THE MINERAL INDUSTRY OF

KAZAKHSTAN

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Kazakhstan is the second largest country in land area after Russia to form from the republics of the former Soviet Union (FSU). It is endowed with large reserves of a wide range of minerals. Kazakhstan was a major producer of a large number of metals, including beryllium, bismuth, cadmium, chromium, copper, ferroalloys, lead, magnesium, rhenium, titanium, uranium, and zinc. It had significant production of a number of other mineral products, including arsenic, barite, coal, gold, molybdenum, natural gas, oil, phosphate rock, and tungsten. Kazakhstan had commercial reserves of 3 ferrous metals, 29 nonferrous metals, 2 precious metals, 84 types of industrial minerals, as well as coal, natural gas, and petroleum (Zharkenov, 1997).

During the immediate post-Soviet period, the mineral industry in Kazakhstan had been characterized by falling output, increasing unemployment, stoppages at many enterprises, lowering of investment levels, and lowering of demand for the industry's output domestically and on export markets where products have had difficulty competing (Zharkenov, 1997). The mineral industry was critically in need of investment and restructuring, which led in the 1995-96 period to a large number of enterprises being put under foreign management through concessionaire contracts. A large percentage of mining and metallurgical enterprises are now under the control of foreign managers who, in exchange for a share of the profits and potential ownership rights to stock, are investing in modernizing the enterprises, increasing output, increasing exports, decreasing costs, and upgrading technology to meet environmental standards (Zharkenov, 1997).

Subsequent to the awarding of management contracts, the mineral industry entered a period of stabilization and growth (Danayev, 1997). In 1997, mineral production accounted for more than 50% of the country's industrial output, of which oil and gas production accounted for about 24%; ferrous metals production, almost 14%; and nonferrous metals production, about 12% (Uzhkenov, 1997).

In 1996 and 1997, a number of the largest metallurgical enterprises of Kazakhstan, accounting for 20% of the country's gross domestic product, were controlled by the Trans-World Group Company (TWG) of the United Kingdom through a group of offshore subsidiary companies. The Kazakhstan enterprises controlled by TWG were the Aluminum Kazakhstan Joint Stock Company (JSC), which controls bauxite mining and alumina production; the Sokolovsko-Sarbay mining and beneficiation complex, which was one of the country's largest iron ore mining enterprises; and the Kazchrome Transnational Company, which controled chromite mining and ferroalloys. In all these ventures, TWG was in partnership with the Kazakhstan Mineral Resources Corporation (KMRC), which was registered in the British Virgin Islands. However, by the beginning of 1998, KMRC had gained

THE MINERAL INDUSTRY OF KAZAKHSTAN-1998

control of the management of these mineral enterprises, and TWG was effectively excluded from their management (Rozhkova and Frolov, 1999). In January 1999, the Supreme Court of Kazakhstan ruled that TWG had damaged the enterprises under its management to the extent of \$200 million, which it assessed as punitive damages and ruled that TWG was to be excluded from the list of shareholders of Kazakhstan enterprises (Rozhkova and Frolov, 1999; Trans-World Group Company, February 17, 1999, Kazakhstan Supreme Court attempts to expropriate assets worth over USD 400 million from Trans-World Group, press release, accessed February 19, 1999, at URL http://biz.yahoo.com/prnews/990217/trtans wrld 1.htm 1). The Supreme Court found that TWG had submitted the enterprises to disadvantageous working conditions, by which it had done them and the state appreciable damage. Furthermore, trade contracts and loans totaling \$200 million owed to TWG were invalidated (Rozhkova and Frolov, 1999; Trans-World Group Company, February 17, 1999, Kazakhstan Supreme Court attempts to expropriate assets worth over USD 400 million from Trans-World Group, press release, accessed February 19, 1999, at URL http://biz.yahoo.com/prnews/990217/trtans wrld 1.htm 1). Representatives of TWG considered the ruling of the Kazakhstan Supreme Court illegal and stated that this Court did not have legal jurisdiction over these joint ventures. TWG representatives were seeking a court resolution of this dispute in the British Virgin Islands where KMRC was registered and have also taken legal action at the London Court of International Arbitration (Rozhkova and Frolov, 1999).

In 1998, the financial crises that affected Russia and Asia caused severe repercussions in Kazakhstan as the decline in demand for metals on the world market affected Kazakhstan's volume of exports while the decrease in demand lowered commodity prices, which resulted in diminished revenues from exports. Also, the currency devaluations in the affected countries put downward pressure on the Kazakhstan currency, the Tenge, which depreciated by 6% from mid-August to the beginning of December and remained under pressure. Given that Kazakhstan's major trading partner was Russia, Standard and Poor's downgraded Kazakhstan's debt rating in mid-September (Almaty Herald, December 3-9, 1998, Kazakhstan recovers from contagion, Almaty, no. 145, accessed May 20, 1999, at URL http://www.kazecon.kz/English/ABN kazakh.HT M). In 1998, there was also a significant decline in the economic performance of firms under management contracts as only 4 of 38 large companies under the management of foreign and domestic investors showed improved performance in comparison to 1997 (Interfax Statistical Report, 1999).

