



2007 Minerals Yearbook

KAZAKHSTAN

THE MINERAL INDUSTRY OF KAZAKHSTAN

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Kazakhstan ranked second only to Russia among the countries of the Commonwealth of Independent States (CIS) in the volume of its mineral production. It is endowed with large resources of a wide range of metallic ores, industrial minerals, and mineral fuels, and its metallurgical sector is a major producer of a large number of metals from domestic and imported raw materials. Its mining sector produced bauxite, chromite, copper, gold, iron, lead, manganese, and zinc ores, and its metallurgical sector produced such metals as beryllium, bismuth, cadmium, copper, ferroalloys, lead, magnesium, rhenium, steel, tantalum, titanium, and zinc. The country produced other nonferrous and precious metals and industrial minerals as byproducts or in smaller-scale operations, such as arsenic, barite, cadmium, molybdenum, phosphate rock, and silver. The country was a large regional producer of mineral fuels, including coal, natural gas, and oil, and was a leading world producer of uranium.

Minerals in the National Economy

In 2007, the volume of production in Kazakhstan's mineral extraction industry increased by 2.6% compared with that of 2006. The volume of output of the energy and fuel extraction sector increased by 3% compared with that of 2006, and the volume of output of the mining sector, which excludes fuel and energy raw materials, decreased by 0.4%. The volume of output of the metallurgical sector increased by 3%; within this sector, the volume of production in the ferrous metallurgical sector increased by 11.5% and the volume of production in the nonferrous metallurgical sector decreased by 1.7%. In 2007, the value of industrial production accounted for 28.3% of the value of the gross domestic product in current prices and that of the mineral extraction industry accounted for about 57% of the value of industrial production in current prices (Agency of Statistics of the Republic of Kazakhstan, The, 2009).

Government Policies and Programs

According to the 2003 Land Code, only native born and naturalized citizens of Kazakhstan and Kazakhstan companies may own land in Kazakhstan, although certain categories of land are excluded from private ownership. Only state-owned entities may permanently use land according to this law. Land may be leased on a short-term or a long-term basis. Short-term land leases last for up to 5 years; for long-term leases, the maximum period is 49 years. Kazakhstan law specifies that no sectors of the economy are fully closed to foreign investors, but there are some limitations on participation, depending on the sector. The 2005 Production Sharing Agreement (PSA) law mandates that, for offshore projects, the state oil company JSC NC KazMunaiGaz must have a minimum 50% ownership stake. In 2004, the Government amended the law regulating oil and gas exploration by assigning to the state the right of

first refusal on the purchase of shares in PSAs in the extractive industries. According to the Government, the law applies to all existing and future contracts and supersedes any preemptive rights consortium partners might have negotiated in the original contracts (U.S. Department of State, 2007).

Amendments to the Oil and Gas Law that were passed in 1999 require mining and oil companies to use local goods and services. Subsurface users must comply with local content regulations, which obligate them to purchase goods and services from Kazakhstan entities (provided that the local goods meet minimum project standards) and they must also give preference to the employment of local personnel. In their tenders, prospective subsurface users are required to specify the anticipated local content of their work, goods, and services. Amendments to the Law on Subsurface Use, which were approved in 2004, also require that tender proposals specify the user's commitment to developing regional infrastructure and contributing to the provision of social services (U.S. Department of State, 2007).

The Government of Kazakhstan has a major role in overseeing foreign investment. Government officials at the highest levels have screened major foreign investment proposals, such as the PSAs for Kashagan (Kazakhstan's massive offshore Caspian Sea oilfield) and for the Karachaganak oilfield and gasfield, which appears to have received the President of Kazakhstan's personal stamp of approval (U.S. Department of State, 2007).

Amendments to the law "On Petroleum" (the "Petroleum Law") dated June 28, 1995, and to the law "On the Subsurface and Use of the Subsurface" (the "Subsurface Law") dated January 27, 1996, were approved by the Senate on January 12, 2007. These amendments change Kazakhstan's preemptive purchase right by stipulating that the Government must pay the world market price [that is, a price that does not exceed the world market price] and prohibit the transfer of subsurface-use rights "for two years after the effective date of a Hydrocarbon Contract." This rule does not apply to rights "disposed of during a liquidation, reorganization or the exercise of a security interest" or when the transferee is KazMunaiGaz, which is the country's state oil company.

Legislation was also signed into law on January 12, 2007, that prevents foreign investors from selling stakes in Kazakhstan's assets to third parties for 2 years after purchase. In discussing this legislation, the Energy and Natural Resources Minister said that the law would provide a way for the Government to respond to the \$1.9 billion sale of the Karazhanbas oilfield by Canada-based Nations Energy Company Ltd. to China International Trust and Investment Corp. (CITIC). The Minister also stated that the 2005 sale of PetroKazakhstan—another Canada-based company with Kazakh oil assets—to a Chinese firm illustrated the need for the new law, which gives Kazakhstan the right of first refusal to buy assets in any proposed transfer of oil assets between foreign companies.

KazMunaiGaz became a stakeholder in PetroKazakhstan in 2005 and, following the passage of this legislation, KazMunaiGaz executed an agreement with CITIC to purchase 50% of Karazhanbas (Caucas.com, 2005; Access My Library, 2007; Nurshayeva, 2007b).

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 President of Kazakhstan signed the amendments into law on October 24. Under the new law, in those instances in which actions by holders of subsurface deposits have the potential to "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 law also allows the Government to 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, 2007c; Reuters, 2007b).

Production

In 2007, output decreased somewhat for most of the major mineral commodities produced in the country, which included copper, lead, and zinc metal. Production increased somewhat for other metals, however, including chromite and titanium sponge, of which the country was one of the world's leading producers. In the mineral fuel sector, Kazakhstan continued to increase production of oil and natural gas, of which it was a large regional producer, and of uranium, of which the country planned to be the world's leading producer by 2009. Data on mineral production are in table 1.

