



2011 Minerals Yearbook

KAZAKHSTAN

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 (36% of world output); the second ranked producer of chromite (16% of world output); the fourth ranked producer of titanium sponge (11% of world output), cadmium metal (8% 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, 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 maintained partial Government ownership of significant mineral commodity producing companies. Kazakhstan's resources attracted an increasing number of companies and projects attempting to exploit Kazakhstan's mineral wealth and could result in further increases of mineral commodity production in the country (Bray, 2012; Edelstein, 2012; Gambogi, 2012; Jaskula, 2012; Kramer, 2012; Papp, 2012; Polyak, 2012; Tolcin, 2012a, b; World Nuclear Association, 2012b).

Minerals in the National Economy

In 2011, Kazakhstan's real GDP increased by 7.5% compared with that of 2010, and the nominal 2011 GDP was valued at \$188 billion.¹ The value added from mining and quarrying made up 18.2% of the nominal GDP, and manufacturing made up 11.4%. The processing of mineral commodities likely made up a significant share of manufacturing, but the exact share is not known. Total industrial production was valued at \$109 billion and included \$68.8 billion (63% of the value of industrial production) from mining (which included \$58.1 billion from extraction of crude petroleum, \$3.1 billion from mining of nonferrous metal ores, \$2.3 billion from mining of iron ores, \$1.2 billion from extraction of coal and lignite, and \$362 million from extraction of natural gas). Metallurgy contributed \$13.2 billion to industrial output, of which ferrous metallurgy contributed \$5.4 billion (Agency of Statistics of the Republic of Kazakhstan, 2012a; 2012d, p. 98, 170).

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 \$18.1 billion, of which \$10.9 billion (60%) was investment in mining and \$1.7 billion (9%) was investment in metallurgy. Investment in crude petroleum and natural gas production made up about 67% of total fixed capital investment in the mining industry. Gross foreign direct investment totaled

about \$21.2 billion, of which investment in geologic and prospecting activity accounted for \$10.0 billion, investment in mining accounted for \$3.5 billion (investment in crude petroleum and natural gas made up about \$2.1 billion of the total mining investment), and investment in nonferrous and ferrous metallurgy accounted for \$1.5 billion and \$1.0 billion, respectively (Agency of Statistics of the Republic of Kazakhstan, 2012d, p. 108–109, 113).

Mining and quarrying were also important for employment in the industrial sector, although they made up only a small percentage of overall employment in Kazakhstan. In 2011, a total of 8.3 million people were employed in Kazakhstan, of which 960,300 people were employed in industry and 206,800 people (21.5% of industrial employment and 2.5% of total employment) were employed in the mining and quarrying sector. The manufacturing sector employed 542,200 people, but no information was available as to how many of these employees were employed in metallurgy and mineral processing (Agency of Statistics of the Republic of Kazakhstan, 2012b).

Production

Output of mineral commodities generally remained close to 2010 levels or increased. The increases in mineral commodity output took place owing to a combination of new investments in production facilities and recovered production after the world economic crisis that began in late 2008 and limited output in 2009. Production of silicon metal increased by an estimated 433%; titanium sponge, by 43%; salt, by 42%; gold metal, by 25%; gold mine output, 22%; silver, by 17%; lignite, by 15%; cement, by 14%; steel, by 11%; aluminum, by 10%; and uranium, by 9%. The only significant decreases in production were for ferrosilicon, which decreased by 65%, and ferrosilicochromium, which decreased by 10% (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. Glencore owned a 50.7% share of Kazzinc, but in April, Glencore conditionally agreed to increase its ownership in Kazzinc to 93% for \$3.2 billion. Glencore expected the purchase of the additional shares to be finalized in the third quarter of 2012. Although ENRC and Kazakhmys had headquarters in the United Kingdom, both companies

¹Where necessary, values have been converted from Kazakhstani tenge (KZT) to U.S. dollars (US\$) at an annual average exchange rate of KZT146.62=US\$1.00 for 2011.

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 and 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, 2012, p. 65, 94; Glencore International plc, 2012, p. 54; Kazakhmys plc, 2012, p. 121; World Nuclear Association, 2012a).