In Kazakhstan in 1998 in comparison with 1997, nonferrous output increased for some commodities with production increases reported of 7.3% for blister copper, 7.95% for refined

copper, 15.1% for refined lead, 4.8% for unrefined silver, 37.5% for refined silver, and 27.9% for zinc metal. However, production decreases of 0.8% were reported for alumina; 3.7%, unrefined gold; and 8.2%, refined gold (Interfax Mining and Metals Report, 1999c).

In the ferrous metals sector in 1998 in comparison with 1997, production decreases were reported for chromite, of 10.8%; crude steel, 22%; ferrochrome, 10.7%; ferrochromiumsilicon, 30.9%; iron ore, 28.7%; pig iron, 16%; and tin-plate, 9% (Interfax Mining and Metals Report, 1999f). [These reported percentage changes in production for ferrous, nonferrous, and precious metals in some cases will not match the numbers reported in table 1 because some production numbers listed in there were reported in other sources and deemed more reliable than those that could be derived by using percentage increases or decreases; other numbers in table 1 that were derived from these reported percentage changes are listed as estimates and rounded.]

Kazakhstan during the Soviet period underwent extensive development of the metals mining and metallurgical industries. However, with the dissolution of the Soviet Union, the country lost almost all its former base of consumers. Intensive mining development resulted in the depletion of many deposits that are now left with low-grade ores at great depths. At polymetallic deposits in the Rudnyy Altay, the Ertis (Irtysh), the Leninogorsk, and the Zvrvanovsk regions, ore was mined with a combined grade for copper, lead, and zinc of less than 3% from underground mines at deep levels. The lack of funds to conduct exploration since the breakup of the Soviet Union has greatly exacerbated this problem. Replenishing the reserve base with high-grade ores was considered to be one of the highest priorities for the minerals production sector. Also, the industry was in need of additional restructuring to make it cost competitive for operating under market economy conditions. This included installing state-of-the-art equipment and eliminating inefficient linkages, whereby processing facilities were often located hundreds, if not thousands, of kilometers from the mines (Danavey, 1997).

A main direction for reforming the mineral industry sector included reforming laws regarding investment and taxation to attract foreign investment more successfully. Investment was needed for exploring and developing new deposits and for introducing state-of-the-art processing technology to extract maximum value from ores and wastes (Zharkenov, 1997).

Kazakhstan has significant oil and gas reserves. The oil and gas industry, one of Kazakhstan's most attractive foreign investment areas, was export oriented. Since 1993, more than 40% of total foreign investment in Kazakhstan has gone into the oil and gas industry (Kazkommerts Securities, January 1998, Kazakhstan economic research, accessed May 15, 1999, at URL http://www.kazecon.kz/Kazkom/NewGuide/engl/p age_4.htm). The Caspian Pipeline Consortium (CPC) project was expected to increase Kazakhstan's oil exports by around 80% in comparison with 1998 (about \$1 billion in terms of export proceeds) by 2000 and by a further 40% (an additional \$1 billion) in 2001 (Almaty Herald, December 3-9, 1998, Kazakhstan recovers from contagion, no. 145, accessed May 16, 1999, at URL http://www.kazecon.kz/English/ABN_kazakh.HTM). Coal was Kazakhstan's major source of domestic fuel. Up to 80% of the energy sector's fuel demand was met by coal. The country produced sufficient amounts of coal for domestic use and exported coal to other FSU countries. There was a trend in the development of Kazakhstan's coal industry whereby some coal mines and electric powerplants have been purchased by industrial enterprises interested in obtaining an uninterrupted supply of energy (Kazkommerts Securities, January 1998, Kazakhstan economic research, accessed May 15, 1999, at URL http://www.kazecon.kz/Kazkom/NewGuide/engl/page_4.htm).

Environmental Conditions

Kazakhstan occupies a territory of more than 2.7 million square kilometers in the center of Eurasia. There are almost all varieties of landscapes from dry subtropics and hot deserts to high mountainous tundra and glaciers as well as continental seas and lakes, such as the Caspian, Aral, Balqash (Balkhash), Zaysan, and Alakol'. During the Soviet period, the country was pursuing economic development with almost no regard to its environment impact (Ministry of Environment and Natural Resources of the Republic of Kazakhstan, National environmental action plan for sustainable development of the Republic of Kazakhstan, accessed May 4, 1999 at URL http://www.zoo.co.uk/~z80000142/links.html). Kazakhstan's wealth of mineral resources spurred rapid development of mining and mineral-processing industries. Furthermore, the country's territory was the site of military bases, the Baykonur cosmodrome, and weapons testing grounds, including nuclear weapons. All these resulted in intensive air, water, and soil pollution and natural resource depletion. Changes in the environment caused a sharp rise in population morbidity and mortality rates, serious destruction of ecosystems, desertification, and significant loss of biodiversity. In some regions of the country, life expectancy was 15 to 20 years less than in developed countries (Ministry of Environment and Natural Resources of the Republic of Kazakhstan, National environmental action plan for sustainable development of the Republic of Kazakhstan, accessed May 4, 1999, at URL http://www.zoo.co.uk/~z80000142/links.html). Radioactive fallout from weapons testing traced by radioactive clouds has spread over a territory of 304,000 square kilometers inhabited by about 1.5 million people.

