



# 2012 Minerals Yearbook

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## KAZAKHSTAN

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# THE MINERAL INDUSTRY OF KAZAKHSTAN

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Kazakhstan produced a diverse range of mineral commodities and was the world's leading producer of uranium (37% of world output); the second-ranked producer of chromite (16% of world output); the fourth-ranked producer of titanium sponge (11% of world output) and magnesium metal (3% of world output); and the fifth-ranked producer of rhenium (6% of world output). The country was also a significant producer of bauxite, cadmium, copper, gallium, and zinc. The mineral industry accounted for a significant share of the country's gross domestic product (GDP) and foreign trade revenue; petroleum and natural gas were the leading 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 (Bedinger, 2013; Bray, 2013; Edelstein, 2013; Jaskula, 2013; Kramer, 2013; Papp, 2013; Polyak, 2013; Tolcin, 2013a, b; U.S. Energy Information Administration, 2013).

## Minerals in the National Economy

In 2012, Kazakhstan's real GDP increased by 5.1% compared with that of 2011, and the nominal 2011 GDP was valued at \$203.5 billion.<sup>1</sup> Total industrial production was valued at \$113 billion, of which \$68.7 billion (60.8% of the value of industrial production) was from mineral extraction (which included \$57.9 billion from the extraction of crude petroleum, \$3.3 billion from the mining of nonferrous metal ores, \$1.6 billion from the mining of iron ores, \$1.3 billion from the extraction of coal and lignite, and \$548 million from the extraction of natural gas). Metallurgy contributed \$13.1 billion to industrial output, of which ferrous metallurgy contributed \$4.8 billion. As of January 1, 2013, Kazakhstan had a total of 2,240 enterprises engaged in mining and mine development; 189 of these enterprises were joint firms with foreign partners and 209 were fully owned by foreigners (Agency of Statistics of the Republic of Kazakhstan, 2013a, b).

Mining and metallurgy attracted significant amounts of fixed capital investment and foreign direct investment in Kazakhstan. Total fixed capital investment in industrial production was about \$19.2 billion, of which \$10.7 billion (55.7%) was investment in mining and \$1.8 billion (9.4%) was investment in metallurgy. Investment in crude petroleum and natural gas production made up about 67% of total fixed capital investment in the mineral industry. In 2011 (the latest year for which data were available), gross foreign direct investment totaled about \$23.5 billion, of which investment in mining and mine development accounted for \$5.4 billion (investment in crude petroleum and natural gas made up about \$3.5 billion of the total mining investment), and investment in metallurgy and in production of finished products

made out of metals accounted for \$2.4 billion (Agency of Statistics of the Republic of Kazakhstan, 2013a).

## Government Policies and Programs

In August, the Government of Kazakhstan adopted a new document called "A Concept for the Development of the Geological Industry of the Republic of Kazakhstan through 2030." The document describes the current state of the exploration and mining industries and outlines goals and principles for their future development. According to the document, Kazakhstan's proven reserves of copper and polymetallic ores have been in decline and would be able to supply the country's industry for only another 10 to 15 years. Since 2000, proven reserves—including increases in reserves brought about through new exploration—of copper decreased by 2.4 million metric tons (Mt) (or by 5.8%); zinc, by 7.2 Mt (19.8%); lead, by 1.1 Mt (6.5%); and bauxite, by 54.5 Mt (15%). In other words, in the past several decades there was an imbalance between additions to reserves from exploration and development and removals from reserves by mining, and this trend would need to be reversed to avoid significant depletion of reserves (Ministry of Industry and New Technologies, 2012; TengriNews.kz, 2012).

The "Concept" document recommends forming a Government structure designed to assist in effective exploration for and the rational use and timely replenishment of mineral reserves. The document assumes that the first 2 years (2013 and 2014) would be spent on preparing to reorganize the mineral industry; in particular, preparing new technical and legal documents aimed at creating a new legal and technical foundation for reorganization of the exploration industry. In addition, the Government would create a new research institute, conduct marketing research, and train specialists. Then, during the period of 2015 to 2020, massive national and regional exploration work would be conducted, and during the period of 2020 to 2030, the main tasks would be prospecting and development. The document notes that an important component of revitalization of the exploration industry will be attracting leading foreign companies to Kazakhstan's mineral exploration industry and training young geologists in the country (MinerJob.ru, 2012b; Ministry of Industry and New Technologies, 2012).

In December, the President of Kazakhstan gave an order to cancel the Government moratorium on the issuance of new mining licenses. The moratorium was introduced in 2008 and was motivated by the Government's understanding of the need for the country to adopt a new mining code and to cut down on corruption surrounding the process of issuing licenses. Since 2008, new licenses had been available only to firms that had formed joint ventures with Tau-Ken Samruk, which was the vertically integrated Government-owned company working in the spheres of mining and metallurgy.

<sup>1</sup>Where necessary, values have been converted from Kazakhstani tenge (KZT) to U.S. dollars (US\$) at an annual average exchange rate of KZT149.11=US\$1.00.

The Ministry of Industry and New Technologies (MINT) was also discussing the possibility of offering companies mining licenses without going through the standard competition procedures in exchange for companies agreeing to make large investments in the mining projects. The MINT also noted that, despite its rich mineral resources, Kazakhstan attracts less than 1% of world investment in metallic deposits. The Ministry expected that legislation supporting the expedited procedures for issuing mining licenses could be written and adopted in 2013 (Mineral.ru, 2012h; MinerJob.ru, 2012e, f).

## Production

Output of mineral commodities generally remained close to the levels of output in 2011. Production of mined silver and silver metal increased by 48% each; barite concentrate, gold metal, and salt, by 27% each; silicon metal, by an estimated 25%; ferrosilicochromium and estimated marketable barite, by 15% each. On the other hand, ferrosilicon production decreased by 70%. Production of crude steel decreased by 29%, and that of rolled steel, by 23%. Refined lead production decreased by 21%; production of gallium, by 16%; and that of pig iron, by 14% (table 1).

## Structure of the Mineral Industry

The four most significant producers of nonfuel mineral commodities in Kazakhstan were Eurasian Natural Resources Corp. plc (ENRC) of the United Kingdom (aluminum, ferroalloys, and iron ore), Kazakhmys plc of the United Kingdom (copper and zinc), the state-owned company Kazatomprom JSC (uranium and rare metals), and Kazzinc JSC (lead and zinc, and byproducts, such as minor metals and gold). ENRC and Kazakhmys were both listed on the London Stock Exchange, and Kazzinc was majority owned by Glencore International plc of Switzerland, which was also listed on the London Stock Exchange. In 2012, Glencore increased its share of Kazzinc to 69.61% from 50.3% (Xstrata plc, 2013).

Although ENRC and Kazakhmys had headquarters in the United Kingdom, both companies were originally Kazakhstani companies, and a combination of Kazakhstani nationals and the Government of Kazakhstan still owned a majority of the shares of both companies. The core assets of all four companies were obtained in the early to mid-1990s when Kazakhstan's mining and metals production facilities were privatized. Each company controlled a majority of Kazakhstan's output of at least one mineral commodity, and Kazatomprom controlled all production of uranium in Kazakhstan; private companies were able to participate in the uranium industry only through partnerships with Kazatomprom (Eurasian Natural Resources Corp. plc, 2013, p. 65, 94; Kazakhmys plc, 2013, p. 121).

## Commodity Review

### Metals

**Chromium.**—Kazakhstan produced about 16% of the world's output of chromite and was the world's second-ranked

producer behind South Africa. Of the two producers of chromite in Kazakhstan, TNK Kazchrome, which was a division of ENRC, was by far the leading producer, producing 3.59 million metric tons per year (Mt/yr) of marketable chromite output (a 5% increase compared with that of 2011) and 1.13 Mt of ferrochromium (a 1% increase compared with that of 2011). ENRC reported Australasian Joint Ore Reserves Committee (JORC)-compliant proven reserves of 59.0 Mt of ore grading 41.6% Cr<sub>2</sub>O<sub>3</sub> and probable reserves of 153.4 Mt of ore grading 40.9% Cr<sub>2</sub>O<sub>3</sub> (Eurasian Natural Resources Corp. plc, 2013; Papp, 2013).