Structure of the Mineral Industry

Eurasian Natural Resources Corporation PLC (ENRC) was a mining and metals group with more than 64,000 employees; it had revenue of more than \$4.1 billion in 2007. The ENRC group controlled Aluminium of Kazakhstan, Kazchrome chromite mining and ferroalloys production enterprise, 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. The leading shareholders in ENRC were the Kazakhstan Government followed by the copper company Kazakhmys PLC (Kazakhstan Embassy in Ukraine and Moldova, 2007; Kazakhstan News Bulletin, 2007).

In 2007, ENRC announced that it had completed the acquisition of a controlling interest in the Serov group and certain related entities in Russia. The Serov group owned Russia's only chromite producing enterprise as well as a

ferroalloy producing enterprise in eastern Russia (Eurasian Natural Resources Corporation PLC, 2008a).

Kazakhmys, which was the country's leading copper producer, was a United Kingdom-registered copper mining company whose main assets were located in Kazakhstan. Its headquarters were located in London and the headquarters of its main subsidiary, Kazakhmys Corp., were located in Dzhezkazgan, Kazakhstan. The company was listed on the London Stock Exchange in October 2005. Glencore International AG, which was headquartered in Switzerland, owned or controlled (by way of 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 Kazakhstan's major oilfield and gasfield developments since the country achieved statehood in 1991 were by projects in which foreign companies and Kazakhstan state-owned firms had some form of joint ownership. The country's uranium industry was controlled by National Atomic Company Kazatomprom, a holding company that was engaged in six main areas of activity: energy, geologic exploration, metallurgy, scientific support and staff training, social support, and uranium mining. Kazatomprom's stock was 100% held by the Government and it employed more than 25,000 people. Kazatomprom was the country's sole importer, exporter, and transporter of uranium and other products used in the nuclear power industry (Interfax Russia & CIS Metals and Mining Weekly, 2007d).

Mineral Trade

Hydrocarbons (65%) and ores and metals (14%) accounted for 79% of the value of the Kazakhstan's exports (Federation of International Trade Associations, 2008). The country was sending 100% of its gas exports and 90% of its oil exports on routes through Russia. Discussions were underway concerning Kazakhstan diversifying its fuel export routes. Metals were the second ranked export after crude oil (Embassy of Kazakhstan in the United Kingdom of Great Britain and Northern Ireland, The, 2008). The vast majority of Kazakhstan's metal output was exported. China was playing an increasing role as a recipient of Kazakhstan's metal exports. Kazakhmys exported 85% of its cathodes and rods to China (United World, 2007). Kazakhstan had concluded an agreement with China that resulted in the value of Kazakhstan's iron ore exports to China increasing by 83% in 2006 compared with the value in 2005 (Materials World, 2007).

Commodity Review

Metals

Aluminum.—ENRC's alumina and aluminum division included two bauxite mining units, a limestone mine, an alumina refinery, and a powerplant. In December, ENRC announced the startup of the first phase of its aluminum smelter, which had an annual capacity of 62,500 metric tons (t). Construction of the smelter reportedly had proceeded ahead of schedule and was within budget. The smelter's annual capacity was scheduled to

be increased to 125,000 metric tons per year (t/yr) in 2008 and would reach the planned full annual capacity of 250,000 t/yr by 2011. The aluminum smelter was to be a key aspect of ENRC's capital expenditure in 2008 (Eurasian Natural Resources Corporation PLC, 2008a).

The Krasnooktyabrskoye bauxite mining directorate (KGBR) and the Torgayskiy bauxite mining directorate were the country's leading bauxite producers and the main suppliers of bauxite for the Pavlodar alumina plant. All bauxite mined in Kazakhstan was processed into alumina at the Pavlodar plant, which was one of the world's 10 largest alumina plants in terms of output.

Kazakhstan adopted a program to increase alumina output from about 1.5 million metric tons (Mt) in 2006 to between 1.6 million metric tons per year (Mt/yr) and 1.8 Mt/yr in the 2007-10 period. High-quality bauxite reserves, which were estimated to be between 35 and 45 Mt, could be sufficient to maintain these production goals for only the next 6 to 10 years. Further development of alumina production would be based on reserves of lower quality bauxite and nonbauxite aluminum raw materials or on imports. In 2007, bauxite was the only aluminum raw material being mined in the country. In previous years, the country had mined nepheline syenite. Total bauxite reserves were reportedly 356.7 Mt in the C1 category, according to the reserves classification system used in the Soviet Union and then Kazakhstan, with another 82.3 Mt of C2 reserves and 13.3 Mt of subeconomic (zabalansovye) reserves. [A more-detailed description of the Soviet reserve classification system is available in the U.S. Bureau of Mines Minerals Yearbook 1989, v. 3, Europe and the USSR.] The country's bauxite reserves are concentrated in the north of the country (Kovzalenko, 2007).

Beryllium.—Kazatomprom, which controlled the country's entire uranium industry, was engaged in full-cycle beryllium production that extended from ore processing to production of beryllium alloys at its Ulba Metallurgical Plant in Oskemen. Ulba was the only plant in the CIS with this production capability. Ulba was also the only enterprise in the CIS with the capability to process tantalum feedstock and produce finished products (Interfax Russia & CIS Metals and Mining Weekly, 2007e).

Kazatomprom's strategy for development of beryllium production included (1) improving existing technology for extracting beryllium from ores and concentrates to obtain cheaper beryllium hydroxide with a quality equal to the hydroxide that it was using; (2) developing technologies and equipment for producing different types of products from beryllium bronze in accordance with world and domestic market requirements, including products for the oil and gas industry of Kazakhstan; and (3) improving technologies and equipment for producing beryllium metal and beryllium-bearing master alloys to reduce production costs. To implement this strategy, Kazatomprom was engaged in a number of projects, which included a project for the production of beryllium bronze rolled metal in China with Ningbo Xinye Electric Copper Strip Co., which was part of Shine Copper Industry Co. Ltd. In November 2007, the joint venture was registered under the name Yingtan Ulba Shine Metal Materials Company Ltd. (National Atomic Company Kazatomprom, 2009a).