Also, in the FSU, more than 40% of uranium output was produced on the territory of Kazakhstan. Extracting and processing uranium ores was accompanied by generation of radioactive waste. As a result, the situation regarding the use and burial of radioactive waste remains a pressing issue. In February 1997, heads of five Central Asian states signed the Almaty Declaration announcing 1998 to be the Year of Environmental Protection in the Central Asian region under United Nation's auspices. This Declaration is aimed at developing a complex program on environmental protection. It challenges all interested countries to support the initiative of declaring Central Asia a nonnuclear zone on the eve of the 50year anniversary of establishing the Semipalatinsk nuclear weapons test site.

Commodity Review

Aluminum

Reserves.—The country's bauxite reserves are in sedimentary karst type deposits. The largest deposits are the Belinskoye, Koktal'skoye, Krasnooktyabrskoye, Tuansorskoye, and Vostochno-Ayatskoye, which compose 76% of the country's reserves (Uzhkenov, 1997). The country's economic reserves are reported to be about 355 million metric tons (Mt). Bauxite ore averages about 44% alumina (Kruse and Parchmann, 1998, p. 62).

Production Status.—Kazakhstan produced alumina at the Pavlodar aluminum plant. Local ores supplied the Pavlodar aluminum plant, which, despite its name, produced only alumina. The country ranked as a significant world alumina producer with more than 1 million metric tons per year (Mt/yr) of production. In 1998, alumina production at Pavlodar decreased by 0.8% to 1.085 Mt compared with 1997 (Interfax Mining and Metals Report, 1999d). The Pavlodar plant was also a large producer of byproduct gallium. Most alumina production was shipped to aluminum smelters in Russia (USAID Kazakhstan Securities Market Development Project, July 18, 1997, JSC alumina Kazakhstan, accessed May 4, 1999, at URL http://www.kazecon.kz/Memos/Eng/ALUM.htm).

Production Development.—Bauxite reserves were considered to be adequate for more than 90 years at the current level of output and for more than 60 years at projected levels of development. Plans called for construction of a primary aluminum plant, which has been on the drawing board for decades. Problems in developing aluminum production included issues concerning the quality of local ore, ensuring an adequate energy supply, and environmental issues involving the location of the plant (Interfax Mining and Metals Report, 1999b).

Ownership Status.—JSC Aluminum Kazakhstan, created by a Government resolution in 1996, included the Pavlodar aluminum plant and the Krasnooktvabr (Red October) and Turgay bauxite mining companies. As of 1994, Aluminum Kazakhstan had been under the management of Whiteswan Ltd. Whiteswan was a joint venture of TWG of the United Kingdom and KMRC, which was registered in the British Virgin Islands. Whiteswan purchased controlling shares of the aluminum plant and the two bauxite mining companies. Whiteswan also purchased the Pavlodar No. 1 heating and powerplant (Almaty Herald 1999a; USAID Kazakhstan Securities Market Development Project, July 18, 1997, JSC Aluminum Kazakhstan, accessed May 4, 1999, at URL http://www.kazecon. kz/Memos/Eng/ALUM.htm). At the end of 1997, a process began whereby TWG lost management and ownership control of its mineral enterprises in Kazakhstan, which were put under the control of KMRC. TWG was disputing these actions in court proceedings in the British Virgin Islands and at the London Court of International Arbitration (Almaty Herald, 1999a; Trans-World Group Company, February 17, 1999, Kazakhstan Supreme Court attempts to expropriate assets worth over USD 400 million from Trans-World Group, press release, accessed February 19, 1999, at URL http://biz.yahoo.com/prnews/990217/ trtans wrld 1.html).

Barite

Reserves.—Kazakhstan's barite reserves of 162 Mt of BaSO₄ composed more than 30% of the world's reserves (Kruse and Parchmann, 1998, p. 85). Three deposits—Ansay, Bestube, and Zhayrem—accounted for more than 70% of reserves in categories A, B, and C1, based on the Soviet reserve classification system (Daukeev, 1995, p. 11). [For an explanation of the Soviet reserve classification system, which is not comparable to that used in the United States, refer to the Mineral Industry of Russia chapter, pages 287-289 in the 1993 U.S. Bureau of Mines Minerals Yearbook, Volume III, Mineral Industries of Europe and Central Eurasia].

