



2017–2018 Minerals Yearbook

KAZAKHSTAN [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF KAZAKHSTAN

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Note: In this chapter, information for 2017 is followed by information for 2018.

In 2017, Kazakhstan produced a diverse range of mineral commodities and was the world's leading producer of uranium (39% of world output); the 2d-ranked producer of asbestos (16%) and chromite (13%); the 4th-ranked producer of barite (7.2%) and titanium sponge (5.0%); the 5th-ranked producer of bismuth (1.6%), cadmium (5.9%) and rhenium (2.1%); the 6th-ranked producer of sulfur (4.4%); the 7th-ranked producer of magnesium metal (0.9%); the 8th-ranked producer of antimony (0.5%) and lead (2.4%); the 9th-ranked producer of zinc (2.6%); the 11th-ranked producer of gold (2.6%) and manganese (1.0%); and the 12th-ranked producer of iron ore (1.6%). The country was also a significant producer of lime 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 significant mineral-commodity-producing companies (World Nuclear Association, 2018; Apodaca, 2019; Bedinger, 2019; Bray, 2019; Corathers, 2019a, b; Flanagan, 2019; George, 2019; Jasinski, 2019; Klochko, 2019a, b; McRae, 2019; Polyak, 2019; Schulte, 2019; Singerling, 2019; Thomas, 2019; Tolcin, 2019; Tuck, 2019; U.S. Energy Information Administration, 2019).

In 2017, Government-funded exploration in Kazakhstan was conducted on 98 mineral exploration targets and 8 billion tenge (about \$23 million) was expended.¹ As a result of this exploration, an increase in inferred resources of gold amounted to 1,500 kilograms (kg), and that for copper, 28 million metric tons (Mt). The increase in inferred resources of tin was estimated to be 16,500 metric tons (t), and lithium resources were not disclosed. The inferred resources of methane in the Karaganda Coal Basin were estimated to be 14 billion cubic meters. In 2018, AO Kazgeologiya planned to explore 14 targets and to expend between \$1.1 million to \$3.2 million (Kasymova, 2018; Kt.kz, 2018).

Minerals in the National Economy

In 2017, Kazakhstan's real GDP increased by 4.1% compared with that of 2016, and the nominal GDP was 53.1 trillion tenge (about \$163 billion). The share of industrial production in the GDP was 26.8% compared with 26.1% in 2016. In 2017, the contribution of industrial production to the GDP increased by 7.7%. The total nominal industrial production was valued at 22.8 trillion tenge (\$69.9 billion) and real industrial production

increased by 7.1% from 2016. Mineral extraction played a significant role in industrial production—11.6 trillion tenge (\$35.6 billion), or 50.1% of the value of industrial production, was from this sector. The value of mineral extraction included 9.0 trillion tenge (\$27.6 billion) from the extraction of crude petroleum; 944 billion tenge (\$2.9 billion) from the mining of nonferrous metal ores; 292 billion tenge (\$896 million) from the extraction of coal, including lignite; 244 billion tenge (\$748 million) from the mining of iron ore; and 208 billion tenge (\$638 million) from the extraction of natural gas. In comparison with that of 2016, real output of petroleum increased by 10.5%; mined nonferrous metals, by 7.6%; iron ore, by 7.0%; coal and lignite, by 5.2%; and natural gas, by 2.6%. In 2017, metallurgy contributed 4.1 trillion tenge (\$12.6 billion) to industrial output, of which nonferrous metallurgy and production of precious metals contributed 2.5 trillion tenge (\$7.7 billion) and petroleum refining and coke production accounted for 716 billion tenge (\$2.2 billion). Compared with that of 2016, the real output value of nonferrous and precious metals increased by 6.3%; that of ferrous metals increased by 6.2%; and that of petroleum refining and coke increased by 3.7% (Agency of Statistics of the Republic of Kazakhstan, 2018, p. 143–258).

Government Policies and Programs

In December 2017, the President of Kazakhstan signed into law a new “Subsoil and Use of Subsoil Code” (Mining Code) of the Republic of Kazakhstan. The new code was expected to introduce several innovations that would likely attract new investment and venture capital to Kazakhstan's mineral industry. The new code would significantly simplify the procedures required to obtain exploration and mining licenses, reduce the time requirements to obtain relevant permits, and create 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).

Production

In 2017, production of mined lead increased by 58%; phosphate rock, by 55%; mined antimony and titanium sponge, by an estimated 22% each; associated natural gas, electrowon copper, and primary magnesium metal (estimated), by 20% each; mined copper, by 19%; ferrosilicochromium, by 17%; refined gold, refined petroleum, and bituminous coal, by 16% each; tantalum metal, by 15%; chromite, mined gold, and sulfur (byproduct of natural gas and petroleum), by 14% each; lime, by 13%; and chromium concentrate, refined lead, and crude petroleum, by 11% each. Production of selenium

¹Where necessary, values have been converted from Kazakhstani tenge (KZT) to U.S. dollars (US\$) at an annual average exchange rate of 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.

decreased by 50%; niobium metal, by 43%; ferrosilicon, by 13%; and refined silver, by 12%. These and other production data are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2017, the value of Kazakhstan's exports amounted to \$48.5 billion, which was a 32% increase compared with the value of exports in 2016. In 2017, Kazakhstan's imports increased by 16.6% to \$29.6 billion. In 2016, both exports and imports decreased by 20.1% and 17%, respectively (Agency of Statistics of the Republic of Kazakhstan, 2019b, p. 1–35).