Chromium.—ENRC's ferroalloy division produced and sold ferrochromium and other ferroalloys primarily to steel

producers, and sold chromite and manganese ore to ferroalloy producers and the chemical industry. The ferroalloy division was a vertically integrated operation that included chromite and manganese ore mines and two ferroalloy plants. The division's chromite reserves, which were reported to be 166 Mt as of December 31, 1997, were believed to be the largest in the CIS and to be among the world's highest grade reserves (42.2% Cr₂O₃) for large-scale producers (Eurasian Natural Resources Corporation PLC, 2008a).

ENRC'S chromite mining enterprise, Kazchrome, was the world's leading chromium ore mining enterprise, the world's leading ferrochrome producer on the basis of chromium content, and the world's third ranked ferrochromium producing enterprise. Kazchrome was one of the main assets of ENRC (Kazakhstan Embassy in Ukraine and Moldova, 2007; Kazakhstan News Bulletin, 2007). Kazchrome supplied high-quality ferroalloys to leading steelmakers worldwide, including countries in Southeast Asia, Europe, North America, and South America. Kazchrome had invested in new technology and plant facilities, which had increased its annual ferrochrome production to more than 1 Mt/yr, and it planned to increase production of calcined chrome ore pellets substantially by adopting new technology.

Kazchrome consisted of the following four production units: the Aqtobe and Aksu ferroalloys plants, the Donskoy mining and beneficiation complex, and the Kazmarganets manganese mining and beneficiation complex. It employed about 18,000 workers and had 43 electric arc furnaces engaged in ferroalloy production. The company's Molodezhnaya Mine produced about 2 Mt/yr of chromite. The chromite mining division had three beneficiation plants with the capacity to process 5 Mt/yr of ore. A newly constructed fired pellets plant that employed technology from the Finnish company Outokumpu Technology Oy Finland was to have an annual capacity of 700,000 t (Eurasian Natural Resources Corporation PLC, 2008a).

ENRC's acquisition of the Serov chromite mining and ferroalloys properties in Russia helped fulfill a number of important aspects of the company's strategy. The transaction was ENRC's first acquisition outside of Kazakhstan and strengthened its position as a producer of low-carbon and medium-carbon ferrochrome. The acquisition provided ENRC with an incremental annual sales volume of about 200,000 t and also enabled ENRC to benefit from further vertical integration within its ferroalloys business. It also provided ENRC with an important asset base in Russia, which supported its strategy of pursuing regional expansion opportunities (Eurasian Natural Resources Corporation PLC, 2008a).

The ferroalloy division's principal strategic objective was to increase production of ferrochrome. To fulfill this objective, the ferroalloy division planned to construct new furnaces at the Aksu ferroalloys plant, which was expected to increase the ferroalloy division's annual ferrochrome production by more than 200,000 t by 2011 (Eurasian Natural Resources Corporation PLC, 2008a).

Copper.—The country's leading copper producer, Kazakhmys, was engaged in mining, beneficiating, smelting, and refining copper products, including copper cathodes and rods. Kazakhmys' copper division consisted of 20 mining

entities with 14 underground mines and 6 open pit mines. The mineral reserves and resources of these mines reportedly were adequate to support projected production for at least 20 years. Ore was processed in 10 concentrators and 2 smelters and refineries. Kazakhmys' copper division was divided into four administrative areas—the Balkhash complex, the East region, the Karaganda region, and the Zhezkazgan complex. In addition to producing copper, the division produced significant quantities of gold, silver, and zinc. The division had spare smelting capacity, and copper concentrate was purchased, which provided additional output (Kazakhmys PLC, 2007). Kazakhmys also owned Mansfeld, Kupter und Messing GmbH (MKM), a copper products fabrication company located in Germany. Kazzinc, which was the country's major lead and zinc producer, also produced significant amounts of copper; in 2007, it produced 66,389 t of refined copper (Metall Ukrainy, 2008).

Iron Ore.—In 2007, SSPGO, which was ENRC's iron ore division, mined iron ore, which was processed into concentrate and fluxed pellets for domestic customers and foreign customers primarily in China and Russia. The iron content of its iron ore concentrate reached 66%, and the iron ore content of its fluxed pellets, about 61.5%. SSPGO's assets included the Kachar, the Kurzshunkul, the Sarbai, and the Sokolov iron ore open pits; the Sokolov underground mine; dolomite and limestone open pits; and concentrating, pelletizing, and stone-crushing facilities. Power for these operations was supplied by the Rudny heat and energy plant, which was purchased by SSPGO in 1998. SSPGO employed about 18,500 people. The company's investment program was directed at increasing production levels and efficiency through the installation of integrated computer systems. Through enhanced computer systems, capacity at the Sokolov open pit, for example, had risen substantially within the past 2 years. SSPGO reportedly had iron ore resources totaling 3.6 billion metric tons (Gt), of which 1.5 Gt was reportedly proved and probable reserves capable of sustaining production for 40 years (Eurasian Natural Resources Corporation PLC, 2008c).

The principal strategic objectives of SSPGO were to increase capacity at its mining, beneficiating, and pelletizing facilities. SSPGO planned to expand mining operations and increase iron ore concentrate production capacity by approximately 4 Mt/yr by 2010 and to construct a 1.8-Mt/yr direct-reduced iron (DRI) plant and a 5-Mt/yr iron ore pelletizing unit. DRI, which is a higher value product, had a broader customer base than ENRC's existing iron ore products because it is relatively cheaper to transport DRI than concentrate or pellets for long distances and DRI can be used in electric furnaces, which is not the case with concentrate and pellets. Construction of the DRI plant was scheduled to start in 2008; the plant was expected to be completed by 2011 (Eurasian Natural Resources Corporation PLC, 2008a).

Lead and Zinc.—Kazzinc was the country's leading producer of lead and zinc. In 2007, Kazzinc increased its lead metal production by 5.6% to 90,689 t compared with production in 2006 and refined zinc production by 1.8% to 294,384 t. Kazakhmys also produced significant quantities of zinc.

