	16,000 <sup>e</sup>	17,000	17,000 <sup>e</sup>	18,000	18,000 <sup>e</sup>
Perlite	29,996	49,963	35,000 <sup>e</sup>	35,000 <sup>e</sup>	35,000 <sup>e</sup>
Salt	31,625	34,682	37,000	34,800	37,300
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Natural gas, dry million cubic meters	NA	NA	1,596	2,285	3,000 <sup>e</sup>

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>p</sup>Preliminary. <sup>r</sup>Revised. do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Reported figure.

TABLE 5  
CAUCASUS REGION—ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Aluminum, rolled and foil	ARMENAL (formerly Kanaker aluminum plant) (United Company RUSAL)	K'anak'err	25,000
Cement	Araratsement (Mutti Group)	Ararat region	NA
Do	Mika-Cement	Hrazdan	1,200
Copper:			
Mine output, Cu content	Facilities in operation: Agarak copper-molybdenum mining and processing complex (Comsup Commodities, Inc.) Kapan mining complex (Deno Gold Mining Co.) Zangezur copper-molybdenum complex [Cronimet Mining GmbH, 60%; OJSC Yerevan Pure Iron Works, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; LLC Zangezur Mining, 12.5%] Facilities not in operation: Akht'ala mining complex Shamlugh mining complex	Agarak Kapan Kadzharan Akht'ala Shamlugh	30,000 <sup>3</sup>
Blister	CJSC Armenian Copper Programme (ACP) (Valex F.M. Establishment, 81%, and Russian businessman, 19%)	Alaverdi	10,000
Diamond, cut stones	Aghavni diamond-cutting works <sup>4</sup>	Nor Geghi	NA
Do.	Amma group diamond-cutting works <sup>4</sup>	Artashat	NA
Do.	Andranik-Dashk diamond-cutting works	Nor Hachyn	NA
Do.	Arevakn diamond producing plant	do.	NA
Do.	Diamond Company of Armenia (DCA)	Yerevan	NA
Do.	Diamond Tech	Talin	NA
Do.	Lori diamond-cutting works	Nor Hachyn	NA
Do.	Lusampor <sup>4</sup>	Melik'gyugh	NA
Do.	Punji diamond-cutting works <sup>4</sup>	Yerevan	NA
Do.	Sapphire diamond-cutting works	Nor Hachyn	NA
Do.	Shoghakan gem-cutting plant	do.	120
Gold	Sotk mining complex (GeoProMining Ltd.)	Sot'k'	2,000
Do.	Megradzor deposit	Megradzor	NA
Do.	Lichkvazkoye, Shaumyanskiy Rayon, Sotkskoye, and Terterasarskoye deposits	NA	NA
Iron ore	Hrazdan deposit	Sulagyan Mountains	NA
Molybdenum:			
Mine output, Mo content	Agarak copper-molybdenum mining and processing complex [Comsup Commodities, Inc. (United States)]	Agarak	2,000
Do.	Zangezur copper-molybdenum complex [Cronimet Mining GmbH, 60%; OJSC Yerevan Pure Iron Works, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; LLC Zangezur Mining, 12.5%]	Kadzharan	20,400
Metal, ferromolybdenum	Armenian Molybdenum Production LLC (AMP) (Cronimet Mining GmbH, 51%, and Armenian residents, 49%)	NA	3,600
Do.	OJSC Yerevan Pure Iron Works	Yerevan	NA
Perlite	Aragats-Perlite mining-beneficiation complex	Aragats deposit	1,110
Zinc, mine output, Zn content	Kapan mining complex (Deno Gold Mining Co.)	Kapan	NA

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through February 28, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

<sup>4</sup>Current existence of enterprise cannot be confirmed.

TABLE 6  
CAUCASUS REGION—AZERBAIJAN: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008	
<b>METALS</b>						
Alumina	232,000	315,000	362,700	184,483 <sup>r</sup>	164,879	
Aluminum, primary and secondary	29,537	31,762	31,852	39,241	61,607	
Iron ore, marketable:						
Gross weight	19,100	7,300	11,300	17,600	28,100	
Fe content <sup>e</sup>	9,550	3,650	5,650	8,800	8,600	
Steel:						
Crude	90,410	286,117	54,309	273,393	300,000 <sup>e</sup>	
Pipes	84	1,257	14,108	25,706	28,196	
<b>INDUSTRIAL MINERALS</b>						
Bentonite	40,000 <sup>r, e</sup>	40,000 <sup>r, e</sup>	40,644	50,459	50,000 <sup>e</sup>	
Bromine <sup>e</sup>	2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,000 <sup>r</sup>	2,000 <sup>r</sup>	3,500	
Caustic soda	24,700	30,000	30,509	18,013	20,635	
Cement	1,427,500	1,537,900	1,622,000	1,698,800 <sup>r</sup>	1,599,900	
Gypsum	8,837 <sup>r</sup>	28,242	35,034	22,037	38,375	
Iodine <sup>e</sup>	400	500	600	600	300 <sup>e</sup>	
Limestone	1,273,000	1,256,443	1,416,039 <sup>r</sup>	1,413,031 <sup>r</sup>	1,363,978	
Salt	9,234	11,202	12,029	7,126 <sup>r</sup>	7,407	
Sand, construction	684,110	662,410	986,700	702,100	1,247,200	
Sulfuric acid	26,400	18,800	19,700	24,800	39,400	
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Natural gas	thousand cubic meters	5,010,048 <sup>r</sup>	5,820,056 <sup>r</sup>	6,820,065 <sup>r</sup>	10,832,100	16,336,500
Petroleum:						
Crude		16,231,099 <sup>r</sup>	22,484,308 <sup>r</sup>	33,049,128 <sup>r</sup>	43,336,197 <sup>r</sup>	44,720,275
Refinery products		6,607,200	7,655,900	7,788,800	8,088,500	6,885,300

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>For some metals, including copper, gold, lead, molybdenum, silver, and zinc, and for a number of industrial minerals that Azerbaijan produced, data were not sufficient to derive production estimates or to determine if production had ceased.

TABLE 7  
CAUCASUS REGION—AZERBAIJAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Locations or deposit names	Annual capacity <sup>c</sup>
Alumina	OJSC Azerbaijan Aluminum [Azeraluminum (Azeral)]: Gyandzha refinery	Ganca	400,000
Aluminum	Sumgait smelter	Sumqayit	60,000
Alunite ore	Zaglik alunite mining directorate	Zaglik, Dashcasan Region	600,000
Arsenic	Bitibulagh enargite deposit	Gedabay	NA
Do.	Daridagh red orpiment-realgar deposit	Julpha	NA
Do.	NA	Dzhul'finskiy Region	NA
Barite	Azad, Bashgishlag, Chaycand, Chovdar, Gusgchu, Tonashen, and Zaylik deposits	Khanlarskiy Region	NA
Bauxite	Permian deposit	Nakhichevan Region	NA
Cement	Plants: Karadagly Tauz	Karadagly Tauz Region	2,000,000 <sup>3</sup>
Clays:			
Bentonite	Dash-Salakhinskoye deposit	do.	100,000
Refractory	Chardakhla deposit	Chardakhla	NA
Construction materials:			320,000
Building sawn stone-block	NA	Aidagh, Dash Salahly, Dilagarda, Dovlatyary, Gozdak, Mardacan, Naftalan, Shahbulag, Zayam deposits	
Facing stone	NA	Dashcasan, Gulably, Gulbacht, Shahtahty deposits	
Copper ore	Karadagskiy complex	Shamkhorskiy Region	30,000
Dolomite	Negram and Kobustan deposits	do.	NA
Gemstones, precious and semiprecious	Agate, chalcedony, and heliotrop deposits	Santon	NA
Do.	Amethyst, garnet, and granite deposits	Gedebey Rayonu	NA
Gypsum	Deposits: Agdjakend deposit Araz deposit Jukhary Aghjacad anhydrite deposit	Regions: Kazakhskiy Region Nakhichevan Region Goranboy Region	40,000 <sup>3</sup>
Iodine and bromine	Baku, Karadagly, and Novaneftechala plants	Process oil well brines at plants in Baku, Karadagly, and Neftechala	NA
Iron ore, marketable	Dashkasan mining directorate	Dashkasan Region	50,000 <sup>3</sup>
Do.	NA	Kokhnemden field, Kurekchai Basin, and Chovda, Dagkeseme, Geida, Karabakh iron ore deposits	NA
Lead-zinc ore	Gumushlu deposit	Ordubadskiy and Norashenskiy Regions	NA
Limestone	Dashkasan deposit	Dashkasan Region	NA
Natural gas, processing	Karadagly plant	Near Baku	NA
Quartz sands	Miocene-Pliocene deposits	Gobustan, Absheron Peninsula, Guba Region	10,000
Petroleum and natural gas: <sup>4</sup>			
Crude petroleum and gas condensate	Azerbaijan International Oil Consortium (AIOC) in conjunction with BP p.l.c., Chevron Corp., State Oil Company of the Republic of Azerbaijan (SOCAR), Inpex Corp., Statoil ASA, Exxon Mobil Corp., Turkiye Petrollirti Anonim Ortaklig (TPAO), Itochu Corp., Devon Energy Corp., and Delta/Hess (Delta Oil Co. and Hess Corp.)	Azeri-Chirag-Gunashi (ACG) offshore oilfields in Caspian Sea	NA
Do.	State Oil Company of the Republic of Azerbaijan (SOCAR) in conjunction with international production-sharing agreements	Production from onshore deposits, which includes deposits on the Ashperon Peninsula and in the Izhnekurin Valley	NA
Do.	do.	Production from offshore fields	NA

See footnotes at end of table.

TABLE 7—Continued  
CAUCASUS REGION—AZERBAIJAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Locations or deposit names	Annual capacity <sup>c</sup>
Natural gas		Azneft [a subsidiary of State Oil Company of the Republic of Azerbaijan (SOCAR)] in conjunction with international production-sharing agreements	Almost all production from offshore fields including Bakharly field	NA
Do.		International consortium consisting of BP p.l.c., Statoil ASA, State Oil Company of the Republic of Azerbaijan (SOCAR), LukAgip {a joint venture of OAO LUKOIL Co. and Agip [a subsidiary of Eni S.p.A., National Iranian Oil Co. (NICO), Total S.A., and Turkiye Petrollirti Anonim Ortaklig (TPAO)]}	Shah-Deniz gas condensate field	NA
Petroleum, refined	42-gallon barrels	Azernefteyag (formerly Baku) refinery	Baku	83,950,000 <sup>4</sup>
Do.	do.	Heydar Aliiev (formerly Azernefteyagandzhah and Novo-Baku refinery)	do.	77,380,000 <sup>4</sup>
Rock salt		Hehram and Pusyan deposits	Nakhichevan Region	2,500,000
Steel:				
Crude		Azerboru JSC	Sumqayit	400,000
Pipe, tubes		Baku Steel Works	Baku	400,000

<sup>6</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations. A number of production facilities, which include those for arsenic, bauxite, copper, and lead-zinc, may not be in operation and information is not adequate to determine if production capacity, if any, at these facilities exists.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

<sup>4</sup>Capacity for crude petroleum distillation.

TABLE 8  
CAUCASUS REGION—GEORGIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007 <sup>c</sup>	2008 <sup>c</sup>
METALS					
Copper, mine output, Cu content of concentrate <sup>c</sup>	12,000	10,000	9,000	11,000	11,000
Ferroalloys, electric furnace:					
Ferromanganese	12,821	13,945	5,130	5,000	5,000
Silicomanganese	93,830	109,414	116,945	120,000	120,000
Total	106,651	123,359	122,075	125,000	125,000
Gold <sup>c</sup> kilograms	1,377 <sup>2</sup>	1,620	1,600	2,000	2,000
Lead, mine output, Pb content <sup>c</sup>	400	400	400	400	400
Manganese ore, marketable:					
Gross weight	218,700	251,800	328,643	350,000 <sup>2</sup>	400,000
Mn content <sup>c</sup>	63,600	73,000	95,300	102,000	116,000
Silver <sup>c</sup> kilograms	1,200	1,000	1,000	1,200	1,360
Zinc, mine output, Zn content of concentrate <sup>c</sup>	400	400	400	400	400
INDUSTRIAL MINERALS					
Barite <sup>c</sup>	NA	NA	NA	NA	NA
Cement <sup>c</sup>	424,600 <sup>2</sup>	450,000	450,000	450,000	450,000
Clays, bentonite	1,800	7,876	4,487	5,000	5,000
Gypsum	1,707	238	123	125 <sup>2</sup>	125
Nitrogen, N content of ammonia <sup>c</sup>	107,800 <sup>2</sup>	130,000	140,000	150,000	150,000
Perlite <sup>c</sup>	45,000	45,000	45,000	45,000	45,000
Salt <sup>c</sup>	30,000	30,000	30,000	30,000	30,000
Zeolites	NA	NA	NA	NA	NA
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	8,000	5,100	8,284	8,280	NA
Natural gas thousand cubic meters	6,100	14,800	21,400	21,400	NA
Petroleum:					
Crude	97,600	66,600	63,506	63,500	NA
Refined	37,500	40,000	40,000 <sup>e</sup>	40,000	40,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Reported figure.

TABLE 9  
CAUCASUS REGION—GEORGIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>6</sup>
Arsenic:	Deposits:	Locations:	2,000 <sup>3</sup>
As content of ore	Lukhumi deposit Tsani deposit	Ambrolauri region Lentekhi region	
Metal and compounds	Racha mining and chemical plant	Racha	NA
Do.	Tsana mining and chemical plant	Ts'ana	NA
Barite	Chordskoye deposit	Onis Raioni	70,000
Do.	NA	Madneuli deposit	NA
Barite-zinc	NA	Kvaisi deposit	NA
Bentonite	Gumbrskoye and Askanskoye deposits	Gumbra and Askana regions	200,000 <sup>3</sup>
Cement	Rust'avi cement plant	Rust'avi	1,500,000
Coal	Akhalt'sikhe, Tkibuli-Shaorskoye, and Tkvarchelskoye deposits	Akhalt's'ikhis Raioni, Tqibuli, and Tqvrach'eli regions	300,000 <sup>3</sup>
Copper, Cu content of ore	JSC Madneuli complex [GeoProMining Ltd. (formerly Stanton Equity Corp.), 97%]	Bolnisi region	12,000
Copper-gold	Trans-Georgian Resources [GeoProMining Ltd. (formerly Stanton Equity Corp.), 50%]	Sakdrisi deposit	NA
Diatomite	Kisatibskoye deposit	K'isat'ibi region	150,000
Ferroalloys:			
Ferromanganese	Zestafoni plant of Georgian Manganese Holding Limited LLC (Stemcor UK Ltd.)	Zestap'onis Raioni	100,000
Silicomanganese	do.	do.	250,000
Manganese sinter	do.	do.	250,000
Gold, mill	Quartzite Ltd. [GeoProMining Ltd. (formerly Stanton Equity Corp.), 97%]	Madneuli deposit	3
Iron ore	Hrazdan deposit	Sulagyan Mountains	NA
Do.	Tkibuli-Shaorskoye deposit	Tqibuli region	NA
Lead-zinc:			
Pb content of ore	NA	Kvaisi deposit	1,200
Zn content of ore	NA	do.	3,000
Manganese, marketable ore	Chiat'uramanganumi enterprise of Georgian Manganese Holding Limited LLC (Stemcor UK Ltd.)	Chiat'ura-Sach'kheris field, Chiat'ura region	400,000
Nitrogen	JSC Azoti chemical plant (Energy-Invest)	Rust'avi	NA
Petroleum:			
Crude	Saknavtobi and most Georgian petroleum companies in joint ventures with Frontera Resources Corp., Loris Valley Corp., Georgian British Oil Co. (GBOC), Ninotsminda, Anadarko Petroleum Corp., and GeoGeroi	About 60 wells that account for 98% of output in Mirzaani, Sup'sa, and Zemo T'elet'I regions	200,000 <sup>3</sup>
Refined	Batumi refinery (LLC Terminal)	Batumi region	NA
Do.	42-gallon barrels per day Georgian American Oil Co. (GAOR) refinery (CanArgo Energy Corp., 51%)	Sartichala	4,000
Steel, crude	Rust'avi steel mill [Energy and Industry Complex (a subsidiary of Thames Steel)]	Rust'avi	1,400,000

<sup>6</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through February 28, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimate is the total for all enterprises that produce that commodity.