The Government of Kazakhstan maintains a significant presence in the mineral industry through its regulatory functions and through ownership of shares in mining and mineral processing companies. In 2010, the Ministry of Energy and Mineral Resources was replaced by the Ministry of Oil and Gas and the Ministry for Industry and New Technologies as the executive bodies responsible for regulating the oil and gas and nonfuel mineral commodity industries, respectively. The Ministry for Industry and New Technologies reported that one of its major goals was to reduce the export of mined products, such as ores and concentrate, and instead to process these raw materials into higher value added products for export or domestic use. The Government owned shares in mineral commodity producers mainly through Sovereign Wealth Fund Samruk-Kazyna JSC and its subsidiaries, Kazatomprom, KazMunaiGas JSC, and Tau-Ken Samruk JSC (Ministry of Industry and New Technologies of the Republic of Kazakhstan, 2012; Sovereign Wealth Fund Samruk-Kazyna JSC, 2012; U.S. Energy Information Administration, 2012).

Mineral Trade

In 2011, Kazakhstan had exports valued at \$88.0 billion; exports of mineral commodities made up 91% of total exports. Exports of mineral products accounted for \$68.3 billion (78%) of total exports and another \$11.6 billion (13%) was from exports of base metals and articles thereof. Another 4% (\$3.4 billion) of export revenues was from exports of chemical products and products from related industries. Total imports were valued at \$37.1 billion, of which 15% (\$5.4 billion) was from the importation of mineral products and 10% (\$3.7 billion) was from imports of base metals and articles thereof (Agency of Statistics of the Republic of Kazakhstan, 2012d, p. 135–139).

Commodity Review

Metals

Beryllium.—Beryllium production in Kazakhstan took place at the Ulba Metallurgical Plant JSC (UMP) in Oskemen (formerly Ust-Kamenogorsk) from stockpiled beryl. UMP was a subsidiary of Kazatomprom JSC and was therefore a Government-owned company. IBC Advanced Alloys of Canada and Materion Corp. (formerly Brush Wellman Inc.) of the United States were significant consumers of beryllium produced at UMP. In June, IBC and Kazatomprom renewed

their Memorandum of Understanding (MOU) for strategic cooperation that included a long-term supply agreement of beryllium products to IBC and an agreement to work together on future investment opportunities and technology development. Specifically, the companies were interested in developing projects for the production of rare metals, such as niobium and tantalum (IBC Advanced Alloys Corp., 2011).

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, ENRC was by far the leading producer, with an estimated 3,500,000 metric tons per year (t/yr) of marketable chromite output. ENRC reported Australasian Joint Ore Reserves Committee (JORC)-compliant proven reserves of 59.0 million metric tons (Mt) of ore grading 41.6% Cr₂O₃ and probable reserves of 153.4 Mt of ore grading 40.9% Cr₂O₃ (Eurasian Natural Resources Corp. plc, 2012, p. 24, 140; Papp, 2012, p. 43).

ENRC used the majority of its chromite internally to produce ferrochromium and ferrosilicochromium. In 2011, ENRC's ferroalloys division operated at close to full capacity and was Kazakhstan's only producer of ferrochromium. Construction began in 2010 on ENRC's new \$750 million ferroalloys plant at Aktobe. The plant had designed production capacity of 440,000 t/yr of high-carbon ferrochromium and was expected to begin production in 2013 (Eurasian Natural Resources Corp. plc, 2012, p. 15, 27).

During the course of the past 6 years, the volume of exports of ferrochromium from Kazakhstan to China had significantly increased. Kazakhstan exported about 539,000 metric tons (t) of ferrochromium to China (30% of total ferrochromium exports) in 2011; 428,000 t (51%) in 2009; 165,000 t (17%) in 2008; 271,000 t (27%) in 2007; and 179,000 t (19%) in 2006; there was no information available about Kazakhstan's ferrochromium exports in 2010. The importance of the Chinese market increased during the financial crisis as demand for ferrochromium decreased elsewhere, but in 2011, the share of exports to China decreased as demand increased in such markets as Japan, where ferrochromium could be sold for relatively higher prices (Eurasian Natural Resources Corp. plc, 2012, p. 25; United Nations Statistics Division, 2012).