Kazzinc was completing the acquisition of JSC Kaz-Tyumen in Ridder in northeastern Kazakhstan, which processed lead

battery scrap into lead bullion and refined metal. The assets of Kaz-Tyumen would be combined with Kazzinc's Ridder Zinc Refinery to form the Ridder Metallurgical Complex, which would be a subdivision of Kazzinc. Kazzinc was developing a modernization program for its lead plant, which would be based on treating a feed made up of lead scrap together with flue dusts and lead cakes generated by Kazzinc's metallurgical operations. Also, measures would be undertaken to improve the environmental performance of the plant and lessen its impact on the town of Ridder. The acquisition and modernization of Kaz-Tyumen would provide Kazzinc with the opportunity to increase its treatment of secondary-lead-bearing feeds and, in addition, would release primary smelting capacity at Kazzinc's Ust-Kamenogorsk lead smelter (Kazzinc JSC, 2008).

ShalkiyaZinc N.V. was another zinc and lead mining company in Kazakhstan. The company's main operations were located in southern Kazakhstan and included the underground Shalkiya Mine that mined the Shalkiya deposit in the Kyzylorda Region, a processing plant near the town of Kentau [which is located 165 kilometers (km) southeast of the Shalkiya Mine], and the Talap greenfield deposit, which is located 30 km southwest of the Shalkiya Mine. The Shalkiya deposit was one of the company's major assets; the deposit was reportedly the largest known zinc deposit in Kazakhstan and accounted for approximately 30% of the country's total zinc reserves. ShalkiyaZinc sold zinc and lead concentrate to regional smelters and traders. It is listed on the London Stock Exchange (London Stock Exchange plc, 2006; Reuters, 2006). Based on a new audit of its reserves, which was conducted by AMC Consultants of the United Kingdom according to the Australasian Joint Ore Reserves Committee (JORC) system, ShalkiyaZinc planned to increase its lead-zinc ore extraction at the Shalkiya deposit to 4 Mt/yr from 3 Mt/yr by 2010. According to the latest audit, ShalkiyaZinc's probable ore in situ metal reserves were estimated to total 6.6 Mt of zinc and 1.7 Mt of lead. The new audit showed that the zinc content of ore that could be profitably mined was far lower than 3%, which was the previous assessment. ShalkiyaZinc had a contract with Outokumpu to construct a new ore processing plant at the deposit (Interfax Russia & CIS Metals and Mining Weekly, 2007c).

Manganese.—The Kazmarganets manganese mining and processing enterprise was the country's main manganese producer. It was under the control of Kazchrome, which was a part of ENRC. Kazmarganets reportedly had measured and indicated resources totaling 47.7 Mt of manganese ore and proved and probable reserves totaling 24.5 Mt. Kazmarganets comprised the East, the Kamys, and the Tur manganese ore deposits (located in the Karaganda region), and the Zhezdy processing plant. It had the capacity to process more than 1 Mt/yr of ore to produce 330,000 t/yr of manganese concentrate. Kazmarganets' investment program was directed towards the expansion of operating facilities and the discovery of new deposits in the Ulytau-Zhezdy area (Eurasian Natural Resources Corporation PLC, 2008b).

Tantalum.—Kazatomprom, which was the Government-owned uranium company, also controlled the country's tantalum production. Kazatomprom's tantalum production complex was located at the Ulba Metallurgical

Plant in Oskamen and was one of the world's leading tantalum production enterprises. It had a complete production cycle, from the reprocessing of tantalum-niobium-bearing feedstock to the production of finished products. Kazatomprom did not have its own tantalum resources and purchased tantalum concentrate. Kazatomprom formulated a strategic plan to develop its tantalum production sector, which includes construction of a capacitor production plant and production of high-capacity tantalum capacitor powders (National Atomic Company Kazatomprom, 2009b).

Titanium.—The Ust-Kamenogorsk titanium-magnesium complex (UKTMK) was producing at about 50% of its design capacity. It exported about 50% of the titanium sponge it produced to the United States. The complex had developed its own domestic resources of titanium raw material (which it previously had imported primarily from Ukraine) and had also commissioned facilities to produce titanium ingots and slabs. Ilmenite ore was being mined at the Obukhovskoye, the Satpayevskoye, and the Shokoshskoye deposits in Kazakhstan (Skorodumov and Nikitina, 2007).

Mineral Fuels and Related Materials

Coal.—Kazakhstan reportedly contains Central Asia's largest recoverable coal reserves. The country has registered 49 deposits in its state reserve balance; the deposits contain a total of 33.6 billion metric tons (Gt), of which 21.5 Gt are hard coal and 12.1 Gt are brown coal. The reserves occur mainly in the Ekibastuz, the Karaganda, and the Shubarkol deposits and the Turgay coal basin. Coal mining in Kazakhstan was conducted by 33 companies, including 5 foreign companies (Interfax Russia & CIS Metals and Mining Weekly, 2007a, b).

Kazakhstan produced more coal than it consumed and exported coal mostly to Russia followed by Ukraine. Coal accounted for about 80% of electricity generation in Kazakhstan. After acquiring independence, coal production was hampered initially by the country's inability to attract foreign investment to maintain the viability of the industry. By 2007, however, the country's coal industry had received significant foreign investment. In 2007, the ArcelorMittal Group stated that it would invest \$500 million to increase coal production by about 5 Mt in the Karaganda region. One of the country's leading coal producers was Bogatyr Coal, LLP, which produced about 70% of the coal output from the Ekibastuz Basin. Bogatyr Coal was developing the Bogatyr and the Severny coalfields in the Ekibastuz Coal Basin. It was the country's leading coal exporter to Russia, which used the coal primarily in electric powerplants in southern Russia. Russian firms also owned stakes in Kazakhstan's coal industry (Bogatyr Komir, 2007; U.S. Energy Information Administration, 2008b).