Overall, in 2017, more than two-thirds (68.6%) of Kazakhstan's export revenue was from exports of mineral products. Revenue from mineral exports increased by \$9.3 billion compared with that of 2016. Crude petroleum, ferroalloys, copper, natural gas, and flat-rolled steel were the primary sources of export revenue. Revenue from exports of crude petroleum increased to \$26.6 billion from \$19.3 billion in 2016; natural gas, by 21.1% to \$1.55 billion; fuel oil, by 40.3% to \$1.09 billion; and coal, by 46.7% to \$445 million. In 2017, the share of metals in exports was 18.1% compared with 17.2% in 2016 and 8.5% in 2014. The revenue from ferroalloy exports amounted to \$2.4 billion, and the primary recipients were China (\$868 million), Japan (\$534 million), and the United States (\$183 million). Revenue from copper exports amounted to \$2.3 billion, and the primary recipients were China (\$1.1 billion), the United Arab Emirates (\$537 million), and Turkey (\$401 million). The revenue from flat-rolled steel contributed \$1.47 billion to export revenue; zinc, \$834 million; and aluminum, \$473 million (Nikonorov, 2018; Agency of Statistics of the Republic of Kazakhstan, 2019b, p. 1–35).

Kazakhstan's main export partner was Italy, which received 17.9%, by value, of the country's exports. It was followed by China (12.0%), the Netherlands (9.8%), Russia (9.6%), Switzerland (6.4%), France (5.9%), Spain (3.0%), Uzbekistan (2.6%), Turkey (2.4%), the Republic of Korea and Ukraine (2.3% each), and Greece (2.0%) (Agency of Statistics of the Republic of Kazakhstan, 2019b, p. 1–35.)

The major import categories were foodstuffs, machinery and equipment, and metal products. Kazakhstan's main import partner was Russia, which shipped to Kazakhstan 39.6% of its imports, by value. It was followed by China (15.9%), Germany (5.0%), the United States (4.2%), Italy (3.2%), and Turkey and Uzbekistan (2.5% each) (Agency of Statistics of the Republic of Kazakhstan, 2019a, p. 1–35).

Commodity Review

Metals

Chromium and Ferroalloys.—In 2017, AO TNK 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, located in Pavlodar Province; the Aktobe

ferroalloy plant, located in the city of Aktobe; the Kazmarganets manganese mine, which was located in Karagandy Province and was involved in manganese mining; and the Donskoy chromite 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).

In May, the Donskoy GOK announced that it had begun mining the Pervomayskoye deposit and had produced the first 3,500 t of ore. The design capacity of the mine was 300,000 metric tons per year (t/yr) of ore and the deposit was expected to be mined through 2025. The reserves of the mine were estimated to be 3 Mt of chromite. The company expected to use experience gained from work on the Pervomayskoye Mine to begin the second stage of a much larger mine located nearby—the “10 Years of Kazakhstan's Independence” Mine—the annual capacity of which was expected to reach 6 million metric tons per year (Mt/yr) of ore. In 2017, the Donskoy GOK produced about 2 Mt of ore at that mine (Metalinfo.ru, 2017b).

Copper.—In 2017, KAZ Minerals plc increased copper production by about 80% compared with that of 2016, to 259,000 t, which included production from the Bozymchak deposit in Kyrgyzstan. KAZ Minerals' leading deposits in Kazakhstan were the Bozshakol, which produced 101,000 t (111% more than in 2016), and the Aktogay, which produced 90,000 t (65,000 t from sulfide ore and 25,000 t from oxide ore). In 2018, KAZ Minerals planned to produce about 300,000 t of copper. In February 2017, KAZ Minerals began production of copper concentrate at the Aktogay GOK and reached design projected capacity in October 2017 at the new processing plant with a capacity to process 25 Mt/yr of sulfide ore. The Aktogay project produced its first copper cathodes from copper oxides in December 2015. It was expected that during the first 10 years of operations, the Aktogay GOK would produce 90,000 t/yr of copper from sulfide ore and 15,000 t/yr of copper cathodes from copper oxides (Kursiv.kz, 2017b; Malko, 2017; KAZ Minerals plc, 2018).

In 2017, the Aktyubinskaya Mednaya Kompaniya (AMK), a subsidiary of the Russian Copper Co. of Russia, produced 58,000 t copper in copper concentrate. The company had been in operation since 2004 and its holdings included the “50th Anniversary of October” deposit, which had the capacity to produce 3 Mt/yr of copper ore; the Priorskoye deposit, which had 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. As of March 2017, AMK planned to build mines at the Kundyzdy and the Limannoye deposits, each with 2 Mt/yr of ore capacity, and to build beneficiation plants with a combined capacity to process 5 Mt/yr of ore. Additionally, the company had plans to develop the Vesenne-Aralchinskoye deposit, which spans the Kazakhstan-Russia border. In particular, the company planned to build a mine with a capacity to produce 500,000 t/yr of ore that would be in production for 15 years (Metalinfo.ru, 2017a, 2018).

In August, Rio Tinto of the United Kingdom together with AO Kazgeologiya was conducting exploration of two deposits—the Korgantas and the Balkhash-Saryshagan—for porphyry copper ore. Both deposits are located in

Karagandy Province. The Korgantas had an area of about 4,000 square kilometers (km²), and the Balkhash-Saryshagan, 13,000 km². The exploration project began in 2015 and was expected to continue for between 5 and 6 years and to cost about 3.4 billion tenge (about \$15.3 million). Rio Tinto had an objective to find a copper deposit with resources of at least 1 billion metric tons of ore (Kapital.kz, 2017b).

In January, Polymetal International plc (Polymetal) of Russia announced a complete consolidation of its ownership of the Tarutinskoye copper deposit, located in Russia, purchasing the remaining 25% for \$10 million (having previously owned 75% of the deposit). The Tarutinskoye copper deposit is located 150 kilometers from the Varvarinskoye deposit in Kazakhstan's Kostanay Province that Polymetal had been developing since 2009. Polymetal planned to begin production at the Tarutinskoye deposit in 2018 and to use the flotation plant at Varvarinskoye to process the ore from Tarutinskoye. According to the Joint Ore Reserves Committee (JORC)-compliant reserves estimate completed in 2012, the reserves amounted to 890,000 t of ore containing 0.1 gram per metric ton (g/t) gold, 13 g/t silver, and 1.62% copper. From 2018 to 2020, Polymetal planned to process up to 300,000 t/yr of ore at the Varvarinskoye plant and to produce between 4,000 and 5,000 t/yr of copper from the Tarutinskoye Mine (Kursiv.kz, 2017c; Kapital.kz, 2018).