The second ranked producer of chromite in Kazakhstan was Oriel Resources Ltd., which was a subsidiary of OAO Mechel of Russia. Commercial production at Oriel's Voskhod GOK² began in 2009 when it produced 211,000 t of chromite concentrate; output was 255,000 t in 2010 and 295,100 t in 2011. The complex was designed to eventually reach production of 600,000 to 700,000 t/yr of chromite concentrate. Chromite ore produced by Oriel was sent to Mechel's Tikhvin ferroalloy plant, which is located in Tikhvin, Leningrad Oblast, Russia. Mechel estimated that Oriel had reserves of about 16.8 Mt of chromite with an average grade of 42.2% Cr₂O₃ (Mechel OAO, 2010; 2011; 2012, p. 121–122, 129).

Copper.—The U.S. Geological Survey (USGS) estimate of output of copper content of concentrate for Kazakhstan was significantly revised for all years in table 1. Previously

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

reported production figures came from the Agency of Statistics of the Republic of Kazakhstan, but it is now thought that those figures underreported production. Production figures for the years 2006 and earlier as reported in previous editions of the USGS Minerals Yearbook are thought to be accurate. In 2011, production by company was 303,000 t from Kazakhmys; an estimated 51,200 t from Kazzinc; 53,700 t from Aktyubinsk Copper Co. of Russia; and 6,915 t from Polymetal JSC. Aktyubinsk Copper Co. began production in the fall of 2006 and Polymetal began production in 2010 (CJSC Russian Copper Co., 2012; Glencore International plc, 2012, p. 53; Kazakhmys plc, 2012, p. 43; Polymetal JSC, 2012, p. 5).

Kazakhmys was the dominant producer of copper ore and metals in Kazakhstan. In 2011, the company produced 73% of copper contained in concentrate and 301,000 t of refined copper cathodes, which accounted for 89% of refined copper produced in Kazakhstan. The average copper grade of crude ore produced by Kazakhmys decreased to 1.01% from 1.09% in 2010, resulting in a 6% decrease in copper content of ore production despite a 1.5% increase in crude ore production. Declining ore grades at Kazakhmys were mainly responsible for the decrease in overall copper content of concentrate production in Kazakhstan in 2011. Kazakhmys planned to increase its production of copper to more than 500,000 t/yr by 2018 with new mine developments, including the Bozshakol project. Bozshakol was in the development 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 (table 1; Kazakhmys plc, 2012, p. 24, 43).

In August, Kazzinc commissioned a new copper smelter and refinery complex with a production capacity of 70,000 t/yr of copper cathodes. The new complex was located in Oskemen (also known as Ust-Kamenogorsk) and was expected by Kazzinc to reach its production capacity in 2012 (Glencore International plc, 2012, p. 54).

Gold.—Interest in gold was high throughout the world in 2011 as investors looked for a safe investment in the difficult financial climate, and the price of gold continued to increase. Gold prices in 2011 reached a high of \$1,895 per troy ounce in September and had an annual average price of \$1,572 per troy ounce, which was a 28% increase compared with that of 2010. Kazakhstan was not one of the world's leading gold producers, but there was significant interest in the country's production potential (London Bullion Market Association, 2012a, b; World Gold Council, 2012, p. 3–7).

Kazzinc produced gold as a byproduct at its lead and zinc mines and as a primary product through its subsidiary JSC Altyntau Resources. The company owned one of the country's two gold smelters, and in 2011, it produced about 13.3 t of gold metal (about 12.1 t from its own resources). Kazakhmys was the second ranked producer with about 3.7 t of gold byproduct production from its copper mining projects. Kazakhstan's other gold refinery was owned by Kazakhmys, but reportedly its refined gold did not meet international standards. Some of the other producers of mined gold in 2011 included Polyus Gold International Ltd. (3.6 t), OJSC Polymetal (2.9 t),

Nord Gold N.V. (2.6 t), Sekisovskoye Ltd. (0.7 t), and Alhambra Resources Ltd. (0.5 t) (Orininskaya, 2011; Glencore International plc, 2012, p. 53).