In 2007, Kazakhstan produced 93.6 Mt of coal, which was a 2.8% decrease compared with production in 2006. Long-range plans called for Kazakhstan to reduce coal consumption by 45% by 2024 as part of its program to achieve sustainable growth. At the same time, the use of renewable energy was targeted to increase from 0.2% in 2006 to 5% in 2024. Long-range plans also called for Kazakhstan to increase annual coal production to 145.6 Mt by 2020 according to the Coal Industry Department

at the Energy and Mineral Resources Ministry. Production of metallurgical coal was projected to increase to 24.3 Mt in 2020 from 12.9 Mt in 2006, and production of steam coal, to 121.3 Mt from 83.4 Mt. Achieving the targeted level for 2020 would require an investment of \$3.9 billion, of which \$2.1 billion would be targeted for metallurgical coal development and \$1.8 billion would be targeted for steam coal (Interfax Russia & CIS Metals and Mining Weekly, 2007b).

Natural Gas.—Although in 2007 Kazakhstan produced about as much natural gas as it consumed, the country was poised to become a net exporter in 2008 based on production at the Karachaganak and the Tengiz fields. More than 70% of the country's natural gas was produced by international consortia at the Karachaganak and the Tengiz fields. In 2007, the Oil & Gas Journal revised upwards its estimate of proven natural gas reserves in Kazakhstan to 100 trillion cubic feet (about 2.8 trillion cubic meters), which was roughly equal to Turkmenistan's natural gas reserves. Most of Kazakhstan's natural gas reserves are located in the west of the country, and about 25% of its proven reserves are located in the Karachaganak field. This oil and gas condensate field reportedly has proven natural gas reserves of 48 trillion cubic feet (1.36 trillion cubic meters). The consortium developing Karachaganak expected to produce 900 billion cubic feet (about 25.5 billion cubic meters) by 2012. Natural gas production in Kazakhstan was almost entirely associated gas. The country had three gas processing plants (U.S. Energy Information Administration, 2008a, c).

Petroleum.—Kazakhstan reportedly has the largest recoverable crude oil reserves in the Caspian Sea region and produced about one-half of the crude oil output in the region (U.S. Energy Information Administration, 2008d). Kazakhstan has most of the largest known oilfields in the Caspian Sea. The country's combined onshore and offshore proven hydrocarbon reserves have been estimated to be between 9 and 40 billion barrels (Gbbbl) (1.2 and 5.4 Gt), which is comparable to Algeria on the lower end and Libya on the higher end of the estimates. Major oil-producing enterprises included CNPC-Aktobemunaigas, Hurricane Kumkol Munai, the Karachaganak Petroleum Operating BV, Mangistaumunaigas, the Tengizchevroil joint venture, and Uzenmunaigaz; these enterprises accounted for about 70% of hydrocarbon production in the country. Other production was centered in smaller fields.

Oil production growth was expected to increase in the next decade primarily from the Tengiz field, where production was expected to double, and from the Kashagan offshore field, which could produce an additional 1 million barrels per day (Mbbbl/d) after 2011. The Tengiz field, which had been developed since 1993 by the Tengizchevroil joint venture, was the country's leading oil producer; Chevron Corp. estimated recoverable crude oil reserves to be between 6 and 9 Gbbbl (800 Mt and 1.2 Gt) (U.S. Energy Information Administration, 2008d).

The Kashagan field, which is located off the northern shore of the Caspian Sea near the city of Atyrau, is the largest oilfield in terms of reserves outside the Middle East and the fifth largest in the world. The field's recoverable reserves were estimated to be 13 Gbbbl (1.77 Gt) of oil equivalent, with total reserves-in-place of about 38 Gbbbl (5.2 Gt). The field could

produce about 300,000 barrels per day (bbl/d) (almost 15 Mt/yr) by late 2011, and full-scale commercial production was expected to commence in 2013. Peak production from Kashagan was estimated to be about 1.3 Mbbbl/d (about 65 Mt/yr). The Kashagan field presented particular challenges for its developers because it contains a high proportion of natural gas under very high pressure and contains large quantities of sulfur. Offshore platforms must also withstand extreme weather fluctuations in the northern Caspian Sea. Additional oil production could originate from the Karachaganak oilfield and gas condensate field onshore in northern Kazakhstan near the border with Russia's Orenburg field. Karachaganak's oil reserves were estimated to be between 8 and 9 Gbbl (1.1 and 1.2 Gt) of oil and gas condensate (U.S. Energy Information Administration, 2008d).

In 2007, the shareholders in the Kashagan project [a consortium known as Agip Kazakhstan North Caspian Operating Co. (Agip KCO)] were as follows: Eni S.p.A of Italy, Exxon Mobil Corp. of the United States; Royal Dutch Shell plc (RDSa.L) (headquartered in the Netherlands and registered in the United Kingdom), and Total S.A. (headquartered in France) (18.52% interest each); ConocoPhillips Co. of the United States (9.26%), and Inpex Corp. of Japan and KazMunaiGaz (8.33% each). Eni was the operating company. Oil production was originally planned to begin by the end of 2008 with a target production level of about 300,000 bbl/d (almost 15 Mt/yr). On June 29, Eni rescheduled the production plans with Kazakhstan's authorities to show a new initial production date in 2010 and a new phase 1 cost increase to \$19 billion (from an initial estimate of \$10.3 billion). The Government of Kazakhstan rejected these plans and negotiations were begun to settle the dispute (Eni S.p.A., 2008, p. 26-27).

On August 27, 2007, Kazakhstan's Environmental Protection Minister suspended operations at Kashagan for 3 months, citing violations of environmental protection laws. Also on this date, Kazakhstan's Emergency Situations Ministry's Fire Service suspended the operation of an Agip KCO refining installation, citing fire safety violations, and the Customs Control Committee of Kazakhstan's Finance Ministry opened a criminal case against several high-ranking executives of the Agip KCO consortium on charges of evading customs duties (Interfax Russia & CIS Oil and Gas Weekly, 2007b).