The second-ranked producer of chromite in Kazakhstan was Oriel Resources Ltd., which was a subsidiary of OAO Mechel of Russia. The complex was designed eventually to reach production of between 600,000 and 700,000 metric tons per year (t/yr) of chromite concentrate. Chromite ore produced by Oriel was sent to Mechel's Tikhvin ferroalloys plant, which was located in Tikhvin, Leningrad Oblast, Russia. Mechel estimated that Oriel had reserves of about 16.8 Mt of ore with an average grade of 42.2% Cr<sub>2</sub>O<sub>3</sub> (Kazakhstan Today, 2013).

**Copper.**—Kazakhmys was the dominant producer of copper ore and metals in Kazakhstan. In 2012, the company produced 306,100 metric tons (t) of copper in concentrate, 294,000 t of refined copper cathodes, and 23,900 t of wire rods. The average crude ore copper grade was 0.95%, compared with ore grades of 1.01% in 2011 and 1.18% in 2008. The decrease in the overall copper content of concentrate production in Kazakhstan was mainly the result of the declining ore grades at Kazakhmys's mines. Other copper producers in Kazakhstan included Aktyubins Copper Co. of Russia, JSC Polymetal of Russia, and Kazzinc (Mineral.ru, 2012e; Kazakhmys plc, 2013).

Kazakhmys planned to increase its production of copper in concentrates to more than 500,000 t/yr by 2018 with the development of new mines, including the Aktogai and the Bozshakol projects. Bozshakol was in the mine construction stage, and production was planned to begin in 2015, with expected output of about 100,000 t/yr of copper contained in concentrate from 2015 to 2030, and 60,000 t/yr from 2031 to 2056. Development of Bozshakol was expected to cost \$1.8 billion. Mine construction at the Aktogai site was expected to begin in the first half of 2013, and open pit mining was expected to commence in 2015. The life expectancy of the Aktogai Mine was projected to be 50 years. During first 10 years, the mine was expected to produce 104,000 t/yr of copper cathode equivalent, on average, and during all 50 years, the average output was projected to be 72,000 t/yr. The total cost of the Aktogai project was estimated to be \$2 billion (Mineral.ru, 2012f; MinerJob.ru, 2012c, d).

In June, Kazakhmys began an \$80 million renovation project at its Nikolaevskaya plant. The renovation was expected to increase the plant capacity to 2.2 Mt/yr of ore from 1.8 Mt/yr as well as to increase the extraction efficiency of copper, lead, and zinc from ore into concentrates. In addition, after the renovation, the plant would be able to extract precious metals, which, before the renovation, were left within the copper, lead, and zinc concentrates. The renovation was expected to be completed in the beginning of 2013 (Mineral.ru, 2012n; MinerJob.ru, 2012h).

In April, Central Asia Metals plc of the United Kingdom opened a hydrometallurgical plant in the village of Kounrad, which is located near the city of Balkhash in the Karaganda region. The plant was built to recover copper from the waste dumps created by the operations of the Kounrad open pit copper mine that was in operation between 1936 and 2005. The recovery of copper was achieved by in situ leaching followed by solvent extraction-electrowinning (SX–EW). The plant’s design capacity was 10,000 t/yr of copper cathodes, and the company expected to reach this production level in 2013. In 2012, Central Asia Metals produced 6,586 t of copper cathodes at the plant. The company reported that it had spent \$42 million on the plant construction instead of the planned \$47 million and had completed construction within 18 months, as planned. Central Asia Metals was planning to evaluate a potential expansion of its operations in the summer of 2013 (Mineral.ru, 2012a; MinerJob.ru, 2012k; 2013; Central Asia Metals, Plc., 2014).

In August, Orsu Metals Corp. of the United Kingdom, obtained a license for development of the Karchiga polymetallic deposit. Orsu Metals was planning to begin construction of a processing plant that would take between 12 and 15 months to complete. The estimated capital costs of the project were \$147 million, and the company was planning to begin mining in the first quarter of 2014. The Karchiga deposit’s resources were estimated to be 10 Mt of sulfide ore containing 166,700 t of copper and 1.4 t of gold. The new processing plant would have a capacity to process 750,000 t/yr of ore and to produce 11,800 t/yr of copper concentrate and 2,800 t/yr of copper cathodes (MinerJob.ru, 2012g).

In December, KGHM Polska Miedz S.A. of Poland (a subsidiary of KGHM International Ltd.) applied for an exploration license for a large area in the Karaganda region. The company expected the area to contain significant resources of copper, gold, silver, and other metals. KGHM was ranked second among the copper producers in Europe and ninth among the world producers. The company was planning to increase its refined copper production worldwide to 700,000 t in 2018 from 527,000 t in 2012. KGHM also owned other mineral deposits in Chile, Canada, and the United States (Mineral.ru, 2012p; MinerJob.ru, 2012i).

**Gold.**—In 2012, Kazakhstan produced 39,903 kilograms (kg) of unprocessed and semiprocessed gold, which was an 8.3% increase compared with the output in 2011. Kazzinc was the leading gold producer in the country and produced 17,400 kg, which was a 30.8% increase compared with the company’s output in 2011. Kazakhmys—ranked a distant second—produced 4,012 kg, which was an 8.5% increase in output compared with that of 2011. Some of the other producers of mined gold included AK Altynalmas, GMK Kazakhaltyn, JSC Polymetal of Russia, Nord Gold N.V. (which was a gold producing subsidiary of OAO Severstal of Russia), Polyus Gold International Ltd. of Russia, and TOO Yubileynoye (Mineral.ru, 2012b; 2013a; IA Novosti—Kazakhstan, 2013; Murtazin, 2014).

In 2010, the President of Kazakhstan announced that the country would increase mined gold output to 70 t/yr by 2015. Reaching 70 t/yr of gold production by 2015 compared with about 40 t in 2012 would be a significant increase in production,

and a few important projects were in development. Kazakhmys planned to begin production in 2015 at its Bozshakol copper project, which was estimated to have a contained gold resource of about 160 t and could significantly increase Kazakhmys’s gold production (Kazakhmys plc., 2013).

As of 2012, Kazakhstan had two gold refineries. One of them was a part of the Ust-Kamenogorsk metallurgical complex and a division of Kazzinc. It had the capacity to produce 8 t/yr of gold and 300 t/yr of silver and to produce ingots of Good Delivery standard. Good Delivery standard is a set of rules issued by the London Bullion Market association; the Good Delivery standard rules include minimum fineness (995 parts per thousand), required dimensions of the bullion, and content and appearance of special marks imprinted on the bullion. Another refinery was located in central Kazakhstan and belonged to Kazakhmys. It had the capacity to refine 10 t/yr of gold and 650 t/yr of silver that met the requirements of Kazakhstan’s national standard, which were lower than the Good Delivery standard. In June, Kazakhstan began construction of a third gold refinery in Astana. The planned capacity of the new refinery was 25 t/yr of gold and 50 t/yr of silver, and the total cost of the project was estimated to be \$30 million. The construction of the new refinery was to be completed by the end of 2013 (Mineral.ru, 2012t).

**Lead and Zinc.**—Kazakhstan was the world’s eighth-ranked zinc producer and was also a modest world producer of lead. Kazzinc was the leading zinc producer in Kazakhstan; the company was formed in 1997 by a merger of three leading nonferrous metals producers in eastern Kazakhstan—the Ust-Kamenogorsk lead and zinc plant, the Leninogorsk polymetal plant, and the Zyryanovskiy lead plant. As of 2012, Kazzinc employed more than 22,000 workers and had annual revenue of \$2.8 billion. In 2012, Kazzinc produced 301,300 t of zinc metal, which constituted only a slight increase compared with the 300,800 t of output produced in 2011. In August, Kazzinc completed the reconstruction of its lead production line. The reconstruction was expected to lead to higher productivity and a reduction in energy costs and would allow for use of secondary lead in production (Mineral.ru, 2012m; 2013b; Tolcin, 2013b).

During 2012, Glencore increased its holding in Kazzinc to 69.61% from 50.7% by purchasing an 18.91% share from the Verny Capital Group in October. In the beginning of 2012, Glencore had been planning to increase its holding in Kazzinc to 93%, but that deal fell through. As of yearend, the Verny Capital Group continued to own about 30% of Kazzinc (Mineral.ru, 2012c, d).