In June 2010, the President of Kazakhstan announced that the country would increase mined gold output to more than 70 t/yr by 2015. Reaching 70 t of gold production by 2015 compared with about 37 t in 2011 would be a significant increase in production and a few important projects were in development. Kazzinc expected that its subsidiary, Altyntau Kokshetau Ltd., would increase gold production to more than 800,000 troy ounces per year (24.9 t/yr) by 2013 owing to expected improvements in gold recovery rates. In 2011, investments were made to improve the efficiency of Altyntau Kokshetau's two ball mills and increase gold recovery. 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' gold production (Thomson Reuters, 2010; Glencore International plc, 2012, p. 17, 54; Kazakhmys plc, 2012).

In expectation of a significant increase in gold mine output, the Government-owned mining company Tau-Ken Samruk planned to begin construction of a new gold refinery in 2012. The refinery would reportedly cost up to \$30 million to build and would have a production capacity of 25 t/yr of bullion. It would be Kazakhstan's third gold refinery (Orininskaya, 2011).

Lead and Zinc.—Kazakhstan was the world's 8th ranked zinc producer and was also a modest producer of lead. Kazzinc was the leading producer of lead and zinc in Kazakhstan, and in 2011, the company produced 300,800 t of zinc metal (of which 246,000 t was produced from Kazzinc's own mine output) and 101,800 t of lead metal (of which 35,600 t was produced from Kazzinc's own mine output). Based on company reports, estimates of zinc content of concentrate production for 2007 through 2010 in table 1 were revised significantly upwards. Figures in previous editions of the Minerals Yearbook were reported by the Agency of Statistics of the Republic of Kazakhstan (Glencore International plc, 2012, p. 53; Tolcin, 2012b).

Rhenium.—Rhenium in the form of ammonium perrhenate (APR) containing 69.2% rhenium was produced at the state-owned enterprise Zhezkazganredmet (RedMet) from the tailings of copper production at Kazakhmys's Zhezkazgan complex. Both of these facilities are located in Zhezkazgan, Karagandy Province. It is not known if RedMet also obtained raw materials for APR production from other sources. The Government considered rhenium to be a strategic mineral, and the Government maintained the exclusive rights to produce and export APR. Production and export figures for APR were not released by the Government, so production figures in table 1 have been estimated (Zhezkazganredmet, 2012).

Titanium.—In April, 2010, the Ust-Kamenogorsk titanium-magnesium plant (UKTMP) and POSCO of the Republic of Korea entered into a joint venture to build a plant to produce titanium slabs in East Kazakhstan Province. Construction of the new plant began in October 2011 and was expected to be completed in 2013. 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 (POSCO, 2010, 2012).

In September, UKAD, which was a joint venture between UKTMP and Aubert & Duval S.A. of France for the production of titanium semifinished products, officially opened in Saint Georges de Mons, France. EADS N.V. of France signed a long-term agreement with UKAD valued at \$1.2 billion for the supply of titanium semifinished products through 2022. The titanium raw materials for processing at the plant were to be provided by UKTMP, and semifinished products were to be turned into aircraft parts by EADS (Aubert & Duval S.A., 2011; EADS N.V., 2011).

Industrial Minerals

Rare Earths.—No rare-earth metals were produced in Kazakhstan in 2011, but the Government supported the development of rare-earth projects through joint ventures with foreign companies. Summit Atom Rare Earth Co., which was a joint venture between Kazatomprom and Sumitomo Corp. of Japan, planned to begin production of rare-earth concentrate from tailings from uranium processing in 2012. The facility was located in Stepnogorsk and was expected to have an initial production capacity of 1,500 t/yr of rare-earth minerals, but it was not known what planned production was for 2012. In September, Kazatomprom and Toshiba Corp. of Japan established KT Rare Metals Co. Ltd. to engage in the vertically integrated production of rare metals and rare-earth metals. Also in September, Kazatomprom signed an agreement with the Bureau of Geological and Mining Research and the European Company of Monitoring and Strategic Consulting of France in part to establish a strategic partnership to research the development of rare metals and rare-earth metals in Kazakhstan. In March, Kazatomprom signed an MOU with Atomredmetzoloto JSC of Russia to cooperate on projects aimed at the production of rare metals and rare-earth metals (Kazatomprom JSC, 2011a, b; Pala, 2012).