TABLE 10  
CENTRAL ASIA REGION—KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008	
<b>METALS</b>						
<b>Aluminum:</b>						
Alumina	thousand metric tons	1,468	1,505	1,515	1,556	1,713
Bauxite		4,705,400 <sup>r</sup>	4,815,400	4,883,800 <sup>r</sup>	4,942,600 <sup>r</sup>	5,160,100
Metal, primary		--	--	--	11,233	105,989
Arsenic trioxide <sup>e</sup>		1,500 <sup>r</sup>	1,500 <sup>r</sup>	1,500 <sup>r</sup>	1,500	1,500
Beryllium		NA	NA	NA	NA	NA
<b>Bismuth:<sup>c</sup></b>						
Mine output, Bi content		90	150	160	145	150
Metal, refined		130	120	115	120	125
Cadmium, metal		2,358	1,624	2,000 <sup>e</sup>	2,100 <sup>e</sup>	2,100 <sup>e</sup>
Chromite		3,287,100	3,581,242	3,366,078	3,687,200	3,629,000
<b>Copper:</b>						
Mine output, Cu content		461,200	401,700	434,100	406,500 <sup>r</sup>	421,700
<b>Metal:</b>						
Smelter, undifferentiated		445,200	404,817	426,000 <sup>e</sup>	392,834 <sup>r</sup>	392,575
Refined, primary		445,268	418,356	427,723	406,091	398,141
Gallium <sup>c</sup>		5	7	10	10	11
<b>Gold:</b>						
Mine output, Au content	kilograms	19,261	18,062	21,805	22,000 <sup>e</sup>	22,000 <sup>e</sup>
Metal, refined	do.	9,576	9,774 <sup>r</sup>	9,011 <sup>r</sup>	8,157 <sup>r</sup>	8,205
Indium	do.	450	450	450	450	450
<b>Iron and steel:</b>						
<b>Iron ore, marketable:</b>						
Gross weight		20,402,500	19,471,100	22,262,600	23,834,100	21,486,300
Fe content		11,600,000	11,100,000	12,700,000	13,600,000	13,000,000 <sup>e</sup>
<b>Metal:</b>						
Pig iron		4,283,142	3,581,090	3,400,000	3,240,000	2,761,000
<b>Ferroalloys:</b>						
Ferrochromium		1,080,993	1,156,168	1,200,000 <sup>e</sup>	1,307,536 <sup>r</sup>	1,220,315
Ferrochromiumsilicon		104,800	97,870	100,000 <sup>e</sup>	145,695 <sup>r</sup>	133,828
Ferromanganese <sup>e</sup>		2,000	2,100	2,100	2,100	2,100
Ferrosilicon		103,580	104,185	105,000 <sup>e</sup>	59,886 <sup>r</sup>	54,964
Silicomanganese		155,324	170,214	220,000 <sup>e</sup>	188,445 <sup>r</sup>	179,939
Other <sup>c</sup>		9,000	9,000	9,000	9,000	9,000
Total		1,455,697	1,539,537	1,640,000 <sup>e</sup>	1,712,662 <sup>r</sup>	1,600,146
<b>Steel:</b>						
Crude		5,371,698	4,476,642	4,244,521	4,784,105	4,243,582
Finished, rolled		4,039,700	3,392,000	3,163,000	3,437,000	3,100,000 <sup>e</sup>
<b>Lead:</b>						
Concentrate, Pb content		33,000	31,000	48,100	40,200	38,800
Refined, primary and secondary		157,016	135,446	115,974	117,641	105,766
Magnesium, metal, primary <sup>e</sup>		18,000	20,000	21,000	21,000	21,000
<b>Manganese ore, crude ore:</b>						
Gross weight		2,318,000	2,207,700	2,531,100	2,482,000	2,485,000
Mn content <sup>c</sup>		570,000	540,000	550,000	600,000	600,000
Molybdenum, concentrate, Mo content		230 <sup>e</sup>	230	250	400	400 <sup>e</sup>
Nickel, Ni content of laterite ore		--	193	200 <sup>e</sup>	200 <sup>e</sup>	500 <sup>e</sup>
Niobium, metal <sup>c</sup>	kilograms	500	500	500	500	500
Rhenium <sup>c</sup>	do.	5,000	8,000	8,000	7,700	7,700
Silicon		88,000	95,000	95,000	95,000	95,000
Silver, mine output, Ag content	kilograms	733,000	832,000	830,000	800,000	700,000 <sup>e</sup>
Tantalum, metal		NA	NA	NA	NA	NA
Tin, mine output, Sn content		14	5	NA	NA	NA
<b>Titanium:</b>						
Ilmenite and leucoxene		11,670	10,000	25,000	25,000	25,000
Sponge		16,500	19,000	23,000	25,400	26,000
Vanadium, ores, concentrates, slag, V content <sup>c</sup>		1,000	1,000	1,000	1,000	1,000

See footnotes at end of table.

TABLE 10—Continued  
CENTRAL ASIA REGION—KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
METALS—Continued					
Zinc:					
Mine output, Zn content	361,400	364,300	404,600	386,000 <sup>r</sup>	387,400
Smelter, primary and secondary	357,090	364,821	364,821	358,226	365,572
INDUSTRIAL MINERALS					
Asbestos, all grades	346,500	305,500 <sup>r</sup>	314,700 <sup>r</sup>	292,600 <sup>r</sup>	230,100
Barite, marketable	310,700 <sup>r</sup>	251,000 <sup>r</sup>	251,000 <sup>r</sup>	280,300 <sup>r</sup>	492,200
Boron <sup>e</sup> thousand metric tons	30	30	30	30	30
Cement	3,662,000	3,974,800	4,880,200	5,698,600	5,837,300
Fluorspar	4,000	4,750	30,000 <sup>r,e</sup>	64,000 <sup>r</sup>	66,300
Gypsum	800,000	820,000	820,000	653,608 <sup>r</sup>	696,909
Phosphate rock:					
Gross weight	511,950	460,230	450,000	300,000	330,000
P <sub>2</sub> O <sub>5</sub> content <sup>e</sup>	116,000	96,200	92,500	60,000	65,000
Salt and sodium chloride	347,850	178,167	416,680	227,643	504,100
Sulfur, byproduct:					
Metallurgy	351,000	235,000	235,000 <sup>e</sup>	300,000 <sup>e</sup>	300,000 <sup>e</sup>
Natural gas and petroleum	1,625,000	1,590,000	1,650,000	1,660,700 <sup>r</sup>	1,732,600
Total	1,976,000	1,825,000	1,885,000	1,960,000 <sup>r,e</sup>	2,030,000 <sup>e</sup>
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous thousand metric tons	83,065	82,788	91,547	94,014 <sup>r</sup>	106,296
Lignite do.	3,810	3,798	4,773	4,370 <sup>r</sup>	4,770
Total do.	86,875	86,586	96,320	98,384 <sup>r</sup>	111,066
Natural gas thousand cubic meters	14,400,000	14,494,000	14,440,000	16,677,200 <sup>r</sup>	18,708,200
Petroleum:					
Crude oil and gas condensate:					
In gravimetric units	59,485,000	61,486,000 <sup>r</sup>	65,003,100 <sup>r</sup>	67,125,300 <sup>r</sup>	70,671,000
In volumetric units <sup>e</sup> 42-gallon barrels	437,000,000	451,000,000	478,000,000 <sup>r</sup>	493,000,000	520,000,000
Refinery products	9,390,000	11,170,000	11,664,000	12,000,000 <sup>e</sup>	11,790,500
Uranium:					
U content	3,719	4,357	5,279	6,637	8,521
U <sub>3</sub> O <sub>8</sub> content	4,386	5,138	6,226	7,827	10,049

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. NA Not available. -- Zero.

<sup>1</sup>In addition to the commodities listed, Kazakhstan also produces a number of other mineral products, including selenium, tellurium, tungsten, and thallium, but information is inadequate to estimate production.

<sup>2</sup>Table includes data available through January 31, 2010.

TABLE 11  
CENTRAL ASIA REGION—KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Alumina	Pavlodar aluminum plant [Eurasian Natural Resources Corp. (ENRC)]	Pavlodar	1,250,000
Aluminum, primary	Kazakhstan aluminum smelter [Eurasian Natural Resources Corp. (ENRC)]	do.	62,500
Arsenic trioxide	Chimkent polymetallic enterprise and other nonferrous metallurgical enterprises	Shymkent	3,500
Asbestos	Facilities: Dzhetygara complex Chilisay complex	Locations: Qostanay Aqtobe phosphorite basin	1,000,000 <sup>3</sup>
Barite	Facilities: Karagaylinskiy and Zhayrem mining and beneficiation complexes Tujuk Mine Achisay polymetallic complex	Locations: Karagayly, Zhayrem deposit  Almaty Kantau region	300,000 <sup>3</sup>
Bauxite	Turgay and Krasnooktyabrsky bauxite mining complexes [Eurasian Natural Resources Corp. (ENRC)]	Central Kazakhstan	5,000,000
Beryllium, metal	Ulba metallurgical plant (Kazatomprom)	Oskamen	NA
Bismuth, metal	Facilities: Ust-Kamenogorsk lead-zinc metallurgical plant (Kazzinc JSC) Ridder lead smelter (Kazzinc JSC)	Locations: Oskamen  Ridder	70 <sup>3</sup>
Do.	Chimkent refinery	Shymkent	20
Cadmium	do.	do.	10
Do.	Ridder mining-beneficiation complex (Kazzinc JSC)	East Kazakhstan region	1,200
Chromite, mine output, Cr <sub>2</sub> O <sub>3</sub> content (50%)	Donskoy GOK mining-beneficiation complex {Kazchrome [a subsidiary of Eurasian Natural Resources Corp. (ENRC)]}	Khromtau, Kempirsai region	5,000,000
Coal	Ekibastuz Basin, which includes:  Bogartyr Mine Severny Mine	Central and north-central parts of the country Northern Kazakhstan do.	95,000,000 <sup>3</sup>
Do.	Karaganda Basin	do.	50,000,000
Do.	Maykuben Basin	Central and north-central parts of the country	10,000,000
Do.	Shubarkul Basin	do.	6,500,000
Do.	Turgay Basin	do.	1,000,000
Copper:			
Mining, recoverable, Cu content	Kazakhmys PLC mines: Balkhash complex: Kounrad Mine	South-central Kazakhstan	11,800
Do.	Sayak Mine	do.	23,500
Do.	Shatyrkul Mine	do.	12,700
Do.	East Region: Artemyevskoe Mine	East Kazakhstan	7,820
Do.	Belousovskoe Mine	do.	2,700
Do.	Irtyskoe Mine	do.	5,750
Do.	Nikolaevskoe Mine	do.	25,700
Do.	Orlovskoe Mine	do.	86,200
Do.	Yubileyno-Snegirikhinskoe Mine	do.	14,200
Do.	Karaganda Region: Abyz Mine	North-central Kazakhstan	5,710
Do.	Nurkazgan Mine	do.	1,190

See footnotes at end of table.

TABLE 11—Continued  
CENTRAL ASIA REGION—KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
<b>Copper—Continued:</b>			
Mining, recoverable, Cu content—Continued	Kazakhmys PLC mines—Continued: Zhezkazgan complex:		
	Annensky Mine	North-central Kazakhstan	6,630
Do.	East Mine	do.	65,800
Do.	North Mine	do.	32,500
Do.	South Mine	do.	71,600
Do.	Stepnoy Mine	do.	31,700
Do.	West Mine	do.	23,300
Do.	Kazzinc JSC (Glencore International AG, 99%): Ridder:		
	Ridder-Sokolny Mine	East Kazakhstan	NA
Do.	Shubinsky Mine	do.	2,750
Do.	Tishinsky Mine	do.	15,000
Do.	Zyrianovsk: Maleevsky Mine	do.	62,100
Processing, recoverable, Cu content	Kazakhmys PLC mines or plants: Balkhash complex: Balkhash concentrator	South-central Kazakhstan	39,500
Do.	East Region: Belousovskoe Mine	East Kazakhstan	2,100
Do.	Irtyskoe Mine	do.	3,890
Do.	Nikolaevskoe Mine	do.	21,200
Do.	Orlovskoe Mine	do.	77,800
Do.	Karaganda Region: Abyz Mine	North-central Kazakhstan	4,000
Do.	Zhezkazgan complex: Stepnoy Mine	do.	58,200
Do.	Zhezkazgan concentrator: Number 1	do.	88,800
Do.	Number 2	do.	111,000
Do.	Kazzinc JSC: Ridder: Ridder concentrator	East Kazakhstan	NA
Do.	Zyrianovsk: Zyrianovsk concentrator	do.	1,200
Metal	Kazakhmys PLC mines or plants: Balkhash complex:		
	Balkhash smelter	South Central Kazakhstan	250,000
Do.	Balkhash refinery	do.	250,000
Do.	Zhezkazgan complex: Zhezkazgan smelter	North Central Kazakhstan	215,000
Do.	Zhezkazgan refinery	do.	250,000
Do.	Kazzinc JSC: Ust-Kamenogorsk: Lead smelter	Oskamen	80,000
<b>Ferroalloys:</b>			
<b>Ferrochrome:</b>			
High-carbon (60%)	Aqtobe (Aktubinsk) plant {Kazchrome [a subsidiary of Eurasian Natural Resources Corp. (ENRC)]}	Aqtobe	200,000
Medium-carbon (60%)	do.	do.	200,000
Do.	Aksu plant {Kazchrome [a subsidiary of Eurasian Natural Resources Corp. (ENRC)]}	Aksu	200,000
Ferrosilicon	do.	do.	700,000
Ferrosilichromiumsilicon	do.	do.	700,000
Ferrochrome, high-carbon	do.	do.	500,000
Silicomanganese	do.	do.	90,000
Gallium	Pavlodar aluminum plant [Eurasian Natural Resources Corp. (ENRC)]	Pavlodar	NA
Gold	Byproduct of polymetallic ores and native gold mining	NA	30
<b>Iron and steel:</b>			
Pig iron	Ispat-Karmet Steelworks	Karaganda	5,000,000
Steel, crude	do.	do.	6,300,000

See footnotes at end of table.