Production Status.—Kazakhstan produced more than 75% of the FSU's barite output. Barite is produced by companies mining primarily polymetallic and lead-zinc deposits, although some barite is produced at barite deposits (Daukeev, 1995, p. 116). Barite was produced at 2 barite deposits in southern Kazakhstan and at 11 sulfide deposits in the central, eastern, and southeastern parts of the country (Kruse and Parchmann, 1998, p. 85). The Kargayly and Zhayrem deposits accounted for more than 70% of total output. Barite concentrate is produced by flotation at nonferrous metallurgical enterprises and is of low quality owing to the presence of flotation reagents (Daukeev, 1995, p. 116). The main consumers for Kazakhstan's barite were oil drilling and exploration enterprises in Kazakhstan and Uzbekistan (Kruse and Parchmann, 1998, p. 85).

Production Development.—With the expansion of oil production, local barite resources will be of increasing importance. However, many oil industry enterprises refused to use Kazakhstan's barite because of its low quality. A national program was drafted containing technical measures to improve the quality of barite concentrates. To meet future demand, there is a need to develop the Ansay and Chaganak deposits (Daukeev, 1995, p. 118).

Chromite

Reserves.—All chromite production was from the Donskoy group of deposits near Khromtau in the Aqtobe (Aktyubinsk) region with 160.1 Mt of reserves averaging 50.3% Cr₂O₃ (Kruse and Parchmann, 1998, p. 53-54).

Production Status.—Kazakhstan was among the world's leading producers of chromite. In 1998, chromite production at the Donskoy complex decreased by 10.8% compared with 1997 (Interfax Mining and Metals Report, 1999f). More than one-half of chromite production was exported with the remainder used domestically for ferroalloy production, which was also exported. More than 90% of the country's total output of chromite and ferroalloys was exported (USAID Kazakhstan Securities Market Development Project, [undated], Kazchrome, accessed May 20, 1999, at URL http://www.kazecon.kz/English/privatkazchrome.h tm).

Production Development.—The Donskoy mining and beneficiation complex was the exclusive producer of chromite in the country. Mining was being switched to underground methods with the depletion of reserves suitable for open pit development. Kazakhstan had the ability to increase chromite output by 10% to 12% over its peak 1990 levels of more than 3.6 Mt/yr by using low-grade ores in ore folds. Chromite exports were projected to decrease as the country expands ferroalloy production (Zharkenov, 1997).

Ownership Status.—The Kazchrome Transnational Company (KCM) was established in 1996 with the transfer of 90% of the common stock of the Donskoy mining and beneficiation complex and the Ferrochrome concern, comprising the country's two ferroalloys plants, to KCM. KCM was under the management of the Japan Chrome Corp. (a subsidiary of TWG and KMRC). Japan Chrome Corp. owned the controlling block of shares of KCM (Almaty Herald, 1999; USAID Kazakhstan Securities Market Development Project, [undated], Kazchrome, accessed May 20, 1999, at URL http://www.kazecon.kz/English/ privatkazchrome.htm).

At the end of 1997, a process began whereby TWG lost management and ownership control of its mineral enterprises in Kazakhstan, which were put under the control of KMRC. TWG is disputing these actions in court proceedings in the British Virgin Islands and at the London Court of International Arbitration (Almaty Herald; 1999a, Trans-World Group Company press release, February 17, 1999, Kazakhstan Supreme Court attempts to expropriate assets worth over USD 400 million from Trans-World Group, accessed on February 19, 1999 at URL http://biz.yahoo.com/prnews/990217/trtans_wrld_1.html).

Coal

Reserves.—Kazakhstan had more than 400 coal deposits containing more than 30 billion metric tons of reserves. Major deposits were in the Ekibastuz, Karaganda, Maykuben, and Turgay basins and at the Borly, Karazhir (Yubileynyy), Kuu-Cheku, Priozernoye, and Shubarkol deposits (Daukeev, 1995, p. 122; Kruse and Parchmann, 1998, p. 41-42). Brown coal accounted for one-third of reserves. The Karaganda basin is the only supplier of coking coal for the metallurgical industries. The Ekibastuz basin is the chief supplier of coal for powerplants (Daukeev, 1995, p. 124).

Production Status.—Kazakhstan was a major coal producing country. It had been producing more than 130 Mt/yr of coal in the 1980's, but by 1997, production had fallen by about 45%. In 1997, Kazakhstan consumed about 55 Mt and was a coal exporter to Russia and other Commonwealth of Independent States countries. It, however, imported coal from the Kuznetsk basin in Russia to supply its eastern regions. Coal supplied to powerplants often has an ash content much higher than the average for energy coal available on the world market (Daukeev, 1995, p.120).