In addition to Kazzinc, other producers of zinc in Kazakhstan included Kazakhmys, TOO Nova Zinc, and TOO ShalkiyaZinc Ltd. In 2012, Kazakhmys produced 151,600 t of zinc in concentrate, and TOO Nova Zinc produced 34,250 t of zinc in concentrate and 3,590 t of lead in concentrate. ShalkiyaZinc halted its mine production in 2008 because of the reduction in the world zinc prices and had not yet resumed production. Meanwhile, ShalkiyaZinc was continuing with construction of a new processing plant in Kentau with an annual capacity of 4 Mt/yr of ore throughput; ShalkiyaZinc expected to resume production at the mine when the market conditions improve. In 2011, SAT & Co. Holding purchased an 84.3% share of ShalkiyaZinc for \$50 million, and in February 2012, SAT & Co.



increased its shares to 98.56%. Assets of ShalkiyaZinc, which is located in southern Kazakhstan, include the Shalkiya underground mine, the Talap lead and zinc deposit, and a beneficiation plant located 165 kilometers from the Shalkiya Mine (Mineral.ru, 2012i; Chelyabinsk Zinc Plant, 2014).

**Nickel.**—SAT & Co. was planning to build a nickel processing plant in eastern Kazakhstan by 2015. The new plant was expected to employ a unique technology that would enable processing of nickel oxide ores with low nickel content. The cost of construction was estimated to be between \$200 million and \$250 million, and the company was to use both loans and its own funds. In addition, the Government was to invest in related infrastructure, training, and social development. The construction was to start in the fourth quarter of 2012 (Mineral.ru, 2012q).

In 2009, SAT & Co. acquired a 100% share in TOO Kaznickel, which had exploration and mining licenses for the Gornostayevskoye cobalt and nickel deposit. According to the 1999 estimates, probable reserves of the deposit were 20.4 Mt of ore containing 173,000 t of nickel and 12,000 t of cobalt. The processing plant's full capacity was expected to be 1.3 Mt/yr of ore. The first stage of the project was to be completed in mid-2015. By that time, the plant would be processing 500,000 t/yr of ore to produce 2,500 t/yr of nickel matte. By 2017, the plant was expected to reach full capacity and to increase nickel matte production to 4,000 t/yr. The plant's output would be exported to China and Russia for further processing (Mineral.ru, 2012q).

**Titanium.**—The AO Ust-Kamenogorsk titanium-magnesium plant (UKTMK) was the only titanium producer in Kazakhstan and the only fully integrated titanium producer in the world. The plant's production cycle included all production stages; that is, from mining to the output of the final products. UKTMK's main outputs included titanium sponge, primary magnesium in ingots, and titanium ingots and alloys. As of 2012, all output of UKTMK was exported (Listopad, Ivashenko, and Chervonyi, 2010; Kazenergy.com, 2013).

To increase the rate of vertical integration of its production processes, UKTMK participated in two joint ventures with foreign partners. One of those ventures was UKAD, which was a joint venture between UKTMP and ERAMET S.A. of France for the production of semifinished titanium products, such as titanium rods and forged pieces. UKAD's new \$70 million plant, which was equipped with a 4,500-t forging press, officially opened in Saint Georges de Mons, France, in September 2011. The plant was expected to supply titanium rods, sheets, and forged pieces to the aerospace, medical, nuclear, and oil and gas industries (Kazenergy.com, 2013).

UKTMK formed another joint venture, SP TOO POSUK Titanium, with POSCO of the Republic of Korea to build a plant to produce titanium slabs using an electron beam furnace in East Kazakhstan Province. Construction of the new \$70 million plant began in October 2011 and was expected to be completed in 2014. The plant's designed production capacity was 6,000 t/yr of titanium slabs. UKTMP was to supply the titanium sponge raw materials to be used at the plant, and POSCO would process the slabs into plates at its production facilities in the Republic of Korea (Kazenergy.com, 2013).

In December, TOO Tenir-Logistics announced that it was planning to start production of titanium dioxide in Kazakhstan. The plant would be located in close proximity to the Tymlay titanium and magnesium deposit in Jambyl region. The plant's designed capacity would be 10,000 t/yr of pigment titanium dioxide and 10,000 t/yr of silicon dioxide, and the total cost of construction was projected to be \$28.8 million. At yearend, Tenir-Logistics was looking for investors, and the project timeline was not known (Mineral.ru, 2012s; MinerJob.ru, 2012j).

### *Industrial Minerals*

**Rare Earths.**—In November, Summit Atom Rare Earth Co. (SARECO), which was a joint venture between AO NAK Kazatomprom and Sumitomo Corp. of Japan, began production of rare-earth concentrates at its newly constructed plant. The plant cost \$30 million to build and was the first plant in Kazakhstan to focus on production of rare earths. The facility was located in Stepnogorsk and was expected to have an initial production capacity of 1,500 t/yr of total rare-earth oxides (REOs). In 2013, the company was planning to produce about 1,000 t of REOs and to reach 1,500 t of REO capacity in 2014. About 40% of the rare-earth elements are heavy rare-earth elements, mainly dysprosium (Mineral.ru, 2012i).

In the beginning, the SARECO plant expected to use uranium tailings accumulated in Kazakhstan as a raw material for its rare-earth production. In the future, however, it was planning to switch to a dedicated rare-earth deposit as an input source, but, as of 2012, no specific deposit had been selected. If a reliable raw material source can be found, SARECO was planning to expand the production capacity of the plant to 3,000 t/yr of REO by 2015 and to between 5,000 t/yr and 6,000 t/yr by 2017. In addition to production of total REOs, the company was planning to add a rare-earth separating line and a line for manufacturing magnets from rare-earth metals. SARECO was planning to export its output of REO concentrates to Japan, where they would be used for production of electric and hybrid automobiles (MinerJob.ru, 2012a).

### *Mineral Fuels and Related Materials*

**Uranium.**—In 2012, Kazakhstan produced 20,900 t of uranium and remained the world's leading producer of uranium, accounting for about 37% of world uranium mine output. Kazakhstan has no nuclear powerplants, and all mined uranium was exported. AO NAK Kazatomprom, including through its shares in joint ventures, produced 11,900 t of uranium, which corresponded to 20% of world uranium production; it exported 9,260 t of uranium. According to the leadership of Kazatomprom, Kazakhstan has vast resources and could be able to increase its uranium production to 30,000 t/yr within the next 3 years. To achieve this goal, Kazakhstan would both expand its current production capacity and intensify the in situ leaching processes employed at almost all the country's uranium operations (Mineral.ru, 2012j, o).

Kazatomprom also continued forming joint ventures with foreign partners. In December, Kazatomprom announced that Ulba Conversion—a joint venture of Kazatomprom (51%)

and Cameco Corp. of Canada (49%)—would build a uranium processing plant in Ust-Kamenogorsk. The plant would include both refinement and enrichment production stages. The plant would have a capacity to produce 12,000 t/yr of uranium hexafluoride (UF<sub>6</sub>). The new plant was scheduled to be constructed by 2016 and to reach its planned capacity by 2018. In another joint project, in December, OAO TVEL of Russia and Kazatomprom signed key documents on a uranium enrichment joint venture. The project involved the creation of a new SP ZAO Center for Uranium Enrichment (CUE) in Russia. The center would be located in the city of Novouralsk in Sverdlovskaya Oblast and would be located within the OAO Urals Electrochemical Complex. The first shipments of uranium by the joint venture were expected to begin in the second half of 2013 (Mineral.ru, 2012g, k, r).

## Outlook

Interest in Kazakhstan's mineral industry will likely continue to increase along with an increase in the number of projects aimed at exploiting the country's significant mineral resources. Projects involving copper, gold, rare metals, rare-earth metals, and uranium could be of particular interest. The number of exploration projects underway in Kazakhstan indicate the potential for future increases in 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. In particular, if the Government is successful in implementing its new program on geologic exploration, the country is likely to become a stronger leader in mineral production.