TABLE 11—Continued  
CENTRAL ASIA REGION—KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Iron ore, marketable	Lisakovskiy and Sokolovsko-Sarbay mining and metallurgical complexes [Sokolov-Sarbai Mining Production Association (SSGPO), a subsidiary of the Eurasian Natural Resources Corp. (ENRC)]	Qostanay	25,000,000
<b>Lead:</b>			
Mining, recoverable Pb content of ore	Kazzinc JSC: Ridder: Shubinsky Mine	East Kazakhstan	461
Do.	Tishinsky Mine	do.	15,000
Do.	Zyrianovsk: Grekhovskiy Mine	NA	240,000
Do.	Maleevskiy Mine	NA	35,100
Mining, gross weight Pb-Zn ore	ShalkiyaZinc N.V.	Kyzylorda region	3,000,000
Processing, recoverable Pb content of ore	Kazzinc JSC: Ridder concentrator	East Kazakhstan	NA
Do.	ShalkiyaZinc N.V. processing plant	Kentau	NA
Metal	Chimkent smelter	Shymkent	60,000
Do.	Kazzinc JSC: Ust-Kamenogorsk lead smelter	Oskamen	168,000
Magnesium, metal	Ust-Kamenogorsk titanium-magnesium plant	do.	23,000
Manganese, crude ore	Facilities: Atasurda Kazakmarganets {Kazchrome [a subsidiary of Eurasian Natural Resources Corp. (ENRC)]} Sary-Arkapolimetal Zhezdy processing plant {Kazchrome [a subsidiary of Eurasian Natural Resources Corp. (ENRC)]}	Locations: Atasu Tur, East Kamys Mines (Karaganda region) Zhayrang region Zhezdy	2,550,000 <sup>3</sup>
<b>Molybdenum:</b>			
Mining, recoverable content of ore	Kazakhmys PLC facilities: Balkhash complex Karaobinskoye deposit Sayak deposit	Locations: Kounrad Mine Karaoba region Sayaq (Sayak) region	6,000 <sup>3</sup>
Metal	Akchatau molybdenum metal plant	Zhezkazgan region	NA
Natural gas	million cubic meters	Companies: CNPC Aktobemunaigaz Embamunaigaz Hurricane Kumkol Munai Karachaganak Petroleum Operating BV Mangistaumunaigaz Tengizchevroil joint venture  Agip Kazakhstan North Caspian Operating Co. (AGip KCO) Uzenmunaigaz	Locations: Aqtobe Emba District Aral Sea region Northwestern Kazakhstan Mangghyshlaq Peninsula Tengiz deposit Zhanazhol deposit Urikhtau deposit Kashagana offshore field  Uzen deposit
Niobium	Ulba metallurgical plant (Kazatomprom)	Oskamen	NA
<b>Petroleum:</b>			
Crude	Companies: CNPC Aktobemunaigaz Embamunaigaz Hurricane Kumkol Munai Karachaganak Petroleum Operating BV Mangistaumunaigaz Uzenmunaigaz	Locations: Aqtobe Emba District Aral Sea region Karachaganak field Mangghyshlaq Peninsula Uzen deposit	32,000,000 <sup>3</sup>
Do.	Alibekmola, Ayrankul, Chinarevskoye, Kozhasay, North Buzachi, Sazankurak, Saityube, and Urikhtau deposits	NA	NA
Do.	42-gallon barrels per day	Tengizchevroil joint venture	Tengiz deposit
Do.	do.	Agip Kazakhstan North Caspian Operating Co. (AGip KCO)	Kashagan offshore field
Refined, crude oil throughput	do.	Atyrau, Pavlodar, and Shymkent refineries	427,000 <sup>3</sup> respectively

See footnotes at end of table.

TABLE 11—Continued  
CENTRAL ASIA REGION—KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Phosphate rock	Companies: Chilisay mining directorate Karatau production association	Aqtobe phosphorite basin Shymkent and Zhambyl regions	10,000,000 <sup>3</sup>
Rare metals (indium, niobium, selenium, tellurium, thallium)	Aktau complex	Aktau	NA
Do.	Belogorskiy rare metals plant	East Kazakhstan	NA
Do.	Chimkent metallurgical plant (Yuzhpolimetall)	Shymkent	NA
Do.	Ust-Kamenogorsk lead-zinc plant (Kazzinc)	Oskamen	NA
Do.	Akchatau mining-beneficiation complex	Zhezkazgan region	NA
Rhenium	Balkhash copper mining-metallurgical complex (Kazakhmys PLC)	do.	NA
Silver, refined	Facilities: Chimkent metallurgical plants Ridder (Kazzinc) Ust-Kamenogorsk (Kazzinc JSC)	Locations: Shymkent Ridder Zhezkazgan region	1,000 <sup>3</sup>
Tantalum	Ulba metallurgical plant (Kazatompom)	Oskemen	NA
Tin	Akchatau mining-beneficiation complex	Akzhaik deposit, Zhezkazgan	700
Titanium:			
Ore, ilmenite	Obukhovskoye, Satpayevskoye, and Shokashsk deposits	NA	30,000
Metal	Ust-Kamenogorsk titanium-magnesium plant	Oskamen	35,000
Uranium, U content	Kazatomprom affiliated companies: Akbastau JV Appak LLP Baiken-U LLP Betpak Dala JV, consisting of Akdala mine and Site No. 4 mine of Inkai deposit Karatau LLP Katco JV, consisting of Site No. 1 Yuzhnyi and Site No. 2 Tortkuduk of Moinkum deposit Kyzylkum LLP Mining Group No. 6 LLP Priaspiskiy ore enrichment center Semizbai-U Shevchenko Stepnogorskiy mining-chemical complex, Shantobe Mine Stepnoye Mining Group LLP Taboshara Taukent Mining Chemical Plant LLP Tselinny chemical complex Ulba metallurgical plant JSC (UMP) JV Zarechnoye JSC Kazatomprom mines: Kanzhugan, Moinjum, Uvanas Northern Karamurun, Southern Karamurun Vostok Mines	Locations: Budenovskoye deposit, Sozak region Mynkuduk deposit, Mynkuduk region Khorassan deposit, Kyzylorda region Southern Kazakhstan Budenovskoye deposit, Sozak region Southern Kazakhstan Khorassan deposit, Kyzylorda region NA Aqtau Semizbai deposit, interface of Northern Kazakhstan and Akmola Aqtau Vostok and Zvezdnoe deposits, west of Stepnogorsk NA Taboshara NA Stepnogorsk Oskemen Zarechnoye deposit, Olrarski region, South Kazakhstan Chu-Sarysu uranium ore province Srydarya uranium ore province Northern Kazakhstan uranium ore province	7,000 <sup>3</sup>

See footnotes at end of table.

TABLE 11—Continued  
CENTRAL ASIA REGION—KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
<b>Zinc:</b>			
Mining, recoverable, Zn content	Kazakhmys PLC mines:		
	East Region:		
	Artemyevskoe Mine	East Kazakhstan	30,200
Do.	Belousovskoe Mine	do.	8,420
Do.	Irtyskoe Mine	do.	14,700
Do.	Nikolaevskoe Mine	do.	48,700
Do.	Orlovskoe Mine	do.	78,200
Do.	Yubileyno-Snegirikhinskoe Mine	do.	16,500
Do.	Karaganda Region: Abyz Mine	North Central Kazakhstan	20,800
Do.	Kazzinc JSC:		
	Ridder:		
	Ridder-Sokolny Mine	East Kazakhstan	NA
Do.	Shubinsky Mine	do.	2,510
Do.	Tishinsky Mine	do.	79,500
Do.	Shaimerden deposit	North Kazakhstan	1,090,000
Do.	Zyrianovsk:		
	Grekhovskoy Mine	East Kazakhstan	240,000
Do.	Maleevskoy Mine	do.	203,000
Mining, Zn content of Pb-Zn ore	ShalkiyaZinc N.V.	Kyzlordo region	100,000
Processing, recoverable, Zn content	Kazakhmys PLC mines:		
	East Region:		
	Artemyevskoe Mine	Kyzlordo region	8,580
Do.	Belousovskoe Mine	do.	5,760
Do.	Irtyskoe Mine	do.	7,610
Do.	Nikolaevskoe Mine	do.	24,200
Do.	Orlovskoe Mine	do.	55,000
Do.	Yubileyno-Snegirikhinskoe Mine	do.	6,190
Do.	Kazzinc JSC:		
	Ridder concentrator	Kyzlordo region	NA
Do.	Shaimerden deposit	North Kazakhstan	72,000
Metal	Ridder zinc refinery	East Kazakhstan	126,000
Do.	Ust-Kamenogorsk zinc refinery	North Kazakhstan	240,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do, do, Ditto NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

TABLE 12  
CENTRAL ASIA REGION—KYRGYZSTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
METALS					
Antimony:					
Mine output, Sb content <sup>e</sup>	20	10	50	10 <sup>r</sup>	10
Metal and compounds	1,504	1,600	1,500	1,000 <sup>e</sup>	1,000
Gold, mine output, Au content kilograms	20,445	16,751	10,721	10,559 <sup>r</sup>	18,132
Mercury:					
Mine output, Hg content <sup>e</sup>	300 <sup>r</sup>	200 <sup>r</sup>	250 <sup>r</sup>	250 <sup>r</sup>	250
Metal kilograms	488,100	303,500	168,900	331,500	330,000 <sup>e</sup>
Molybdenum, mine output, Mo content <sup>e</sup>	250 <sup>r</sup>	250 <sup>r</sup>	250 <sup>r</sup>	250 <sup>r</sup>	250
Silver kilograms	11,700	NA	NA	NA	NA
INDUSTRIAL MINERALS					
Cement	869,700 <sup>r</sup>	972,800 <sup>r</sup>	1,059,900 <sup>r</sup>	1,229,500 <sup>r</sup>	1,218,100
Clay cubic meters	966,600	NA	NA	NA	NA
Fluorspar, concentrate <sup>e</sup>	3,038 <sup>2</sup>	4,000	4,000	4,000	4,000
Gypsum	14,000	NA	NA	NA	NA
Kaolin <sup>e</sup>	400,000	400,000	400,000	400,000	400,000
Lime, dead-burned	10,400 <sup>r</sup>	8,500 <sup>r</sup>	9,900 <sup>r</sup>	12,900 <sup>r</sup>	8,500
Limestone	445,050	NA	NA	NA	NA
Rare earths:					
Concentrate, gross weight	NA	NA	NA	NA	NA
Rare earth oxide equivalent:					
Compounds	NA	NA	NA	NA	NA
Metals	NA	NA	NA	NA	NA
Other <sup>e</sup>	NA	NA	NA	NA	NA
Salt <sup>e</sup>	1,100	1,100	1,100	1,100	1,100
Sand-gravel aggregate cubic meters	491,300	NA	NA	NA	NA
Sands do.	465,600 <sup>r</sup>	388,100 <sup>r</sup>	514,800 <sup>r</sup>	597,900 <sup>r</sup>	836,200
Stone:					
Building stone	400,000	NA	NA	NA	NA
Facing stone cubic meters	100,000	NA	NA	NA	NA
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous	56,245	48,988	46,266	37,195 <sup>r</sup>	182,344
Lignite	397,347	285,763	267,620	358,338 <sup>r</sup>	363,781
Total	453,592	334,751	313,886	395,533 <sup>r</sup>	546,125
Natural gas thousand cubic meters	28,900 <sup>r</sup>	25,100 <sup>r</sup>	19,400 <sup>r</sup>	15,000 <sup>r</sup>	17,300
Petroleum, crude	74,900 <sup>r</sup>	97,200 <sup>r</sup>	70,900 <sup>r</sup>	68,500 <sup>r</sup>	71,000
Uranium, processed U <sub>3</sub> O <sub>8</sub>	--	--	--	--	800

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Reported figure.



TABLE 13  
CENTRAL ASIA REGION—KYRGYZSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
<b>Antimony:</b>			
Sb content of ore	Kadamzhay complex [ATF Invest (a subsidiary of ATF Bank of Kazakhstan), 70.4%]: Kadamzhay Mine Terek-Sayskiy Mine Khaydarkan complex	Kadamzhayskiy Rayon  Khaydarkan Region	2,400 <sup>3</sup>
Ore	Kadamzhay beneficiation plant [ATF Invest (a subsidiary of ATF Bank of Kazakhstan), 70.4%]	Kadamzhay deposit	200,000
Do.	Terek-Sayskiy beneficiation plant	Terek-Sayskiy deposit	60,000
Metal and compounds	Kadamzhay metallurgical facility [ATF Invest (a subsidiary of ATF Bank of Kazakhstan), 70.4%]	Kadamzhayskiy Rayon	28,000
Cement	Kantskiy cement plant	Kant	1,500,000
Coal	Seven underground mines, five open pits, which include the following deposits: Almalıy, Dzhergalan, Kara-Kiche-Kok-Yangak, Kyzyl-Kiya, Sulyukta, and Tashkumyr	Southwestern, central, and northeastern parts of the country	2,200,000 <sup>3</sup>
Fluorspar, concentrate	Khaydarkan mining-metallurgical complex	Khaydarkan deposit	5,000
<b>Gold:</b>			
Au content of ore	Kumtor Gold Co. (Centerra Gold Inc.)	Kumtor deposit	22
Do.	Makmalzoloto (Kyrgyz Government, 100%)	Makmal deposit	3
Do.	kilograms Solton-Sary Mine	Naryn	500
Do.	Talas Gold	Jerooy, Talas Region	NA
Do.	Taldybulak Levoberezhny deposit	NA	NA
Au content of ore, open pit	Kyrgyzaltyn-Noroks Mining Company JV	Dzher-Uy deposit	650,000
Au content of ore, underground	do.	do.	350,000
Refined	Kara-Balta refinery	Chuskaya Oblast'	22
<b>Mercury:</b>			
Hg content of ore	Khaydarkan mining-metallurgical complex	Khaydarkan, Chauvi, Chonkoy, and Novoye deposits	700 <sup>3</sup>
Metal	do.	do.	1,000
Molybdenum, for nonmetallurgical uses	Kara-Balta mining and metallurgical complex	NA	NA
Do.	Molibden Joint Stock Co.	Chuskaya Oblast'	NA
Natural gas	million cubic meters Kyrgyzzmununayzat	Approximately 300 wells; Changyr-Tash, Chigirchik Pereval, Izbaskentskoye, Kara-Agach, Mayлуу-Suu, Susahoye, and Togap-Beshkenskoye deposits (major)	100 <sup>3</sup>
Petroleum	do.	do.	150,000
Do.	Kyrgyz Petroleum Co.	Dzhalal-Abad Region	NA
<b>Rare earths:</b>			
Concentrates, gross weight	Aktyuzskiy mining directorate	Kutessai II and Aktyuz-Boordu deposits	14,000
Compounds and metals, rare-earth oxide equivalent	Kyrgyz chemical and metallurgical plant	Orlovka	8,000
Silver	Karagoyskoye deposit	Oshskaya Oblast'	NA
Do.	Kumyshtag deposit	Talasskaya Oblast'	NA
Tin	Enil'chek JSC mining enterprise	Atdzhaylau deposit	150
Do.	do.	Trudovoye deposit	350
Do.	Tyanshanolovo mining-beneficiation complex	Sary-Dzhas field	NA
Do.	Uchkoshkon deposit	do.	NA
Tungsten	Enil'chek JSC mining enterprise	Atdzhaylau deposit	90
Do.	do.	Trudovoye deposit	95,600
Uranium, processed	Kara-Balta mining and metallurgical complex	Zarechnoye deposit, Chuskaya Oblast'	3,600
Do.	Linia Prava (LPU) (Nimrodel Resources, 100%)	Southern Fergana Valley, Batken Oblast'	NA

