



2019 Minerals Yearbook

KAZAKHSTAN [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF KAZAKHSTAN

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In 2019, Kazakhstan produced a diverse range of mineral commodities and was the world's leading producer of uranium (42% of world output); the 2d-ranked producer of asbestos (18%); the 3d-ranked producer of chromite (15%) and magnesium metal (2.2%); the 4th-ranked producer of titanium sponge (8.0%) and barite (6.7%); the 5th-ranked producer of cadmium (6.1%); the 6th-ranked producer of bismuth (1.3%) and rhenium (0.9%); the 7th-ranked producer of sulfur (4.4%); the 8th-ranked producer of bauxite (1.6%); the 9th-ranked producer of zinc (2.4%), fluorspar (1.2%), and alumina (1.1%); the 10th-ranked producer of gold (3.2%), refined copper (2.1%), and antimony (0.2%); the 11th-ranked producer of mined copper (2.8%); and the 12th-ranked producer of lead (1.2%) and iron ore (0.9%). The country also was a significant producer of manganese and phosphate rock. The mineral industry accounted for a significant share of the country's gross domestic product (GDP) and export revenue; petroleum and natural gas were the leading mineral commodities in terms of production value. Kazakhstan's Government promoted the development of the mineral industry and owned interests in a number of major mineral-commodity-producing companies (U.S. Energy Information Administration, 2019; World Nuclear Association, 2020; Apodaca, 2021; Bray, 2021a, b; Callaghan, 2021; Flanagan, 2021a, b; Gambogi, 2021; Jasinski, 2021; Klochko, 2021a, b; McRae, 2021a, b; Merrill, 2021; Polyak, 2021; Schnebele, 2021; Schulte, 2021; Sheaffer, 2021; Tolcin, 2021; Tuck, 2021).

Minerals in the National Economy

In 2019, Kazakhstan's real GDP increased by 4.5% compared with that in 2018, and the nominal GDP was 69.5 trillion tenge (about \$182 billion). The share of industrial production in the GDP was 27.5% in 2019 compared with 28.2% in 2018. The total nominal value of industrial production was 29.4 trillion tenge (\$76.8 billion) and industrial production in real terms increased by 4.1% from that in 2018. Mineral extraction accounted for a significant part of the value of industrial production—16.0 trillion tenge (\$41.7 billion), or 54.4% of the value of industrial production was from this sector. Mineral extraction output included 12.7 trillion tenge (\$33.0 billion) from the extraction of crude petroleum, 1.49 trillion tenge (\$3.9 billion) from the mining of nonferrous metal ores, 416 billion tenge (\$1.09 billion) from the mining of iron ore, 397 billion tenge (\$1.03 billion) from the extraction of natural gas, and 358 billion tenge (\$935 million) from the extraction of coal (including lignite). Compared with that in 2018, the output of petroleum in real terms increased by 0.2%; mined nonferrous metals, by 13.1%; iron ore, by 9.3%; and natural gas, by 1.7%. The real output of coal and lignite decreased by 2.8% (Agency of Statistics of the Republic of Kazakhstan, 2020a, p. 9–11; 2020b, p. 5–15).

In 2019, metallurgy contributed 5.0 trillion tenge (\$13.0 billion) to industrial output, of which nonferrous metallurgy and the production of precious metals contributed 3.3 trillion tenge (\$8.6 billion). Petroleum refining and coke production accounted for 840 billion tenge (\$2.2 billion). In 2019, real output increases from those of 2018 were 5.5% for nonferrous and precious metals, 2.5% for ferrous metals, and 5.7% for petroleum refining and coke (Agency of Statistics of the Republic of Kazakhstan, 2020a, p. 9–11; 2020b, p. 5–15).

Government Policies and Programs

The President of Kazakhstan signed into law a new “Subsoil and Use of Subsoil Code” (the Mining Code) of the Republic of Kazakhstan that went into effect at the end of June 2018. The new mining code introduced several innovations in an effort to attract new investment and venture capital to Kazakhstan's mining sector. The new code significantly simplified the procedures required to obtain exploration and mining licenses, reduced the time requirements to obtain relevant permits, and created an interactive system to share the Government's geologic information with exploration and mining companies (Kursiv.kz, 2016; Baymanov, 2017; Mamyrkhanova, 2017; Neftegaz.ru, 2017; Forbes.kz, 2018; Vorotilov, 2018).

Following the adoption of the Mining Code, suggestions were made to transition from imposing a Nalog na Dobychu Poleznykh Iskopaemykh (NDPI) (tax on the production of minerals) to a royalty system. Under an NDPI system, the amount of mineral produced is taxed when it is extracted from the subsoil, but not necessarily sold, which may cause problems for mining companies when there is a long lag time between production and sales. Under a royalty system, however, the tax is paid when the commodity is sold, which avoids the problem of companies having to pay the tax up front (before the commodity is sold). Also, under the new mining code, the NDPI rate depends on approved reserves of the deposit, and when the difference between approved reserves and actual reserves exceeds 20%, a reevaluation process is triggered, which creates additional tax-related administrative hurdles for mining companies. By yearend, it was not clear if there was sufficient support to change the tax system for the mining sector (Pokidayev, 2019a, b). In December 2019, the Government of Kazakhstan concluded that the results of geologic exploration in the country thus far had not provided a replenishment of mineral resources and reserves. As of yearend 2019, Kazakhstan had more than 8,000 mineral deposits, of which 317 were hydrocarbon deposits; 910 were solid mineral deposits; about 3,000 were common (mostly industrial) mineral deposits; and about 4,000 were underground water aquifers. In the past decade, many lead-zinc deposits in East Kazakhstan were depleted, and the replenishment coefficient (the ratio of newly explored resources to produced resources in any given period of time) for all solid minerals was about 0.13. In response to this situation, the

Government adopted a new program for geologic exploration for 2021–25. According to the program, the Government would invest about \$522 million¹ of Government funds in exploration and would attempt to attract another \$2.1 billion in investment from the private sector. The program included plans to increase geologic and mineralogic mapping of the territory of the country to 37.0% from the current 25.8%, with the hope of discovering about 50 areas prospective for solid minerals. Additionally, the Government expected that the program would increase probable mineral resources for gold by 200 metric tons (t); copper, by 5 million metric tons (Mt); various nonferrous metals in polymetallic deposits, by 5 Mt; uranium, by 50,000 t; and hydrocarbons, by 700 Mt (Baygarin, 2019; Elyubayeva, 2020; Tasyimov, 2020b).

AO Tau-Ken Samruk (a Government-owned mining company) developed a program to attract junior companies into geologic exploration in Kazakhstan. In 2018, AO Kazgeologiya, which was the Government-owned geologic exploration company, helped 11 junior companies enter Kazakhstan's market. It was expected that junior companies would invest 10.5 billion tenge (about \$27.4 million) in Kazakhstan's exploration and cover an area of 2,000 square kilometers (Kapital.kz, 2019a; Sabekov, 2019).

Production

In 2019, estimated production of selenium tripled and estimated production of ilmenite and leucosene increased by 50%. Production of magnesium metals increased by 47%; titanium sponge, by 44%; salt, by 24%; ferrosilicon, by 22%; refined gold, by 15%; and smelter copper, by 13%. Production of clay decreased by 81%; rhenium, by an estimated 50%; niobium metal, by 46%; gypsum and mined lead, by 36% each; bauxite, by 28%; rolled steel, mined manganese, and mined zinc, by 20% each; refined lead, by 13%; mined copper, by 12%; and silicomanganese, by 10%. Data on mineral production are in table 1.