On September 6, 2007, Kazakhstan's Prime Minister said that, in accordance with the wishes of Kazakhstan's President, KazMunaiGaz should become a cooperator of the Kashagan project (Interfax Russia & CIS Oil and Gas Weekly, 2007a). Agip KCO and the Government of Kazakhstan continued to debate the issue of ownership of Agip KCO throughout the year. On January 14, 2008, the members of the Agip KCO consortium and the Government of Kazakhstan reached an agreement to settle the dispute. Under the terms of the agreement KazMunaiGaz would increase its share in Agip KCO to 16.81% from 8.33%. KazMunaiGaz would purchase the shares from the other shareholders for \$1.78 billion on a pro-rata basis. Agip KCO also agreed to pay the Government about \$5 billion through a one-off payment and additional royalty payments. Kazakhstan's Energy Minister also stated that Eni would lose its position as the operating company, although a new operating company was not named at that time (Nurshayeva, 2008).

The Tengiz oilfield and gasfield was operated by Tengizchevroil. Tengizchevroil stakes were divided between Chevron (50%), ExxonMobil (25%), KazMunaiGaz (20%), and Lukoil of Russia (5%) (Reuters, 2007a). In 2007, the field's production capacity was approximately 400,000 bbl/d (almost 20 Mt/yr) and production was about 300,000 bbl/d (almost 15 Mt/yr); the capacity was expected to increase to 540,000 bbl/d (almost 27 Mt/yr) in the second half of 2008 (Chevron Corp., 2008, p. 33). According to Chevron, Tengiz could potentially produce 700,000 bbl/d (almost 35 Mt/yr) by 2010 if its sour gas injection program was fully implemented (U.S. Energy Information Administration, 2008d).

In January 2007, the Prosecutor's office in the Atyrau region of Kazakhstan said that it would audit Tengizchevroil to make sure the company had not broken any environmental laws by storing 8.9 Mt of sulfur in a field at Tengiz. The sulfur was a byproduct of oil and gas production at Tengiz (Interfax Russia & CIS Oil and Gas Weekly, 2007d). On February 21, the Kazakhstan Ecology Ministry stated that Tengizchevroil could be fined and even shut down if they did not submit concrete proposals within a month to rectify environmental violations (Interfax Russia & CIS Oil and Gas Weekly, 2007e). On April 4, the Ecology Ministry said that it would drop charges against Tengizchevroil in exchange for the group agreeing to spend up to \$300 million per year for environmental protection (Nurshayeva, 2007a). In the beginning of October, the Government fined Tengizchevroil \$609 million because it was making slow progress in removing sulfur stocks from open air storage. Chevron said that the company would fight the ruling (Reuters, 2007c). In the middle of November, the fine was reduced to \$309 million and paid by Tengizchevroil (AFX News Ltd., 2007).

Uranium.—Kazakhstan reportedly contains about 19% of the world's explored uranium reserves, or about 1.6 Mt. The uranium deposits are grouped into the following six uranium provinces: the Chu-Sarysu uranium ore province, which had the Kanzhugan, the Moinkum, and the Uvanas Mines in operation; the Syrdarya uranium ore province, which had the Northern Karamurun and the Southern Karamurun Mines in operation; the Northern Kazakhstan uranium ore province, which had the Vostok Mine and the Stepnogorsk mill 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 was 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 formed by oxidation of the lignite beds roofs—there was no uranium production in this province in 2007 (National Atomic Company Kazatomprom, 2009c).

In 2007, Kazakhstan produced 6,637 t of uranium (U content), which was almost 26% more than was produced in 2006. 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, and Kazakhstan was aiming to be world's leading uranium producer by 2009. Kazakhstan had established three joint ventures 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, 2007e, 2009).

Outlook

Kazakhstan's long-term mineral development prospects remain promising. Oil production is expected to triple over the next decade, and Kazakhstan is poised to become the world's leading uranium producer. Production growth had been taking place in practically all sectors of the mineral industry and is expected to continue in the next decade.

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TABLE 1
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2003	2004	2005	2006	2007
METALS					
Aluminum:					
Alumina	1,420 ^r	1,468	1,505	1,515 ^r	1,556
Bauxite	4,737,100	4,705,600	4,815,400 ^r	4,860,000 ^r	4,800,000 ^e
Arsenic trioxide ^e	870 ^r	1,200 ^r	1,000 ^r	1,000 ^r	1,500
Beryllium	NA	NA	NA	NA	NA
Bismuth:^e					
Mine output, Bi content	75 ^r	90 ^r	150 ^r	160 ^r	145
Metal, refined	130	130	120	115	120
Cadmium, metal	1,351	2,358 ^r	1,624 ^r	2,000 ^e	2,100 ^e
Chromite	2,927,800 ^r	3,287,100 ^r	3,581,242 ^r	3,366,078 ^r	3,687,200
Copper:					
Mine output, Cu content	485,400 ^r	461,200 ^r	401,700 ^r	434,100 ^r	405,000 ^e
Metal:					
Smelter, undifferentiated	431,930	445,200	404,817 ^r	426,000 ^e	409,000 ^e
Refined, primary	432,511 ^r	445,268 ^r	418,356 ^r	427,723 ^r	406,091
Gallium ^e	10	5	7	10	10
Gold:					
Mine output, Au content	19,266 ^r	19,261 ^r	18,062	21,805 ^r	22,000 ^e
Metal, refined	9,906	9,576	9,788	9,000 ^{r,e}	8,123
Iron and steel:					
Iron ore, marketable:					
Gross weight	19,280,900 ^r	20,402,500 ^r	19,471,100 ^r	22,262,600 ^r	23,834,100
Fe content	10,100,000 ^r	11,600,000 ^r	11,100,000 ^r	12,700,000 ^r	13,600,000 ^e
Metal:					
Pig iron	4,140,000 ^e	4,283,142 ^r	3,581,090	3,400,000	3,240,000
Ferroalloys:					
Ferromromium	993,000	1,080,993	1,156,168	1,200,000 ^e	1,200,000 ^e
Ferromanganesiumsilicon	98,130	104,800	97,870	100,000 ^e	105,000 ^e
Ferromanganese ^e	1,931 ³	2,000	2,100	2,100	2,100
Ferrosilicon	127,300	103,580	104,185	105,000 ^e	105,000 ^e
Silicomanganese	178,920	155,324	170,214	220,000 ^e	220,000 ^e
Other ^e	9,000	9,000	9,000	9,000	9,000
Total	1,408,281	1,455,697	1,539,537	1,640,000 ^e	1,640,000 ^e
Steel:					
Crude	5,069,401 ^r	5,371,698 ^r	4,476,642 ^r	4,244,521 ^r	4,784,105
Finished, rolled	3,837,800	4,039,700	3,392,000	3,163,000	3,437,000

See footnotes at end of table.