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

TABLE 14  
CENTRAL ASIA REGION—TAJIKISTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2004	2005	2006	2007 <sup>e</sup>	2008 <sup>e</sup>
METALS					
Aluminum, primary	358,082	379,630	413,800	419,060 <sup>3</sup>	339,450 <sup>3</sup>
Antimony, Sb content of concentrate	4,069	4,073	3,480	2,000	2,000
Gold kilograms	2,161	1,927	1,920	3,000	3,000
Lead, Pb content of concentrate <sup>e</sup>	800 <sup>r</sup>	800 <sup>r</sup>	800 <sup>r</sup>	800 <sup>r</sup>	800
Mercury, Hg content of concentrate <sup>e</sup>	30	30	30	30	30
Silver, Ag content of concentrate <sup>e</sup> kilograms	5,000	5,000	5,000	5,000	5,000
INDUSTRIAL MINERALS					
Cement	193,600	253,100	281,500	313,100 <sup>r,3</sup>	190,400 <sup>3</sup>
Fluorspar <sup>e</sup>	9,000	8,500	8,500	8,500	8,500
Gypsum	57,000	8,500	8,500	8,500	8,500
Nitrogen, N content of ammonia <sup>e</sup>	44,900	45,000	35,000	25,000	25,000
Salt	59,495	65,992	52,459	52,000	52,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	92,900	98,500	102,400	81,600 <sup>3</sup>	96,200
Natural gas thousand cubic meters	35,600	29,300	19,900	19,000	19,000
Petroleum, crude	18,900	21,600	22,300	22,500	22,500

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>In addition to the commodities listed, Tajikistan had produced a number of other mineral commodities but available information was inadequate to determine if production was still taking place.

<sup>3</sup>Reported figure.

TABLE 15  
CENTRAL ASIA REGION—TAJIKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Aluminum		TALCO aluminum smelter [formerly the Tajikistan Aluminum Smelter (TadAZ)]	Tursunzade	517,000
Antimony, ore		Anzob mining-beneficiation complex	Dzhizhikrutskoye deposit	700,000
Antimony, metal		Isfara hydrometallurgical plant	Isfara	500
Arsenic		Mosrif deposit	NA	NA
Bismuth		Isfara hydrometallurgical plant	Isfara	500
Do.		Leninabad mining-beneficiation complex	Yuzhno-Yangikanskoye deposit	25
Bismuth, copper, fluorspar, gold, silver, zinc (ore processing)		Adrasman mining-beneficiation complex	Kanimansurskoye deposit	650,000
Boron		Yakarkharskoye deposit	Badakhshan Region	NA
Coal		Fan-Yagnob hard coal deposits	Pyandzh Region	50,000
Do.		Isfara hydrometallurgical plant	Isfara	300,000
Do.		Shurab brown coal deposit	Shurab Region	NA
Copper-lead-zinc		Leninabad mining-beneficiation complex	Yuzhno-Yangikanskoye deposit	2,500
Dolomite		Yavan electrochemical complex	Pashkharvoskoye deposit	NA
Fluorspar, concentrate		Takob mining-beneficiation complex	Takob and Krasnye Kholmy deposits	60,000 <sup>3</sup>
Gold, in ore	kilograms	Aprelevka joint venture	Aprelevka deposit	200
Do.	do.	Darvaz joint venture	Yak-Suyskoye deposit, Khatlonskaya Oblast'	2,000
Do.	do.	Tajikzoloto mining-beneficiation complex, Pamiir Artel	Darvazy and Rankul placer deposits, placers in central and southern parts of country	5,000 <sup>3</sup>
Do.	do.	Zerafshan Gold Co.	Dzhilau and Taror deposits, Sughd Oblast'	2,500 <sup>3</sup>
Gold, ore processing	do.	Kansayskaya factory	Aprelevka, Burgunda, Kyzyl-Chek, and Shkol'noye deposits	165,000 <sup>3</sup>
Do.	do.	Vostokredmet refinery	Chkalovsk	NA
Lead-zinc		Adrasman mining-beneficiation complex	NA	NA
Do.		Altyn-Topkan mining directorate (China Global New Technology Export and Import)	Altyn-Topkan deposit (mining ceased in 1997)	NA
Do.		do.	Pay Bulak deposit (mining ceased in 1997)	NA
Do.		Kansayskoye mining complex	Kara-Mazar Region	NA
Do.		Takaelyyskiy metallurgical complex	NA	NA
Limestone		Dushanbe cement complex	Kharangonskoye deposit	NA
Loam		do.	Varzobskoye Ushchel'ye deposit	NA
Marble		Dal'yan Bolo deposit	Shakhristanskiy region	NA
Do.		Dashtak deposit	Darvaz region	NA
Do.		Jilikul deposit	Pendzhikent region	NA
Mercury		Anzob mining-beneficiation complex	Dzhizhikrutskoye deposit	150
Natural gas and petroleum:				
Natural gas	thousand cubic meters	Sixteen oil-gas deposits under exploration, which includes Ayritanskoye, Madaniyatskoye, and Ravatskoye	Fergana depression	200,000 <sup>3</sup>
Petroleum		Beshentyakskoye, Kichik-Belskoye, Shaambary, and Uzunkhorskoye deposits	Southern Tajik depression	200,000 <sup>3</sup>
Salt		Ashtskiy plant	Kamyshkurganskoye deposit	NA
Do.		Khoja-Sartez, Samanchi, and Tanabchi deposits	NA	NA
Do.		Voseyskiy plant	Khodzha-Muminskoye deposit	NA
Do.		Yavan electrochemical complex	Tut-Bulakskoye deposit	NA
Silver	kilograms	Adrasman mining-beneficiation complex	Bolshoy Kanimansur deposit	15,000
Strontium, ore		Chaltash, Chilikutan, and Davgir deposits	Khatlon Region	180,000
Tin-tungsten		Tafkon deposit	NA	NA
Tungsten ore		Maykhura deposit	Central Tajikistan	150,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

TABLE 16  
CENTRAL ASIA REGION—TURKMENISTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
<b>INDUSTRIAL MINERALS</b>					
Bentonite <sup>c</sup>	50,000 <sup>r</sup>	50,000 <sup>r</sup>	50,000 <sup>r</sup>	50,000 <sup>r</sup>	50,000
Bentonite powder	250	250	250	250	250
Bischofite	100	100	100	100	100
Bromine kilograms	150,000	150,000	150,000	150,000	150,000
Cement	550,000	650,000	800,000 <sup>r</sup>	900,000 <sup>r</sup>	900,000
Epsomite	NA	NA	NA	NA	NA
Ferrous bromide, 51% Br	85	85	85	85	85
Gypsum	100,000 <sup>r</sup>	100,000 <sup>r</sup>	100,000 <sup>r</sup>	100,000 <sup>r</sup>	100,000
Iodine	250,000	270,000	270,000	270,000	270,000
Lime	16,000	16,000	16,000	16,000	16,000
Nitrogen, N content of ammonia	200,000	220,000	250,000	270,000	270,000
Salt	215,000 <sup>r</sup>	215,000 <sup>r</sup>	215,000 <sup>r</sup>	215,000 <sup>r</sup>	215,000
Sodium sulfate	60,000	60,000	60,000	60,000	60,000
Sulfur	9,000	9,000	9,000	9,000	9,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Natural gas million cubic meters	58,570 <sup>3</sup>	60,420 <sup>3</sup>	63,201 <sup>r,3</sup>	72,300 <sup>3</sup>	70,501 <sup>3</sup>
<b>Petroleum, crude:</b>					
Gravimetric units	10,051,000 <sup>3</sup>	9,700,000 <sup>3</sup>	8,950,000	9,750,000 <sup>3</sup>	9,678,000 <sup>3</sup>
Volumetric units <sup>e</sup> thousand 42-gallon barrels	78,100	71,800	64,700	73,100	69,100

<sup>r</sup>Revised. NA Not available.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

<sup>2</sup>Table includes data available through January 31, 2010.

<sup>3</sup>Reported figure.

TABLE 17  
CENTRAL ASIA REGION—TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity
Ammonia	thousand metric tons	Maryzoat Association	Mary Region	400,000
Argillite	cubic meters	Keramzit plant	Yagmanskoye deposit	200,000
Barite-witherite		Arpaklenskiy mining enterprise	Arpaklen deposit	10,000
Do.		Kumytash deposit and other deposits	NA	NA
<b>Bench gravel and loam:</b>				
Bench gravel		Bezmeinskiy deposit	Near Ashkhabad	1,200,000
Loam		do.	do.	12,000
Bischofite, epsomite, Caspian Sea salt, Glauber's salt		Karabogazsulfate Association	Kara-Bogaz-Gol Lagoon, off the Caspian Sea	NA
Bromine		Cheleken plant	Cheleken Region	4,740
Do.		Nebitdag plant	Nebitdag Region	2,370
Cement		Bakharlinskiy cement plant	South of Kelyata train station	1,000,000
Do.		Bezmeinskiy cement plant	Kelyata	1,400,000
<b>Clays:</b>				
Bentonite		Oglanly Mine	Oglanly Region	100,000
Kaolin		Ashkhabad glass plant	Kyzylkainskoye deposit	80,000 <sup>c</sup>
Do.		Tuarkyrskoye deposit	250 kilometers southeast of Turkmenbashi	NA
Coal, oxidized		do.	do.	NA
Dolomite		Ashkhabad glass plant	Kelyatinskoye deposit	6,000 <sup>c</sup>
Gypsum		IA Turkmenmineral	Mukry, Tagorin deposits	300,000
Do.		Wastes from Gaurdak sulfur deposit	Gaurdak, Gora	400,000
Do.		Krasnovodsk Aylagy (anhydride) deposit	9 kilometers east of Turkmenbashi	160,000
Iodine		Cheleken plant	Cheleken Region	355
Do.		Nebitdag plant	Nebitdag Region	255 <sup>c</sup>
Limestone		Deposits: Gaurdak	4 kilometers northeast of Gaurdak	NA
Do.		Kara-Dzhumalakskeye	60 kilometers from Gaurdak	NA
Limestone, for facing materials		Charshanginskoye, Gaurdakskeye, Geok-Tepinskoye, Kaylyu, Krasnovodsk Aylagy (tuff and granite), and Tyuzmergenskoye deposits	NA	NA
Do.	cubic meters	Tagarinskoye deposit	8 kilometers from Gaurdak	1,000 <sup>c</sup>
Limestone, for filing stone	do.	Aeroport deposit	21 kilometers northeast of Turkmenbashi	2,000
Do.	do.	Bekdashskoye deposit	200 kilometers north of Turkmenbashi	5,000
Do.	do.	Dostlukskoye deposit	230 kilometers southeast of Turkmenbashi	2,000
Do.	do.	Mukrinskoye deposit	60 kilometers southwest of Gaurdak	25,000
Natural gas	million cubic meters	Achakskoye, Dauletabad, Doviet-Denmez (Donmez), Gygyrlinskoye, Ioltan (South Yolotan-Osman), North and South Naipskiye, Shatlyk, and Yashlar deposits	Onshore in eastern and southwestern parts of country and offshore shore in Caspian Sea; Amu-Dar'ya and Murgab Basins; Dashoguzskiy, Lebapskiy, Maryyskiy deposits	90,000 <sup>e,3</sup>
Natural pigment		Bakhchesu/Cheshme/Gadyn deposit	28 kilometers southwest of Serdar	NA
Ozokerite		Cheleken mining enterprise	NA	NA
<b>Petroleum:</b>				
Crude	thousand metric tons	Barsa-Gelmesskoye, Burunskoye, Cheleken, Gograndagskoye, Ioltan (South Yolotan-Osman), Kamyshldzhinskoye, Korturtepinskoye, Kum Dag, Kuydzhikskoye, Okaremskoye, and Yashlar deposits	Centered in Caspian plain in west Turkmenistan and in offshore oil fields to the west of Cheleken Peninsula in Caspian Sea	11,000 <sup>e,3</sup>
Refined	do.	Seydi oil refinery Turkmenbashi complex of oil refineries	Chardzhou Rayon Turkmenbashi	12,000 <sup>3</sup>
Potash (sylvinite, carnallite)		Karlyuk deposit (experimental mine closed 1998)	25 kilometers from Gaurdak	NA
Do.		Karabil'skoye deposit	17 kilometers south of Gaurdak	NA

See footnotes at end of table.