## References Cited

- Agency of Statistics of the Republic of Kazakhstan, 2013a, Kazakhstan v 2012 godu—Statisticheskij ezhegodnik Kazakhstana [Kazakhstan in 2012—Statistical yearbook of Kazakhstan]: Astana, Kazakhstan, Agency of Statistics of the Republic of Kazakhstan, December, 503 p.
- Agency of Statistics of the Republic of Kazakhstan, 2013b, Promyshlennost' Kazakhstana i ego regionov, 2008–2012 [Industry of Kazakhstan and its regions, 2008–2012]: Astana, Kazakhstan, Agency of Statistics of the Republic of Kazakhstan, 217 p.
- Bedinger, G.M., 2013, Titanium and titanium dioxide: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 172–173.
- Bray, E.L., 2013, Bauxite and alumina: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 26–27.
- Central Asia Metals Plc., 2014, Kounrad: Central Asia Metals Plc. (Accessed May 5, 2014, at <http://www.centralasiametals.com/projects/kounrad>.)
- Chelyabinsk Zinc Plant, 2014, Akzhalsk deposit: Chelyabinsk Zinc Plant. (Accessed May 5, 2014, at <http://www.zinc.ru/resources/akzhalsk>.)
- Edelstein, D.L., 2013, Copper: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 48–49.
- Eurasian Natural Resources Corp. plc, 2013, Annual report and accounts 2012: London, United Kingdom, Eurasian Natural Resources Corp. plc, 160 p.
- IA Novosti—Kazakhstan, 2013, Kazakhstan v 2012 godu uvelichil proizvodstvo zolota na 8,6% -- do 40 tonn [In 2012, Kazakhstan increased gold production by 8.6% to 40 t]: IA Novosti—Kazakhstan, January 16. (Accessed May 5, 2014, at <http://newskaz.ru/economy/20130116/4623509.html>.)
- Jaskula, B.W., 2013, Gallium: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 58–59.
- Kazakhmys plc, 2013, Annual report and accounts 2012: Kazakhmys plc, April 10, 212 p.
- Kazakhstan Today, 2013, Na mirovom rynke khroma za posledniye dva mesyatsa tseny povysilis' (obzor) [In the past two months, the world prices of chromium increased (a review)]: Kazakhstan Today, April 8. (Accessed May 5, 2014, at [http://www.kt.kz/rus/economy/na\\_mirovom\\_rinke\\_hroma\\_za\\_poslednie\\_dva\\_mesjaca\\_cece\\_povysilisj\\_obzor\\_\\_1153570698.html](http://www.kt.kz/rus/economy/na_mirovom_rinke_hroma_za_poslednie_dva_mesjaca_cece_povysilisj_obzor__1153570698.html).)
- Kazenergy.com, 2013, Flagman titano-magnievoy industrii Kazakhstana [The leader of Kazakhstan's titanium and magnesium industry]: Kazenergy.com. (Accessed May 5, 2014, at <http://www.kazenergy.com/2-57-2013/9010-2013-04-29-09-56-31.html>.)
- Kramer, D.A., 2013, Magnesium metal: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 98–99.
- Listopad, D.A., Ivashenko, V.P., and Chervonyi, I.F., 2010, Mirovoy rynek titana I perspektivy ego razvitiya [The world market of titanium and perspectives on its development]: Teoria i praktika metallurgii [Theory and Practice of Metallurgy], v. 5–6, p. 16–21.
- Mineral.ru, 2012a, Central Asia Metals gotovitsya k postavkam medi s zavoda v Kazakhstane [Central Asia Metals is preparing for copper deliveries from a plant in Kazakhstan]: Mineral.ru, May 20. (Accessed February 19, 2014, at <http://www.mineral.ru/News/48653.html>.)
- Mineral.ru, 2012b, EZ OTM nadeetsya na affinazh 20 t zolota Kazakhstana [EZ OTM hopes to process 20,000 metric tons of gold from Kazakhstan]: Mineral.ru, August 28. (Accessed February 19, 2014, at <http://www.mineral.ru/News/49851.html>.)
- Mineral.ru, 2012c, Glencore do kontsa goda uvelichit dolyu v Kazzinke tol'ko do 69,61% [By yearend, Glencore will increase its share in Kazzinc only to 69.61%]: Mineral.ru, September 27. (Accessed February 19, 2014, at <http://www.mineral.ru/News/50243.html>.)
- Mineral.ru, 2012d, Glencore uvelichil dolyu v kazakhskom proizvodele tsinka Kazzinc do 69,61% [Glencore increased its share in Kazakhstani zinc producer Kazzinc to 69.61%]: Mineral.ru, December 10. (Accessed February 19, 2014, at <http://www.mineral.ru/News/50444.html>.)
- Mineral.ru, 2012e, Kazakhmys po itogam pervogo kvartala 2012 g. sokratil vypusk medi i tsinka [Kazakhmys reduced copper and zinc consumption in the first quarter of 2012]: Mineral.ru, April 27. (Accessed February 19, 2014, at <http://www.mineral.ru/News/48444.html>.)
- Mineral.ru, 2012f, Kazakhmys proizvel v 2011 g. chut' bole 300 tys t. medi [In 2011, Kazakhmys produced a bit more than 300,000 metric tons of copper]: Mineral.ru, February 1. (Accessed February 19, 2014, at <http://www.mineral.ru/News/47473.html>.)
- Mineral.ru, 2012g, Kazakhstan k 1 iyunya primet reshenie po tsentru obogasheniya urana v Novoural'ske [Kazakhstan will make a decision about the uranium enrichment center by June 1]: Mineral.ru, May 28. (Accessed February 19, 2014, at <http://www.mineral.ru/News/48739.html>.)
- Mineral.ru, 2012h, Kazakhstan otmnyaet moratoriy na razrabotku nedr [Kazakhstan cancels the mining moratorium]: Mineral.ru, December 1. (Accessed February 19, 2014, at <http://www.mineral.ru/News/51000.html>.)
- Mineral.ru, 2012i, Kazakhstanskiy holding SAT & Company dovel svoyu dolyu v ShalkiyaZinc do 98,56% [SAT & Co. Holding of Kazakhstan increased its share in ShalkiyaZinc to 98.56%]: Mineral.ru, February 1. (Accessed February 19, 2014, at <http://www.mineral.ru/News/47468.html>.)
- Mineral.ru, 2012j, Kazakhstan sposoben za dva-tri goda narastit' dobychu urana do 30 tys. t. v god [Kazakhstan can increase uranium production to 30,000 metric tons per year in 2 to 3 years]: Mineral.ru, June 21. (Accessed February 19, 2014, at <http://www.mineral.ru/News/49036.html>.)
- Mineral.ru, 2012k, Kazatomprom i Cameco do 2018 g. nachnut stroit' zavod po affinazhu urana v Ust-Kamenogorske [Kazakhstan and Cameco will start building a uranium refinery in Ust-Kamenogorsk before 2018]: Mineral.ru, December 21. (Accessed February 19, 2014, at <http://www.mineral.ru/News/51273.html>.)
- Mineral.ru, 2012l, Kazatomprom i Sumitomo Corporation otkryli zavod po proizvodstvu redkozemel'nykh metallov [Kazatomprom and Sumitomo Corp. opened a plant producing rare-earth metals]: Mineral.ru, November 7. (Accessed February 19, 2014, at <http://www.mineral.ru/News/50684.html>.)
- Mineral.ru, 2012m, Kazzinc rekonstruiroval proizvodstvo svintsa [Kazinc has remodeled its zinc production]: Mineral.ru, August 28. (Accessed February 19, 2014, at <http://www.mineral.ru/News/49845.html>.)
- Mineral.ru, 2012n, Korporatsiya Kazakhmys nachala modernizatsiyu Nikolaevskoy obogatitel'noy fabriki v BKO [Kazakhmys corporation started reconstruction of its Nikolaevskaya beneficiation plant in Eastern Kazakhstan]: Mineral.ru, June 27. (Accessed February 19, 2014, at <http://www.mineral.ru/News/49103.html>.)