Gold.—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 (Polymetal), which was one of the 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 (Forbes.kz, 2016).

In August 2017, AO GMK Kazakhaltyn announced that it had completed construction of a new gold-processing plant in Akmola Province. The remaining work included equipment installation and setup and testing at the plant. When in operation, the new plant would have the capacity to produce 1,100 kilograms per year (kg/yr) of dore alloy. The total cost of the project was 11.7 billion tenge (about \$36 million). The new plant would employ 103 workers (Kt.kz, 2017a).

In April, Aurum Deutschland AG of Germany announced that it would begin construction of a new mining and beneficiation complex in Jambyl Province. The total project costs amounted to 250 million euros (about \$271 million). In 2017, the company was expected to complete a project feasibility study and in 2019 begin construction of the complex. In 2020, the company was expected to begin production of dore gold that would be sent for refining at the TOO Tau-Ken Altyn (Astana refinery). The plant would employ such processing methods as heap leaching, tank leaching, and flotation. At full capacity, Aurum Deutschland planned to produce between 5,000 and 6,000 kg/yr of gold and 100,000 kg/yr of silver and to become the third-ranked gold producer in Kazakhstan. The complex would create 1,200 new jobs. The mine was expected to be in production between 20 and 40 years and to contribute about 73 billion tenge (about \$231 million) in taxes to the country's budget through 2025 (Kursiv.kz, 2017a).

In 2017, Polymetal continued work on its Kyzyl project located in East Kazakhstan Province. The reserves of gold at the project were estimated to be 226,000 kg, with an average ore grade of 7.7 g/t gold. In 2018, Polymetal expected to begin mining and to commission a new beneficiation plant. According to the company's plans, the beneficiation plant would have the capacity to process 2 Mt/yr of ore using flotation beneficiation. At full capacity, Polymetal planned to produce 10,000 kg/yr of gold concentrate. In 2016, Polymetal invested 26 billion tenge (about \$76 million) in the project, and in 2017 planned to invest a total of 51 billion tenge (about \$156 million). Also, Polymetal invested 1.74 billion tenge (about \$5.3 million) in social projects that included a childcare facility, a medical office, and a gym facility (Inform.kz, 2017a).

Nickel.—In June 2017, AO BAST announced the completion of the second stage of mine construction at its Maksut copper-nickel mine located in East Kazakhstan Province, and the company increased its ore-processing plant capacity to 400,000 t/yr from 200,000 t/yr of ore. The cost of the second stage included 843 billion tenge (about \$3.49 billion) spent on expansion and 365 billion tenge (about \$1.12 billion) spent on acquisition of new machinery and equipment. The construction was financed by shareholders' funds; in spring 2015, the company had conducted an initial public offering (IPO) at the Kazakhstan Stock Exchange (Schekunskih, 2017a).

In August, new estimates of JORC-compliant reserves of the Maksut deposit were disclosed by AO BAST. According to the new estimates, proved reserves were estimated to be 26.8 Mt of ore grading 0.44% copper and 0.35% nickel. In addition, probable reserves were estimated to be 16.7 Mt of ore. The company estimated an at least 50-year mine life and planned to increase processing capacity to 1.4 Mt/yr of ore. AO BAST expected that the concentrates would be sent to the Almayk GMK in Uzbekistan (Schekunskih, 2017b).

Niobium.—In December, AO Investment Fund for Kazakhstan announced the sale of the Irtysh Chemical and Metallurgical Plant. The new owner was TOO Plant of Rare Earth Metals and the reported transaction amount was 433.3 million tenge (about \$1.33 million). The plant was originally built in 1956 but had not been in operation for the past 20 years. The new owner was expected to modernize the plant to enable processing of molybdenum, niobium, tantalum, tungsten, and zirconium. The capacity of the plant was expected to be 150 t/yr of niobium metal and 645 t/yr of ferroniobium. When in operation, the plant was expected to employ 430 workers (Inform.kz, 2017b; Metaltorg.ru, 2017).

Vanadium.—In June, Ferro-Alloy Resources Ltd. (FAR), which was registered in Guernsey [United Kingdom], announced its intention to conduct an IPO at the Kazakhstan Stock Exchange. FAR owned a 100% share in TOO Balausa Firm, which had a production license for the Bala-Sauskandyk vanadium deposit in Kyzylorda Province. As of 2017, TOO Balausa Firm operated a processing plant that had a capacity of 200 t/yr of vanadium pentoxide. The plant was processing low quality, imported vanadium concentrates. Company leadership stated that production capacity could be increased to as much as 450 t/yr of vanadium pentoxide if higher quality raw materials were used. At the same time, FAR was developing the

Bala-Sauskandyk deposit and planned to eventually construct another processing plant. The first stage of development would involve processing 1 Mt/yr of ore and producing 5,600 t/yr of vanadium pentoxide. The first stage was expected to cost about \$100 million and take no more than 2 years. The second stage of the project would increase mine capacity to 4 Mt/yr of ore and produce 22,400 t/yr of vanadium pentoxide and was estimated to cost \$225 million (Ibrayeva, 2017).

Zinc and Lead.—In 2017, AO ShalkiyaZinc Ltd. (100% owned by AO Samruk-Kazyna) continued building a GOK at its Shalkiya lead and zinc deposit, located in Kyzylorda Province. According to the company, the deposit was one of the 10 largest zinc deposits in the world. The company expected to complete GOK construction and begin production in 2019 at an initial capacity of 500,000 t/yr of ore. By 2020, the amount of ore mined was expected to quadruple, and full capacity was projected to be reached by 2021 at 4 Mt/yr of ore. At full capacity, the GOK would produce 120,000 t/yr of zinc and 25,000 t/yr of lead. The output would be zinc concentrate with at least 54% zinc content and lead concentrate with at least 40% lead content. It was projected that the zinc content of ore at Shalkiya would be between 3.85% and 4.0%, and the lead content, 1.2%. During operations, the GOK was expected to create 1,500 jobs (Irgaliyev, 2016; Kt.kz, 2017b).