Structure of the Mineral Industry

Most of the companies operating in the mineral industry of Kazakhstan were privately owned. A notable exception was in the production of uranium, a sector in which the Government-owned NAK KazAtomProm played an important role. The Government agency regulating mining activities was the Ministry of Ecology, Geology, and Natural resources. Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2019, the value of Kazakhstan's total exports was \$58.1 billion, which was a 5.0% decrease compared with the value of exports in 2018. In 2019, Kazakhstan's imports

¹Where necessary, values have been converted from Kazakhstani tenge (KZT) to U.S. dollars (US\$) at the annual average exchange rates of KZT383.00=US\$1.00 for 2019; KZT344.71=US\$1.00 for 2018; KZT326.00=US\$1.00 for 2017; KZT341.82=US\$1.00 for 2016; and KZT221.73=US\$1.00 for 2015. Euro area euros (EUR) were converted to U.S. dollars (US\$) at the annual average exchange rate of EUR0.893=US\$1.00 for 2019.

increased by 18.0% to \$39.7 billion. Both exports and imports had increased in 2018, by 26.0% and 13.7%, respectively (Agency of Statistics of the Republic of Kazakhstan, 2020c, p. 7).

In 2019, 72.0% of Kazakhstan's export revenue was from exports of mineral commodities, which decreased by \$3.9 billion compared with that in 2018. Crude petroleum, ferroalloys, copper, natural gas, and flat-rolled steel were the primary sources of export revenue. Revenue from exports of crude petroleum decreased to \$33.6 billion from \$37.8 billion in 2018; that from natural gas increased by 15.0% to \$1.51 billion; and that from petroleum products decreased by 26.1% to \$1.04 billion. In 2019, the share of metals in exports was 14.1% compared with 13.7% in 2018. Revenue from copper exports amounted to about \$2.6 billion, and the main recipients were China (\$1.5 billion), Turkey (\$441 million), and the United Arab Emirates (\$433 million). The revenue from ferroalloy exports amounted to \$1.9 billion, and the main recipients were China (\$732 million), Japan (\$445 million), the Republic of Korea (\$118 million), and the United States (\$107 million). The revenue from flat-rolled steel exports was \$963 million; zinc, \$730 million; aluminum, \$513 million; and silver, \$436 million (Agency of Statistics of the Republic of Kazakhstan, 2020c, p. 3–20, 120–132).

Kazakhstan's main export partner was Italy, which received 14.4%, by value, of Kazakhstan exports. It was followed by China (13.8%), Russia (9.8%), the Netherlands (7.6%), France (6.3%), the Republic of Korea (5.3%), Switzerland (4.6%), Turkey (4.2%), Spain (3.7%), Uzbekistan (3.4%), Romania (3.0%), India (2.7%), and Greece (2.3%) (Agency of Statistics of the Republic of Kazakhstan, 2020c, p. 15).

The major import categories were foodstuffs, machinery and equipment, and metal products. Kazakhstan's main import partner was Russia, which supplied 36.0% of Kazakhstan's imports, by value. It was followed by China (17.1%), the Republic of Korea (8.7%), Italy (4.0%), Germany (3.8%), Uzbekistan (3.6%), the United States (3.4%), and Turkey (2.1%) (Agency of Statistics of the Republic of Kazakhstan, 2020c, p. 16).

Commodity Review

Metals

Chromium and Ferroalloys.—In 2019, AO TNK Kazkhrom (Kazkhrom), which was a division of Eurasian Resources Group LLP (ERG), was the major producer of chromite and ferroalloys in Kazakhstan. Kazkhrom had four major production units—the Aksu ferroalloy plant, which was located in Pavlodar Province; the Aktobe ferroalloy plant, which was located in Aktobe Province; the Kazmarganets Mine, which was located in Karagandy Province and was involved in manganese mining; and the Donskoy GOK [mining and beneficiation complex], which was located in the city of Khromtau in Aktobe Province and was involved in chromite mining and processing (Abctv.kz, 2016, 2018; Ryskulov, 2017; Kursiv.kz, 2019).

In July 2019, TOO YDD Corp. commissioned a new ferroalloys plant located in Karagandy Province. The initial capacity of the plant was 180,000 metric tons per year (t/yr) of ferrosilicon, and the primary output would be high-grade ferrosilicon (FeSi75). The total cost of construction was

about \$94 million; the funds were invested by European and Kazakhstani investors with loan assistance from AO Development Bank of Kazakhstan. During construction, the plant created 1,500 new jobs. During operations, the plant created 380 jobs. The plant was built as a modern cutting-edge enterprise—its gas purification system was designed to capture 99.8% of pollutants—and it was constructed in accordance with the Industry 4.0 Program. In November, the second furnace of the plant was commissioned. After the ferroalloys plant reaches its full capacity, it would be able to produce 240,000 t/yr of ferrosilicon and would create a total of 550 jobs. The plant used 94% of domestic inputs and planned to export 100% of output to the countries of the European Union, the Republic of Korea, Russia, Turkey, and the United States (Inform.kz, 2019a; Kt.kz, 2019; Tengrinews.kz, 2019; Kapital.kz, 2020).

Copper.—In 2019, Kazakhstan produced 119 Mt of copper ore, which was a 15% increase compared with that in 2018, and 522,600 t of copper in concentrates, which was an 11.8% decrease compared with that in 2018. The leading copper producers in Kazakhstan were (in order of decreasing production) KAZ Minerals plc, TOO Kazakhmys, and Aktyubinskaya Mednaya Kompaniya (AMK), which was a subsidiary of Russian Copper Co. (RMK) of Russia (tables 1, 2; Metalmininginfo.kz, 2020).

In 2019, KAZ Minerals plc increased copper production by about 6% compared with that in 2018, to 311,000 t (which included production from the Bozymchak Mine in Kyrgyzstan). KAZ Minerals' leading mines in Kazakhstan were the Aktogay Mine, which produced 145,700 t, and the Bozshakol Mine, which produced 110,200 t. The other 55,500 t was produced at mines in East Kazakhstan Province and at the Bozymchak Mine in Kyrgyzstan. KAZ Minerals planned to produce between 280,000 and 300,000 t of copper in 2020, as follows: 120,000 to 130,000 t at the Aktogay Mine, 110,000 to 120,000 t at the Bozshakol Mine, and about 50,000 t in East Kazakhstan Province and at the Bozymchak Mine in Kyrgyzstan (Kt.kz, 2020; Metalmininginfo.kz, 2020; Tasymov, 2020a).

In 2019, KAZ Minerals continued with construction of one more beneficiation plant at the Aktogay Mine that was expected to be completed in 2021. The plant was part of the company's second-stage development of the mine. In January 2018, KAZ Minerals announced that it had begun the process of obtaining the required licenses and permits for the second stage of development of the Aktogay deposit, which was dubbed Aktogay II. The company planned to invest \$1.2 billion to increase the capacity of processed sulfide ore from 25 million metric tons per year (Mt/yr) to 50 Mt/yr by 2021. With this expansion, annual production of copper would increase to 170,000 t/yr from 80,000 t/yr for the period between 2022 and 2027, and after that, production would stabilize at the 130,000 t/yr level. As a result, the life of the Aktogay Mine would decrease from 50 years to 28 years and the total cost of mine expansion was estimated at \$2.2 billion. The company planned to finance the project from three sources—loans from China Development Bank, a credit line from the Development Bank of Kazakhstan, and the company's own funds (Tumashova, 2018; Chernyavskaya, 2019).

In 2019, RMK planned to invest about \$90 million in Kazakhstan's economy, which was about 7% more than in 2018. Its subsidiary AMK had been in operation since 2004. AMK's facilities included the "50 years of October" Mine, which had mineralized material resources of 46 Mt containing 823,000 t of copper and the capacity to produce 3 Mt/yr of copper ore; the Priorskoye Mine, which had mineralized material resources of 36 Mt containing 377,000 t of copper and 1.4 Mt of zinc and the capacity to produce 2 Mt/yr of copper-zinc ore; and the AMK GOK, which had the capacity to process 5 Mt/yr of copper and copper-zinc ore. In November 2019, AMK announced that it had begun mining the Aralchinskoye copper-zinc deposit in Aktobe Province. The Aralchinskoye Mine had a capacity of 500,000 t/yr of ore, was mined by an open pit method, and had an expected life of 15 years. The investment in the development of the Aralchinskoye Mine amounted to \$144 million. The Aralchinskoye Mine was Kazakhstan's part of a two-country deposit. Russia's part was called the Vesenneye deposit and was being developed by AO Ormet, which was also a subsidiary of RMK. AO Ormet planned to begin mining the Vesenneye deposit in 2020 (Metalinfo.ru, 2017; Drogayeva, 2019; Volshukov, 2019).