- Mineral.ru, 2012o, Po itogam 2012 g. ob'em dobychi urana v Kazakhstane sostavil 20,9 tys t. [In 2012, Kazakhstan produced 20,900 metric tons of uranium]: Mineral.ru, January 25. (Accessed February 19, 2014, at <http://www.mineral.ru/News/51585.html>.)
- Mineral.ru, 2012p, Polska Miedz ishet mednoe syr'e v Kazakhstane [Polish Miedz is looking for copper ore in Kazakhstan]: Mineral.ru, November 12. (Accessed February 19, 2014, at <http://www.mineral.ru/News/50844.html>.)
- Mineral.ru, 2012q, SAT & Company postroit zavod po proizvodstvu nickelya v Vostochnom Kazakhstane [SAT & Company will build a nickel plant in eastern Kazakhstan]: Mineral.ru, August 13. (Accessed February 19, 2014, at <http://www.mineral.ru/News/49665.html>.)
- Mineral.ru, 2012r, TVEL i Kazatomprom podpisali klyuchevye dokumenty po sovmetnomu proektu po obogasheniyu urana [TVEL and Kazatomprom signed key documents for the joint uranium enrichment project]: Mineral.ru, November 26. (Accessed February 19, 2014, at <http://www.mineral.ru/News/50916.html>.)
- Mineral.ru, 2012s, V Kazakhstane planiruyut nachat' proizvodstvo dioksida titana [Kazakhstan plans to start production of titanium dioxide]: Mineral.ru, December 18. (Accessed February 19, 2014, at <http://www.mineral.ru/News/51212.html>.)
- Mineral.ru, 2012t, V Kazakhstane postroyat novyi affinazhnyi zavod [Kazakhstan will build a new gold refinery]: Mineral.ru, May 14. (Accessed February 19, 2014, at <http://www.mineral.ru/News/48583.html>.)
- Mineral.ru, 2013a, Kazzinc v 2012 g. uvelichil proizvodstvo zolota ns 30,8% [In 2012, Kazzinc increased gold production by 30.8%]: Mineral.ru, February 14. (Accessed February 19, 2014, at <http://www.mineral.ru/News/51842.html>.)
- Mineral.ru, 2013b, Kazzinc v 2012 g. uvelichil vyruchku na 26% [In 2012, Kazzinc increased its revenue by 26%]: Mineral.ru, March 6. (Accessed February 19, 2014, at <http://www.mineral.ru/News/52098.html>.)
- MinerJob.ru, 2012a, AO "NAK Kazatomprom" i Sumitomo otkryli zavod po vypusku redkozemel'nykh metallov [AO NAK Kazatomprom and Sumitomo Corp. opened a rare-earth metals plant]: MinerJob.ru, November 8. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=22368>.)
- MinerJob.ru, 2012b, Geologi kazakhstana poluchayut garantirovannuyu rabotu na dva desyatiletiya vpered [Kazakhstan's geologists got guaranteed jobs for the next two decades]: MinerJob.ru, September 14. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=21846>.)
- MinerJob.ru, 2012c, Kazakhmys nachinaet stroitel'stvo gorno-obogatitel'nogo kombinata na mestorozhdenii Bozshakol' [Kazakhmys is starting construction of a mining and beneficiation plant at the Bozshakol' deposit]: MinerJob.ru, June 3. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=21391>.)
- MinerJob.ru, 2012d, Kazakhmys planiruet na Aktogae proizvodit' samuyu deshevuyu med' [Kazakhmys plans to produce the cheapest copper at Aktogai]: MinerJob.ru, December 7. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=22851>.)
- MinerJob.ru, 2012e, Kazakhstan nameren privlekat' vedushie zarubezhnye kompanii dlya vnedreniya novykh tekhnologiy v geologicheskuyu otrasl' [Kazakhstan intends to attract leading foreign companies for implementation of new technologies in the geologic industry]: MinerJob.ru, July 24. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=21536>.)
- MinerJob.ru, 2012f, Kazakhstan reshil predostavlyat' mestorozhdeniya v obmen na investitsii [Kazakhstan decided to offer deposits in exchange for investments]: MinerJob.ru, July 5. (Accessed February 19, 2014, at <http://testserver.minerjob.ru/viewnew.php?id=21396>.)
- MinerJob.ru, 2012g, Kazakhstan utverdil proekt britanskoj Orsu po osvoeniyu mednogo mestorozhdeniya Karchiga [Kazakhstan confirmed the project of British company Orsu for development of the Karchiga copper deposit]: MinerJob.ru, August 20. (Accessed February 19, 2014, at <http://minerjob.ru/viewnew.php?id=21684>.)
- MinerJob.ru, 2012h, Korporatsiya Kazakhmys nachala modernizatsiyu Nikolaevskoy obogatitel'noy fabрики v VKO [Kazakhmys Corp. started modernization of the Nikolaevskaya beneficiation plant located in eastern Kazakhstan]: MinerJob.ru, June 25. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=21360>.)
- MinerJob.ru, 2012i, Pol'skiy KGHM interesuyut resursy Kazakhstana [Polish KGHM is interested in Kazakhstan's resources]: MinerJob.ru, December 14. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=22960>.)
- MinerJob.ru, 2012j, V Kazakhstane planiruyut nachat' sobstvennoe proizvodstvo dioksida titana [Kazakhstan plans to open its own production of titanium dioxide]: MinerJob.ru, December 13. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=22929>.)
- MinerJob.ru, 2012k, V Kazakhstane zarabotal novyi mednyi zavod [A new copper plant started operations in Kazakhstan]: MinerJob.ru, May 4. (Accessed February 19, 2014, at <http://www.minerjob.ru/viewnew.php?id=21163>.)
- MinerJob.ru, 2013, Central Asia Metals uspesшно proizvela med' v Kazakhstane [Central Asia Metals successfully produced copper in Kazakhstan]: MinerJob.ru, January 14. (Accessed February 19, 2014, at <http://forum.minerjob.ru/viewnew.php?id=23159>.)
- Ministry of Industry and New Technologies, 2012, O kontseptsii razvitiya geologicheskoy otrasli respubliki Kazakhstan do 2030 goda [About the concept for the development of the geologic industry of the Republic of Kazakhstan through 2030]: Ministry of Industry and New Technologies, August 13. (Accessed May 5, 2014, at <http://www.mint.gov.kz/index.php?id=437&lang=ru>.)
- Murtazin, Azat, 2014, "Kazakhmys" nedoschitalsya zolota [Kazakhmys's gold fell short]: Kursiv.kz, February 5. (Accessed May 5, 2014, at <http://www.kursiv.kz/news/details/kompanii/Kazakhmys-nedoschitalsya-zolota/>.)
- Papp, J.F., 2013, Chromium: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 42–43.
- Polyak, D.E., 2013, Rhenium: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 130–131.
- TengriNews.kz, 2012, Razvedannyykh zapasov medi i polimetallov v Kazakhstane ostalos' na 10 – 15 let [Proven reserves of copper and polymetals will last 10 to 15 years]: TengriNews.kz, July 24. (Accessed May 5, 2014, at [http://tengrinews.kz/kazakhstan\\_news/razvedannyyh-zapasov-medi-i-polimetallov-v-kazakhstane-ostalos-na-10-15-let-217792](http://tengrinews.kz/kazakhstan_news/razvedannyyh-zapasov-medi-i-polimetallov-v-kazakhstane-ostalos-na-10-15-let-217792).)
- Tolcin, A.C., 2013a, Cadmium: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 36–37.
- Tolcin, A.C., 2013b, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 188–189.
- U.S. Energy Information Administration, 2013, Kazakhstan: U.S. Energy Information Administration country analysis brief, October 28. (Accessed February 19, 2014, at <http://www.eia.gov/countries/cab.cfm?fips=KZ>.)
- Xstrata plc, 2013, Annual report 2012: Xstrata plc, 152 p. (Accessed May 5, 2014, at <http://www.glencorexstrata.com/assets/Uploads/2012-Annual-Report-FINAL.pdf>.)