Mineral Fuels and Related Materials

Uranium.—In 2011, Kazakhstan remained the world's leading producer of uranium and accounted for about 36% of world uranium mine output. There were no nuclear powerplants in Kazakhstan, and all uranium production was exported. In recent years, Kazakhstan rapidly increased its investment in its uranium industry, and the country's production of uranium increased from 3,719 t in 2004 to 19,451 t in 2011. Fixed capital investment in uranium and thorium mining increased from about \$35 million in 2004 to about \$309 million in 2009 (the latest year for which data were available). Foreign direct investment in uranium mining in 2011 was about \$257 million and was attracted through the establishment of joint ventures with Kazatomprom. According to the Organization for Economic Co-operation and Development's Nuclear Energy Agency and the International Atomic Energy Agency, as of 2009, Kazakhstan had 651,000 t of recoverable resources of uranium, which accounted for 12% of the world total and was the world's second largest national uranium resource after Australia

(Agency of Statistics of the Republic of Kazakhstan, 2009, p. 208; 2010, p. 102, 205; 2012c; World Nuclear Association, 2012b).

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 and 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.

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TABLE 1
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011
METALS					
Aluminum:					
Alumina	1,537,000	1,600,000	1,608,000	1,639,000	1,670,000
Bauxite, gross weight	4,963,000	5,160,100	5,130,000	5,310,400	5,495,000
Metal, primary	12,000	106,000	127,000	226,000	249,000
Antimony, Sb content of concentrate	952	890	597	785	800 ^e
Beryllium	NA	NA	NA	NA	NA
Bismuth: ^c					
Mine output, Bi content	145	150	-- ³	-- ³	--
Metal, refined	--	--	90	150	150
Cadmium, metal ^e	1,300	1,100	1,300	1,400	1,300
Chromite, marketable ore	3,687,200	3,552,000	3,544,000	3,760,000 ^e	3,800,000 ^e
Copper:					
Mine output, Cu content of concentrate ^e	440,000 ^r	465,000 ^r	455,000 ^r	427,000 ^r	417,000
Metal:					
Smelter, undifferentiated	392,834	392,575	332,854	318,637	302,975
Refined, primary	406,091	398,411	312,767	323,368	338,346
Gallium kilograms	18,666	18,666	18,702	18,702	18,703
Gold:					
Mine output, Au content do.	22,564	20,825	22,839	29,941 ^r	36,670
Metal, refined do.	8,157	8,205	10,279	13,313	16,632
Iron and steel:					
Iron ore, marketable:					
Gross weight	23,834,100	21,486,300	22,281,300	24,229,100	24,812,800
Fe content ^e	13,600,000	12,200,000	12,700,000	13,800,000	14,100,000
Metal:					
Pig iron	3,795,000	3,106,000	2,996,000	2,984,000	3,141,200
Ferroalloys:					
Ferrochromium	1,307,536	1,220,315	1,173,286	1,311,302	1,289,917
Ferrosilicochromium	145,695	133,828	60,829	159,765	143,296
Ferrosilicon	59,886	54,964	33,100	4,813	1,683
Silicomanganese	188,445	179,939	200,374	224,627	232,039
Other	1,222	1,473	1,205	1,283	1,754
Total	1,702,784	1,590,519	1,468,794	1,701,790	1,668,689
Steel:					
Crude	4,784,105	4,243,582	3,324,000 ^r	3,338,000 ^r	3,699,000
Finished, rolled	3,440,708	2,826,202	2,990,167	2,886,943	3,092,223
Lead:					
Concentrate, Pb content	40,200	38,800	39,400	36,100	34,600
Refined, primary and secondary	117,641	105,766	80,994	103,110	111,249
Magnesium, metal, primary ^e	21,000	21,000	21,000	21,000	21,000
Manganese:					
Ore:					
Gross weight	2,482,000	2,485,000	2,457,400	3,041,800	2,963,000
Mn content ^e	600,000	600,000	520,000	610,000	590,000
Concentrate:					
Gross weight	1,003,000	1,117,000	982,000	1,094,000	1,100,000
Mn content ^e	360,000	400,000	360,000	390,000	390,000
Molybdenum, concentrate, Mo content	-- ^r	-- ^r	-- ^r	-- ^r	--
Nickel, Ni content of laterite ore ^e	200	500	500	500	500
Niobium, metal	NA	NA	NA	NA	NA
Rhenium ^e kilograms	5,500	5,500	3,000	3,000 ^r	3,000
Silicon, metal ^e	--	--	--	1,500	8,000
Silver:					
Mine output, Ag content kilograms	722,927	645,627	618,141	550,735 ^r	644,676
Refined do.	707,954	628,763	613,544	547,665	640,664
Tantalum, metal	NA	NA	NA	NA	NA