In November 2019, TOO Kazgeorud, which was a subsidiary of AMK, announced that it had begun production at its Kundyzdy Mine in Aktobe Province. The mine's design capacity was 2 Mt/yr of copper and copper-zinc ore, and the total investment to date was \$205 million. AMK was also investing \$33 million in infrastructure projects around the Kundyzdy Mine, including in the construction of 22.3 kilometers (km) of roads, 18.5 km of railroad, and a railroad terminal. The project would provide feed for the AMK GOK through 2033 (Metalinfo.ru, 2018; Drogayeva, 2019).

In 2019, Kazakhstan exported 443,000 t of refined copper and copper alloys worth about \$2.6 billion. Compared with the amounts in 2018, the quantity of the exports increased by 13.2%, and their value, by 3.2%. China was the leading export partner, having purchased 275,400 t valued at about \$1.5 billion. It was followed by the United Arab Emirates (which purchased 75,100 t valued at \$433.7 million), Turkey (57,100 t at \$329.1 million), the United Kingdom (21,900 t at \$125.4 million), France (6,800 t at \$39.1 million), Germany (1,500 t at \$8.5 million), and Lithuania (1,400 t at \$5.8 million). Smaller amounts were exported to Belgium, Canada, the Netherlands, and other countries (Yesenalina, 2020).

Gold.—In 2019, Kazakhstan produced about 106,600 kilograms (kg) of mined gold, which was a 6.3% increase compared with that in 2018. The leading producers of mined gold in Kazakhstan were TOO Altyntau Kokshetau, which was owned by TOO Kazzinc, and AO GMK Kazakhaltyn, both of which had operations in Akmola Province. Polymetal International plc of Russia (Polymetal), which was one of leading producers of precious metals in Russia, had recently entered Kazakhstan's market and operated mostly in Kostanay Province. AO AK Altynalmas operated in Karagandy Province and Zhambyl Province. Between 2011 and 2019, production of mined gold in Kazakhstan increased 2.8 times. The significant increase in gold production took place predominantly because of the commissioning of such large projects as Aktogay and

Bozshakol (KAZ Minerals), modernization of the Akbakay gold-processing plant, opening of the Pustynnoye gold mine (AO AK Altynalmas), and gold production at the Bakyrchik polymetallic deposit (Polymetal) (tables 1, 2; Forbes.kz, 2016; Nurbay, 2020; Strategy2050.kz, 2020).

In 2019, TOO Bakyrchik produced about 10,000 kg of gold in concentrate. Together, the Bakyrchik GOK and the Bolshevik GOK formed the Kyzyl project, which was located in East Kazakhstan Province and operated by Polymetal. In July 2019, Polymetal updated the reserves of the project; the new Joint Ore Reserves Committee (JORC)-compliant reserves were estimated to be 41.7 Mt grading 6.3 grams per metric ton (g/t) gold, and the total gold reserves were estimated to be about 264,300 kg, which was an 18% increase compared with the estimate completed at the end of 2018. Of the total reserves, reserves suitable for open pit mining were increased by 37% to 130,600 kg of gold at an ore grade of 5.7 g/t gold, and reserves accessible only by underground mining were increased by 4% to 133,700 kg of gold at an ore grade of 7.1 g/t gold. Compared with the previous feasibility study, the mine life was increased by 8 years to 2047, and the open pit mining period increased by 5 years to 2031. In 2018, Polymetal began mining and commissioned a new beneficiation plant with a capacity to process 2 Mt/yr of ore by flotation. The obtained concentrate that had a low carbon content was sent to Polimetal's Amurskiy GMK (AGMK-1) in Russia for processing, and the high-carbon concentrate was sold to other companies. In 2019, Polymetal was building a new plant at the Amurskiy GMK (called AGMK-2) that would be able to process high-carbon concentrate. When the AGMK-2 plant is commissioned, Polymetal would be able to process 100% of the gold produced at Kyzyl at the company's own facilities (Inform.kz, 2017; Inbusiness.kz, 2019; Kapital.kz, 2019d).

In 2019, Aurum Deutschland AG of Germany announced that it would begin construction of a new mining and beneficiation complex in Zhambyl Province in 2021. The total projected costs were 329 million euros (about \$368 million). When the complex is completed, the company was to begin production of gold dore that was expected to be sent to the TOO Tau-Ken Altyn (Astana refinery) for refining. The complex would employ such methods as heap leaching, tank leaching, and flotation. At full capacity, Aurum Deutschland planned to produce 5,100 kilograms per year (kg/yr) of gold and 100,000 kg/yr of silver, which would make it the third-ranked gold producer in Kazakhstan. The complex would create 5,000 new jobs during construction and 1,000 new jobs during operation. The mine was expected to be in operation for between 20 and 40 years and to contribute about 73 billion tenge (about \$190 million) in taxes to the country's revenue through 2025 (Kursiv.kz, 2017; Inform.kz, 2019b; Forbes.kz, 2020).

In 2019, Tau-Ken Samruk announced reserves of two deposits—the Gagarinskoye and the Shokpar—in Jambyl Province. The Gagarinskoye deposit had reserves of 2.26 Mt of ore grading 4.48 g/t of gold and 37.31 g/t of silver with total reserves of 10,100 kg of gold and 84,200 kg of silver. The Shokpar deposit, which was located 40 km from the Gagarinskoye deposit, had 1.55 Mt of ore grading 7.05 g/t gold and 33.14 g/t silver with total reserves of 10,950 kg of gold

and 51,500 kg of silver. The company applied for a production license and was looking for strategic partners to develop the deposits (Kapital.kz, 2019e; Sputnik.kz, 2019b).

In October 2019, AO AltynEx Co. announced that it planned to build a new gold-processing plant at its Yubileynoye deposit in Aktobe Province. Proven reserves of the deposit were estimated to be about 100,000 kg of gold. The plant would have the capacity to process 5 Mt/yr of gold-containing ore and to produce 6.3 t/yr of dore. The cost of the project was estimated to be 148 billion tenge (about \$386 million), and the plant was expected to be completed in 2021. When completed, the new gold plant was expected to create 300 new jobs (Inform.kz, 2019c; Kapital.kz, 2019f; Metalmininginfo.kz, 2019).

In 2019, Kazakhstan produced about 61,100 kg of refined gold, which was a 15% increase compared with that in 2018. As of 2019, Kazakhstan had three gold refineries—the Tau-Ken Altyn refinery, the TOO Kazakhmys refinery, and the Ust-Kamenogorsk refinery. The Tau-Ken Altyn refinery in Nur-Sultan was commissioned in 2013, and in the course of 6 years had produced a total of 92 t of gold. Tau-Ken Altyn was a subsidiary of Tau-Ken Samruk. In 2019, the refinery produced 27 t of refined gold and planned to increase production in 2020 to 30 t. In September 2019, the refinery received the Good Delivery Standard, which is a quality certificate issued by the London Bullion Market Association (tables 1, 2; Kapital.kz, 2019c; Mamyshev, 2019; Vnedra.ru, 2019).

Tin.—In 2019, Kazakhstan did not produce any tin, although the Syrymbet deposit in North Kazakhstan Province had been under development for 18 years. According to AO Samruk Kazyna, the Syrymbet deposit was the largest tin deposit in Central Asia and the largest undeveloped tin deposit in the world; its tin reserves were estimated to be 153,000 t. The deposit was being developed by AO Tin One Mining, which before 2017 was known as AO Syrymbet. AO Tin One Mining was owned by TOO Berkut Mining (75%) and AO Samruk-Kazyna (25%). In May 2019, the company began stripping operations to remove overburden at the deposit, and the total investment in 2019 was expected to amount to 4 billion tenge (about \$10.4 million). The production at the mine was expected to begin in 2021, and the total investment in the project at that point would be 100 billion tenge (about \$300 million). At capacity, the mine would produce 10,000 t/yr of tin, which would make Kazakhstan one of the 10 top world producers of tin (Kapital.kz, 2019b; Sputnik.kz, 2019a).