In October, TOO Kazzinc announced that it would build a new GOK next to the town of Zhayrem in Karagandy Province. The GOK would mine the ore from the Zhayrem polymetallic deposit, known to contain barium, lead, and zinc. The total resources of the deposit were estimated at 132 Mt of mineralized material with the lead content varying between 1.18% and 2.72% and zinc content varying between 1.20% and 5.58%, depending on the location within the deposit. When completed, the GOK would have the capacity to process 5 Mt/yr of polymetallic ore. The total cost of the two-stage project was estimated to be \$424 million, and the first stage was estimated to cost \$352 million. The Bank for Development of Kazakhstan would provide a \$100 million loan for 7 years, with Kazzinc financing the remainder of the project from its own funds. The first stage of the project would include mine development and plant construction for heavy and medium fraction separation and was expected to be completed by the end of 2018. The second stage would include construction of the beneficiation plant's main building (which would provide flotation-based processing), and auxiliary infrastructure, and was expected to be commissioned by the end of 2019. At full capacity, the GOK was expected to produce 130,000 t/yr of zinc, 60,000 t/yr of lead, and 25,000 kg/yr of silver (OAO Zhayremskiy GOK, 2016, p. 6; Kapital.kz, 2017a; Ten, 2017).

Industrial Minerals

Clay (Kaolin).—In September, Yildizlar SSS Holding of Turkey announced its intention to explore, develop, and produce kaolinitic clays in Akmola Province with the goal to produce construction materials (ceramics and ceramic granite). The company signed an agreement with AO Kazgeologiya that allowed the company to conduct exploration in Kazakhstan, and it was expected to expend up to \$50 million. As of 2017, Yildizlar SSS Holding produced about one-half of

all construction ceramics and ceramic granite in Turkey (Kapital.kz, 2017c).

Mineral Fuels and Related Materials

Uranium.—In 2017, Kazakhstan produced 23,390 t of uranium, which was a 4.5% decrease compared with that of 2016. In December, National Atomic Company Kazatomprom (NAK Kazatomprom) announced that starting in January 2018, it planned to further decrease production. The production reduction was a reaction of uranium producers to a decrease in world uranium prices, by 47% since 2016. NAK Kazatomprom planned to reduce production by a total of 11,000 t of uranium over 3 years. Kazakhstan had been the world leader in uranium production since 2009 and had increased its production volume six-fold during the past 10 years (table 1; Sputniknews, 2017).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

Minerals in the National Economy

In 2018, Kazakhstan's real GDP increased by 4.1% compared with that of 2017, and the nominal GDP in 2018 was 61.8 trillion tenge (about \$179 billion). The mining and quarrying sector's contribution to the GDP was 18.4 trillion tenge (about \$56.4 billion), or 29.8%, compared with 27.2% in 2017 (Agency of Statistics of the Republic of Kazakhstan, 2019a, p. 140–257).

In April 2018, the Ministry of Investment and Development of Kazakhstan announced that subsoil users would be able to obtain licenses through the National Databank of natural resources that was being created. The primary goal of the new Databank would be to provide information on available sections and known data about those resources. The Ministry stated that the system for online licensing would operate by the end of 2018, but that the interactive online database would require several years to be completed (Pokidayev, 2018).

In 2018, the value of Kazakhstan's exports amounted to \$61.1 billion, which was a 26.0% increase compared with the value of exports in 2016; Kazakhstan's imports increased by 13.7% to \$33.7 billion. In 2018, about 62% of export revenue was from petroleum, natural gas, and petroleum products; 7.1% was from nonferrous metals; and 6.8% was from ferrous metals and ferroalloys (Agency of Statistics of the Republic of Kazakhstan, 2019a, p. 1–35; Shibutov, 2019).

Production

In 2018, production of ilmenite and leucoxene increased by an estimated 60%; titanium sponge, by an estimated 45%; magnesium metal, by an estimated 42%; refined gold, by 20%; bauxite and mined gold, by 18% each; mined copper, by 15%; and silicomanganese, by 11%. Production of antimony decreased by an estimated 57%; mined lead, by 22%; raw steel, by 20%; pig iron, by 16%; lime, by 15%; mined manganese (Mn content of concentrate), by 14%; and rolled steel, by 110%. These and other production data are in table 1.

Commodity Review

Metals

Copper.—In April, Polymetal and Russian Copper Co. agreed to exchange 100% of the Tarutinskoye deposit (located in Russia and owned by Polymetal) for an 85% share of the East Tarutinskoye deposit (located in Kazakhstan and owned by Russian Copper Co.). The transaction included an exchange of mineral deposits and production licenses but did not involve payments or other compensation. Polymetal stated that the East Tarutinskoye deposit was better suited to their company because of logistics and proximity to the functioning hub at the Varvarinskoye deposit. The East Tarutinskoye copper-gold deposit is located in Kostanay Province and the licensed area was 66.4 km². The region had well-developed infrastructure with easy access to power lines, railroad, and automobile road networks. The mineral resources of the deposit, previously estimated according to JORC-compliant standards, were 6.4 Mt of mineralized material grading 1.06% copper and 0.07 g/t gold. Polymetal planned to conduct additional exploration at the deposit in 2018 and 2019 and to complete a new JORC-compliant estimate of resources in the first half of 2020 (Kliman, 2018; Metalorg.ru, 2018).

In January 2018, KAZ Minerals announced that it had begun the process of obtaining required licenses and permits for the second stage of development of the Aktogay deposit, dubbed Aktogay II. The company planned to invest \$1.2 billion to increase the capacity of processed sulfide ore from 25 Mt/yr to 50 Mt/yr by 2021. With this expansion, annual production of copper would increase to 170,000 t/yr from 80 Mt/yr for the period between 2022 and 2027 and after that, production would stabilize at the 130,000 t/yr level. The company planned to finance the project from three sources—loans from the China Development Bank, a credit line from the Development Bank of Kazakhstan, and the company's own funds (Tumashova, 2018).