TABLE 17—Continued  
CENTRAL ASIA REGION—TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity
Quartz sand	Annauskoye, Babadurmazskoye, Bakhardenskoye, and Kelyatinskoye deposits	NA	NA
Rock salt	Gaurdak deposit	8 kilometers from Gaurdak	15,000 <sup>e</sup>
Do.	Khodzhaguymaskoye deposit	4 kilometers west of Gaurdak	NA
Do.	Kugitangskoye deposit	75 kilometers from Gaurdak	2,000 <sup>e</sup>
Do.	Uzun-Kudukskoye deposit	20 kilometers from Gaurdak	2,000 <sup>e</sup>
Salt	Kuulinskoye deposit	40 kilometers north of Turkmenbashi	650,000 <sup>e</sup>
Sand and gravel	cubic meters Dushakoye deposit	NA	1,150,000
Do.	do. Kala-I-Morskoye deposit	NA	925,000
Do.	do. Kernayskoye deposit	NA	36,000
Do.	do. Kubatayskoye deposit	NA	740,000
Do.	do. Ufrinskoye deposit	NA	900,000
Sodium sulfate	Karabogazsulfate Association	Bekdash, Kara-Bogaz-Gol Lagoon (off Caspian Sea)	400,000
Strontium (celesite)	Arikskoye deposit (mining ceased 1992)	Near Gaurdak	NA
Do.	Shakhtaminskoye deposit	do.	NA
Sulfur	Darvaza, Segli-Kar, and Kara-Kum sulfur plants	Kara-kum deposit (mining ceased 1962)	NA
Do.	Gaurdak plant	Gaurdak deposit (mining ceased 1997)	500,000 <sup>e</sup>
Do.	IA Turkmenmineral	Gora deposit	340,000
Do.	Kugitangskoye deposit	75 kilometers from Gaurdak	NA

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

TABLE 18  
CENTRAL ASIA REGION—UZBEKISTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
<b>METALS<sup>2</sup></b>					
Aluminum, secondary <sup>c</sup>	3,000	3,000	3,000	3,000	3,000
Copper:					
Mine output, Cu content	83,000	103,500	100,000	95,000	95,000 <sup>e</sup>
Metal:					
Blister <sup>c</sup>	94,000 <sup>r</sup>	105,000 <sup>r</sup>	95,000 <sup>r</sup>	92,000 <sup>r</sup>	92,000
Refined	93,770 <sup>r</sup>	103,870 <sup>r</sup>	92,300 <sup>r</sup>	89,655 <sup>r</sup>	90,000 <sup>e</sup>
Gold kilograms	88,350	84,210	84,000 <sup>e</sup>	85,000 <sup>e</sup>	85,000 <sup>e</sup>
Molybdenum, mine output, Mo content <sup>c</sup>	500	575	600	600	500
Rhenium <sup>e</sup> kilograms	NA	NA	850	900	900
Silver, mine output <sup>c</sup> do.	80,000	83,000	83,000	83,000	83,000
Steel:					
Crude	602,166	607,253	592,450	740,000 <sup>e</sup>	680,000 <sup>e</sup>
Rolled	562,200	576,500	560,000	700,000	640,000
Zinc, metal, smelter, primary	60,000 <sup>e</sup>	35,030	45,000 <sup>e</sup>	71,800 <sup>r</sup>	70,445
<b>INDUSTRIAL MINERALS</b>					
Cement	5,067,800	5,068,000	5,700,000 <sup>r,e</sup>	6,500,000 <sup>r</sup>	6,600,000 <sup>e</sup>
Clays:					
Bentonite <sup>c</sup>	15,000	15,000	15,000	15,000	15,000
Kaolin	202,300	216,600	251,000	250,000 <sup>e</sup>	250,000 <sup>e</sup>
Feldspar <sup>c</sup>	4,300 <sup>r</sup>	4,300 <sup>r</sup>	4,300 <sup>r</sup>	4,300 <sup>r</sup>	4,300
Fluorspar	86,000	85,000	88,000	90,000 <sup>e</sup>	90,000 <sup>e</sup>
Graphite <sup>c</sup>	60	60	60	60	60
Gypsum <sup>c</sup>	80,000	80,000	80,000	80,000	80,000
Iodine <sup>c</sup> kilograms	2,000	2,000	2,000	2,000	2,000
Nitrogen, N content of ammonia <sup>c</sup>	875,300 <sup>3</sup>	880,000	940,000	1,000,000	1,000,000
Phosphate rock:					
Gross weight	430,000 <sup>r</sup>	430,000 <sup>r</sup>	600,000	600,000	600,000
P <sub>2</sub> O <sub>5</sub> content <sup>e</sup>	102,000 <sup>r</sup>	102,000 <sup>r</sup>	140,000	140,000	140,000
Sulfur:					
Sulfur, bByproduct: <sup>c</sup>					
Metallurgy	170,000	170,000	170,000	170,000	170,000
Natural gas and petroleum	350,000	350,000	350,000	350,000	350,000
Total	520,000	520,000	520,000	520,000	520,000
Sulfuric acid	834,300	740,500	600,000	600,000 <sup>e</sup>	600,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal, lignite	2,699,000 <sup>r</sup>	3,003,000 <sup>r</sup>	3,126,000 <sup>r</sup>	3,282,000 <sup>r</sup>	2,400,000
Natural gas, dry million cubic meters	59,862 <sup>r</sup>	59,692 <sup>r</sup>	62,750 <sup>r</sup>	65,186 <sup>r</sup>	67,593
Petroleum and gas condensate:					
In gravimetric units	4,139,000 <sup>r</sup>	3,451,000 <sup>r</sup>	3,007,000 <sup>r</sup>	3,017,000 <sup>r</sup>	2,533,000
In volumetric units thousand 42-gallon barrels	29,565	24,648	21,476	21,551	18,095
Petroleum refinery products:					
In gravimetric units	7,749,000	7,133,000 <sup>r</sup>	7,323,000 <sup>r</sup>	NA <sup>r</sup>	NA
In volumetric units thousand 42-gallon barrels	55,351	50,949	52,308	NA	NA
Uranium:					
U content	2,016	2,300	2,270	2,320	2,338
U <sub>3</sub> O <sub>8</sub> content	2,377	2,712	2,677	2,736	2,757

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Uzbekistan also produces rhenium, selenium, and tellurium, but information is not adequate to estimate production.

<sup>3</sup>Reported figure.

TABLE 19  
CENTRAL ASIA REGION—UZBEKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Bismuth	Ustarassay deposit (depleted)	Chotqol and Kuraminskiy Khrebet	NA
Cesium, lithium, rubidium	Shava-Say deposit	NA	NA
Clays:			
Bentonite	Arab-Dasht and Khaudag deposits	NA	NA
Kaolin	Angren deposit	Angren Region	8,000,000
Coal:			
Lignite	OJSC Uzbekcoal and OJSC Apartak	Angren deposit, Toshkent Viloyati	6,000,000
Bituminous	JSC Shargunugol	Baysunskoye and Shargunskoye deposits, Surkhandarya Region	1,000,000 <sup>3</sup>
Copper:			
Mine output, Cu content	Almalyk mining and metallurgical complex	Dalneye, Kalmakyr, and Sary-Cheku deposits	100,000 <sup>3</sup>
Metal	Almalyk refinery	Olmaliq	130,000
Diamond	Karashok and Kok-Say deposits	Nawoiy District	NA
Feldspar	Karichasayskoye and other deposits	Deposits in Samarqand and Toshkent Viloyati Regions; Karakalpakstan Kara-Kalpakskaya ASSR)	120,000 <sup>3</sup>
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 Viloyati	NA
Do.	Samarqand chemicals plant	Samarqand	NA
Fluorspar	Agata-Chibargata, Aurakhmat, Kengutan, Kyzylbaur, Naugarzan, and Nugisken deposits	East of Toshkent (Tashkent) Viloyati	150,000
Do.	Syrpatash deposit	Namanganskaya Oblast'	NA
Gold	kilograms Adzhi-Bugutty, Amantaytau, Balpantau, Bulutkan, Donguz-Tau, Muruntau, and Taurbay deposits	Central Kyzylkum Region	85,000 <sup>3</sup>
Do.	Navoi Integrated Mining and Metals complex (Uzbekistan State Committee for Geology and Mineral Resources)	Muruntau deposit	65
Do.	Kochbulak and Kyzyl-Al'ma-Say deposits	Toshkent Viloyati	NA
Do.	Almalyk mining and metallurgical complex	Dalneye, Kalmakyr, and Sary-Cheku deposits	NA
Graphite	Tadzhi-Kazgan deposit	Navoiyskaya Oblast'	NA
Iron ore	Syurenata deposit	Toshkent Viloyati	NA
Lead, mine output, Pb content	Almalyk mining and metallurgical complex; Altyn-Topkan and Uchkulach deposits	Uchkulach deposit in Toshkent Viloyati [Altyn-Topkan deposit in Kurama mountain range in Tajikistan (in March 1999, Altyn-Topkan transferred to control of Tajikistan)]	40,000 <sup>3</sup>
Manganese	Dautashskoye deposit	Kashkadar'inskaya Oblast'	40,000
Molybdenum:			
Mine output, Mo content	Almalyk mining and metallurgical complex; Kalmakyr and Sary-Cheku deposits	Toshkent Viloyati	900 <sup>3</sup>
Metal	Uzbek refinery and hard metals plant	Chirchiq	NA
Natural gas	million cubic meters Gazli, Kandym, Khauzak, Kokdumalak, Pamuk, and Shurtan-Say deposits (major)	Amu-Dar'ya Basin; Mubarek area	70,000 <sup>3</sup>
Do.	Itera/Lukoil (Russia), Uzbekneftegaz JSC	Kan-Dam field	NA
Natural gas condensate	Trinity Energy (United Kingdom)	Ustyurt Plato Region	NA
Natural gas liquids	million cubic meters Mubarek gas processing plant	Muborak	28,000
Do.	Shurtan gas-chemical complex	Shurtan-Say deposit, Kashkad'ya Region	137,000
Petroleum:			
Crude	Kokdumalak and Mingbulak deposits (major)	NA	9,000,000 <sup>3</sup>
Refinery products	Fergana oil refinery	Farghona Region	8,800,000
Do.	Bukhara oil refinery	Bukhoro	2,500,000

See footnotes at end of table.



TABLE 19—Continued  
CENTRAL ASIA REGION—UZBEKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Phosphate	Kyzylkum complex	Dzheroy-Sardarin Moroccan type; Karaktay, Severnyy, and Dzhetymtau deposits	NA
Polyethylene	Shurtan gas-chemical complex	Shurtan-Say deposit, Kashkad'ya Region	125,000
Potash	Tyubegatan deposit	Southern Uzbekistan	NA
Rhenium	Almalyk mining and metallurgical complex	Toshkent Viloyati	NA
Selenium	do.	do.	NA
Silver	do.	do.	NA
Do.	Kosmanachi, Okzhetpes, and Vysokovoltnoye deposits	Namanganskaya Oblast'	NA
Steel, crude	Bekabad steel mill	Bekabad	1,100,000
Sulfur	Almalyk mining and metallurgical complex	Dalneye, Kalmakyr, and Sary-Cheku deposits	NA
Do.	Mubarek gas processing plant complex	Muborak	2,000,000
Tellurium	Almalyk mining and metallurgical complex	Toshkent Viloyati	NA
Tungsten:	Deposits:	Locations:	1,200 <sup>3</sup>
Mine output, W content	Koytash deposit Ingichka and Lyangar deposits Ugat deposit	Northeastern Uzbekistan Zirabulak Mountains Northern Uzbekistan	
Mine output, WO <sub>3</sub> content (0.49%)	Sautbay wolframite deposit	Kyzylkum Region	NA
Metal	Uzbek refractory and hard metals plant	Chirchiq	NA
Uranium, U content	Navoi mining and metallurgical complex	Central Kyzylkum Region	3,000
Vermiculite	cubic meters Tebin-Bulak deposit	NA	25,000
Zinc:			
Mine output, Zn content	Almalyk mining and metallurgical complex	Khandiza and Uchkulach deposits	NA
Metal	do.	do.	80,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>Capacity estimates are totals for all enterprises that produce that commodity.

TABLE 20  
EURASIA REGION—BELARUS: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity		2004	2005	2006	2007	2008
<b>METALS</b>						
Steel:						
Crude	thousand metric tons	1,920	2,076	2,297	2,387	2,660
Rolled	do.	1,676	1,839	2,047	2,192	2,470
Pipes	do.	109,700	108,300	134,200	147,900	150,000 <sup>e</sup>
<b>INDUSTRIAL MINERALS</b>						
Cement	thousand metric tons	2,731	3,131	3,495	3,820	4,219
Diamond, synthetic <sup>e</sup>	thousand carats	25,000	25,000	25,000	25,000	25,000
Lime	thousand metric tons	727	785	853	925	950
Nitrogen, N content of ammonia		767,000	774,000	815,000	830,000	805,000
Potash, K <sub>2</sub> O equivalent	thousand metric tons	4,611	4,844	4,605	4,972	4,968
Salt <sup>2</sup>		1,883,000	1,839,000	2,075,693	1,665,350	1,866,000
Sulfur		32,288	48,663	38,567	41,031	30,000 <sup>e</sup>
Sulfuric acid	thousand metric tons	600	700	800	800	800
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Natural gas	million cubic meters	245	228	219	201	152
Peat:						
Horticultural use <sup>e</sup>	thousand metric tons	300	300	300	318 <sup>3</sup>	395 <sup>3</sup>
Fuel use	do.	2,500 <sup>r</sup>	2,500 <sup>r</sup>	2,500 <sup>r</sup>	2,502 <sup>r</sup>	2,364
Total	do.	2,800	2,800	2,800	2,820	2,759
Petroleum:						
Crude	do.	1,804	1,785	1,780	1,760	1,684
Refined	do.	18,451	19,802	21,253	21,349	21,305

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Includes byproduct salt from potash production.

<sup>3</sup>Reported figure.

TABLE 21  
EURASIA REGION—BELARUS: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1</sup>

(Metric tons)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Cement	Krichevskiy and Volkovysk plants	Mahilyowskaya and Wawkavysk Voblasts'	3,500,000 <sup>2</sup>
Diamond	Gomel Production Association "Kristall"	Homyel'skaya Voblast'	NA
Nitrogen, N content of ammonia	OJSC Grodno "Azot" (Belneftekhim)	Hrodna region	1,000,000
Peat, fuel use	Production at 37 enterprises that produce mainly briquets	All regions of country	5,000,000 <sup>3</sup>
Petroleum:			
Crude	State Concern for Oil and Chemistry (Belneftekhim)	Rechitskoye, Ostashkovichskoye, Vishanskoye, Tishkovskoye and Yuzhno-Ostashkovichskoye deposits, southeastern part of country	2,000,000
Refined	JSC Mozyr oil refinery (Government of Belarus, 42.7%, and Slavneft, 42.5%)	Gomel	16,000,000 <sup>4</sup>
Do.	Navapolatsk refinery (Naftan)	Vitebsk	10,800,000 <sup>4</sup>
Potash, K <sub>2</sub> O equivalent	Republican unitary enterprise (RUE) Production Amalgamation (PA) Belaruskali	Starobin deposit, Salihorsk area	5,000,000
Steel:			
Crude	Belarusian Steel Works (BSW) (Ministry of Industry of Belarus)	Zhlobin	2,400,000
Pipe	do.	do.	250,000
Do.	JSC Mogilev Metallurgical Works [Belarusian Steel Works (BSW)]	Mahilyowskaya Voblast'	80,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Total for both plants.

<sup>3</sup>Total peat for fuel use.

<sup>4</sup>Crude throughput.

TABLE 22  
EURASIA REGION—MOLDOVA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008 <sup>c</sup>
METALS					
Crude steel	1,012,600	1,016,000	675,400	995,000	885,000
INDUSTRIAL MINERALS					
Cement	439,700	641,000	837,000	800,000 <sup>r, e</sup>	750,000
Clays, unspecified	--	--	227,968	165,040	165,000
Gypsum	102,500	130,800 <sup>r</sup>	186,200 <sup>r</sup>	311,900 <sup>r</sup>	300,000
Lime	1,911	1,900	2,153	1,135	1,000
Limestone	--	--	15,333	166,870	165,000
Sand and gravel <sup>e</sup>	1,600,000	1,900,000	289,042 <sup>2</sup>	272,197 <sup>2</sup>	200,000
MINERAL FUELS AND RELATED MATERIALS					
Natural gas, dry	NA	NA	56	-- <sup>r</sup>	50
Peat, fuel use <sup>e</sup>	475,000	475,000	475,000	475,000	475,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>Reported figure.

TABLE 23  
EURASIA REGION—MOLDOVA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location or deposit names	Annual capacity <sup>c</sup>
Cement	S.A. Ciment Rezina (joint venture with Lafarge S.A.)	Rezina	1,100,000
Granite thousand cubic meters	Cariera de granit si pietris din Soroca S.A.	Cosauti	150
Gypsum	Chisinau Municipal Council (CMC)-Knauf AG (joint Moldovan-German venture)	Kirovskoye deposit	850,000
Oil and natural gas:			
Oil, crude	Valiexchimb LTD (joint venture with Island Oil & Gas plc)	Valeni oilfield	100,000
Oil, refined	Comrat oil refinery	Cahul	100,000
Natural gas thousand cubic meters	NA	Victorovca gasfield	5,000
Sand and gravel do.	NA	71 mined deposits	1,000
Steel, crude	OJSC Moldova Steel Works minimill [Rumney Trust Reg, 75%; Energy Investment and Management Corp. (EIM), 15.6%; Government, 9.4%]	Ribnita, Transnistria region	1,100,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through March 31, 2010.