Production Development.—Reserves at most operating mines were adequate to maintain production for 20 years or more. However, the underground mining of coking coal at Karaganda was expensive and added to the cost of metal production. Development of the Karazhir deposit, with more than 1 billion metric tons of reserves of high-quality coal suitable for surface mining, was made possible by the shutdown of the Semipalatinsk nuclear testing grounds. With the development of Karazhir, it will no longer be necessary for the eastern regions of the country to import coal (Daukeev, 1995, p. 124-125).

Ownership Status.—In 1996, the Karaganda and Ekibastuz production associations were dissolved and the mines put up for sale or lease. Fifteen of the mines in the Karaganda basin were sold to the Karaganda iron and steel company Ispat-Karmet. That year, the Shubarkol Mine was leased to Global Mineral Resources of the United States (Peck, 1998, p. 34-39). In 1998, the management contract with GMR was annulled by the Government of Kazakhstan. In 1996, the Japan Chrome Corp., a subsidiary of the Trans World Group, purchased the Vostochnyy open pit in the Ekibastuz basin as well as a 30% interest in the Stepnoy Mine. Also in 1996, Access Industries of the United States purchased the remaining 70% of the Stepnoy Mine and the Bogatyr Mine in the Ekibastuz basin; ownership of the Severnyy Mine in Ekibastuz was acquired by Unified Energy Systems of Russia: and the German firm HTD GmbH acquired a 50% stake in the Maykuben pit in the Maykuben basin (Peck, 1998, p. 34-39). In 1997, ZhezkazganTsvetMet purchased the Borly coal mine, which is now part of the copper production amalgamation KazakhMys Inc. (USAID Kazakhstan Securities Market Development Project, [undated], JSC KazakhMys Cu, accessed May 20, 1999, at URL http://www.kazecon.kz/Memos/ Eng/KAZM.htm).

Copper

Reserves.—Kazakhstan reportedly has about 36.6 Mt of proven copper reserves (USAID Kazakhstan Securities Market Development Project, [undated], JSC KazakhMys Cu, accessed May 20, 1999, at URL http://www.kazecon.kz/Memos/Eng/KAZ M.htm). Of its total reserves, 39% were in porphyry copper deposits; 30%, cupriferous sandstone deposits; and 13%, copper pyrite deposits (Daukeev, 1995, p. 32-42). The major deposits were the Zhezkazgan, Aktogia (Semipalatinsk region), and Boshekul-Maikain (Pavlodar region). There were also significant reserves in the following deposits: Rudnyy Altay (East Kazakhstan region), Yuzhniy Dzhungariya (Taldy Kurgan region), Kendyktas [Zhambyl (Dzhambul) region], and Mugodzhariya [Aqtobe (Atyubinsk) region]. Reserves averaged 0.68% copper for the country (Daukeev, 1995, p. 32-42; Uzhkenov, 1997).

Production Status.—In 1998, Kazakhstan ranked 11th in the world in mine output of copper (Edelstein, 1999). More than 60% of mine output came from the Zhezkazgan region. Approximately 55,000 people were employed in mining and processing copper. The country was a large copper exporter (USAID Kazakhstan Securities Market Development Project, [undated], JSC KazakhMys Cu, accessed May 20, 1999, at URL http://www.kazecon.kz/Memos/Eng/KAZM.htm).

Production Development.—The reserves being exploited composed only 35% of total enterprise reserves and 11% of total reserves. Nevertheless, problems of adequate reserves existed at the two major copper-producing enterprises—the Balkhash and Zhezkazgan mining and metallurgical complexes in central Kazakhstan (Zharkenov, 1997).

Ownership Status.—All copper-producing enterprises were amalgamated into the KazakhMys Inc. joint stock company, which was a vertically integrated company controlling mining, beneficiating, smelting, and refining. Samsung Deutschland, a subsidiary of Samsung of the Republic of Korea, owned the largest percentage of shares of KazakhMys and had the management contract for the ZhezkazganTsvetMet mining and metallurgical enterprise that produced the majority of the country's copper.

The formation of KazakhMys occurred in the following sequence. In May 1996, Samsung won a tender to purchase 40% of ZhezkazganTsvetMet. In April 1997, it purchased the Balkhash mining and beneficiation complex and the Zhezkent beneficiation plant. In May 1997, Samsung purchased the East Kazakhstan copper-chemical complex and the Borly coal mine and incorporated all its holdings into ZhezkazganTsvetMet. Then in August 1997, it formed KazakhMys on the basis of ZhezkazganTsvetMet, its main production entity, and transferred ownership of the Balkhash, Borly, the East Kazakhstan copperchemical complex, and Zhezkent from ZhezkazganTsvetMet to KazakhMys, which then controlled all the above.

Samsung was in the process of purchasing the shares of ZhezkazganTsvetMet that it won the right to purchase via tender. The Government owned the second largest percentage of shares of ZhezkazganTsvetMet and was planning to offer a percentage of its shares for sale. Samsung also had the right to purchase a percentage of the remaining Government shares (USAID Kazakhstan Securities Market Development Project, [undated], JSC KazakhMys Cu, accessed May 20, 1999, at URL http://www.kazecon.kz/Memos/Eng/KAZM.htm).