TABLE 1  
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2008	2009	2010	2011	2012
<b>METALS</b>					
<b>Aluminum:</b>					
Alumina	1,600,000	1,608,000	1,639,000	1,670,000	1,510,000
Bauxite, gross weight	5,160,100	5,130,000	5,310,200 <sup>r</sup>	5,495,200 <sup>r</sup>	5,170,200
Metal, primary	106,000	127,000	226,000	249,000	249,000
Antimony, Sb content of concentrate	890	597	785	800	865
Beryllium	NA	NA	NA	NA	2,526
<b>Bismuth:<sup>e</sup></b>					
Mine output, Bi content	150	-- <sup>3</sup>	-- <sup>3</sup>	-- <sup>3</sup>	--
Metal, refined	--	90	150	150	150
Cadmium, metal <sup>e</sup>	1,100	1,300	1,400	1,300	1,200
Chromite, marketable ore	3,552,000	3,544,000	3,200,000 <sup>r</sup>	3,800,000 <sup>r</sup>	3,590,000
<b>Copper:</b>					
Mine output, Cu content of concentrate	421,700 <sup>r</sup>	406,100 <sup>r</sup>	380,600 <sup>r</sup>	405,300 <sup>r</sup>	419,200
<b>Metal:</b>					
Smelter, undifferentiated	392,575	332,854	318,637	302,975	302,183
Refined, primary	398,411	312,767	323,368	338,524 <sup>r</sup>	367,161
Gallium kilograms	18,666	18,702	18,702	18,703	15,711
<b>Gold:</b>					
Mine output, Au content do.	20,825	22,839	30,272 <sup>r</sup>	36,846 <sup>r</sup>	39,903
Metal, refined do.	8,205	10,279	13,456 <sup>r</sup>	16,672 <sup>r</sup>	21,133
<b>Iron and steel:</b>					
<b>Iron ore, marketable:</b>					
Gross weight	21,486,300	22,281,300	24,229,100	24,812,800	25,209,800
Fe content <sup>e</sup>	12,200,000	12,700,000	13,800,000	14,100,000	14,326,000 <sup>3</sup>
<b>Metal:</b>					
Pig iron	3,106,000	2,996,000	2,984,000	3,141,100 <sup>r</sup>	2,707,000
<b>Ferroalloys:</b>					
Ferromanganese	1,220,315	1,173,286	1,311,302	1,289,917	1,305,343
Ferrosilicochromium	133,828	60,829	159,765	143,296	164,853
Ferrosilicon	54,964	33,100	4,813	1,683	494
Silicomanganese	179,939	200,374	224,627	232,039	251,530
Other	1,473	1,205	1,283	1,754	1,845
Total	1,590,519	1,468,794	1,701,790	1,668,689	1,724,065
<b>Steel:</b>					
Crude	4,243,582	3,324,300 <sup>r</sup>	3,338,000	3,699,300 <sup>r</sup>	2,610,000
Finished, rolled	2,826,202	2,990,167	2,899,800 <sup>r</sup>	3,107,900 <sup>r</sup>	2,402,300
<b>Lead:</b>					
Concentrate, Pb content	38,800	33,600 <sup>r</sup>	35,400 <sup>r</sup>	38,800 <sup>r</sup>	38,100
Refined, primary and secondary	105,766	80,994	103,110	111,249	88,099
Magnesium, metal, primary <sup>e</sup>	21,000	21,000	21,000	21,000	21,000
<b>Manganese:</b>					
<b>Ore:</b>					
Gross weight	2,485,000	2,457,400	3,044,700 <sup>r</sup>	2,963,000	2,675,000
Mn content <sup>e</sup>	600,000	520,000	610,000	590,000	595,000
<b>Concentrate:</b>					
Gross weight	1,117,200 <sup>r</sup>	982,400 <sup>r</sup>	1,094,400 <sup>r</sup>	1,096,300 <sup>r</sup>	1,070,500
Mn content <sup>e</sup>	400,000	360,000	390,000	390,000	390,000
Nickel, Ni content of laterite ore <sup>e</sup>	500	500	500	500	450
Niobium, metal	NA	NA	NA	NA	43
Rhenium <sup>e</sup> kilograms	5,500	3,000	3,000 <sup>r</sup>	3,000 <sup>r</sup>	3,000
Silicon, metal <sup>e</sup>	--	--	1,500	8,000	10,000
<b>Silver:</b>					
Mine output, Ag content kilograms	645,627	618,141	552,060 <sup>r</sup>	650,649 <sup>r</sup>	963,182
Refined do.	628,763	613,544	548,990 <sup>r</sup>	646,685 <sup>r</sup>	958,495
Tantalum, metal	NA	NA	NA	NA	213

See footnotes at end of table.



TABLE 1—Continued  
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2008	2009	2010	2011	2012
METALS—Continued					
Titanium:					
Ilmenite and leucocoxene <sup>c</sup>	25,000	25,000	25,000	25,000	25,000
Sponge	26,000	16,800	14,500	20,700	21,000 <sup>e</sup>
Zinc:					
Concentrate, Zn content	387,400 <sup>r</sup>	398,400 <sup>r</sup>	405,300 <sup>r</sup>	376,700 <sup>r</sup>	369,700
Smelter, primary and secondary	365,572	327,873	318,858	319,847 <sup>r</sup>	319,900
INDUSTRIAL MINERALS					
Asbestos, all grades	230,100	230,000	214,100	223,100	241,200
Barite:					
Ore and concentrate	492,200	306,000	358,000	466,200 <sup>r</sup>	590,100
Marketable <sup>c</sup>	170,000	170,000	200,000	200,000	230,000
Boron <sup>c</sup> thousand metric tons	30	30	30	30	30
Cement	5,837,300	5,694,100	6,686,300	7,642,100	7,800,000 <sup>e</sup>
Fluorspar <sup>c</sup>	64,300 <sup>r,3</sup>	65,000 <sup>r</sup>	65,000 <sup>r</sup>	65,000	65,000
Gypsum <sup>c</sup>	696,900 <sup>3</sup>	700,000	700,000	700,000	700,000
Lime	905,917	798,180	881,225	958,231	1,000,000 <sup>e</sup>
Phosphate rock, beneficiated:					
Gross weight	1,226,000	1,225,000	1,600,000 <sup>e</sup>	1,600,000 <sup>e</sup>	1,600,000 <sup>e</sup>
P <sub>2</sub> O <sub>5</sub> content <sup>e</sup>	280,000	280,000	350,000	350,000	350,000
Rare-earth elements, rare-earth oxide content	--	--	--	--	50 <sup>e</sup>
Salt	438,047 <sup>r</sup>	222,942	276,131 <sup>r</sup>	364,222 <sup>r</sup>	463,960
Sulfur, byproduct: <sup>c</sup>					
Metallurgy	300,000	300,000	300,000	300,000	300,000
Natural gas and petroleum	1,732,600 <sup>3</sup>	2,200,000	2,400,000	2,400,000	2,400,000
Total	2,030,000	2,500,000	2,700,000	2,700,000	2,700,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous thousand metric tons	106,296	91,042	99,285	103,015	107,911
Lignite do.	4,777	5,084	7,283	8,368	7,748
Total do.	111,073	96,126	106,568	111,383	115,659
Coke	2,687,700	2,552,000	2,526,800 <sup>r</sup>	2,663,300 <sup>r</sup>	2,569,300
Natural gas:					
Nonassociated gas thousand cubic meters	18,708,000	18,132,000	17,595,000	19,305,000	20,308,800
Associated gas do.	14,181,000	17,809,000	19,811,000	20,199,000	19,820,100
Total do.	32,889,000	35,941,000	37,406,000	39,504,000	40,128,900
Petroleum:					
Crude oil and gas condensate <sup>4</sup> 42-gallon barrels	514,000,000	556,000,000	578,000,000	582,000,000	576,200,000
Refinery products <sup>5</sup> do.	93,400,000	92,900,000	101,600,000	106,200,000	108,400,000
Uranium:					
U content	8,521	14,020	17,803	19,451	20,900
U <sub>3</sub> O <sub>8</sub> content	10,049	16,534	20,995	22,939	24,648

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

<sup>1</sup>Table includes data available through January 31, 2014.

<sup>2</sup>In addition to the commodities listed, Kazakhstan may also have produced a number of other mineral products, including cesium, cobalt, germanium, indium, molybdenum, scandium, selenium, tellurium, and vanadium, but information is inadequate to estimate production.