Industrial Minerals

Cement.—In 2019, Kazakhstan produced about 10.3 Mt of cement, which was a 3.6% increase compared with that in 2018. In 2010, Kazakhstan had produced only about 5 Mt of cement and had to import cement from Russia and other countries. By 2018, Kazakhstan was able to meet domestic demand and even began to export cement (table 1; Cem.kz, 2020).

As of 2019, Kazakhstan had 15 cement plants with a total combined capacity of about 15.3 Mt/yr; its domestic consumption in 2019 amounted to about 8.75 Mt. About two-thirds of the cement plants in Kazakhstan were relatively new plants that had opened in the past 10 to 15 years. HeidelbergCement Group of Germany owned three cement

plants in Kazakhstan with total combined capacity of 3.1 Mt/yr of cement; they were Bukhtarma Cement Co. (which had a capacity 1.3 Mt/yr and had been owned by HeidelbergCement since 2005), AO ShymkentCement (which had a capacity of 1 Mt/yr and had been owned by HeidelbergCement since 2016), and KaspiyCement (which had a capacity of 800,000 t/yr and was built in 2014). Steppe Cement Ltd. of Malaysia owned two cement plants—AO Central Asia Cement and AO Karcement—which had a total combined capacity of about 2.0 Mt/yr of cement. The other cement producers in the country included PO KoksheCement (which had a capacity of 2.0 Mt/yr and was built in 2017), TOO Standard Cement (2.0 Mt/yr, built in 2006), TOO Zhambyl Cement Production Co. (1.3 Mt/yr, built in 2010), PK Cement Plant Semey (1.2 Mt/yr, built in 1958), TOO Kazakhcement (1.0 Mt/yr, built in 2006), TOO SAS-Tobe Technologies (500,000 t/yr, built in 1953), AO ACIG (400,000 t/yr, built in 2014), and TOO Jambyl Nedr (300,000 t/yr, built in 2017) (Shestakova, 2019; Kachalova, 2020).

Kazakhstan built two new cement plants in 2018—TOO Rudnenskiy Cement Plant in Kostanay Province, which was commissioned on December 1 and had the capacity to produce 500,000 t/yr of cement, and TOO Gezhoubas Shieli Cement, which was commissioned on December 11 and had the capacity to produce of 1.0 Mt/yr of cement. As of yearend 2019, two additional cement plants were under construction—the Alatsay plant in Almaty Province, which would have a capacity of 1.2 Mt/yr, and a plant in Aktobe Province, which would have a capacity of 1.8 Mt/yr. Both plants were expected to be commissioned either in 2020 or 2021 (Shestakova, 2019; Kachalova, 2020).

Mineral Fuels and Related Materials

Coal.—In 2019, Kazakhstan reduced its production of coal by about 2.6% to 111 Mt, including 104.8 Mt of bituminous coal, which was a decrease of 2.6%, and about 5.9 Mt of lignite, which was a decrease of 9.6%. Major coal producers in the country were ArcelorMittal Temirtau, Bogatyr' Komir, Eurasian Resources Group S.a.r.l. (ERG), and Karazhira. The leading coal-producing region was Pavlodar Province, which produced 68.4 Mt of coal, followed by Karagandy Province (34.2 Mt) and East Kazakhstan Province (8.2 Mt). About 70% of coal production was used domestically, primarily for powerplants and residential heating, and the rest was exported. The leading coal export partners of Kazakhstan were Belarus, Kyrgyzstan, Poland, Russia, Ukraine, and Uzbekistan (tables 1, 2; Coalinvest.ru, 2020).

Petroleum.—In 2019, Kazakhstan produced 658 million barrels (Mbbbl) of crude petroleum (including gas condensate), which was about the same as in 2018. In monetary terms, petroleum production resulted in 12.3 trillion tenge (about \$32.1 billion) in revenue, which corresponded to about 18% of Kazakhstan's GDP. Also, Kazakhstan supported an additional reduction of petroleum production by 500,000 barrels per day (bbl/d) for the first quarter of 2020 in accordance with the Organization of the Petroleum Exporting Countries (OPEC)+ Agreement framework. Petroleum reserves in Kazakhstan were estimated at about 30 billion barrels. By 2025, the

country expected to increase its annual production to 105 Mt (about 767 Mbbbl). During 2016–19, the Kashagan deposit alone produced about \$700 million worth of petroleum. Of the total amount of petroleum produced in the country, 32.9% was produced by TengizChevroil; 15.6%, by North Caspian Operating Co. NV (NCOC); and 12.4%, by Karachaganak Petroleum Operating BV (DKnews.kz, 2020; Kursiv.kz, 2020; Sputnik.kz, 2020).

In 2019, Kazakhstan had 250 deposits of petroleum and natural gas operated by 104 companies. Atyrau Province produced 54.6% of the total output; Mangistau Province, 19.8%; and Western Kazakhstan Province, 13.0%. In 2017, work at the Kashagan field was begun to further increase production—to 420,000 bbl/d in 2022 from 390,000 to 400,000 bbl/d at yearend 2019. Between 2004 and 2019, the NCOC consortium (the operator of the Kashagan field) invested \$14.6 billion in development of project, including its production, labor force, and infrastructure, and contributed \$686 million in social projects (DKnews.kz, 2020; Kursiv.kz, 2020).

In 2019, petroleum refining in Kazakhstan increased by about 4.7% to 111 Mbbbl. As a result, production of different types of gasoline (including jet fuel) increased by 14.4% to about 4.5 Mt compared with about 4.0 Mt in 2018. The Shymkent refinery (PetroKazakhstan Inc.) produced 1.9 Mt of gasoline, or 42% of the total; the JSC Pavlodar Oil Chemistry Refinery produced about 31%; and the other 27% was produced by the Atyrau refinery. In 2019, domestic consumption of gasoline in the country amounted to 4.2 Mt, which was 300,000 t less than gasoline production. Starting in July 2019, Kazakhstan began to export automotive gasoline. As of yearend, Kazakhstan was ranked ninth among countries with the lowest cost of automotive gasoline. In the country, a liter of regular gasoline cost 174 tenge (about \$0.45) (table 1; DKnews.kz, 2020).

Outlook

Interest in Kazakhstan's mineral industry will likely continue to increase along with an increase in the number of projects aimed at developing the country's significant mineral resources, especially following adoption of the new mining code, which was aimed, among other goals, at better protection of investors. Projects involving gold, hydrocarbons, rare metals, rare-earth elements, uranium, and zinc could be of particular interest. New polymetallic projects, especially those including copper and gold, are likely to further increase production, and the opening of new cement plants is likely to increase cement exports. The number of exploration projects underway in Kazakhstan indicates the potential for future increases in the production of mineral commodities in the country, but any future development will depend on a variety of factors, including mineral commodity prices and the development of Government policies and programs to encourage the growth of the industry.

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TABLE 1
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019	
METALS						
Aluminum:						
Bauxite	4,682,600	4,801,300	4,846,100	5,700,000	4,118,400	
Alumina	1,448,280	1,500,013	1,509,005	1,481,000	1,393,411	
Metal, primary	221,939	245,788	254,000 ^r	258,400	277,718	
Antimony, mine, concentrate, Sb content	500 ^e	573	700 ^e	300 ^e	300 ^e	
Beryllium, products, metallurgical	1,687	1,747	1,585	1,712	1,688	
Bismuth, refinery ^e	220	270	270	290	270	
Cadmium, refinery, primary	1,475	1,500 ^e	1,500 ^e	1,500 ^e	1,500 ^e	
Chromium, mine, chromite:						
Ore	5,382,800	5,542,900	6,313,300	6,688,800	7,018,900	
Concentrate	4,198,400	4,148,900	4,599,000	4,965,000	5,133,100	
Copper:						
Mine, Cu content:						
Concentrates	458,100	432,400	515,600	592,800	522,600	
Solvent extraction ³	15,500	35,100	42,200	42,700	39,500	
Smelter, primary	309,355	310,001	334,844	327,314	371,359	
Refinery, primary:						
Leaching, electrowon	15,500	35,100	42,200	42,700	39,500	
Other	394,641	408,435	426,191	438,115	472,327	
Ferroalloys:						
Ferrosilicon	1,414,476	1,525,221	1,640,300	1,740,000 ^e	1,858,130	
Ferrosilicon	86,984	68,779	60,001 ^r	65,405	79,930	
Ferrosilicochromium	74,609	94,468	110,497	110,000 ^e	114,000 ^e	
Silicomanganese	164,189	135,885	123,977	137,710	123,464	
Other, unspecified	1,662	1,987	--	46 ^r	-- ^e	
Total	1,740,000	1,830,000	1,930,000	2,050,000^e	2,180,000^e	
Gold:						
Mine, Au content	kilograms	63,614	74,737	85,339	100,288	106,559
Refinery	do.	31,044	37,852	44,094	53,100	61,080
Iron ore, mine:						
Gross weight		37,269,700	35,793,500	38,728,200	41,876,500	45,221,900
Fe content		11,566,000	10,101,400	10,812,300	11,727,600	11,642,900

See footnotes at end of table.