See footnotes at end of table.

TABLE 1—Continued
KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011
METALS—Continued					
Titanium:					
Ilmenite and leucocoxene ^c	25,000	25,000	25,000	25,000	25,000
Sponge	25,400	26,000	16,800	14,500	20,700
Vanadium, ores, concentrates, slag, V content ^c	NA ^r	NA ^r	NA ^r	NA ^r	NA
Zinc:					
Concentrate, Zn content ^c	450,000 ^r	460,000 ^r	410,000 ^r	440,000 ^r	420,000
Smelter, primary and secondary	358,226	365,572	327,873	318,858	319,752
INDUSTRIAL MINERALS					
Asbestos, all grades	292,600	230,100	230,000	214,100	223,100
Barite:					
Ore and concentrate	280,300	492,200	306,000	358,000	466,000
Marketable ^c	130,000	170,000	170,000	200,000	200,000
Boron ^c thousand metric tons	30	30	30	30	30
Cement	5,698,600	5,837,300	5,694,100	6,686,300	7,642,100
Fluorspar ^c	64,000 ³	64,300 ^{r,3}	65,000 ^r	65,000 ^r	65,000
Gypsum ^c	653,600 ³	696,900 ³	700,000	700,000	700,000
Lime	1,023,178	905,917	798,180	881,225	958,231
Phosphate rock, beneficiated:					
Gross weight	720,000	1,226,000	1,225,000	1,600,000 ^c	1,600,000 ^c
P ₂ O ₅ content ^c	165,000	280,000	280,000	350,000	350,000
Salt and sodium chloride	227,643	504,100	222,942	228,801	324,719
Sulfur, byproduct: ^c					
Metallurgy	300,000	300,000	300,000	300,000	300,000
Natural gas and petroleum	1,660,700 ³	1,732,600 ³	2,200,000	2,400,000	2,400,000
Total	1,960,000	2,030,000	2,500,000	2,700,000	2,700,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous thousand metric tons	94,014	106,296	91,042	99,285	103,015
Lignite do.	4,370	4,777	5,084	7,283	8,368
Total do.	98,384	111,073	96,126	106,568	111,383
Coke	2,925,000	2,687,700	2,552,000	2,681,800	2,651,200
Natural gas:					
Nonassociated gas thousand cubic meters	16,677,000	18,708,000	18,132,000	17,595,000	19,305,000
Associated gas do.	12,884,000	14,181,000	17,809,000	19,811,000	20,199,000
Total do.	29,561,000	32,889,000	35,941,000	37,406,000	39,504,000
Petroleum:					
Crude oil and gas condensate ⁴ 42-gallon barrels	488,000,000	514,000,000	556,000,000	578,000,000	582,000,000
Refinery products ⁵ do.	90,200,000	93,400,000	92,900,000	101,600,000	106,200,000
Uranium:					
U content	6,637	8,521	14,020	17,803	19,451
U ₃ O ₈ content	7,827	10,049	16,534	20,995	22,939

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

¹Table includes data available through January 31, 2012.