Ferrosilicon.—In March 2018, the Development Bank of Kazakhstan (a subsidiary of AO National Managing Holding Bayterek) announced that it had opened a 24 billion tenge (about \$70 million) credit line for an 11-year term to TOO YDD Corp. LLP for construction of the first stage of a ferroalloy plant in Karagandy Province. The plant would have the capacity to produce 96,000 t/yr of ferrosilicon and was expected to be commissioned in the first half of 2019. The total cost of the project was estimated to be 34 billion tenge (about \$99 million), of which about one-third would be financed from the company's own funds. The proposed plant would likely have relatively low costs of production because it would be in close proximity to a combined heat and power (HPC) system and to such raw materials as coal, limestone, quartzite, and shale. Once in operation, the plant would create an estimated 550 jobs. After the first stage, the company had plans to build second and third stages, which would increase the plant's capacity to 144,000 t/yr and 240,000 t/yr of ferrosilicon, respectively. The company planned to export ferrosilicon to Russia, Turkey, the Republic of Korea, the United States, and countries of the European Union (Mamyrkhanova, 2018).

Gold.—In May 2018, Polymetal sold a 50% share in the Dolinnoye deposit to AO AK Altynalmas for \$16.7 million,

including corrections for the capital funds tied to raw materials and finished products. In March, Polymetal and Dolphinflip Co. Ltd. agreed to sell their shares in the Dolinnoye deposit to Altynalmas for a total of \$33.5 million, so that Altynalmas could acquire a 100% share in the deposit. Polymetal explained that the Dolinnoye deposit was no longer an asset of interest for the company after the Komarovskoye deposit became the primary ore source for the Varvarinskoye processing hub (IPrime.ru, 2018; Kursiv.kz, 2018).

Nickel.—In April 2018, AO BAST announced that it intended to increase production capacity at the Maksut deposit by 3.5 times. In particular, by the end of 2019, the company planned to reach a processing capacity of 1.4 Mt/yr of copper-nickel ore from 400,000 t/yr that was reached in 2017. The company planned to start capacity expansion in the beginning of 2019. The company secured preliminary investment of between \$8 million and \$10 million and planned to attract more external investment after determining the cost of expansion (Baykadamov, 2018).

Mineral Fuels and Related Materials

Uranium.—In 2018, Kazakhstan produced 21,705 t of uranium, which was a 7.2% decrease compared with that of 2017. Following a decrease in world uranium prices, NAK Kazatomprom continued with production restrictions that resulted in production amounts that were 20% below the maximum level assumed by the company's contracts and licenses. The 2019 production in Kazakhstan was expected to be about 22,800 t, and production by NAK Kazatomprom companies, specifically, to be between 13,000 and 13,500 t of uranium trioxide (table 1; Vlast.kz, 2019).

Outlook

Interest in Kazakhstan's mineral industry will likely continue to increase, as will the number of projects for extracting the country's significant mineral resources. This is especially true following the adoption of the new mining code, which among other goals, is aimed at better protecting investors. Projects involving gold, hydrocarbons, rare metals, rare-earth elements, uranium, and zinc could be of particular interest. The number of exploration projects underway in Kazakhstan indicates the potential for future increases in the country's mineral production, 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	2014	2015	2016	2017	2018	
METALS						
Aluminum:						
Bauxite	4,515,600	4,682,600	4,801,300	4,846,100	5,700,000	
Alumina	1,419,000	1,448,280	1,500,013 ^r	1,509,005	1,481,000	
Metal, primary	209,252	221,939	245,788 ^r	254,000	258,400	
Antimony, mine, concentrate, Sb content	481	500 ^e	573 ^r	700 ^e	300 ^e	
Beryllium, products, metallurgical	1,776	1,687	1,747	1,585	1,712	
Bismuth, refinery, Bi content ^e	230 ^r	220 ^r	270 ^r	270	290	
Cadmium, refinery, primary	1,633	1,475	1,500 ^{r,e}	1,500 ^e	1,500 ^e	
Chromium, mine, chromite:						
Ore	5,410,700	5,382,800	5,542,900	6,313,300	6,688,800	
Concentrate	4,475,700	4,198,400	4,148,900	4,599,000	4,965,000	
Copper:						
Mine:						
Concentrates, Cu content	458,800	458,100	432,400	515,600	592,800	
Solvent extraction	12,900	15,500	35,100 ^r	42,200	42,700	
Smelter, primary	214,058	309,355	310,001	334,844	327,314	
Refinery, primary:						
Leaching, electrowon ³	12,900	15,500	35,100 ^r	42,200	42,700	
Other	294,808	394,641	408,435	426,191	438,115	
Ferroalloys:						
Ferrosilicon	1,351,803	1,414,476	1,525,221	1,640,300	1,740,000 ^e	
Ferrosilicon	395	86,984	68,779	59,926	65,405	
Ferrosilicochromium	158,825 ^r	74,609	94,468	110,497	110,000 ^e	
Silicomanganese	200,379	164,189	135,885	123,977	137,710	
Other, unspecified	3,735	1,662	1,987	--	-- ^e	
Total	1,720,000	1,740,000	1,830,000	1,930,000	2,050,000	
Gold:						
Mine, Au content	kilograms	50,339	63,614	74,737	85,339	100,288
Refinery	do.	26,884	31,044	37,852	44,094	53,100
Iron ore, mine:						
Gross weight	51,540,800 ^r	37,269,700 ^r	35,793,500	38,728,200	41,876,500	
Fe content	14,946,000 ^r	11,566,000 ^r	10,101,400	10,812,300	11,727,600	
Iron and steel:						
Pig iron	3,184,780	3,233,671	3,595,000	3,775,100	3,174,100	
Steel:						
Raw steel	2,908,800	2,947,800	3,175,300	3,411,900	2,744,300	
Products, finished, rolled	2,532,186	2,509,010	2,976,900	2,846,400	2,546,900	
Lead:						
Mine, Pb content	37,800	40,700	70,500	111,200	86,500	
Refinery, primary and secondary	127,064	120,108	134,192	149,129	152,767	
Magnesium, primary, metal ^e	9,500	8,100	10,000	12,000	17,000	
Manganese, mine:						
Crude ore:						
Gross weight	2,608,800	1,625,700	1,600,700	1,460,000	1,427,300	
Mn content ^e	522,000	325,000	320,000	292,000	273,000	
Concentrate:						
Gross weight	1,092,300	615,900	509,500	463,600	434,000	
Mn content ^e	390,000	222,000	183,000	167,000	143,000	
Niobium, metal, niobium products, Nb content	72	97	47	27	26	
Rhenium, Re content ^e	kilograms	300	1,000	1,000	1,000	
Selenium	42	28	2 ^r	1	1 ^e	
Silicon, metal	998	866	-- ^r	--	-- ^e	

See footnotes at end of table.