TABLE 1—Continued
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019
METALS—Continued					
Iron and steel:					
Pig iron	3,233,671	3,595,000	3,775,100	3,174,100	3,208,700
Steel:					
Raw steel	2,947,800	3,175,300	3,411,900	3,964,000 ^r	4,085,000
Products, finished, rolled	2,509,010	2,976,900	2,846,400	2,546,900	2,036,700
Lead:					
Mine, Pb content	40,700	70,500	111,200	86,500	55,700
Refinery, primary and secondary	120,108	134,192	149,129	152,767	132,669
Magnesium, metal, primary ^c	8,100	10,000	12,000	17,000	25,000
Manganese, mine:					
Crude ore:					
Gross weight	1,625,700	1,600,700	1,460,000	1,427,300	1,142,300
Mn content ^c	325,000	320,000	292,000	273,000	217,000
Concentrate:					
Gross weight	615,900	509,500	463,600	434,000	460,000
Mn content ^c	222,000	183,000	167,000	143,000	152,000
Niobium, metal, niobium products	97	47	27	26	14
Rhenium, Re content ^c kilograms	1,000	1,000	1,000	1,000	500
Selenium	28	2	1	1 ^e	3
Silicon, metal	866	--	--	14,000 ^r	13,000 ^e
Silver:					
Mine, Ag content kilograms	370,404	413,821	441,056	400,000 ^e	420,000 ^e
Refinery, primary do.	1,306,575	1,182,476	1,041,838	959,000	1,007,671
Tantalum, metal	141	122	140	132	121
Titanium:					
Ilmenite and leucoxene	8,000 ^e	14,000	9,400	10,000 ^{r,e}	15,000 ^e
Sponge	7,300	9,000 ^e	11,000 ^e	16,000 ^e	23,000
Zinc:					
Mine, concentrate, Zn content	342,500	324,800	315,900	304,400	244,700
Smelter, primary and secondary	323,848	325,820	331,018	317,965	318,399
INDUSTRIAL MINERALS					
Asbestos, all grades	179,800	192,600	192,700	202,900	210,700
Barite, ore and concentrate	674,500 ^r	685,100 ^r	569,900 ^r	570,000 ^{r,e}	530,600
Boron	-- ^r	-- ^r	-- ^r	--	--
Cement, hydraulic thousand metric tons	8,729	9,204	9,398	9,913	10,268
Clay, unspecified ⁴ do.	4,594	5,889	7,976	60,821	11,677
Fluorspar	80,000 ^{r,e}	80,000 ^{r,e}	80,000 ^{r,e}	80,000 ^{r,e}	87,800
Gypsum, mine	82,300	137,400	133,200	121,400	78,200
Lime	870,654	927,947	1,048,300	886,000	874,500
Nitrogen, ammonia, N content	151,800	172,100	178,750	172,610	178,260
Phosphate rock:					
Gross weight	548,700	780,800	1,207,900	1,250,000 ^r	1,273,900
P ₂ O ₅ content	137,000	195,000	302,000	312,500 ^r	318,500
Salt	608,627	730,283	803,794	885,717 ^r	1,094,659
Sulfur:					
Byproduct, S content:					
Metallurgy	604,000	604,000	600,000	600,000	600,000 ^e
Natural gas and petroleum	2,514,900	2,547,000	2,914,000	2,910,000	2,900,000 ^e
Total	3,120,000	3,150,000	3,510,000	3,510,000	3,500,000 ^e
Compounds, sulfuric acid	2,518,600	2,220,800	2,430,700	2,297,400	2,290,800

See footnotes at end of table.

TABLE 1—Continued
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019	
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	97,072,000	92,824,700	101,797,300 ^r	107,595,900 ^r	104,809,100	
Lignite	5,526,000	5,750,400	6,095,000	6,560,700	5,928,900	
Total	103,000,000	98,600,000	108,000,000 ^r	114,000,000 ^r	111,000,000	
Coke, metallurgical	2,628,100	2,839,900	2,954,100	2,839,200	2,604,800	
Natural gas:						
Associated	thousand cubic meters	23,761,800	25,049,100	30,051,300	32,785,300	34,524,300
Nonassociated	do.	21,493,700	21,363,700	22,869,800	22,668,200	22,157,000
Total	do.	45,300,000	46,400,000	52,900,000	55,500,000	56,700,000
Petroleum:						
Crude, including condensate ⁵	42-gallon barrels	576,000,000	567,000,000	627,000,000	657,000,000	658,000,000
Refinery ⁶	do.	107,000,000	102,000,000	103,000,000 ^r	106,000,000 ^r	111,000,000
Uranium, mine, U content		23,800	24,500	23,390	21,705	22,761

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through December 21, 2020. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²In addition to the commodities listed, cesium, cobalt, gallium, germanium, indium, molybdenum, nickel, rare-earth metals, scandium, tellurium, and vanadium may have been produced, but available information was inadequate to make reliable estimates of output.

³The copper content of solvent extraction output at the mine level is the same as electrowon refinery output; however, copper produced in the solvent extraction and electrowinning process is typically reported only at the refinery level.

⁴Includes kaolin.

⁵Figures were converted to barrels from metric tons, which were reported as follows: 2015—79,456,800; 2016—78,031,800; 2017—86,194,400; 2018—90,359,500; and 2019—90,555,400.

⁶Figures were converted to barrels from metric tons, which were reported as follows: 2015—13,534,700; 2016—12,863,200; 2017—12,974,300; 2018—13,400,100; and 2019—14,037,600.