Gold

Reserves.—Kazakhstan's gold reserve base was reportedly about 800 metric tons (t) of gold in ore grading on average 6.3 grams per ton (g/t) gold with the gold content of ore in deposits under development grading on average 8.97 g/t. The country has 134 primary lode deposits with 61.5% of reserves, 60 polymetallic sulfide ore deposits with 38% of reserves, and 30 placer deposits with 0.5% of reserves (Kruse and Parchmann, 1998, p. 78). Only 41% of the ore in the reserve base can be processed by using simple gravitation and flotation technology. The remainder was categorized as technically difficult to beneficiate (Uzhkenov, 1997).

Production Status.—Approximately one-half of the country's gold output was a byproduct of nonferrous metals mining, and a program was underway to develop primary gold deposits (Daukeev, 1995, p. 93). Gold was mined at about 65 deposits (Uzhkenov, 1997). A large percentage of the gold extracted was refined in Kazakhstan.

Production Development.—The Government program "Gold of Kazakhstan" called for increasing gold extraction to more than 50 metric tons per year (t/yr) and creating additional facilities for processing gold ores in the country. To accomplish this, the Ministry of Geology issued licenses for exploration and extraction to about 70 commercial entities (Zharkenov, 1997). To achieve this increase in output, the Ministry of Geology estimated that it would require more than \$1 billion in investment (Uzhkenov, 1997). Another important component of the program was to introduce new technology, including heap leaching, to recover gold from wastes (Zharkenov, 1997).

Ownership Status.—In January 1993, the principal mining and beneficiation enterprises were placed under the control of the State firm, Altynalmas. Foreign investment was being sought for mines under Altynalmas' control. The state-owned firm Asier was created to hold the Government's interest in joint ventures involving mines for which foreign investment was obtained. It was also possible for foreign firms to own a 100% interest in gold mines and to engage in management contracts with options to purchase shares of the mines (Peck, 1998, p. 29-32).

Iron Ore

Reserves.—At the beginning of 1997, Kazakhstan reportedly had an iron ore reserve base of 16.9 billion metric tons in 27 deposits, of which 9.1 billion metric tons were proven reserves in categories A, B, and C1 (Uzhkenov, 1997). The average iron content of proven reserves is 38.9%. The Minister of Energy and Natural Resources stated that there were 12.5 billion metric tons of economic iron ore reserves. Of these economic reserves, 40% were characterized as composed of ore suitable for direct shipping or easy to beneficiate (Uzhkenov, 1997). Skarn magnetite deposits supply the Sokolovsko-Sarbay and other mining enterprises, sedimentary brown hematite deposits supply the Lisakovskiy and other mining enterprises, and vulcanogenic-sedimentary-hematite-magnetite deposits supply the West Karazhal mining enterprise and others (Kruse and Parchmann, 1998, p. 49).

Production Status.—In 1998, iron ore production in Kazakhstan fell significantly compared with 1997, with production decreasing by 39.9% at the Sokolovsko-Sarbay mining and beneficiation complex and by 12.9% at the Atasu mining and beneficiation complex but increasing by 12% at the Lisakovskiy mining and beneficiation complex (Interfax Mining and Metals Report, 1999a). Since 1990, iron ore production has fallen sharply. In 1997, mining enterprises were working at less than 50% of capacity (Uzhkenov, 1997). Iron ore was used to supply the country's iron, steel, and ferroalloys industries; a significant portion was also exported, mainly to Russia and China. Kazakhstan and Russia have experienced a significant decline in ferrous metals production, which has decreased demand for iron ore.

Production Development.—Plans called for increasing and then stabilizing iron ore production at a level of 15 to 16 Mt/yr. Reserves were considered to be adequate for the next century. These production levels will be attained by stabilizing output at the Sokolovskiy and the Sarbayskiy open pits and by closing down the unprofitable Sokolovskiy underground mine and the Kruzhunkul'skiy open pit. Domestic demand was expected to stabilize, as well as export demand. Development was planned for the Kacharskiy mining and beneficiation complex with the participation of Russian or other interested foreign investors to produce iron ore and pellets with a high iron content. Plans called for maintaining production at the Lisakovskiy mining and beneficiation complex by introducing state-of-the art technology for processing low-grade ore. To reduce costs in the ferrous metals production sector, the quality of ore delivered to the Ispat-Karmet steel mill will need to be improved (Zharkenov, 1997).

Ownership Status.—In 1995, management of the country's largest mining enterprise, the Sokolovsko-Sarbay, was transferred to Ivedon International, which, although registered in

Iceland, was a joint venture of TWG and KMRC. In 1966, a 51% stake in the country's second largest mine, the Lisakovskiy, was purchased by the Yesil enterprise, a financial- industrial company from Kazakhstan. In 1997, an 80% stake in the Atasuruda Mine, which supplies the Ispat-Karmet steel mill, was purchased by the Kazakhstan firm ELROVO (Peck, 1998, p. 20-23).