<sup>3</sup>Reported figure.

<sup>4</sup>Figures were converted to barrels from metric tons, which were reported as follows: 2008—70,671,000; 2009—76,482,600; 2010—79,517,700; 2011—80,039,100; and 2012—79,224,500.

<sup>5</sup>Figures were converted to barrels from thousand metric tons, which were reported as follows: 2007—11,384; 2008—11,791; 2009—11,717; 2010—12,794; 2011—13,393; and 2012—13,668.

TABLE 2  
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2012<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
Alumina	Aluminium of Kazakhstan JSC [Eurasian Natural Resources Corp. plc (ENRC)]	Pavlodar	1,600,000
Aluminum, primary	Kazakhstan Aluminium Smelter JSC [Eurasian Natural Resources Corp. plc (ENRC)]	do.	250,000
Barite	Vostochnoye Rudoupravleniye LLP	Shyganak, Zhambyl Province	NA
Do.	Zhartas LLC	Zhambyl Province	25,000
Do.	Stroyservice LLC	Kentau District, South Kazakhstan Province	30,000
Do.	Zhairemsky GOK <sup>3</sup> JSC [Eurasian Natural Resources Corp. plc (ENRC)]	Ushkatyn III, Zhairem, and Zhumanai deposits near Zhairem	NA
Do.	JSC Yuzhpolimetall	Kentau District, South Kazakhstan Province	NA
Do.	Barite Oil Kentau LLC	Kentau District, South Kazakhstan Province	NA
Bauxite	Kazakhstan Aluminium Smelter JSC [Eurasian Natural Resources Corp. plc (ENRC)]	Torgai and Krasnooktyabrsk mining complexes, Kostanay Province	5,400,000
Beryllium, metal	Ulba Metallurgical Plant JSC (Kazatomprom JSC)	Oskemen (also known as Ust-Kamenogorsk)	NA
Bismuth, metal	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 69.61%)]	do.	NA
Do.	Chimkent metallurgical plant (JSC Yuzhpolimetall)	Shymkent	NA
Cadmium	do.	do.	NA
Do.	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	NA
Chromite, marketable ore containing about 50% Cr <sub>2</sub> O <sub>3</sub> content	TNK Kazchrome [a subsidiary of Eurasian Natural Resources Corp. plc (ENRC)]	Khromtau, Aktobe Province	3,600,000
Do.	Oriel Resources Ltd. (OAO Mechel)	Voskhod GOK, <sup>3</sup> Khromtau, Aktobe Province	600,000
<b>Copper:</b>			
Mining, recoverable, Cu content	Kazakhmys plc: Central Region:		
	Konyrat Mine	Karagandy Province	11,800 <sup>4</sup>
Do.	Sayak I and III Mines	do.	23,500
Do.	Shatyrkul Mine	Zhambyl Province	12,700
Do.	Abyz Mine	Karagandy Province	5,710
Do.	Nurkazgan Mine	do.	20,000
Do.	Akbastau Mine	East Kazakhstan Province	9,000
Do.	East Region:		
	Artemyevsky Mine	do.	25,000
Do.	Belousovsky Mine	do.	2,700
Do.	Irtysky Mine	do.	5,750
Do.	Nikolayevsky Mine	do.	25,700
Do.	Orlovsky Mine	do.	86,200
Do.	Yubileyno-Snegirikhinsky Mine	do.	14,200
Do.	Zhezkazgan Region:		
	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

See footnotes at end of table.

TABLE 2—Continued  
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2012<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
<b>Copper—Continued:</b>			
Mining, recoverable, Cu content— Continued	Kazzinc JSC (Glencore International 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: Maleevsky Mine	15 kilometers north of Zyryanovsk	40,000
Do.	Grekhovskiy Mine	NA	NA
Do.	Aktubinsk Copper Co. TOO (CJSC Russian Copper Co.)	50th Anniversary of October Mine, at Koktau, Aktobe Province	NA
Do.	JSC Polymetal	Varvarinskoye deposit, Kostanay Province	NA
Concentrate, Cu content	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.	Irtyskoy 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.	Kazzinc JSC (Glencore International plc, 69.61%): Ridder complex: Ridder concentrator	Karagandy Province	10,000
Do.	Zyrianovsk complex: Zyrianovsk concentrator	do.	10,000
Do.	Aktubinsk Copper Co. TOO (CJSC Russian Copper Co.)	50th Anniversary of October Mine, at Koktau, Aktobe Province	55,000
Do.	JSC Polymetal	Varvarinskoye deposit, Kostanay Province	NA
Metal	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 [Kazzinc JSC (Glencore International plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	70,000
Do.	Central Asia Metals plc	Karagandy Province	10,000
<b>Ferroalloys:</b>			
<b>Ferrochrome:</b>			
High-, medium-, and low-carbon FeCr containing 69% Cr	Aktobe plant {Kazchrome [Eurasian Natural Resources Corp. plc (ENRC)]}	Aktobe	450,000
High-carbon FeCr containing 69% Cr	Aksu plant {Kazchrome [Eurasian Natural Resources Corp. plc (ENRC)]}	Aksu	850,000
Ferrosilicon	do.	do.	NA
Ferrosilicochromium	do.	do.	NA
Silicomanganese	do.	do.	NA
Do.	Taraz Metallurgical Plant LLP (SAT & Co.)	Taraz, Zhambyl Province	NA
Do.	Temirtau Electrometallurgical Complex	Temirtau, Karagandy Province	NA

See footnotes at end of table.

TABLE 2—Continued  
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2012<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
Gallium	Aluminium of Kazakhstan JSC [Eurasian Natural Resources Corp. plc (ENRC)]	Pavlodar	NA
Gold, mined	Kazzinc JSC (Glencore International plc, 69.61%)	Northern Kazakhstan	NA
Do.	Kazakhmys JSC	do.	NA
Do.	Polyus Gold International, Ltd.	do.	NA
Do.	JSC Polimetal	do.	NA
Do.	Nord Gold N.V.	Suzdal Mine	NA
Do.	GMK Kazakhaltyn	Northern Kazakhstan	NA
Do.	AK Altynalmas	Eastern Kazakhstan	NA
Do.	TOO Yubileynoye	Aktobe Province	NA
Indium	Kazzinc JSC (Glencore International plc, 69.61%)	NA	NA
Iron and steel:			
Pig iron	ArcelorMittal Temirtau	Temirtau, Karagandy Province	5,700,000
Steel, crude	do.	do.	6,000,000
Iron ore, marketable, gross weight	JSC Sokolov-Sarbai Mining Production Association [Eurasian Natural Resources Corp. plc (ENRC)]	4 open pit mines and 1 underground mine in Kostanay Province	20,000,000
Do.	TOO Orken (ArcelorMittal Temirtau)	Karagandy Province	5,000,000
Lead:			
Mining, recoverable Pb content of ore	Kazzinc JSC (Glencore International 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 Zyrianovsk	26,000
Do.	TOO ShalkiyaZinc Ltd.	Shalkiya Mine, 15 kilometers northeast of Zhanakorgan	NA
Concentrate, Pb content	Kazzinc JSC (Glencore International plc, 69.61%): Ridder concentrator	Ridder, East Kazakhstan Province	NA
Do.	Zyrianovsk concentrator	Zyrianovsk, East Kazakhstan Province	NA
Do.	TOO ShalkiyaZinc Ltd.	Kentau concentrating plant, South Kazakhstan Province	NA
Do.	TOO Nova Zinc (JSC Chelyabinsk Zinc Plant)	Akzhal	4,000
Metal	Chimkent metallurgical plant (JSC Yuzhpolimetal)	Shymkent	NA
Do.	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	130,000
Magnesium, metal	Ust-Kamenogorsk titanium-magnesium plant	do.	NA
Manganese, crude ore	Facilities: Kazmarganets {Kazchrome JSC [Eurasian Natural Resources Corp. plc (ENRC)]} Zhairemsky GOK <sup>3</sup> JSC [Eurasian Natural Resources Corp. plc (ENRC)] Atasurda mining and processing complex (TOO Orken) TOO Arman 100 Temirtau electrometallurgical complex	Locations: Tur and East Kamys Mines, Karagandy Province Perstenevsky, Ushkatyn III, Zhomart and Zapadny Zhomart Mines near Zhairem Atasu 170 kilometers east of Zhezkazgahan, Karagandy Province Temirtau, Karagandy Province	NA <sup>5</sup>
Minor metals (indium, selenium, tellurium, thallium, and so forth)	Belogorskiy rare-metals plant	Asubulak, East Kazakhstan Province	NA <sup>6</sup>
Do.	Chimkent metallurgical plant (JSC Yuzhpolimetal)	Shymkent	NA <sup>6</sup>
Do.	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 69.61%)]	Oskemen (also known as Ust-Kamenogorsk)	NA
Natural gas	million cubic meters Companies: Tengizchevroil (Chevron Corp., 50%; KazMunaiGas JSC, 20%; ExxonMobil Kazakhstan Inc., 25%; LukArco B.V., 5%) 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%) Additional production at smaller fields	Locations: Tengiz and Korolev fields Karachaganak field NA	NA <sup>5</sup>

See footnotes at end of table.