TABLE 2
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual
Alumina	AO Aluminium of Kazakhstan [Eurasian Resources Group LLP (ERG)]	Plant in the city of Pavlodar	1,600,000
Aluminum, primary	Kazakhstan Electrolysis Plant (KEZ) (also known as Pavlodar Aluminum Plant) [Eurasian Resources Group LLP (ERG)]	do.	260,000
Asbestos	AO Kostanai Minerals	Mine in Zhitikara, Kostanay Province	210,000
Barite	TOO Vostochnoye Rudoupravleniye	Chiganak, Zhambyl Province	300,000
Do.	Stroyservice LLC	Kentau District, South Turkistan Province	30,000
Do.	Zhartas LLC	Zhambyl Province	25,000
Do.	Barite Oil Kentau LLC	Kentau District, Turkistan Province	NA
Do.	OAO Yuzhpolyimmetall	do.	NA
Do.	Zhairemskiy GOK ² [Eurasian Natural Resources Corp. (ENRC)]	Ushkatyn III, Zhairem, and Zhumanai deposits near the city of Zhairem	NA
Bauxite	AO Kazakhstan Aluminium Smelter [Eurasian Resources Group LLP (ERG)]	Torgayskoye and Krasnooktyabrskoye mining complexes, Kostanay Province	5,400,000
Beryllium, metal	Ulba Metallurgical Plant (AO NAK Kazatomprom)	Oskemen (also known as Ust-Kamenogorsk)	NA
Bismuth, metal	Ust-Kamenogorsk metallurgical complex [TOO Kazzinc (Glencore plc, 69.61%)]	do.	NA
Do.	Chimkent metallurgical plant (JSC Yuzhpolyimmetall)	Shymkent	NA
Cadmium	do.	do.	NA
Do.	Ust-Kamenogorsk metallurgical complex [TOO Kazzinc (Glencore plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	NA
Cement	AO ACIG	Zhambyl Province	400,000
Do.	AO Karcement (Steppe Cement Ltd.)	Karagandy Province	1,200,000
Do.	AO Central Asia Cement (Steppe Cement Ltd.)	do.	800,000
Do.	AO ShymkentCement (HeidelbergCement Group)	Turkistan Province	1,000,000
Do.	Bukhtarma Cement Co. (HeidelbergCement Group)	East Kazakhstan Province	1,300,000
Do.	KaspiyCement (HeidelbergCement Group)	Mangystau Province	800,000
Do.	PK Cement Plant Semey (Saikan Co.)	East Kazakhstan Province	1,200,000
Do.	PO KoksheCement	Akmola Province	2,000,000
Do.	TOO Gezhoubai Shieli	Kyzylorda Province	1,000,000
Do.	TOO Zhambyl Cement Production Co. (Vicat, 90%, and The World Bank/International Finance Corp., 10%)	Zhambyl Province	1,300,000
Do.	TOO Zhambyl Nedr	Zhambyl Province	300,000
Do.	TOO Kazakhcement	East Kazakhstan Province	1,000,000
Do.	TOO SAS-Tobe Technologies	Turkistan Province	500,000
Do.	TOO Rudnenskiy Cement	Kostanay Province	500,000
Do.	TOO Standard Cement	Turkistan Province	2,000,000
Chromite, marketable ore	AO TNK Kazkhrom [Eurasian Resources Group LLP (ERG)]	Donskoy GOK, Khromtau, Aktobe Province	7,100,000
Do.	Oriel Resources Ltd. (Yildirim Resources)	Voskhod GOK, Khromtau, Aktobe Province	NA
Coal	thousand metric tons Companies: ArcelorMittal Temirtau Bogatyr' Komir Eurasian Resource Group (ERG) Karzhira	Locations: Karagandy Province Pavlodar Province Karagandy Province East Kazakhstan Province	120,000 ³

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Copper:			
Ore, recoverable, Cu content	Aktyubinskazya Mednaya Kompaniya (AMK) [Russian Copper Co. (RMK)]	50th Anniversary of October Mine, Koktau, Aktobe Province Aralchinskoye Mine, Aktobe Province Kundyzy Mine, Aktobe Province Priorskoye Mine, Aktobe Province	NA
Do.	KAZ Minerals plc	Aktogay Mine, East Kazakhstan Province	150,000
Do.	do.	Bozshakol Mine, East Kazakhstan Province	120,000
Do.	do.	Artemyevskiy, Irtyskiy, and Orlovskiy Mines, East Kazakhstan Province	120,000
Do.	Polymetal International plc	Varvarinskoye deposit, Kostanay Province	NA
	TOO Kazakhmys:		
	Central Region:		
Do.	Abyz Mine	Karagandy Province	5,710
Do.	Akbastau Mine	East Kazakhstan Province	29,000
Do.	Konyrat Mine	Karagandy Province	11,800
Do.	Nurkazgan Mine	do.	20,000
Do.	Sayak I and III Mines	do.	23,500
Do.	Shatyrykul Mine	Zhambyl Province	16,000
	East Region:		
Do.	Belousovsky Mine	East Kazakhstan Province	2,700
Do.	Nikolayevsky Mine	do.	25,700
Do.	Yubileyno-Snegirikhinsky Mine	do.	22,000
	Zhezkazgan Region:		
Do.	Annensky Mine	Karagandy Province	25,000
Do.	East Mine	do.	35,000
Do.	North Mine	do.	28,000
Do.	South Mine	do.	30,000
Do.	Stepnoy Mine	do.	30,000
Do.	West Mine	do.	23,300
Do.	Zhomart Mine	do.	60,000
Do.	TOO Kazzinc:		
	Ridder complex:		
	Ridder-Sokolnyi Mine	East Kazakhstan Province	NA
Do.	Shubinskiy Mine	do.	2,750
Do.	Tishinskiy Mine	do.	15,000
Do.	Zyrianovsk complex:		
	Grekhovskiy Mine	do.	NA
Do.	Maleevsky Mine	15 kilometers north of Zyryanovsk	40,000
Concentrate, Cu content	Aktyubinskaya Mednaya Kompaniya (AMK) [Russian Copper Co. (RMK)]	50th Anniversary of October Mine, Koktau, Aktobe Province	58,000
Do.	AO BAST	East Kazakhstan Province	NA
Do.	Polymetal International plc	Concentrator at Varvarinskoye deposit, Kostanay	NA
Do.	TOO Kazakhmys:		
	Central Region:		
	Balkhash concentrator	Karagandy Province	40,000
Do.	Karagaily concentrators:		28,000
	Abyz	do.	
	Akbastau	do.	
	Kosmurun	do.	
Do.	Nurkazgan concentrator	do.	15,000

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Copper:—Continued			
Concentrate, Cu content—Continued	East Region:		
	Orlovsky concentrator	Karagandy Province	70,000
Do.	Belousovsky concentrator	East Kazakhstan Province	13,000
Do.	Irtysky concentrator	do.	6,000
Do.	Nikolayevsky concentrator	do.	30,000
Do.	Zhezkazgan Region:		
	Satpayev concentrator	do.	30,000
Do.	Zhezkazgan No. 1 concentrator	do.	88,800
Do.	Zhezkazgan No. 2 concentrator	do.	95,000
Do.	TOO Kazzinc (Glencore plc, 69.61%), includes:		
	Ridder complex, Ridder concentrator	Karagandy Province	10,000
Do.	Zyrianovsk complex, Zyrianovsk concentrator	do.	10,000
Metal	Central Asia Metals plc	Smelter in Balkhash, Karagandy Province	10,000
Do.	TOO Kazakhmys plants:		
	Central Region:		
	Balkhash smelter	Karagandy Province	250,000
Do.	Balkhash refinery	do.	250,000
Do.	Zhezkazgan Region:		
	Zhezkazgan smelter	do.	250,000
Do.	Zhezkazgan refinery	do.	250,000
Do.	Ust-Kamenogorsk metallurgical complex [TOO Kazzinc (Glencore plc, 69.61%)]	Smelter in Oskemen (also known as Ust-Kamenogorsk)	70,000
Ferroalloys:			
Ferrochrome:			
High-, medium-, and low-carbon FeCr containing 69% Cr	Aktobe plant {AO TNK Kazkhrom [Eurasian Resources Group (ERG)]}	Aktobe Province	450,000
High-carbon FeCr containing 69% Cr	Aksu plant {AO TNK Kazkhrom [Eurasian Resources Group (ERG)]}	Aksu City, Pavlodar Province	850,000
Unspecified	AO TNK Kazkhrom plant [Eurasian Resources Group (ERG)]	Aktobe City	NA
Ferrosilicon	do.	do.	NA
Do.	TOO YDD Corp.	Karagandy Province	180,000
Ferrosilicochromium	AO TNK Kazkhrom plant [Eurasian Resources Group (ERG)]	Aktobe Province	NA
Silicomanganese	do.	Aktobe City	NA
Do.	Taraz Metallurgical Plant LLP (SAT & Co.)	Taraz, Zhambyl Province	NA
Do.	Temirtau Electrometallurgical Complex	Temirtau, Karagandy Province	NA
Gallium	AO Aluminium of Kazakhstan [Eurasian Resources Group (ERG)]	Plant in Pavlodar City	NA
Gold:			
Mine production, Au content	AO AK Altynalmas (Aquila Gold DV)	Mines in Karagandy and Zhambyl Provinces, including the Pustynnoye Mine	NA
Do.	AO GMK Kazakhaltyn	Akmola Province	NA
Do.	TOO Kazakhmys	do.	NA
Do.	KAZ Minerals plc	Aktogay Mine, eastern Kazakhstan	NA
Do.	do.	Bozshakol Mine, eastern Kazakhstan	NA
Do.	Nord Gold N.V.	Suzdal Mine, East Kazakhstan Province	NA
Do.	Polyus Gold International Ltd.	Northern Kazakhstan	NA
Do.	Polymetal International plc	Mines in northern Kazakhstan, including Bakyrchik and Bolshevik Mines	NA
Do.	TOO Altyntau Kokshetau [TOO Kazzinc (Glencore plc, 69.61%)]	Akmola Province	NA
Do.	TOO Yubileynoye	Aktobe Province	NA