At the end of 1997, a process began whereby TWG lost management and ownership control of its mineral enterprises in Kazakhstan, now under the control of KMRC. TWG is disputing these actions in court proceedings in the British Virgin Islands and at the London Court of International Arbitration (Almaty Herald, 1999a; Trans-World Group Company, February 17, 1999, Kazakhstan Supreme Court attempts to expropriate assets worth over USD 400 million from Trans-World Group, press release, accessed February 19, 1999, at URL http://biz.yahoo.com/prnews/990217/trtans wrld 1.html).

Lead and Zinc

Reserves.—Reserves of lead reportedly totaled 14.9 Mt, and those of zinc, 34.7 Mt (Kruse and Parchmann, 1998, p. 67). The ore was low grade, averaging 1.31% lead and 3.11% zinc (Uzhkenov, 1997). Major deposits that have been developed were the Grekhovskiv and Zyrvanovskiv, which supplied the Zvrvanovsk complex: the Ridder-Sokolnove. Shubinskove, and Tishinskoye deposits, which supplied the Leninogorsk complex; the Belousovskiy and Beresovsko-Irtysh deposits, which supplied the Irtysh complex (which appeared to have ceased operations); the Kamyshinskoye, Nikolayevskoye, and Shemonaikhinskoye deposits, which supplied the East Kazakhstan copper-chemical complex; the Orlovskove deposit, which supplied the Zhezkent complex; the Ushkatyn III and Zhayrem deposits, which supplied the Sary-Arkapolimetal complex; the Karagayliskoye deposit, which supplied the Akchatau complex; the Koksu, Tekeli, Tulyuk, and Zapadnyy deposits, which supplied the Tekeli complex; and the Ansayskove, Bayzhansai, Mirgalimsayskove, and Shalkia deposits, which supplied the Achisay complex. Two major deposits slated for development in eastern Kazakhstan were the Artemyevskoye and Maleyevskoye (Daukeev, 1995, p. 43-58). The largest deposits were the Shalkia and Zhayrem, which combined had 28% of the country's lead reserves and 34% of its zinc reserves (Uzhkenov, 1997).

Production Status.—Kazakhstan was the major producer of lead and zinc among the republics of the Soviet Union and remains the largest producer of these metals in the countries of the FSU. As of 1998, production had fallen by about 57% from peak output levels in the 1980's for lead and by about 51% for zinc. Peak mine output of lead was 207,600 t/yr, and that of zinc, 494,900 t/yr (Uzhkenov, 1997). Major lead and zinc mining and metallurgical enterprises were part of the KAZZINC company, which included the Leninogorsk, Ust-Kamenogorsk, Zyryanovsk, and Tekeli complexes. KAZZINC was the country's main producer of lead, zinc, gold, and silver. KAZZINC included five mines, two zinc plants, and one lead plant and employed 26,000 people (USAID Kazakhstan Securities Market Development Project, [undated], KAZZINC—Description of companies activities and status, accessed May 20,

1999, at URL http://www.kazecon.kz/English). Mines and beneficiation plants were working at far below capacity. However, the country fully met its domestic demands for lead and zinc and exported large amounts of these metals (Uzhkenov, 1997).

Production Development.—The Ministry of Energy and Natural Resources claimed that economic reserves at existing enterprises were adequate for ensuring 25 more years of production, although the Ministry did not specify the level of production (Uzhkenov, 1997). Plans called for developing the Artem'yevskoye, Chekmarskoye, Maleyevskoye, and Yubileyno-Snegirikhinskiy deposits and for further developing the Irtysh, Nikolayevskoye, Shemonaikhinskoye, Shalkia, Tishinskoye, Zhayrem, and other deposits (Uzhkenov, 1997; Zharkenov, 1997). Plans also called for modernizing zinc production facilities at KAZZINC (USAID, Kazakhstan Securities Market Development Project, [undated], KAZZINC —Description of companies activities and status, accessed May 20, 1999, at URL http://www.kazecon.kz/English).

Ownership Status.—KAZZINC was formed in January 1997 as a result of the amalgamation of the country's largest lead and zinc producers. KAZZINC included the Ust-Kamenogorsk metallurgical complex and the Leninogorsk, Tekeli, and Zyryanovsk mining and processing complexes. Its main shareholder was Kazastur Zinc AG, which was created by Glencore International AG of Switzerland and Asturiana de Zinc of Spain and controled 62.4% of shares (USAID, Kazakhstan Securities Market Development Project, [undated], KAZZINC— Description of companies activities and status, accessed May 20, 1999, at URL http://www.kazecon.kz/English).