TABLE 2—Continued  
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2012<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>c</sup>
Niobium, metal		Ulba Metallurgical Plant (Kazatomprom JSC)	Oskemen (also known as Ust-Kamenogorsk)	NA
<b>Petroleum:</b>				
Crude		Tengizchevroil (Chevron Corp., 50%; KazMunaiGas JSC, 20%; ExxonMobil Kazakhstan Inc., 25%; LukArco B.V., 5%)	Tengiz and Korolev fields	NA <sup>3</sup>
		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%)	Karachaganak field	
		CNPC AktobeMunaiGas (China National Petroleum Corp., 85.42%)	Aktobe Province	
		PetroKazakhstan Inc. (China National Petroleum Corp., 67%, and KazMunaiGas JSC, 33%)	South Turgai basin	
		Mangistaumunaigaz JSC	Mangistau Province	
		Ozenmunaigas (KazMunaiGas JSC)	do.	
		Embamunaigas (KazMunaiGas JSC)	Western Kazakhstan	
		JV Kazgermunai LLP (KazMunaiGas JSC)	Kyzylorda Province	
		JSC Karazhanbasmunai (CITIC Group and KazMunaiGas JSC)	Mangistau Province	
		North Buzachi oilfield	do.	
		Additional producers	NA	
Refined, crude oil throughput	42-gallon barrels per day	JSC Pavlodar Oil Chemistry Refinery (KazMunaiGas JSC, 58%)	Pavlodar	120,000
Do.	do.	Atyrau Refinery (KazMunaiGas, 99.49%)	Atyrau	100,000
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)	Chilisai deposit, northwestern Kazakhstan	400
Rare-earth metals, products		SARECO (AO NAK Kazatomprom and Sumitomo Corp.)	Stepnogorsk	1,500
<b>Rhenium:</b>				
Ammonium perrhenate (containing 69.2% Re)		Zhezkazganredmet (RedMet) (Government owned)	Zhezkazgan, Karagandy Province	NA
In tailings from copper ore processing		Balkhash copper mining-metallurgical complex (Kazakhmys plc)	Karagandy Province	NA
Silicon, metal		Silicium Kazakhstan LLP	Karaganda	12,500
Silver, refined		Facilities: Chimkent metallurgical plant (JSC Yuzhpolimetall) Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 50.7%)] Balkhash refinery (Kazakhmys plc)	Locations: Shymkent Oskemen (also known as Ust-Kamenogorsk) Karagandy Province	1,000 <sup>5</sup>
Tantalum, metal		Ulba Metallurgical Plant JSC (Kazatomprom JSC)	Oskemen (also known as Ust-Kamenogorsk)	NA
<b>Titanium:</b>				
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 2012<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>6</sup>
Uranium, U content	Companies:	Locations:	19,500 <sup>5</sup>
	Akbastau JV (Kazatomprom JSC, 50%, and Uranium One Inc., 50%)	Blocks 1, 3, and 4 of the Budenovskoye deposit, Sozak Region, South Kazakhstan Province	
	Appak LLP (Kazatomprom JSC, 65%; Sumitomo Corp., 25%; Kansai Electric Power Co. Inc., 10%)	West Mynkuduk Mine of the Mynkuduk deposit, Sozak Region, South Kazakhstan Province	
	Baikent-U LLP (Kazatomprom JSC, 60%, and Japanese consortium, 40%)	Block No. 2 of the Kharassan deposit, Zhanakorgan Region, Kyzylorda Province	
	Betpak Dala JV (Uranium One Inc., 70%, and Kazatomprom JSC, 30%)	Akdala Mine and Site No. 4 (South Inkai) Mine of the Inkai deposit, Sozak Region, South Kazakhstan Province	
	Inkai JV (Cameco Corp., 60%, and Kazatomprom JSC, 40%)	Blocks 1, 2, and 3 of the Inkai deposit, Sozak Region, South Kazakhstan Province	
	Karatau LLP (Kazatomprom JSC, 50%, and Uranium One Inc., 50%)	Block No. 2 of the Budenovskoye deposit, Sozak Region, South Kazakhstan Province	
	Katco JV (Areva Group, 51%, and Kazatomprom JSC, 49%)	Tortkuduk Mine and Block No. 1 of the South Moinkum deposit, Sozak Region, South Kazakhstan Province	
	JSC Ken Dala.kz (Kazatomprom JSC, 100%)	Central Mynkuduk deposit, Sozak Region, South Kazakhstan Province	
	Kyzylkum LLP (Japanese consortium, 40%; Uranium One Inc., 30%; Kazatomprom JSC, 30%)	Block No. 1 of the Kharassan deposit, Zhanakorgan Region, Kyzylorda Province	
	Mining Company LLP (Kazatomprom JSC, 100%): Mining Group No. 6 LLP	North and South Karamurun Mines, Shieli and Zhanakorgan Regions, Kyzylorda Province	
	Stepnoye Mining Group LLP	Uvanas and East Mynkuduk Mines, Sozak Region, South Kazakhstan Province	
	Taukent Mining Chemical Plant LLP	Kanzhugan and South Moinkum Mines, Sozak Region, South Kazakhstan Province	
	Semizbai-U (Kazatomprom JSC 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 Province	
	Stepnogorsk Mining-Chemical Complex LLP (Kazatomprom JSC, 100%)	Shantobe Mine of the Vostok and Zvezdnoe deposits, 300 kilometers west of Stepnogorsk	
	JV Zarechnoye JSC (Kazatomprom JSC, 49.67%, and JSC Atomredmetzoloto, 49.67%)	Zarechnoye and South Zarechnoye deposits, Orlarski Region, South Kazakhstan Province	

See footnotes at end of table.

TABLE 2—Continued  
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2012<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
<b>Zinc:</b>			
Mine output, 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.	Orlovsky Mine	do.	78,200
Do.	Yubileyno-Snegirikhinsky Mine	do.	16,500
Do.	Central Region complex: Abyz Mine	Karagandy Province	13,500
Do.	Kazzinc JSC (Glencore International 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	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 Nova Zinc (JSC Chelyabinsk Zinc Plant)	Akshatau, Karagandy Province	35,000
Do.	TOO ShalkiyaZinc Ltd.	Kyzylorda Province	NA
Do.	Kazzinc JSC (Glencore International plc, 69.61%):		
	Ridder concentrator	do.	NA
Do.	Zyrianovsk concentrator	Zyryanovsk, East Kazakhstan Province	NA
Metal	Kazzinc JSC (Glencore International plc, 69.61%):		
	Ridder zinc refinery	East Kazakhstan Province	110,000
Do.	Ust-Kamenogorsk metallurgical complex	do.	190,000

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

<sup>1</sup>Table includes data available through January 31, 2014.

<sup>2</sup>Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

<sup>3</sup>GOK is the abbreviation for gorno-obogatitelnyi kombinat, which translates as "mining and beneficiation complex."

<sup>4</sup>Production at the Konyrat (formerly known as the Kounrad Mine) was stopped in 2005 owing to high production costs.

<sup>5</sup>Capacity estimates are totals for all enterprises that produce that commodity.

<sup>6</sup>It is unknown which, if any, rare metals are still being produced at this facility.