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ²
Gold:—Continued				
Refined	kilograms	TOO Kazakhmys	Central Kazakhstan	10,000
Do.	do.	TOO Tau-Ken Altyn (Government)	Astana	30,000
Do.	do.	Ust-Kamenogorsk refinery (TOO Kazzinc)	Oskemen	8,000
Gypsum		AO Zhambylgypsum	Zhambyl Province	270,000
Indium		TOO Kazzinc (Glencore plc, 69.61%)	NA	NA
Iron and steel:				
Pig iron	thousand metric tons	ArcelorMittal Temirtau	Temirtau, Karagandy Province	5,700
Steel:				
Raw	do.	do.	do.	6,000
Products, rolled	do.	do.	do.	3,000
Iron ore, marketable, gross weight	do.	JSC Sokolov-Sarbai Mining Production Association [Eurasian Natural Resources Corp. (ENRC)]	4 open pit mines and 1 underground mine in Kostanay Province	50,000
Do.	do.	TOO Orken (ArcelorMittal Temirtau)	Karagandy Province	10,000
Lead:				
Mine production, recoverable Pb content of ore		TOO Kazzinc (Glencore plc, 69.61%): Ridder complex: Shubinsky Mine	15 kilometers east of Ridder	630
Do.		Tishinsky Mine	15 kilometers southwest of Ridder	15,000
Do.		Zyrianovsk complex, Maleevsky Mine	15 kilometers north of Zyryanovsk	26,000
Do.		TOO ShalkiyaZinc Ltd., Shalkiya Mine	15 kilometers northeast of Zhanakorgan city	NA
Concentrate, Pb content		TOO Kazzinc (Glencore plc, 69.61%), includes: Ridder concentrator Zyrianovsk concentrator	Locations: Ridder, East Kazakhstan Province Zyryanovsk, East Kazakhstan Province	4,000
Do.		TOO ShalkiyaZinc Ltd. (Kentau concentrating plant)	Turkistan Province	NA
Do.		TOO Nova Zinc (JSC Chelyabinsk Zinc Plant)	Akzhal city	NA
Metal		Chimkent metallurgical plant (JSC Yuzhpolimetall)	Shymkent	NA
Do.		Ust-Kamenogorsk metallurgical complex [TOO Kazzinc (Glencore plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	130,000
Lime		AO Temirtau electrometallurgical complex	Temirtau, Karagandy Province	NA
Do.		TOO Kazhimtecsnab	Semey, East Kazakhstan Province	NA
Do.		TOO Maykain Lime Plant	Maykain, Pavlodar Province	NA
Do.		TOO Neohim	Aktobe, Aktobe Province	NA
Do.		TOO SAS-Tobe Technologies	Sastobe, Turkistan Province	NA
Do.		TOO SH WORK	Tekeli, Almaty Province	NA
Do.		TOO Tulkubas Lime Plant	Shymkent, Turkistan Province	NA
Limestone		Keregetas limestone mine	Keregetas, Turkistan Province	NA
Magnesium, metal		AO Ust-Kamenogorsk titanium-magnesium plant	Oskemen (also known as Ust-Kamenogorsk)	NA
Manganese, crude ore, Mn content		Facilities: Atasurda mining and processing complex (TOO Orken) Kazmarganets [Eurasian Resources Group LLP (ERG)] AO Temirtau electrometallurgical complex TOO Arman 100 Zhairemskiy GOK [Eurasian Resources Group LLP (ERG)]	Locations: Atasu Tur and East Kamys Mines, Karagandy Province Temirtau, Karagandy Province 170 kilometers east of Zhezkazgan, Karagandy Province Perstenevsky, Ushkatyn III, Zhomart and Zapadny Zhomart Mines, Karagandy Province	400,000 ³

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Minor metals (indium, selenium, tellurium, thallium, and so forth)		Belogorskiy rare-metals plant ⁴	Asubulak, East Kazakhstan Province	NA
Do.		Chimkent metallurgical plant (JSC Yuzhpolimetal) ⁴	Shymkent	NA
Do.		Ust-Kamenogorsk metallurgical complex [TOO Kazzinc (Glencore plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	NA
Natural gas	million cubic meters	Companies: Karachaganak Petroleum Operating B.V. (BG Group plc., 29.25%; ENI S.p.A., 29.25%; Chevron Corp., 18%; OAO Lukoil, 13.5%; KazMunaiGas JSC, 10%) Tengizchevroil (Chevron Corp., 50%; ExxonMobil Kazakhstan Inc., 25%; KazMunaiGas JSC, 20%; LukArco B.V., 5%) Additional production at smaller fields	Locations: Karachaganak field Tengiz and Korolev fields NA	58,000 ³
Nickel, ore	thousand metric tons	Maksut Mine (AO BAST, 100%)	East Kazakhstan Province	400
Niobium, metal		Ulba Metallurgical Plant (AO NAK Kazatomprom)	Oskemen (also known as Ust-Kamenogorsk)	28
Nitrogen, ammonia, N content		AO KazAzot	Aktau, Mangystau Province	200,000
Petroleum:				
Crude	thousand 42-gallon barrels	Various companies: CNPC AktobeMunaiGas (China National Petroleum Corp., 85.42%) Embamunaigas (AO NK KazMunaiGas) JSC Karazhanbasmunai (CITIC Group and AO NK KazMunaiGas) JV Kazgermunai LLP (AO NK KazMunaiGas) Karachaganak Petroleum Operating B.V. (BG Group plc, 29.25%; ENI S.p.A., 29.25%; Chevron Corp., 18%; OAO Lukoil, 13.5%; AO NK KazMunaiGas, 10%) AO Mangistaumunaigaz North Buzachi oilfield North Caspian operating Co. (NCOC) (Eni S.p.A., 16.81% KazMunaiGas, 16.81%; Royal Dutch Shell, 16.81%; Total S.A., 16.81%; ExxonMobil Corp., 16.81; China National Petroleum Corp., 8.4%; Inpex, 7.56%) Ozenmunaigas (AO NK KazMunaiGas) PetroKazakhstan Inc. (China National Petroleum Corp., 67%, and AO NK KazMunaiGas, 33%) Tengizchevroil (Chevron Corp., 50%; ExxonMobil Kazakhstan Inc., 25%; AO NK KazMunaiGas, 20%; LukArco B.V., 5%)	Various locations: Aktobe Province West Kazakhstan Mangystau Province Kyzylorda Province Karachaganak field Mangystau Province do. Kashagan deposit, Atyrau Province Mangystau Province South Turgai basin Tengiz and Korolev fields	650,000 ³
Refined, crude petroleum throughput	42-gallon barrels per day	Atyrau Refinery (AO NK KazMunaiGas, 99.49%)	Atyrau	100,000
Do.	do.	JSC Pavlodar Oil Chemistry Refinery (AO NK KazMunaiGas, 58%)	Pavlodar	120,000
Do.	do.	PetroKazakhstan Inc. (China National Petroleum Corp., 67%, and AO NK KazMunaiGas, 33%)	Shymkent	110,000
Phosphate rock, beneficiated		Chulaktau mining and processing complex (Kazphosphate LLC)	Chulaktau, Zhambyl Province	NA
Do.		Karatau mining and processing complex (Kazphosphate LLC)	Zhanatas, Zhambyl Province	NA
Do.		Temir Service LLP (Sunkar Resources plc)	Chilisai deposit, northwestern Kazakhstan	NA