TABLE 24  
EURASIA REGION—RUSSIA: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008	
<b>METALS</b>						
<b>Aluminum:</b>						
<b>Ore and concentrate:</b>						
Alumina	thousand metric tons	3,269	3,259	3,265	3,300 <sup>e</sup>	3,200 <sup>e</sup>
Bauxite		6,017,600	6,409,300	6,399,200	6,777,000	6,300,000 <sup>e</sup>
Nepheline concentrate, 25% to 30% <sup>c</sup>		1,023,257 <sup>3</sup>	1,000,000	1,000,000	1,000,000	1,000,000
Metal, smelter, primary		3,591,747	3,647,072	3,717,907	3,955,417	3,800,000 <sup>e</sup>
Antimony, mine output, recoverable Sb content <sup>c</sup>		3,000	3,000	3,500	3,500	3,500
Arsenic, white <sup>c</sup>		1,500	1,500	1,800	1,500	1,500
<b>Bismuth:<sup>e</sup></b>						
Mine output, Bi content		50 <sup>f</sup>	50 <sup>f</sup>	55 <sup>f</sup>	55 <sup>f</sup>	70
Metal, refined		10	10	11	12	13
Cadmium, metal, smelter		532	621	690	810	800 <sup>e</sup>
Chromium, chrome ore, marketable		320,200	772,000	966,065	776,681	750,000 <sup>e</sup>
<b>Cobalt:<sup>e</sup></b>						
Mine output, recoverable Co content		6,000	6,300	6,300	6,300	6,200
Metal, refined		4,800	5,000	5,000	3,800	2,500
<b>Copper:</b>						
Ore, recoverable Cu content <sup>c</sup>		675,000 <sup>f</sup>	700,000 <sup>f</sup>	725,000 <sup>f</sup>	740,000 <sup>f</sup>	750,000
<b>Metal:</b>						
<b>Blister, smelter:<sup>c</sup></b>						
Primary		662,000	696,000	635,000	650,000	630,000
Secondary		257,000	262,000	312,000	290,000	235,000
Total		919,000	958,000	947,000	940,000	865,000
<b>Refined:</b>						
Primary		682,000	684,000	635,000	650,000	610,000
Secondary		237,000	249,000	312,000	289,000	250,000
Total		919,000	933,000	947,000	939,000	860,000
Gallium <sup>c</sup>		9	10	11	11	11
<b>Gold:</b>						
Mine output, Au content	kilograms	163,148	164,186	159,340	156,975 <sup>f</sup>	176,347
Secondary recovery	do.	4,844	4,884	4,981	5,867	8,140
Indium <sup>c</sup>		11	12	12	12	12
<b>Iron and steel:</b>						
<b>Iron ore:</b>						
Gross weight		96,980,000	96,764,400	102,000,000	105,000,000	99,900,000
Fe content, 55% to 63% <sup>c</sup>		56,200,000	56,100,000	59,100,000	60,800,000	57,800,000
<b>Metal:</b>						
Pig iron		50,426,700	49,175,000	51,683,000	51,523,000	48,300,000
Direct-reduced iron <sup>c</sup>		3,140,000	3,340,000	3,340,000	4,000,000	4,000,000
<b>Ferroalloys:<sup>e</sup></b>						
<b>Blast furnace:</b>						
Ferromanganese		110,000 <sup>f</sup>	110,000 <sup>f</sup>	130,000 <sup>f</sup>	120,000	110,000
Ferrophosphorus		3,500	3,500	3,500	3,500	3,500
Spiegeleisen		7,000	7,000	7,000	7,000	7,000
<b>Electric furnace:</b>						
Ferrochromium		454,000 <sup>f</sup>	578,000 <sup>3</sup>	600,000	570,000	530,000
Ferrochromiumsilicon		4,000	4,000	4,000	4,000	4,000
<b>Ferronickel, gross weight:<sup>4</sup></b>						
High-nickel		9,641 <sup>f,3</sup>	12,900	11,330 <sup>f,3</sup>	14,020 <sup>f,3</sup>	14,000
Other		20,900	8,160	18,800	20,000	20,000
Ferroniobium (ferrcolumbium)		--	--	--	121 <sup>f</sup>	121
Ferrosilicon		721,000	742,000 <sup>2</sup>	882,300 <sup>3</sup>	896,100 <sup>3</sup>	850,000
Ferrovandium		13,700	12,880 <sup>2</sup>	11,000	12,000	12,000
Silicomanganese		141,000 <sup>f</sup>	48,000 <sup>f</sup>	40,000 <sup>f</sup>	40,000 <sup>f</sup>	40,000
Silicon metal		75,000	58,000	54,500	54,000	54,000
Other		22,000	22,000	22,000	22,000	22,000
Total		1,580,000 <sup>f</sup>	1,610,000 <sup>f</sup>	1,780,000 <sup>f</sup>	1,760,000 <sup>f</sup>	1,670,000

See footnotes at end of table.

TABLE 24—Continued  
EURASIA REGION—RUSSIA: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
METALS—Continued					
Iron and steel—Continued:					
Metal—Continued:					
Steel:					
Crude	65,645,600	66,186,200	70,816,000	72,389,000	68,695,000
Finished, rolled	53,800,000	54,600,000	58,200,000	59,660,000	56,564,000
Pipe	5,990,000	6,673,000	7,898,400	8,706,000	7,778,000
Lead: <sup>c</sup>					
Mine output, recoverable Pb content	23,200	36,400	34,000	50,000	60,000
Metal, refined, primary and secondary	70,000	66,000	78,000	94,000	80,000
Magnesium: <sup>c</sup>					
Magnesite	1,000,000	930,000	1,200,000	1,200,000	1,200,000
Metal, including secondary	45,000	45,000	35,000	37,000 <sup>r</sup>	37,000
Manganese ore: <sup>c</sup>					
Gross weight	29,000	8,000	12,000	44,000	45,000
Mn content	6,000	1,600	2,400	9,000	9,200
Mercury <sup>c</sup>	50	50	50	50	50
Molybdenum, in concentrate <sup>c</sup>	2,900	3,000	3,100	3,300 <sup>r</sup>	3,600
Nickel: <sup>c</sup>					
Marketable mine production, Ni content:					
Laterite ore	33,227 <sup>3</sup>	34,419 <sup>3</sup>	37,754 <sup>3</sup>	45,690 <sup>3</sup>	45,000
Sulfide concentrate	235,318 <sup>3</sup>	242,758 <sup>3</sup>	239,231 <sup>3</sup>	234,083 <sup>3</sup>	232,000
Total	268,545 <sup>r,3</sup>	277,177 <sup>r,3</sup>	276,985 <sup>r,3</sup>	279,773 <sup>r,3</sup>	277,000
Matte, for export	599	700	1,300	670 <sup>r,e</sup>	600 <sup>e</sup>
Nickel products:					
Ferronickel, Ni content	12,700	12,600	14,400	17,100	16,000
Metal	246,000	254,000	258,000	249,000	237,000
Oxide sinter	3,805 <sup>3</sup>	4,075 <sup>3</sup>	2,713 <sup>3</sup>	235 <sup>3</sup>	200
Chemicals	3,000	3,000	3,500	3,500	3,300
Total	266,000	274,000	279,000	270,000	257,000
Niobium <sup>c</sup>	500	500	500	500	500
Platinum-group metals: <sup>c</sup>					
Platinum kilograms	28,000	29,000 <sup>r</sup>	29,000 <sup>r</sup>	27,000	23,000
Palladium do.	97,000 <sup>r</sup>	97,400	98,400	96,800	87,700
Other do.	15,000 <sup>r</sup>	15,500	15,600	14,500	12,500
Total do.	140,000 <sup>r</sup>	142,000	143,000 <sup>r</sup>	138,000	123,000
Rare earths, loparite concentrate <sup>c</sup>	9,000	9,000	9,500	9,500	10,000
Rhenium <sup>c</sup> kilograms	1,400	1,400	1,400	1,500	1,500
Selenium <sup>c</sup>	85	100	110	110	110
Silicon <sup>c</sup>	550,000	525,000	600,000	635,000	640,000
Silver: <sup>c</sup>					
Mine output, Ag content kilograms	1,276,900 <sup>3</sup>	1,350,000 <sup>3</sup>	1,250,000	1,200,000	1,300,000
Secondary recovery do.	265	265	265	265	265
Tantalum, tantalum pentoxide content of ore	39	39	39	40	40
Tellurium <sup>c</sup>	34	34	34	34	35
Tin: <sup>c</sup>					
Mine output, recoverable Sn content	2,500	3,000	3,000	2,500	1,500
Metal, smelter:					
Primary	4,570	5,000	4,980	3,800	2,000
Secondary	500	500	500	400	300
Total	5,070	5,500	5,480	4,200	2,300
Titanium sponge <sup>c</sup>	26,000	29,000	32,000	34,200	36,000
Tungsten, concentrate, W content <sup>c</sup>	2,800 <sup>r</sup>	2,800 <sup>r</sup>	2,800 <sup>r</sup>	3,300 <sup>r</sup>	3,000
Vanadium, metal <sup>c</sup>	10,900	15,100	15,100	14,500	14,500
Zinc: <sup>c</sup>					
Mine output, recoverable Zn content	161,700 <sup>3</sup>	180,000 <sup>r</sup>	190,000 <sup>r</sup>	185,000	204,000
Metal, smelter, primary and secondary	240,000	220,000	240,000	260,000	260,000
Zirconium, baddeleyite concentrate, averaging 98% ZrO <sub>2</sub> <sup>c</sup>	5,500	6,700	7,500	7,136 <sup>3</sup>	7,000 <sup>3</sup>

See footnotes at end of table.

TABLE 24—Continued  
 EURASIA REGION—RUSSIA: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
<b>INDUSTRIAL MINERALS</b>					
Asbestos, grades I-VI	923,000	925,000 <sup>e</sup>	925,000 <sup>e</sup>	1,025,000 <sup>r</sup>	1,017,000
Barite	63,400	63,400	63,000	63,000 <sup>e</sup>	63,000 <sup>e</sup>
Boron <sup>e</sup> thousand metric tons	500	400	400	400	400
Cement, hydraulic	45,700,000	48,500,000	54,700,000	59,900,000	53,600,000
Clays: <sup>e</sup>					
Bentonite	870,000	850,000	830,000	800,000	800,000
Kaolin concentrate	1,200,000	1,150,000	1,000,000	1,000,000	1,000,000
Diamond: <sup>e</sup>					
Gem carats	23,700,000	23,000,000	23,400,000	23,300,000	21,925,000 <sup>3</sup>
Industrial do.	15,200,000	15,000,000	15,000,000	15,000,000	15,000,000
Synthetic do.	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
Total do.	119,000,000	118,000,000	118,000,000	118,000,000	117,000,000
Feldspar <sup>e</sup>	156,391 <sup>3</sup>	160,000	160,000	160,000	160,000
Fluorspar, concentrate, 55% to 96.4% CaF <sub>2</sub>	226,400	245,500	210,000 <sup>e</sup>	180,000 <sup>e</sup>	269,000 <sup>e</sup>
Germanium	3	3	2	2	2 <sup>e</sup>
Graphite	5,500	5,300	5,100	5,100	5,100 <sup>e</sup>
Gypsum <sup>e</sup>	2,077,000 <sup>3</sup>	2,200,000	2,200,000	2,300,000	2,300,000
Iodine <sup>e</sup>	105,000 <sup>3</sup>	300,000 <sup>r</sup>	300,000 <sup>r</sup>	300,000 <sup>r</sup>	300,000
Lime, industrial and construction <sup>e</sup>	8,200,000 <sup>3</sup>	8,200,000	8,200,000	8,200,000	8,200,000
Mica <sup>e</sup>	100,000	100,000	100,000	100,000	100,000
Nitrogen, N content of ammonia	9,800,000	10,000,000	10,500,000	10,500,000 <sup>e</sup>	10,425,000
Perlite	56,000	55,000	52,000	52,000	52,000 <sup>e</sup>
Phosphate rock: <sup>e</sup>					
Gross weight	11,345,300 <sup>3</sup>	11,317,400 <sup>3</sup>	10,866,000 <sup>3</sup>	11,000,000	11,000,000
P <sub>2</sub> O <sub>5</sub> content:					
Apatite concentrate, 37% to 39.6%	4,220,000	4,210,000	4,040,000	4,120,000	3,800,000
Sedimentary rock, 19% to 30%	123,000	123,000	118,000	120,000	120,000
Total	4,340,000	4,330,000	4,160,000	4,240,000	3,920,000
Potash, marketable, K <sub>2</sub> O equivalent	6,405,000	7,131,000	6,610,000 <sup>e</sup>	7,275,000 <sup>r</sup>	6,730,000
Salt, all types	2,900,000	2,700,000	2,800,000	2,200,000	2,200,000 <sup>e</sup>
Soda ash <sup>e</sup>	2,600,000	2,600,000	2,800,000	2,900,000	2,800,000
Sulfur: <sup>e</sup>					
Native	50,000	50,000	50,000	50,000	50,000
Pyrites	286,000	304,000	304,000	200,000	200,000
Byproduct:					
Metallurgy	572,000	640,000	695,000	800,000	820,000
Natural gas	5,909,958 <sup>3</sup>	6,301,000 <sup>3</sup>	6,346,000 <sup>3</sup>	6,000,000	6,100,000
Total	6,820,000	7,300,000	7,400,000	7,050,000	7,170,000
Sulfuric acid	9,200,000	9,500,000	9,500,000	9,689,000 <sup>r,3</sup>	9,106,000 <sup>3</sup>
Talc <sup>e</sup>	150,000	160,000	160,000	170,000	160,000
Vermiculite <sup>e</sup>	21,000	25,000	25,000	25,000	25,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal:					
Anthracite thousand metric tons	7,202 <sup>r</sup>	6,300 <sup>r</sup>	8,290 <sup>r</sup>	8,662 <sup>r</sup>	9,823
Bituminous do.	182,556 <sup>r</sup>	192,913 <sup>r</sup>	202,128 <sup>r</sup>	209,216 <sup>r</sup>	237,259
Lignite do.	69,186 <sup>r</sup>	73,668 <sup>r</sup>	74,148 <sup>r</sup>	71,143 <sup>r</sup>	76,044
Total do.	258,944 <sup>r</sup>	272,881 <sup>r</sup>	284,566 <sup>r</sup>	289,021 <sup>r</sup>	323,126
Coke, 6% moisture content do.	32,274 <sup>r</sup>	29,998 <sup>r</sup>	30,701 <sup>r</sup>	33,908 <sup>r</sup>	32,000
Natural gas, marketed million cubic meters	633,950	635,964	656,230	653,000 <sup>r</sup>	664,999
Oil shale	1,300,000	1,700,000	1,900,000	1,900,000	1,900,000 <sup>e</sup>
Peat, fuel use	1,500,000	1,600,000	1,300,000	1,300,000	1,300,000
Petroleum:					
Crude:					
In gravimetric units	458,808,000	469,600,000	480,480,000	491,000,000	488,105,000
In volumetric units <sup>e</sup> thousand 42-gallon barrels	3,300,000	3,500,000	3,530,000	3,610,000 <sup>r</sup>	3,590,000
Refinery products <sup>5</sup>	195,000,000	207,000,000	219,575,000	211,000,000	236,301,000

See footnotes at end of table.