TABLE 1—Continued
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2003	2004	2005	2006	2007
METALS—Continued					
Lead:					
Concentrate, Pb content	37,500 ^r	33,000 ^r	31,000 ^r	48,100 ^r	40,200
Refined, primary and secondary	133,178 ^r	157,016 ^r	135,446 ^r	115,974 ^r	117,641
Magnesium, metal, primary ^e	14,000	18,000	20,000	21,000	21,000
Manganese ore, crude ore:					
Gross weight	2,361,000	2,318,000	2,207,700	2,531,100 ^r	2,482,000
Mn content ^e	580,000	570,000	540,000	550,000	600,000
Molybdenum, concentrate, Mo content	230	230 ^e	230	250	400
Nickel, Ni content of laterite ore	--	--	193	200 ^e	200 ^e
Rhenium ^e kilograms	2,600	5,000	8,000	8,000	7,700
Silicon	83,000	88,000	95,000	95,000	95,000
Silver, mine output, Ag content kilograms	826,500 ^r	733,000 ^r	832,000	830,000	800,000 ^e
Tantalum	NA	NA	NA	NA	NA
Tin, mine output, Sn content	13	14	5	NA	NA
Titanium:					
Ilmenite and leucoxene	9,300	11,670	10,000	25,000	25,000
Sponge	12,500	16,500	19,000	23,000	25,400
Vanadium, ores, concentrates, slag, Va content ^e	1,000	1,000	1,000	1,000	1,000
Zinc:					
Mine output, Zn content	393,500 ^r	361,400 ^r	364,300 ^r	404,600 ^r	386,000
Smelter, primary and secondary	316,731 ^r	357,090 ^r	364,821 ^r	364,821 ^r	358,226
INDUSTRIAL MINERALS					
Asbestos, all grades	354,500	346,500	300,500 ^r	300,000 ^{r,e}	300,000 ^e
Barite	79,000 ^r	115,000 ^r	95,000 ^r	95,000 ^{r,e}	95,000 ^e
Boron ^e thousand metric tons	30	30	30	30	30
Cement	2,569,700	3,662,000	3,974,800	4,880,200 ^r	5,698,600
Clays, kaolin ^e	-- ^r	-- ^r	-- ^r	-- ^r	--
Fluorspar	3,500 ^r	4,000 ^r	4,750 ^r	4,750 ^{r,e}	4,750 ^e
Gypsum	711,000 ^e	800,000	820,000	820,000	820,000
Phosphate rock:					
Gross weight	378,090 ^r	511,950 ^r	460,230 ^r	450,000 ^e	300,000
P ₂ O ₅ content ^e	85,000 ^r	116,000 ^r	96,200 ^r	92,500 ^r	60,000
Salt and sodium chloride	287,238	347,850	178,167	416,680	227,643
Sulfur, byproduct:					
Metallurgy	327,000 ^r	351,000 ^r	235,000 ^r	235,000 ^{r,e}	300,000 ^e
Natural gas and petroleum	1,585,000 ^r	1,625,000 ^r	1,590,000 ^r	1,650,000 ^r	2,300,000 ^e
Total	1,912,000 ^r	1,976,000 ^r	1,825,000 ^r	1,885,000 ^r	2,600,000 ^e
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous thousand metric tons	80,807	83,065	82,788	91,547	88,974
Lignite do.	4,099	3,810	3,798	4,773	4,638
Total do.	84,906	86,875	86,586	96,320	93,612
Natural gas thousand cubic meters	14,700,000	14,400,000	14,494,000	14,440,000	15,699,000
Petroleum:					
Crude oil and gas condensate:					
In gravimetric units	51,451,000	59,485,000	61,500,000	64,860,000	67,640,000
In volumetric units ^e 42-gallon barrels	378,000,000	437,000,000	451,000,000	476,000,000	496,000,000
Refinery products	8,750,000 ^e	9,390,000	11,170,000	11,664,000	12,000,000 ^e
Uranium:					
U content	3,300 ^r	3,719 ^r	4,357 ^r	5,279 ^r	6,637
U ₃ O ₈ content	3,892 ^r	4,386 ^r	5,138 ^r	6,226 ^r	7,827

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through February 28, 2009.

TABLE 2
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007^{1, 2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Alumina	Pavlodar aluminum plant [Eurasian Natural Resources Corporation PLC (ENRC)]	Pavlodar	1,250,000
Aluminum, primary	Kazakhstan aluminum smelter [Eurasian Natural Resources Corporation PLC (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 ³
Barite	Facilities: Karagaylinskiy and Zhayrem mining and beneficiation complexes Tujuk Mine Achisay polymetallic complex	Locations: Karagayly, Zhayrem deposit Almaty Kentau region	300,000 ³
Bauxite	Turgay and Krasnooktyabrsky bauxite mining complexes [Eurasian Natural Resources Corporation PLC (ENRC)]	Central Kazakhstan	5,000,000
Beryllium, metal	Ulba metallurgical plant (National Atomic Company Kazatomprom)	Oskamen	NA
Bismuth, metal	Facilities: Ust-Kamenogorsk lead-zinc metallurgical plant (Kazzinc JSC) Ridder lead smelter (Kazzinc JSC)	Locations: Oskamen Ridder	70 ³
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 ₂ O ₃ content (50%)	Donskoy GOK mining-beneficiation complex [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Khromtau, Kempirsai region	5,000,000
Coal	Ekibastuz Basin, among which: Bogartyr Mine Severny Mine	Central and north-central parts of the country Northern Kazakhstan do.	95,000,000 ³
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	Locations: South-central Kazakhstan	11,800
Do.	Sayak Mine	do.	23,500
Do.	Shatyrkul Mine	do.	12,700
	East Region:		
Do.	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
	Karaganda Region:		
Do.	Abyz Mine	North-central Kazakhstan	5,710
Do.	Nurkazgan Mine	do.	1,190