TABLE 1—Continued
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2014	2015	2016	2017	2018
METALS—Continued					
Silver:					
Mine, Ag content kilograms	474,991 ^r	370,404 ^r	413,821 ^r	441,056	400,000 ^e
Refinery, primary do.	983,697	1,306,575	1,182,476	1,041,838	959,000
Tantalum, metal, Ta content	154	141	122	140	132
Titanium:					
Ilmenite and leucocoxene	10,000 ^e	8,000 ^e	14,000 ^r	9,400	15,000 ^e
Sponge	8,700	7,300	9,000 ^e	11,000 ^e	16,000 ^e
Zinc:					
Mine, concentrate, Zn content	345,200	342,500	324,800	315,900	304,400
Smelter, primary and secondary	324,946	323,848	325,820	331,018	317,965
INDUSTRIAL MINERALS					
Asbestos, all grades	213,100	179,800	192,600	192,700	202,900
Barite, ore and concentrate ^e	590,000 ^r	607,000 ^r	620,000 ^r	620,000	620,000
Boron thousand metric tons	507	500 ^e	500 ^e	500 ^e	--
Cement, hydraulic do.	8,140	8,729	9,204	9,398	9,913
Fluorspar	65,000 ^{r,e}	21,200 ^{r,e}	20,000 ^{r,e}	--	-- ^e
Gypsum	113,400	82,300	137,400	133,200	121,400
Lime	923,300	870,654	927,947 ^r	1,048,300	886,000
Nitrogen, ammonia, N content	138,700	151,800	172,100	178,750	172,610
Phosphate rock:					
Gross weight	485,400	548,700	780,800	1,207,900	1,300,000 ^e
P ₂ O ₅ content	121,000	137,000	195,000	302,000	325,000 ^e
Salt	596,508	608,627	730,283	803,794	800,000 ^e
Sulfur:					
Byproduct, S content:					
Metallurgy	604,000 ^e	604,000 ^e	604,000 ^e	600,000	600,000
Natural gas and petroleum	2,464,600	2,514,900	2,547,000 ^r	2,914,000	2,910,000 ^e
Compounds, sulfuric acid	2,329,900	2,518,600	2,220,800	2,430,700	2,297,400
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous	102,378,000	97,072,000	92,824,700 ^r	107,891,800	114,136,600
Lignite	6,894,000	5,526,000	5,750,400	6,095,000	6,560,700
Total	109,000,000	103,000,000	98,600,000	114,000,000	121,000,000
Coke, metallurgical	2,697,800	2,628,100	2,839,900	2,954,100	2,839,200
Natural gas:					
Associated thousand cubic meters	21,898,300	23,761,800	25,049,100	30,051,300	32,785,300
Nonassociated do.	21,278,500	21,493,700	21,363,700	22,869,800	22,668,200
Total do.	43,200,000	45,300,000	46,400,000	52,900,000	55,500,000
Petroleum:					
Crude, including condensate ⁴ thousand 42-gallon barrels	586,000	576,000	567,000	627,000	657,000
Refinery ⁵ do.	115,000	107,000	102,000	118,000	128,000
Uranium, mine, U content	22,829	23,800	24,500	23,390	21,705

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

¹Table includes data available through January 16, 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, 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 because copper produced in the solvent extraction and electrowinning process is typically reported only at the refinery level.

⁴Figures were converted to barrels from metric tons, which were reported as follows: 2014—80,825,600; 2015—79,456,800; 2016—78,031,800, 2017—86,194,400; and 2018—90,359,500.

⁵Figures were converted to barrels from metric tons, which were reported as follows: 2014—14,542,600; 2015—13,534,700; 2016—12,863,200; 2017—14,900,000; and 2018—16,190,000.

TABLE 2
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Alumina	AO Aluminium of Kazakhstan [Eurasian Resources Group LLP (ERG)]	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 Monerals	Zhitikara, Kostanay Province	210,000
Barite	TOO Vostochnoye Rudoupravleniye	Chiganak, Zhambyl Province	300,000
Do.	Zhartas LLC	Zhambyl Province	25,000
Do.	Stroyservice LLC	Kentau District, South Kazakhstan Province	30,000
Do.	Zhairemskiy GOK ² [Eurasian Natural Resources Corp. plc (ENRC)]	Ushkatyn III, Zhairem, and Zhumanai deposits near the city of Zhairem	NA
Do.	JSC Yuzhpolimetall	Kentau District, South Kazakhstan Province	NA
Do.	Barite Oil Kentau LLC	do.	NA
Bauxite	Kazakhstan Aluminium Smelter JSC [Eurasian Natural Resources Corp. plc (ENRC)]	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 Yuzhpolimetall)	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	Companies: AO Karcement AO ShymkentCement (HeidelbergCement Group) Bukhtarma Cement Co. (HeidelbergCement Group) Kaspiy Cement (HeidelbergCement Group) TOO Jambyl Cement Production Co. TOO Kazakhcement TOO Standard Cement	Locations: Karaganda Province South Kazakhstan Province East Kazakhstan Province Mangystau Province Jambyl Province East Kazakhstan Province South Kazakhstan Province	10,000 ³
Chromite, marketable ore	Companies: AO TNK Kazkhrom [Eurasian Natural Group LLP (ERG)] Oriol Resources Ltd. (Yildirim Resources)	Locations: Khromtau, Aktobe Province Voskhod GOK, ² Khromtau, Aktobe Province	6,800,000 ³
Copper:			
Ore, recoverable, Cu content	Aktyubinskazya Copper Mednaya Kompaniya (AMK) [Russian Copper Co (RMK)]	50th Anniversary of October Mine, at Koktau, Aktobe Province	NA
Do.	KAZ Minerals plc	Aktogay Mine, Eastern Kazakhstan	90,000
Do.	Kazakhmys plc:		
	Central Region:		
	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.	Shatyrcul Mine	Zhambyl Province	16,000
Do.	East Region:		
	Artemyevsky Mine	do.	25,000
Do.	Belousovsky Mine	do.	2,700
Do.	Irtysky Mine	do.	8,500
Do.	Nikolayevsky Mine	do.	25,700
Do.	Orlovsky Mine	do.	86,200
Do.	Yubileyno-Snegirikhinsky Mine	do.	22,000