TABLE 24—Continued  
 EURASIA REGION—RUSSIA: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
<b>MINERAL FUELS AND RELATED MATERIALS—Continued</b>					
<b>Uranium:</b>					
U content	3,223	3,431	3,262	3,413	3,521
U <sub>3</sub> O <sub>8</sub> content	3,801	4,045	3,847	3,762	4,152

<sup>6</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>7</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>In addition to the commodities listed, Russia produces a number of other mineral commodities, which include lithium and its compounds, rare-earth metal concentrates, metals, and compounds, and zirconium metal, but available information is inadequate to estimate production.

<sup>2</sup>Table includes data available through January 31, 2010.

<sup>3</sup>Reported figure.

<sup>4</sup>In December 2001, Mechel OAO acquired a 79.9% interest in the South Urals Nickel Plant, which was previously operated by Yuzhuralnikel Combine JSC. The new owner made substantial improvements to the Orsk ferronickel plant and produced a low-iron ferronickel (greater than 85% nickel). Excludes nickel-chromium remelt alloy produced from scrap. The remelt alloy typically has a nickel content of 20% to 50%.

<sup>5</sup>Not distributed by type and therefore not suitable for conversion to volumetric units. Data include all energy and nonenergy products but exclude losses.



TABLE 25  
EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
Alumina	Achinsk (United Company RUSAL) <sup>3</sup>	Achinsk in East Siberia	900,000
Do.	Bogoslovsk (United Company RUSAL) <sup>3</sup>	Krasnotur'insk	1,050,000
Do.	Boksitogorsk (United Company RUSAL) <sup>3</sup>	European north	200,000
Do.	Pikalyovo (United Company RUSAL) <sup>3</sup>	Pikalyovo	300,000
Do.	Uralsk (United Company RUSAL) <sup>3</sup>	Kamensk-Uralskiy	700,000
Aluminum, primary smelters	Bogoslovsk (United Company RUSAL) <sup>3</sup>	Krasnotur'insk	175,000
Do.	Bratsk (United Company RUSAL) <sup>3</sup>	Bratsk	950,000
Do.	Irkutsk (United Company RUSAL) <sup>3</sup>	Irkutskaya Oblast'	300,000
Do.	Kandalaksha (United Company RUSAL) <sup>3</sup>	Kola Peninsula	75,000
Do.	Khakas (United Company RUSAL) <sup>3</sup>	Khakassiya	300,000
Do.	Krasnoyarsk (United Company RUSAL) <sup>3</sup>	Krasnoyarskiy Kray	875,000
Do.	Nadvoitsy (United Company RUSAL) <sup>3</sup>	Nadvoitsy, Kareliya (Petrozavodsk) Republic	75,000
Do.	Novokuznetsk (United Company RUSAL) <sup>3</sup>	Novokuznetsk	300,000
Do.	Sayansk (United Company RUSAL) <sup>3</sup>	Sayanogorsk	425,000
Do.	Uralsk (United Company RUSAL) <sup>3</sup>	Kamensk-Uralskiy	150,000
Do.	Volgograd (United Company RUSAL) <sup>3</sup>	Volgogradskaya Oblast'	175,000
Do.	Volkhov (United Company RUSAL) <sup>3</sup>	Volkhov, east of St. Petersburg	20,000
Amber	Kaliningrad Amber enterprise (Kaliningrad regional authorities and Alrosa Co. Ltd.)	Kaliningrad Oblast'	250
<b>Antimony:</b>			
Sb content of concentrate	Sarylakh deposit	Ust'-Nera region, Sakha (Yakutiya) Republic	6,000 <sup>4</sup>
Do.	Sentachan deposit	Northeastern Sakha (Yakutiya) Republic	NA
Compounds and metals	Ryazsvetmet plant	Ryazanskaya Oblast'	NA
Apatite, concentrate	Khibiny apatite association (OAO Apatit)	Kola Peninsula	15,000,000
Do.	Kovdor iron ore mining association	do.	700,000
Asbestos	Bazenovskoye chrysotile deposit	Sverdlovsk Oblast'	NA
Do.	Molodeznoye deposit	Zabaykal'sk (Chita) Oblast'	NA
Do.	"Ogenburg Minerals" Co., Kiembraevskoye chrysotile deposit	Orenburgskaya Oblast'	500,000
Do.	"Tuvaasbest" Plant, Ak-Dovurakskoye chrysotile deposit	Tyva (Kyzyl) Republic	250,000
Do.	"Uralasbest" Mining and Clarification Plant	Central Ural Mountains	1,100,000
Barite	Salarinskiy mining and beneficiation complex	Kvartsitovaya Sopka deposit	100,000
Bauxite	North-Urals mining company (United Company RUSAL) <sup>3</sup>	Severoural'sk region	NA
Do.	South-Urals mining company (United Company RUSAL) <sup>3</sup>	South Ural Mountains	NA
Do.	Severnaya Onega Mine (United Company RUSAL) <sup>3</sup>	Northwest region	800,000
Do.	Komi Aluminum (United Company RUSAL) <sup>3</sup>	Sredne-Timan	3,000,000
Boron, boric acid	Bor Association	Primorskiy (Maritime) Kray	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 metric tons Kuznetsk Basin (Kuzbass)	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 (Syktyvkar) Republic	30,000,000
Do.	South Yakutiya Basin	Sakha (Yakutiya) Republic	17,000,000
Cobalt:	OJSC MMC Norilsk Nickel	Noril'sk, Kola Peninsula	4,000
Do.	Rezh and Yuzhuralnikel enterprises	South Ural Mountains	2,100
Do.	Ufaleynikel company	Chelyabinsk Oblast', Ural Mountains	4,000
Do.	Khovu-Aksynskoe (nickel-cobalt) deposit	Khovu-Aksy, Tyva (Kyzyl) Republic	NA

See footnotes at end of table.

TABLE 25—Continued  
EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>6</sup>	
<b>Copper:</b>				
Cu in ore	OJSC MMC Norilsk Nickel	Noril'sk region, Kola Peninsula	500,000	
Do.	Russian Copper Co. (RMK)	Urals	70,000	
Do.	Ural Mining and Metallurgical Co. (UMMC)	do.	230,000	
Metal, refined	OJSC MMC Norilsk Nickel	Noril'sk region, Kola Peninsula	450,000	
Do.	Russian Copper Co. (RMK)	Urals	170,000	
Do.	Ural Mining and Metallurgical Co. (UMMC)	do.	360,000	
Diamond, gem and industrial	Almazy Rossii-Sakha Joint Stock Co. (Alrosa Co. Ltd.) enterprises:	Sakha (Yukutiya) Republic mines:		
	thousand carats	Udachnyy mining and beneficiation complex	Zarnitsa and Udachnyy	NA
Do.	do.	Mirny mining and beneficiation complex	Mir and International	NA
Do.	do.	Aikhal mining and beneficiation complex	Aikhal and Komsomol'skiy	NA
Do.	do.	Anabaraskiy mining and beneficiation complex	Alluvial mines	NA
Do.	do.	Nyurbinskiy mining and beneficiation complex	Nyurbinskiy and Botuobinskiy	NA
Do.	do.	Lomonosov	Arkhangel'skaya Oblast'	NA
Feldspar	Kheto-Lanbino and Lupikko deposits	Kareliya (Petrozavodsk) Republic	NA	
Ferroalloys	Kosaya Gora iron works	Kosaya, Gora	200,000	
Do.	Kuznetsk ferroalloys plant	Novokuznetsk	400,000	
Do.	Lipetsk iron and steel works	Lipetskaya Oblast'	NA	
Do.	Serov ferroalloy plant	Sverdlovsk Oblast'	NA	
Do.	Chelyabinsk electrometallurgical plant	Chelyabinskaya Oblast'	450,000	
Do.	Chusovoy iron and steel plant	Perm' Krai	NA	
Do.	Klyuchevsk ferroalloy plant	Dvurechensk	160,000	
Ferronickel	Ufaleynikel company	Chelyabinsk Oblast', Urals	5,000	
Ferrovandium	Vanadii-Tulachermet	Tula, North Caucasus	NA	
Fluorspar	Abagaytuy deposit	Transbaikal	NA	
Do.	Usugli Mine	do.	NA	
Do.	Kyaktinsky deposit	do.	NA	
Do.	Kalanguy mining complex	Zabaykal'sk (Chita) Krai, Transbaikal	NA	
Do.	Yaroslavsky mining-beneficiation complex	Pogranichnoye and Vosnesenskoye deposits, Russian Far East's Primorskiy (Maritime) Krai	NA	
Gallium	Achinsk (United Company RUSAL) <sup>3</sup>	Achinsk in East Siberia	15 <sup>4</sup>	
Do.	OOO Gallyi	NA	NA	
Do.	Novosibirsk tin complexes	Novosibirsk	NA	
Do.	Pikalevo (United Company RUSAL) <sup>3</sup>	Pikalevo	NA	
Germanium, metal and products	Federal State Unitary Enterprise Germanium	Kranoyarsk	7	
Gold	kilograms	Mining companies:	Mining regions:	
		Amur a/s ZAO	Khabarovsk Krai	5,500
Do.	do.	Buryatzoloto OAO	Buryat Republic	5,000
Do.	do.	Chukotka a/s	Chukotsk Autonomous Oblast'	1,700
Do.	do.	GRK Aldanzoloto OOO	Sakha (Yukutiya) Republic	4,000
Do.	do.	LT-Resurs, ZAO	Irkutsk Oblast'	2,700
Do.	do.	Neryungri-Metallik, OOO	Sakha (Yukutiya) Republic	1,500
Do.	do.	Nirungan, OOO	do.	1,100
Do.	do.	Omchak OAO	Magadan Oblast'	3,000
Do.	do.	Omolonskaya ZRK, OAO	do.	5,000
Do.	do.	Omsukchanskaya GKG, ZAO	do.	3,000
Do.	do.	Oyna, a/s	Tyva (Kyzyl) Republic	1,500
Do.	do.	Pokrovskiy Mine OAO	Amur Oblast'	6,000
Do.	do.	Polimetal, MNPO, OAO	Magadan and Sverdlovsk Oblast's, Khabarovsk Krai	7,500
Do.	do.	Polyarnaya, a/s	Chukotsk Autonomous Oblast'	1,000
Do.	do.	Polyus ZAO	Krasnoyarsk Krai	38,000
Do.	do.	Priisk Drazhnyy, OOO	do.	1,200
Do.	do.	Priisk Solov'yevskiy, OAO	Amur Oblast'	1,500
Do.	do.	Ros-DV, OOO	Khabarovsk Krai	1,100
Do.	do.	Russdragmet OOO	Khabarovsk Krai, Chita Oblast'	6,000
Do.	do.	Seligdar, a/s	Sakha (Yukutiya) Republic	2,000

See footnotes at end of table.

TABLE 25—Continued  
 EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Gold—Continued	kilograms	Mining companies—Continued:	Mining regions—Continued:
		Sovrudnik, OOO	Krasnoyarsk Krai
		Susumanzoloto, OAO	Magadan Oblast'
Do.	do.	Seligdar, a/s	Sakha (Yukutiya) Republic
Do.	do.	Sovrudnik, OOO	Krasnoyarsk Krai
Do.	do.	Susumanzoloto, OAO	Magadan Oblast'
Do.	do.	Uralsktomed', OAO	Sverdlovsk Oblast'
Do.	do.	Vitim, a/s	Irkutsk Oblast'
Do.	do.	Votok, a/s	Khabarovsk Krai
Do.	do.	Yuzhuralzoloto	Chelyabinsk Oblast'
Do.	do.	Zapadnaya, a/s	Krasnoyarsk Krai
Do.	do.	Zolotaya, ZDK, ZAO	Khakasiya Republic
Indium:			
Primary	Chelyabinsk zinc plant	Chelyabinsk	6
Secondary	Elektrotsink plant	Vladikavkaz	6
Iron ore	Kursk Magnetic Anomaly (KMA) region, which contains the following enterprises: Lebedi and Stoilo Mikhaylovka	Locations:  Gubkin Zheleznogorsk	50,000,000 <sup>4</sup>
Do.	Northwest region, which contains the following enterprises: Kostomuksha Kovdor Olenegorsk	Locations:  Kostomuksha Kola Peninsula Olenegorsk	22,000,000 <sup>4</sup>
Do.	Siberia region, which contains the following enterprises: East: Korshunovo Rudnogorsk West: Abakan Sheregesh Tashtagol Teya	Locations:  Zheleznogorsk Rudnogorsk  Abaza Sheregesh Tashtagol Vershina Tei	18,000,000 <sup>4</sup>
Do.	Ural Mountains region, which contains the following enterprises: Akkermanovka Bakal Goroblagodat Kachkanar Magnitogorsk Peshchanka	Locations:  Novotroitsk Bakal Kushva Kachkanar Magnitogorsk Rudnichnyy	22,000,000 <sup>4</sup>
Lead, metal	Dalpolymetal lead smelter	Rudnaya in the Primorskiy (Maritime) Krai	20,000
Do.	Elektrozinc lead smelter [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz in North Caucasus	40,000
Lead-zinc, recoverable content of ore:			
Lead, recoverable Pb content of ore	Altay mining-benefication complex	Altay (Barnaul) Krai, South Siberia	2,000
Do.	Dalpolymetal mining-benefication complex	Primorskiy (Maritime) Krai	20,000
Do.	Nerchinsk polymetallic complex	Chitinskaya Oblast'	7,000
Do.	Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	5,000
Do.	Salair mining-benefication complex	Kemerovo Oblast'	2,000
Zinc, recoverable Zn content of ore	Altay mining-benefication complex	Altay (Barnaul) Krai, South Siberia	1,000
Do.	Dalpolymetal mining-benefication complex	Primorskiy (Maritime) Krai	25,000
Do.	Nerchinsk polymetallic complex	Chitinskaya Oblast'	12,500
Do.	Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	14,000
Do.	Salair mining-benefication complex	Kemerovo Oblast'	10,500

See footnotes at end of table.