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ⁶
Rare-earth metals, products	SARECO (AO NAK Kazatomprom, 51%, and Sumitomo Corp., 49%)	Stepnogorsk	1,500
Rhenium:			
Ammonium perrhenate (containing 69.2% Re)	Zhezkazganredmet (RedMet) (Government)	Zhezkazgan, Karagandy Province	NA
In tailings from copper ore processing	Balkhash copper mining-metallurgical complex (TOO Kazakhmys)	Karagandy Province	NA
Salt	AO Araltuz	Zhaksykylysh, Kyzylorda Province	NA
Do.	AO Asylytuz	Zhambyl Province	NA
Silicon, metal	Silicium Kazakhstan LLP	Karagandy Province	12,500
Silver:			
Mined	TOO Kazakhmys	Mines in Karagandy Province	NA
Do.	TOO Kazzinc (Glencore plc, 69.61%)	Mines in East Kazakhstan Province	NA
Refined	Facilities: Balkhash refinery (TOO Kazakhmys) Chimkent metallurgical plant (JSC Yuzhpolimetal) Ust-Kamenogorsk metallurgical complex [TOO Kazzinc (Glencore plc, 69.61%)]	Locations: Karagandy Province Shymkent Oskemen (also known as Ust-Kamenogorsk)	1,000 ³
Sulfur	Tengizchevroil (Chevron Corp., 50%; ExxonMobil Kazakhstan Inc., 25%; KazMunaiGas JSC, 20%; LukArco B.V., 5%)	Tengiz and Korolev fields	NA
Sulfuric acid	TOO Kazakhmys	Various regions	NA
Do.	TOO Kazphosphat	Taraz, Zhambyl Province	NA
Do.	TOO Kazzinc (Glencore plc, 69.61%)	East Kazakhstan Province	NA
Do.	TOO SKSK (AO NAK Kazatomprom)	Stepnogorsk, Akmola Province	NA
Do.	TOO SKZ-U (AO NAK Kazatomprom)	Kyzylorda, Kyzylorda Province	NA
Tantalum, metal	Ulba Metallurgical Plant (AO NAK Kazatomprom)	Oskemen (also known as Ust-Kamenogorsk)	NA
Titanium:			
Ore	Satpaevsk Titanium Mines Ltd. (Ust-Kamenogorsk titanium-magnesium plant, 49%)	Bektemir deposit, East Kazakhstan Province	NA
Do.	Shokash deposit	Aktobe Province	NA
Do.	Tioline LLP	Obuhovskoye deposit, just north of Kokshetau, Akmola Province	NA
Metal (sponge)	AO Ust-Kamenogorsk titanium-magnesium plant (UKTMK)	Oskemen (also known as Ust-Kamenogorsk)	35,000

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Uranium, U content	Companies:	Locations:	24,000 ³
	Akbastau JV (AO NAK Kazatomprom, 50%, and Uranium One Inc., 50%)	Blocks 1, 3, and 4 of the Budenovskoye deposit, Sozak Region, Turkistan Province	
	Appak LLP (AO NAK Kazatomprom, 65.0%; Sumitomo Corp., 25%; Kansai Electric Power Co. Inc., 10%)	West Mynkuduk Mine of the Mynkuduk deposit, Sozak Region, Turkistan Province	
	Baikenu LLP (AO NAK Kazatomprom, 52.5%, and Japanese consortium, 47.5%)	Block No. 2 of the Kharassan deposit, Zhanakorgan Region, Kyzylorda Province	
	Betpak Dala JV (Uranium One Inc., 70%, and AO NAK Kazatomprom, 30%)	Akdala Mine and Site No. 4 (South Inkai) Mine of the Inkai deposit, Sozak Region, Turkistan Province	
	Inkai JV (AO NAK Kazatomprom, 60%, and Cameco Corp., 40%)	Blocks 1, 2, and 3 of the Inkai deposit, Sozak Region, Turkistan Province	
	Karatau LLP (AO NAK Kazatomprom, 50%, and UraniumOne Inc., 50%)	Block No. 2 of the Budenovskoye deposit, Sozak Region, Turkistan Province	
	Katco JV (Areva Group, 51%, and AO NAK Kazatomprom, 49%)	Tortkuduk Mine and Block No. 1 of the South Moinkum deposit, Sozak Region, Turkistan Province	
	Ken Dala.kz JSC (AO NAK Kazatomprom, 100%)	Central Mynkuduk deposit, Sozak Region, Turkistan Province	
	Kyzylkum LLP (AO NAK Kazatomprom, 50%; Japanese consortium, 30%; UraniumOne Inc., 20%)	Block No. 1 of the Kharassan deposit, Zhanakorgan Region, Kyzylorda Province	
	Mining Co. LLP (AO NAK Kazatomprom, 100%); Mining Group No. 6 LLP	North and South Karamurun Mines, Shieli and Zhanakorgan Regions, Kyzylorda Province	
	Semizbai-U (AO NAK Kazatomprom and its subsidiary, Mining Company LLP, 51%, and China Guangdong Nuclear Power Group, 49%)	Irkol Mine in Kyzylorda Province and Semizbai Mine, on the border of North Kazakhstan and Akmola Provinces	
	Stepnogorsk Mining-Chemical Complex LLP (AO NAK Kazatomprom, 100%)	Shantobe Mine of the Vostok and Zvezdnoe deposits, 300 kilometers west of Stepnogorsk	
	Stepnoye Mining Group LLP	Uvanas and East Mynkuduk Mines, Sozak Region, Turkistan Province	
	Taukent Mining Chemical Plant LLP	Kanzhugan and South Moinkum Mines, Sozak Region, Turkistan Province	
	Zarechnoye JV JSC (AO NAK Kazatomprom, 49.98%, and JSC Atomredmetzoloto, 49.67%)	Zarechnoye and South Zarechnoye deposits, Orlarski Region, Turkistan Province	

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ²
Vanadium, vanadium pentoxide	TOO Balausa Firm, processing plant	Kyzylorda Province	200
Zinc:			
Ore, Zn content	TOO Kazakhmys:		
	East Region complex:		
	Artemyevsky Mine	East Kazakhstan Province	90,000
Do.	Belousovsky Mine	do.	NA
Do.	Irtysky Mine	do.	18,000
Do.	Nikolaevsky Mine	do.	20,000
Do.	Orlovsky Mine	do.	78,200
Do.	Yubileyno-Snegirikhinsky Mine	do.	16,500
Do.	Central Region complex: Abyz Mine	Karagandy Province	13,500
Do.	TOO Kazzinc (Glencore plc, 69.61%):		
	Ridder complex:		
	Ridder-Sokolny Mine	East Kazakhstan Province	NA
Do.	Shubinsky Mine	do.	4,000
Do.	Tishinsky Mine	do.	65,000
Do.	Shaimerden deposit	Kostanay Province	NA
Do.	Zyrianovsk complex: Maleevsky Mine	do.	135,000
Do.	TOO Nova Zinc (JSC Chelyabinsk zinc plant)	Akshatau, Karagandy Province	NA
Do.	TOO ShalkiyaZinc Ltd.	Kyzylorda Province	NA
Concentrate, Zn content	TOO Kazakhmys:		
	East Region complex:		
Do.	Artemyevsky concentrator	do.	55,000
Do.	Belousovsky concentrator	do.	5,800
Do.	Irtysky concentrator	do.	11,000
Do.	Nikolaevsky concentrator	do.	36,000
Do.	Orlovsky concentrator	do.	60,000
Do.	Karaganda Region complex: Karagaily concentrator	Karagandy Province	8,000
Do.	TOO Kazzinc (Glencore plc, 69.61%):		
	Ridder concentrator	do.	NA
Do.	Zyrianovsk concentrator	Zyryanovsk, East Kazakhstan Province	NA
Do.	TOO Nova Zinc (JSC Chelyabinsk zinc plant)	Akshatau, Karagandy Province	35,000
Do.	TOO ShalkiyaZinc Ltd.	Kyzylorda Province	NA
Metal	TOO Kazzinc (Glencore plc, 69.61%):		
	Ridder zinc refinery	East Kazakhstan Province	110,000
Do.	Ust-Kamenogorsk metallurgical complex	do.	190,000

²Estimated; estimated data are rounded to no more than three significant digits. Do., do., Ditto. NA Not available.

¹Many 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.

²GOK is the abbreviation for gomo-obogatitelnyi kombinat, which translates as "mining and beneficiation complex."

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

⁴It is unknown which, if any, rare metals were still being produced at this facility.