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Copper—Continued:			
Ore, recoverable, Cu content—	Zhezkazgan Region:		
Continued	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.	Polymetal International plc	Varvarinskoye deposit, Kostanay Province	NA
Do.	TOO Kazzinc (Glencore plc, 69.61%): Ridder complex:		
	Ridder-Sokolny Mine	East Kazakhstan Province	NA
Do.	Shubinsky Mine	do.	2,750
Do.	Tishinsky Mine	do.	15,000
Do.	Zyrianovsk complex:		
	Grekhovskiy Mine	NA	NA
Do.	Maleevskiy Mine	15 kilometers north of Zyryanovsk	40,000
Concentrate, Cu content	Akt'yubinskaya Mednaya Kompaniya (AMK) [Russian Copper Co (RMK)]	50th Anniversary of October Mine, at Koktau, Aktobe Province	58,000
Do.	AO BAST	East Kazakhstan Province	NA
Do.	Kazakhmys plc:		
	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
Do.	East Region:		
	Orlovskiy concentrator	do.	70,000
Do.	Belousovskiy concentrator	East Kazakhstan Province	13,000
Do.	Irtyskiy concentrator	do.	6,000
Do.	Nikolayevskiy 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.	Polymetal International plc	Varvarinskoye deposit, Kostanay	NA
Do.	TOO Kazzinc (Glencore plc, 69.61%): Ridder complex, Ridder concentrator	Karagandy Province	10,000
Do.	Zyrianovsk complex, Zyrianovsk concentrator	do.	10,000
Metal	Central Asia Metals plc	Balkhash, Karagandy Province	10,000
Do.	Kazakhmys plc mines or 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%)]	Oskemen (also known as Ust-Kamenogorsk)	70,000

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits		Location or deposit names	Annual capacity ^c
Ferrous:				
Ferrochrome:				
High-, medium-, and low-carbon FeCr containing 69% Cr	Aktobe plant {Kazkhrom [Eurasian Resources Group (ERG)]}		Aktobe Province	450,000
High-carbon FeCr containing 69% Cr	Aksu plant {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
Ferrosilicochromium	do.		do.	NA
Silicomanganese	AO TNK Kazkhrom plant (Eurasian Resources Group [ERG])		do.	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)]		Pavlodar City	NA
Gold:				
Mine production, Au content	AO AK Altynalmas (Aquila Gold DV)		Eastern Kazakhstan	NA
Do.	GMK Kazakhaltyn		Northern Kazakhstan	NA
Do.	Kazakhmys plc		do.	NA
Do.	Nord Gold N.V.		Suzdal Mine	NA
Do.	Polyus Gold International, Ltd.		Northern Kazakhstan	NA
Do.	Polymetal International plc		do.	NA
Do.	TOO Altyntau Kokshetau [TOO Kazzinc (Glencore plc, 69.61%)]		Akmola Province	NA
Do.	TOO Yubileynoye		Aktobe Province	NA
Refined	kilograms	TOO Kazakhmys	Central Kazakhstan	10,000
Do.	do.	TOO Tau-Ken Altyn (Government)	Astana	50,000
Do.	do.	Ust-Kamenogorsk refinery (TOO Kazzinc)	Oskemen	8,000
Gypsum		AO Jambylgypsum	Jambyl 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. plc (ENRC)]	4 open pit mines and 1 underground mine in Kostanay Province	20,000
Do.	do.	TOO Orken (ArcelorMittal Temirtau)	Karagandy Province	5,000
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%): Ridder concentrator	Ridder, East Kazakhstan Province	4,000 NA
Do.		Zyrianovsk concentrator	Zyryanovsk, East Kazakhstan Province	NA
Do.		Kentau concentrating plant (TOO ShalkiyaZinc Ltd.)	South Kazakhstan Province	NA
Do.		TOO Nova Zinc (JSC Chelyabinsk Zinc Plant)	Akzhal city	NA

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ⁶	
Lead:—Continued				
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 Kazchimtecsnab	Semey, East Kazakhstan Province	NA	
Do.	TOO Maykain Lime Plant	Maykain, Pavlodar Province	NA	
Do.	AO Temirtau electrometallurgical complex	Temirtau, Karagandy Province	NA	
Do.	TOO Neohim	Aktobe, Aktobe Province	NA	
Do.	TOO SAS-Tobe Technologies	Sastobe, South Kazakhstan Province	NA	
Do.	TOO SH WORK	Tekeli, Almaty Province	NA	
Do.	TOO Tulkubas Lime Plant	Shymkent, South Kazakhstan Province	NA	
Limestone	Keregetas limestone mine	Keregetas, South Kazakhstan 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 {Kazchrome JSC [Eurasian Natural Resources Corp. plc (ENRC)]} Temirtau electrometallurgical complex TOO Arman 100 Zhayremskiy GOK ² [Eurasian Natural Resources Corp. plc (ENRC)]	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	400,000 ³	
Minor metals (indium, selenium, tellurium, thallium, and so forth)	Belogorskiy rare-metals plant	Asubulak, East Kazakhstan Province	NA ⁴	
Do.	Chimkent metallurgical plant (JSC Yuzhpolimetall)	Shymkent	NA ⁴	
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	48,000 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, Mangistau Province	200,000
Petroleum:				
Crude	thousand 42-gallon barrels	Various companies: CNPC AktobeMunaiGas (China National Petroleum Corp., 85.42%) Embamunaigas (KazMunaiGas JSC) JSC Karazhanbasmunai (CITIC Group and KazMunaiGas JSC) JV Kazgermunai LLP (KazMunaiGas JSC) 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%)	Various locations: Aktobe Province Western Kazakhstan Mangistau Province Kyzylorda Province Karachaganak field	600,000 ³