TABLE 25—Continued  
EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Lithium and its compounds	JSC Novosibirsk Chemical Plant (TVEL Corp.)	Novosibirsk	NA
Do.	JSC Chemical-Metallurgical Plant (TVEL Corp.)	Kransnoyarsk	NA
Magnesite	Karagayskiy open pit (Magnezit Group) and Magnezitovaya underground mine (Magnezit Group)	Sakha group of deposits (Chelyabinsk Oblast')	3,800,000 <sup>4</sup>
Magnesium, metal (for sale)	Avisma plant	Berezniki	35,000
Do.	Solikamsk plant (Uralkaliy)	Perm' Kray	30,000
Mica	Emel'dzhak deposit, Aldan Shield	Sakha (Yakutiya) Republic	NA
Do.	Lopatova Guba mica pit, Northern Kareliya	Kareliya (Petrozavodsk) Republic	NA
Do.	Kovdor phlogopite Mine (Mica Mine; Slyuda Mine; Kovdorslyuda Shaft)	Kola Peninsula, Murmansk Oblast'	NA
Do.	Irkutsk complex (JSC "Vostoksluda")	Mam deposit, Irkutsk Oblast'	NA
Molybdenum	Dzhida tungsten-molybdenum Mine	West Transbaikal	NA
Do.	Sorsk molybdenum mining enterprise	Khakasiya (Abakan) Republic	NA
Do.	Tymyauz tungsten-molybdenum Mine	North Caucasus	NA
Do.	Shakhtaminskoye molybdenum mining enterprise	Chitinskaya Oblast'	NA
Natural gas	million cubic meters	Komi Republic	8,000
Do.	do.	Noril'sk area	5,500
Do.	do.	North Caucasus	6,000
Do.	do.	Sakhalin	2,000
Do.	do.	Tomsk Oblast	500
Do.	do.	Tyumen Oblast, including:	do.
Do.	do.	Medvezhye field	575,000 <sup>4</sup>
Do.	do.	Urengoy field	(75,000)
Do.	do.	Vyrngapur field	(300,000)
Do.	do.	Vyrngapur field	(17,000)
Do.	do.	Yamburg field	(170,000)
Do.	do.	Bovanenko field	Yamal Peninsula
Do.	do.	Pestsovoy field	Ob-Taz Gulf area
Do.	do.	Zapolyarny field	do.
Do.	do.	Schtokmanov field	Barents Sea
Do.	do.	Urals	Ural'skiye Gory
Do.	do.	Volga	Volgoda Oblast'
Do.	do.	Yakut-Sakha	Sakha (Yakutiya) Republic
Nepheline syenite	Apatite complex	Kola Peninsula	1,500,000
Do.	Kiya-Shaltyr Mine	Goryachegorsk massif, east Siberia	NA
Nickel:			
Ni in ore	OJSC MMC Norilsk Nickel	Noril'sk region, Kola Peninsula	300,000
Do.	Yuzhuralnikel company	South Urals	3,000
Do.	Ufaleynikel company	Chelyabinsk Oblast', Urals	17,000
Metal:			
Smelting	OJSC MMC Norilsk Nickel	Noril'sk region, Kola Peninsula	160,000
Do.	do.	Pechenga	50,000
Do.	do.	Monchegorsk	50,000
Refining	do.	Noril'sk region, Kola Peninsula	100,000
Do.	do.	Monchegorsk	140,000
Ni products and Ni in FeNi	Rezh, Ufaleynikel, and Yuzhuralnikel enterprises	South Urals	65,000
Niobium (columbium)	Karnasurt mining enterprise (AO Sevredmet)	Lovozerkoye deposit, Kola Peninsula	12,000
Oil shale	Leningradslanets Association	Slantsy, Leningrad Oblast'	5,000,000
Petroleum	Bashneft	Bashkortostan Republic	12,000,000
Do.	Gazprom	Deposits throughout Russia	50,000,000

See footnotes at end of table.

TABLE 25—Continued  
 EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Petroleum—Continued	OAO Lukoil	West Siberian deposits Kechimovskoye Nivagalskoye Urals deposits Volga deposits Timen Pechora deposits Yuzhnaya Khylichuya Komi Republic deposits Kyrtyayelskoye Pashshorskoye Perevoznoye	100,000,000 <sup>4</sup>
Do.	OAO Novatek	West Siberia	5,000,000
Do.	OJSC OC Rosneft	Deposits throughout Russia	120,000,000
Do.	Russneft	Central and West Siberia, Ural Mountains and Volga regions	15,000,000
Do.	JSC Slavneft	West Siberia and Krasnoyarsk Kray	20,000,000
Do.	OJSC Surgutneftegas		60,000,000
Do.	OAO Tatneft	Deposits Romashkinskoye Novo-Elkhovskoye Bavlinskoye Bondyuzskoye Pervomayskoye Sabandchinskoye	30,000,000 <sup>4</sup>
Do.	TNK-BP	Deposits Kamennoye Kovyatka Russkoye Suzunskoye Tagulskoye Uvat Verkhnechonsk	75,000,000 <sup>4</sup>
Phosphate rock	Kingisepp complex (OAO fosforit)	Leningradskaya Oblast'	3,500,000
Do.	Lopatino and Yegorevsk deposits	Moscow Oblast'	NA
Do.	Polpinskoye deposit	Bryanskaya Oblast'	NA
Do.	Verkhnekamsk deposit	Ural'skiye Gory	NA
Phosphate rock, apatite concentrate	OAO Apatit	Kola Peninsula	12,000,000
Do.	Kovdor iron mining complex	do.	700,000
Platinum-group metals:			
Ore, PGM content	OJSC MMC Norilsk Nickel	Noril'sk region, Kola Peninsula	150
Do.	AO Koryakgeoldobycha, Amur Prospectors	Placer deposits (mostly platinum), Urals; Siberia; Russian Far East	10 <sup>4</sup>
Metals	Krasnoyarsk Nonferrous Metals Plant (Kratsvetmet)	Krasnoyarskiy Kray	NA
Do.	Ekaterinburgskiy plant (EZOTsM)	Sverdlovsk (Yekaterinburg) Republic	NA
Do.	Priobsk plant (OJSC Gazprom Neft)	Khanty-Mansi (Khanty-Mansiisk) Autonomous Okrug	NA
Potash, K <sub>2</sub> O equivalent	OJSC Uralkali	Verkhnekamsk deposit	3,000,000
Do.	OAO Silvinit	Solikamsk-Berezniki regions, Ural'skiye Gory	2,000,000
Rare earths	Lovozerskoye deposit	Kola Peninsula	NA
Salt	AO Bassol'	Lake Baskunchak in Astrakhan' Oblast'	2,500,000
Do.	Dus-Dagskoe deposit	Dus-Dag Mountains	25,000
Silver	Dukat Mine	Magadanskaya Oblast'	1,000

See footnotes at end of table.

TABLE 25—Continued  
 EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Soda ash	Achinsk plant	East Siberia	595
Do.	Berezniki plant	Ural'skiye Gory	1,080
Do.	Pikalevo plant	Leningradskaya Oblast'	200
Do.	Sterlitamak plant	Bashkortostan Republic	2,135
Do.	Volkhov plant	Leningradskaya Oblast'	20
Steel, crude	Companies:	Locations:	
Do.	AO Amurmetal	Komsomol'sk-na-Amure	1,600,000
Do.	JSC Asha Metallurgical Plant	Chelyabinsk Oblast'	450,000
Do.	Beloretsk Iron and Steel Works	Bashkirskoye	380,000
Do.	Chusovskoy Iron and Steel Works	Perm' Krai	570,000
Do.	JSC Electrostal Metallurgical Plant	Moscow	314,000
Do.	Gorkovskoy Metallurgichesky Zavod	Nizhniy Novgorod Oblast'	78,000
Do.	Gur'yevsk Steel Works	Kemerovo Oblast'	160,000
Do.	Karaganda	Karagandinskaya Oblast'	6,300,000
Do.	Kuznetsk Steel Works	Kemerovo Oblast'	4,700,000
Do.	Lys'va Metallurgical Plant	Permskaya Oblast'	350,000
Do.	Magnitogorsk Iron and Steel Works (MMK)	Chelyabinsk Oblast'	16,200,000
Do.	Mechel OAO (Mechel)	do.	7,000,000
Do.	Nizhniy Sergi Steel Works	Sverdlovsk (Yekaterinburg) Oblast'	300,000
Do.	Nizhniy Tagil Iron and Steel Works (NTMK)	do.	8,000,000
Do.	Nosta JSC (JSC Orsk-Kahlilovo Iron and Steel Works)	Novotroitsk, Orenburgskaya Oblast'	4,600,000
Do.	Novolipetsk Iron and Steel Corp. (NLMK)	Lipetskaya Oblast'	9,900,000
Do.	Novosibirsk Steel Works (Novosibprokat)	Novosibirskaya Oblast'	1,100,000
Do.	CJSC Omutninsk Metallurgical Plant	Kirov Oblast'	210,000
Do.	Oskol Electric Steel Works (OEMK)	Staryy Oskol	2,500,000
Do.	Petrovsk-Zabaykal'skiy Steel Works	Petrovsk-Zabaykal'skiy	426,000
Do.	Revdinskiy Steel and Wire Production Works	Sverdlovsk (Yekaterinburg) Oblast'	281,000
Do.	Salda Steel Works	do.	1,900
Do.	Serov Steel Works	do.	1,000,000
Do.	Serp i Molot (Moscow Metallurgical Works)	Moscow	70,000
Do.	Severskiy Tube Works	Polevskoy, Sverdlovsk Oblast'	825,000
Do.	JSC Severstal	Vologda Oblast'	14,000,000
Do.	Sibelektrostal Metallurgical Works	Krasnoyarskiy Krai	110,000
Do.	Sulinskiy Steel Works (Staks)	Rostov Oblast'	280,000
Do.	Taganrog Iron and Steel Works (Tagmet)	do.	925,000
Do.	OAO Tulachermet	Tula Oblast'	18,400
Do.	Viz-Stal (Verkh-Isetsk Steel Works)	Sverdlovsk (Yekaterinburg) Oblast'	132,000
Do.	Volgograd Steel Works (Red October)	Volgograd Oblast'	2,000,000
Do.	Vyksa Steel Works	Nizhniy Novgorod Oblast'	540,000
Do.	Zapsib Met Kombinat (West Siberian Steel Works)	Kemerovo Oblast'	6,900,000
Do.	Zlatoust Iron and Steel Works	Zlatoust, Chelyabinsk Oblast'	1,200,000
Talc	Onotsk deposit	Irkutskaya Oblast'	NA
Do.	Kirgiteysk deposit	Krasnoyarskiy Krai	NA
Do.	Miass deposit	Chelyabinsk Oblast'	NA
Do.	Shabrovsk deposit	Sverdlovsk (Yekaterinburg) Oblast'	NA
Tantalum, ore	Lovozerkoye deposit	Kola Peninsula	10 <sup>4</sup>
	Zabaykalskiy mining and beneficiation complex	Etykinskoye deposit	
Tellurium	OJSC MMC Norilsk Nickel	NA	5
Do.	Ural Mining and Metallurgical Co. (UMMC)	Urals	35

See footnotes at end of table.

TABLE 25—Continued  
 EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
Tin:	Novosibirsk mining-beneficiation complexes:	Locations:	
Ore	Khinganskoye olovo (Jewish Autonomous District)	Khabarovskiy Kray	NA
Do.	Dalolovo	Solnechnyy deposit, Primorskiy (Maritime) Kray	NA
Do.	Deputatskiy (Sakhaolovo)	Sakha (Yakutiya) Republic	NA
Do.	Vostokolovo	Russian Far East	NA
Do.	Iultin mining-beneficiation complex	Magadanskaya Oblast'	NA
Do.	Khrustalnyy mining-beneficiation complex	Primorskiy (Maritime) Kray	NA
Do.	Pevek mining-beneficiation complex	Magadanskaya Oblast'	NA
Metal	Novosibirsk smelter	Novosibirskaya Oblast'	NA
Do.	Podol'sk smelter	Podol'sk	NA
Do.	Ryazan smelter	Ryazanskaya Oblast'	NA
Titanium:			
Metal	Moscow plant	Moscow	NA
Do.	Podol'sk plant	Podol'sk	NA
Do.	Verkhnyaya Salda Metallurgical Production Association (VSMPO)-Avisma Titanium-Magnesium complex	Sverdlovskaya Oblast', Ural Mountains	NA
Sponge	Verkhnyaya Salda Metallurgical Production Association (VSMPO)-Avisma Titanium-Magnesium complex	do.	40,000
Tungsten:	Deposits:	Locations:	
W content of concentrates	Aginskoye deposit	Sakha (Yakutiya) Republic	NA
Do.	Antonovogorsk deposit	East Transbaikal, Chita Oblast'	NA
Do.	Balkan deposit	Northeast of Magnitogorsk, Ural'skiye Gory	NA
Do.	Belukha deposit	East Transbaikal, Chita Oblast'	NA
Do.	Bom-Grokhom deposit	West Transbaikal	NA
Do.	Dzhida deposit	do.	NA
Do.	Iultin deposit	Magadansk Oblast'	NA
Do.	Kti-Teberdaskoye deposit	North Caucasus	NA
Do.	Lermontovo W-Au deposit	Russian Far East	NA
Do.	Primorsky deposit	do.	NA
Do.	Solnechnyy deposit	Southern Khabarovskiy Kray	NA
Do.	Tyrnyauz tungsten-molybdenum mining and processing complex	Kabardino-Balkariya (Nal'chik) Republic, North Caucasus	NA
Metal, tungsten anhydride	Gidrometallurg plant	Kabardino-Balkariya (Nal'chik) Republic, North Caucasus	NA
Uranium, U content	TVEL Corp. enterprises: ZAO Dalur mining enterprise OAO Khiagda mining enterprise Priargunsky mining and chemical enterprise	Locations: Kurganskaya Oblast' Buryatiya (Ulan-Ude) Republic Krasnokamensk, Zabaykal'sk (Chita) Kray	3,500 <sup>4</sup>
Vanadium:			
Ore	Kachkanar iron mining complex	Ural'skiye Gory	NA
Metal	Chusovoy and Nizhniy Tagil plants	do.	17,000
Pentoxide	Vanadii-Tulachermet	Tula Oblast', North Caucasus	NA
Zinc:			
Zn content of copper-zinc ore	Bashkir copper-zinc complex	Sibai, southern Ural Mountains	5,000
Do.	Buribai copper-zinc mining complex	Buribai, southern Ural Mountains	1,500
Do.	Gai copper-zinc mining-beneficiation complex	Gai, southern Ural Mountains	25,000
Do.	Kirovgrad copper enterprise	Kirovgrad, central Ural Mountains	1,200
Do.	Sredneural'sk copper complex	Revda, central Ural Mountains	5,000
Do.	Uchali copper-zinc mining-beneficiation complex	Uchalinskiy Rayon, southern Ural	90,000

See footnotes at end of table.

TABLE 25—Continued  
 EURASIA REGION—RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>3</sup>
<b>Zinc—Continued:</b>			
Metal	Chelyabinsk electrolytic zinc plant	Chelyabinskaya Oblast <sup>4</sup>	200,000
Do.	Elektrozink plant [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz, North Caucasus	90,000
Do.	Uralkhrommed plant [Ural Mining and Metallurgical Co. (UMMC)]	Verkhnyaya Pyshma	17,000
<b>Zirconium:</b>			
Baddaleyite concentrate	Kovdor iron ore mining and beneficiation complex	Kola Peninsula	3,500
Metal	Chepetsky metallurgical plant (TVEL Corp.)	Glazov, Udmurt Republic	NA

<sup>3</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through January 31, 2010.

<sup>2</sup>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 discrepancies in the names of enterprises and that of locations.

<sup>3</sup>United Company RUSAL was formed by the merger of RUSAL (Russian Aluminum), SUAL (Siberian-Urals Aluminium Company Group), and the alumina assets of Glencore, completed in March 2007.

<sup>4</sup>Capacity estimates are totals for all enterprises that produce that commodity.