²In addition to the commodities listed, Kazakhstan may also have produced a number of other mineral products, including cesium, germanium, indium, rare-earth elements, scandium, selenium, and tellurium, but information is inadequate to estimate production.

³Reported figure.

⁴Figures were converted to barrels from metric tons, which were reported as follows: 2007—67,125,300; 2008—70,671,000; 2009—76,482,600; 2010—79,517,700; and 2011—80,039,100.

⁵Figures 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; and 2011—13,393.

TABLE 2
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1,2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
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.	Zhairesmsky GOK ³ 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	do.	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, 50.7%)]	do.	NA
Do.	Chimkent metallurgical plant (JSC Yuzhpolimetall)	Shymkent	NA
Cadmium	do.	do.	NA
Do.	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 50.7%)]	Oskemen (also known as Ust-Kamenogorsk)	NA
Chromite, marketable ore containing about 50% Cr ₂ O ₃ content	Donskoy GOK ³ {Kazchrome JSC [a subsidiary of Eurasian Natural Resources Corp. plc (ENRC)]}	Khromtau, Aktobe Province	3,500,000
Do.	Oriel Resources Ltd. (OAO Mechel)	Voskhod GOK, ³ Khromtau, Aktobe Province	600,000
Copper:			
Mining, recoverable, Cu content	Kazakhmys plc:		
	Central Region:		
	Konyrat Mine	Karagandy Province	11,800 ⁴
Do.	Sayak I and III Mines	do.	23,500
Do.	Shatyrykul 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:		
Do.	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:		
Do.	Annensky Mine	Karagandy Province	25,000
Do.	East Mine	do.	35,000
Do.	North Mine	do.	28,000
Do.	South Mine	do.	30,000
Do.	Stepnoy Mine	do.	30,000
Do.	West Mine	do.	23,300
Do.	Zhomart Mine	do.	60,000

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1,2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Copper—Continued:			
Mining, recoverable, Cu content— Continued	Kazzinc JSC (Glencore International plc, 50.7%): 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.	Grekhovsky Mine	NA	NA
Do.	Aktubinsk Copper Co. TOO (CJSC Russian Copper Co.)	50th Anniversary of October Mine, at Koktau, Aktobe Province	NA
Do.	Polymetal JSC	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:		
	Orlovsky concentrator	do.	70,000
Do.	Belousovsky concentrator	East Kazakhstan Province	13,000
Do.	Irtysky concentrator	do.	6,000
Do.	Nikolayevsky concentrator	do.	30,000
Do.	Zhezkazgan Region:		
	Satpayev concentrator	do.	30,000
Do.	Zhezkazgan No. 1 concentrator	do.	88,800
Do.	Zhezkazgan No. 2 concentrator	do.	95,000
Do.	Kazzinc JSC (Glencore International plc, 50.7%): 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.	Polymetal JSC	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, 50.7%)]	Oskemen (also known as Ust-Kamenogorsk)	70,000
Ferrous alloys:			
Ferrochrome:			
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
Gallium	Aluminium of Kazakhstan JSC [Eurasian Natural Resources Corp. plc (ENRC)]	Pavlodar	NA