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Petroleum:—Continued				
Crude—Continued	thousand 42-gallon barrels	Mangistaumunaigaz JSC North Buzachi oilfield Ozenmunaigas (KazMunaiGas JSC) PetroKazakhstan Inc. (China National Petroleum Corp., 67%, and KazMunaiGas JSC, 33%) Tengizchevroil (Chevron Corp., 50%; ExxonMobil Kazakhstan Inc., 25%; KazMunaiGas JSC, 20%; LukArco B.V., 5%)	Mangystau Province do. do. South Turgai basin Tengiz and Korolev fields	
Refined, crude petroleum throughput	42-gallon barrels per day	Atyrau Refinery (KazMunaiGas, 99.49%)	Atyrau	100,000
Do.	do.	JSC Pavlodar Oil Chemistry Refinery (KazMunaiGas JSC, 58%)	Pavlodar	120,000
Do.	do.	PetroKazakhstan Inc. (China National Petroleum Corp., 67%, and KazMunaiGas JSC, 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)	Chilिसai deposit, northwestern Kazakhstan	NA
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 (Kazakhmys plc)	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, refined		Facilities: Balkhash refinery (Kazakhmys plc) Chimkent metallurgical plant (JSC Yuzhpolimetall) 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		Kazakhmys plc	Various regions	NA
Do.		TOO Kazphosphat	Taraz, Jambyl 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		Tioline LLP	Obuhovskoye deposit, just north of Kokshetau, Akmola Province	NA
Do.		Satpaevsk Titanium Mines Ltd. (Ust-Kamenogorsk titanium-magnesium plant, 49%)	Bektemir deposit, East Kazakhstan Province	NA
Do.		Shokash deposit	Aktobe 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 2018¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Uranium, U content	Companies: Akbastau JV (AO NAK Kazatomprom, 50%, and Uranium One Inc., 50%) Appak LLP (AO NAK Kazatomprom, 65%; Sumitomo Corp., 25%; Kansai Electric Power Co. Inc., 10%) Baiken-U LLP (AO NAK Kazatomprom, 52.5%, and Japanese consortium, 47.5%) Betpak Dala JV (Uranium One Inc., 70%, and AO NAK Kazatomprom, 30%) Inkai JV (AO NAK Kazatomprom, 60%, and Cameco Corp., 40%) Karatau LLP (AO NAK Kazatomprom, 50%, and UraniumOne Inc., 50%) Katco JV (Areva Group, 51%, and AO NAK Kazatomprom, 49%) Ken Dala.kz JSC (AO NAK Kazatomprom, 100%) Kyzylkum LLP (Japanese consortium, 30%; Uranium One Inc., 20%; AO NAK Kazatomprom, 50%) Mining Company LLP (AO NAK Kazatomprom, 100%): Mining Group No. 6 LLP Semizbai-U (AO NAK Kazatomprom and its subsidiary, Mining Company LLP, 51%, and China Guangdong Nuclear Power Group, 49%) Stepnogorsk Mining-Chemical Complex LLP (AO NAK Kazatomprom, 100%) Stepnoye Mining Group LLP Taukent Mining Chemical Plant LLP Zarechnoye JV JSC (AO NAK Kazatomprom, 49.98%, and JSC Atomredmetzoloto, 49.67%)	Locations: Blocks 1, 3, and 4 of the Budenovskoye deposit, Sozak Region, South Kazakhstan Province West Mynkuduk Mine of the Mynkuduk deposit, Sozak Region, South Kazakhstan Province Block No. 2 of the Kharassan deposit, Zhanakorgan Region, Kyzylorda Province Akdala Mine and Site No. 4 (South Inkai) Mine of the Inkai deposit, Sozak Region, South Kazakhstan Province Blocks 1, 2, and 3 of the Inkai deposit, Sozak Region, South Kazakhstan Province Block No. 2 of the Budenovskoye deposit, Sozak Region, South Kazakhstan Province Tortkuduk Mine and Block No. 1 of the South Moinkum deposit, Sozak Region, South Kazakhstan Province Central Mynkuduk deposit, Sozak Region, South Kazakhstan Province Block No. 1 of the Kharassan deposit, Zhanakorgan Region, Kyzylorda Province North and South Karamurun Mines, Shieli and Zhanakorgan Regions, Kyzylorda Province Irkol Mine in Kyzylorda Province and Semizbai Mine, on the border of North Kazakhstan and Akmola Province Shantobe Mine of the Vostok and Zvezdnoe deposits, 300 kilometers west of Stepnogorsk Uvanas and East Mynkuduk Mines, Sozak Region, South Kazakhstan Province Kanzhugan and South Moinkum Mines, Sozak Region, South Kazakhstan Province Zarechnoye and South Zarechnoye deposits, Olrarski Region, South Kazakhstan Province	24,000 ³
Vanadium, vanadium pentoxide	TOO Balasa Firm, processing plant	Kyzylorda Province	200

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Zinc:			
Ore, Zn content	Kazakhmys plc:		
	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.	Kazakhmys plc:—Continued		
	East Region complex:—Continued		
	Orlovsky Mine	East Kazakhstan Province	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	AO ShalkiyaZinc Ltd.	do.	NA
Do.	Kazakhmys plc:		
	East Region complex:		
	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
Metal	TOO Kazzinc (Glencore plc, 69.61%):		
	Ridder zinc refinery	East Kazakhstan Province	110,000
Do.	Ust-Kamenogorsk metallurgical complex	do.	190,000

^cEstimated; 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.