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007^{1, 2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Copper—Continued:			
Mining, recoverable, Cu content— Continued	Kazakhmys PLC mines—Continued: Zhezkazgan complex:	Location:	
	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
	Kazzinc JSC (Glencore International AG, 99%): Ridder:	Location:	
Do.	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	Locations: South-central Kazakhstan	39,500
	East Region:		
Do.	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
	Zhezkazgan complex:		
Do.	Stepnoy Mine	do.	58,200
Do.	Zhezkazgan concentrator: Number 1	do.	88,800
Do.	Number 2	do.	111,000
	Kazzinc JSC:	Location:	
Do.	Ridder: Ridder concentrator	East Kazakhstan	NA
Do.	Zyrianovsk: Zyrianovsk concentrator	do.	1,200
Metal	Kazakhmys PLC mines or plants: Balkhash complex:	Locations:	
Do.	Balkhash smelter	South-central Kazakhstan	250,000
Do.	Balkhash refinery	do.	250,000
	Zhezkazgan complex:		
Do.	Zhezkazgan smelter	North-central Kazakhstan	215,000
Do.	Zhezkazgan refinery	do.	250,000
Do.	Kazzinc JSC: Ust-Kamenogorsk: Lead smelter	Oskamen	80,000
Ferroalloys:			
Ferrochrome:			
High-carbon 60%	Aqtobe (Aktubinsk) plant [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Aqtobe	200,000
Medium-carbon 60%	do.	do.	200,000
Do.	Aksu plant [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Aksu	200,000
Ferrosilicon	do.	do.	700,000
Ferrosilicochrome	do.	do.	700,000
Ferrochrome, high-carbon	do.	do.	500,000
Silicomanganese	do.	do.	90,000
Gallium	Pavlodar aluminum plant [Eurasian Natural Resources Corporation PLC (ENRC)]	Pavlodar	NA
Gold	Byproduct of polymetallic ores and native gold mining	NA	30

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007^{1, 2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Iron and steel:			
Pig iron	Ispat-Karmet Steelworks	Karaganda	5,000,000
Steel, crude	do.	do.	6,300,000
Iron ore, marketable	Lisakovskiy and Sokolovsko-Sarbai mining and metallurgical complexes [Sokolov-Sarbai Mining Production Association (SSGPO), a subsidiary of the Eurasian Natural Resources Corporation PLC (ENRC)]	Qostanay	25,000,000
Lead:			
Mining, recoverable Pb content of ore	Kazzinc JSC: Ridder: Shubinsky Mine	Locations: 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 Kazmarganets [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)] Sary-Arkapolimetal Zhezdy processing plant [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Locations: Atasu Tur, East Kamys Mines (Karaganda region) Zhayrang region Zhezdy	2,550,000 ³
Molybdenum:			
Mining, recoverable content of ore	Kazakhmys PLC facilities: Balkhash complex Karaobinskoye deposit Sayak deposit	Locations: Kounrad Mine Karaoba region Sayaq (Sayak) region	6,000 ³
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
Petroleum:			
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 ³
Do.	Alibekmola, Ayrankul, Chinarevskoye, Kozhasay, North Buzachi, Sazankurak, Saityube, and Urikhtau deposits	NA	NA

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007^{1, 2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e	
Petroleum—Continued:				
Crude—Continued	42-gallon barrels per day	Tengizchevroil joint venture	Tengiz deposit	400,000
Do.	do.	Agip Kazakhstan North Caspian Operating Co. (AGIP KCO)	Kashagan offshore field	100,000
Refined, crude oil throughput	do.	Atyrau Pavlodar, Shymkent refineries	Atyrau, Pavlodar, Shymkent, respectively	427,000 ³
Phosphate rock	Companies: Chilisay mining directorate Karatau production association	Locations: Aqtobe phosphorite basin Shymkent and Zhambyl regions		10,000,000 ³
Rare metals (columbium, indium, selenium, tellurium)	Aktau complex	Aktau		NA
Do.	Belogorsky rare metals plant	Belogorskiy		NA
Do.	Chimkent metallurgical plant	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)	Locations: Shymkent Ridder Zhezkazgan region		1,000 ³
Tantalum	Ulba metallurgical plant JSC (UMP) (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	National Atomic Compay 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 Prikaspiskiy 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	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		7,000 ³

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007^{1, 2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Uranium, U content—Continued	National Atomic Company Kazatomprom affiliated companies—Continued: Ulba metallurgical plant JSC (UMP) JV Zarechnoye JSC	Locations: Oskemen Zarechnoye deposit, Olrarski region, South Kazakhstan	
	National Atomic Company Kazatomprom mines: Kanzhugan, Moinjum, Uvanas Northern Karamurun, Southern Karamurun Vostok	Locations: Chu-Sarysu uranium ore province Srydarya uranium ore province Northern Kazakhstan uranium ore province	
Zinc:			
Mining, recoverable, Zn content	Kazakhmys PLC mines: East Region:	Locations:	
	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
	Kazzinc JSC: Ridder:	Locations:	
Do.	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
	Zyrianovsk:		
Do.	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:	Locations:	
	Artemyevskoe Mine	do.	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	Locations: do.	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

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Table includes data available through March 31, 2009.

²Many 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.

³Capacity estimates are totals for all enterprises that produce that commodity.