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1,2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Indium	Kazzinc JSC (Glencore International plc, 50.7%)	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, 50.7%): 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.	ShalkiyaZinc N.V. (SAT & Co.)	Shalkiya Mine, 15 kilometers northeast of Zhanakorgan	NA
Concentrate, Pb content	Kazzinc JSC (Glencore International plc, 50.7%): Ridder concentrator	Ridder, East Kazakhstan Province	NA
Do.	Zyrianovsk concentrator	Zyryanovsk, East Kazakhstan Province	NA
Do.	ShalkiyaZinc N.V. (SAT & Co.)	Kantau concentrating plant, South Kazakhstan Province	NA
Do.	Nova Zinc LLP (JSC Chelyabinsk Zinc Plant)	Akzhal	4,000
Metal	Chimkent metallurgical plant (JSC Yuzhpolimetall)	Shymkent	NA
Do.	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 50.7%)]	Oskemen (also known as Ust-Kamenogorsk)	130,000
Magnesium, metal	Ust-Kamenogorsk titanium-magnesium plant	do.	NA
Manganese, crude ore	Facilities:	Locations:	NA ⁵
	Kazmarganets {Kazchrome JSC [Eurasian Natural Resources Corp. plc (ENRC)]}	Tur and East Kamys Mines, Karagandy Province	
	Zhairemsky GOK ³ JSC [Eurasian Natural Resources Corp. plc (ENRC)]	Perstenevsky, Ushkatyn III, Zhomart and Zapadny Zhomart Mines near Zhairem	
	Atasurda mining and processing complex (TOO Orken) TOO Arman 100	Atasu 170 kilometers east of Zhezkazgahan, Karagandy Province	
	Temirtau electrometallurgical complex	Temirtau, Karagandy Province	
Minor metals (indium, selenium, tellurium, thallium, and so forth)	Belogorskiy rare-metals plant	Asubulak, East Kazakhstan Province	NA ⁶
Do.	Chimkent metallurgical plant (JSC Yuzhpolimetall)	Shymkent	NA ⁶
Do.	Ust-Kamenogorsk metallurgical complex [Kazzinc JSC (Glencore International plc, 50.7%)]	Oskemen (also known as Ust-Kamenogorsk)	NA
Natural gas	million cubic meters	Companies:	Locations:
		Tengizchevroil (Chevron Corp., 50%; KazMunaiGas JSC, 20%; ExxonMobil Kazakhstan Inc., 25%; LukArco B.V., 5%)	Tengiz and Korolev fields
		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
		Additional production at smaller fields	NA
Niobium, metal	Ulba Metallurgical Plant (Kazatomprom JSC)	Oskemen (also known as Ust-Kamenogorsk)	NA
Petroleum:			
Crude	Tengizchevroil (Chevron Corp., 50%; KazMunaiGas JSC, 20%; ExxonMobil Kazakhstan Inc., 25%; LukArco B.V., 5%)	Tengiz and Korolev fields	NA ³

See footnotes at end of table.

TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1,2}

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits ³	Location or deposit names	Annual capacity ^c
Petroleum—Continued:				
Crude—Continued		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%; KazMunaiGas JSC, 33%)	Shmykent	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		Irtysk Rare Earths Company Ltd.	Pervomayskiy, about 50 kilometers northwest of Oskemen	NA
Rhenium:				
Ammonium perrhenate (containing 69.2% Re)		Zhezkazganredmet (RedMet) (Government owned)	Zhezkazgan, Karagandy Province	NA
Rhenium 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 ⁵
Tantalum, metal		Ulba Metallurgical Plant JSC (Kazatomprom JSC)	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)		Ust-Kamenogorsk titanium-magnesium plant	Oskemen (also known as Ust-Kamenogorsk)	35,000

See footnotes at end of table.

TABLE 2—Continued
 KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1,2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Uranium, U content	Companies:	Locations:	19,500 ⁵
	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	
	Baikenu 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 2011^{1,2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits ³	Location or deposit names	Annual capacity ^e
Zinc:			
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, 50.7%):		
	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.	Nova Zinc LLP (JSC Chelyabinsk Zinc Plant)	Akshatau, Karagandy Province	NA
Do.	ShalkiyaZinc N.V. (SAT & Co.)	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.	Nova Zinc LLP (JSC Chelyabinsk Zinc Plant)	Akshatau, Karagandy Province	35,000
Do.	ShalkiyaZinc N.V. (SAT & Co.)	Kyzylorda Province	NA
Do.	Kazzinc JSC (Glencore International plc, 50.7%):		
	Ridder concentrator	do.	NA
Do.	Zyrianovsk concentrator	Zyryanovsk, East Kazakhstan Province	NA
Metal	Kazzinc JSC (Glencore International plc, 50.7%):		
	Ridder zinc refinery	East Kazakhstan Province	110,000
Do.	Ust-Kamenogorsk metallurgical complex	do.	190,000

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

¹Table includes data available through January 31, 2012.

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

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

⁴Production at the Konyrat (formerly known as the Kounrad Mine) was suspended in 2008 owing to high production costs.

⁵Capacity estimates are totals for all enterprises that produce that commodity.

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