In 1997, the Shymkent lead smelter was under the management of RR Kazakhstan-Trade, the Akchatau mining and beneficiation complex was under the management of Novo-Trading of Switzerland, and the Achisay mining and beneficiation complex was under the management of River International. Because of the considerable difficulties faced by these management companies in 1997, continuation of their contracts was uncertain (Peck, 1998, p. 15-19).

Manganese

Reserves.—Kazakhstan had 11 identified manganese deposits with a total reserve base of 600 Mt of ore, of which 426 Mt were classified in reserve categories A, B, and C1. According to the Minister of Energy and Natural Resources, 558.7 Mt were economic reserves. The average manganese content of the economic reserves is 20.5%, which is low grade. High-quality ore averaging 40% manganese is in the Kamys and Ushkatyn-III deposits, which together composed 0.2% of reserves (Uzhkenov, 1997).

Production Status.—In 1998, Kazakhstan ranked as the world's 9th largest producer of manganese ore in gross weight and 10th in manganese content of ore (U.S. Geological Survey, unpub. data, 1999). Kazakhstan's three manganese mining enterprises were working at less than 20% of their design capacity of 2.55 Mt/yr of crude ore (Uzhkenov, 1997).

Production Development.—The commissioning of ferromanganese and other manganese products (dioxide, chemical compounds, etc.) production increased domestic

demand for manganese. Reserves were considered to be adequate for the next century (Uzhkenov, 1997). To meet domestic demand, plans called for doubling manganese concentrate production to between 550,000 and 600,000 t/yr by 2000 with crude ore extraction totaling 1 Mt/yr. Plans also called for eventually tripling 1998 levels of output to supply domestic ferroalloy producers, as well as for export (Uzhkenov, 1997).

Ownership Status.—The country's three manganese mining enterprises were under the management of the Swiss firm Nakosta, which also owned shares or had some ownership options in these enterprises (Uzhkenov, 1997, p. 18).

Natural Gas

Reserves.—Kazakhstan reportedly had 900 billion cubic meters of proven gas reserves (Uzhkenov, 1997). More than 40% of its reserves were in the giant Karachaganak field in the northwestern part of the country. There were large reserves of associated gas from oilfields including the Tengiz field (U.S. Department of Energy, January 1999, Country analysis briefs— Kazakhstan, accessed June 8, 1999, at URL http://www.eia.doe. gov/emeu/cabs/kazak.html).

Production Status.—In 1998, Kazakhstan was is not a major gas producer and had difficulty supplying domestic consumers because the domestic gas sector lacked pipelines. Although six gas pipelines connected Kazakhstan to other Central Asian countries and Russia, the country's gas producing areas in the west were not connected to domestic consumers in the populous southeast, east, and industrial north. In 1997, Kazakhstan exported its gas production from the western part of the country to Russia and imported 40% of its gas consumption needs from Turkmenistan and Uzbekistan, along with a small amount from Russia. However, Uzbekistan stopped deliveries in 1988 because of unpaid bills (U.S. Department of Energy, January 1999, Country analysis briefs—Kazakhstan, accessed June 8, 1999, at URL http://www.eia.doe.gov/emeu/cabs/kazak.html).

Production Development.—Construction of a domestic pipeline was under consideration to transport gas from Kazakhstan's western fields to all regions of Kazakhstan (U.S. Department of Energy, January 1999, Country analysis briefs—Kazakhstan, accessed June 8, 1999 at URL http://www.eia.doe.gov/emeu/cabs/kazak.html). Agreements for development of the Karachaganak oilfields and gasfields were signed in November 1997 with a foreign consortium of major oil companies. The 40-year agreement with the Kazakhstan Government for the development of the Karachaganak field was expected to lead to the production by 2000 of approximately 170,000 barrels per day (bbl/d) of oil and 500 cubic meters per day of gas (UN/ECE Gas Centre Database—Kazakhstan—Highlights, [undated], accessed June 13, 1999, at URL http://www.gascentre.unece.org/ungcpubdb/O KZ.HTM).

Ownership Status.—The members of the exploration consortium for development of the Karachaganak oil-field and gasfield were Total, Royal Dutch/Shell Group, an alliance between British Petroleum and Norway's Statoil, BG, Agip, and Mobil, along with the Kazakh state entity, Kazakhstan Caspishelf (UN/ECE Gas Centre Database—KazakhstanHighlights, accessed June 13, 1999, at URL http://www.gascentr e.unece.org/ungcpubdb/O_KZ.HTM).

Petroleum

Reserves.—Kazakhstan's Ministry of Energy and Natural Resources reported proven geologic oil and condensate reserves of 8.5 billion metric tons. Reserves are in the Precaspian, Ustyurtsko-Buzashinskiy, Mangistauskiy, and Yuzhno-Turgayskiy basins (Uzhkenov, 1997). The largest oilfields are concentrated in western Kazakhstan where the Tengiz field is located.

Production Status.—Kazakhstan was the FSU's second largest oil producer after Russia. Almost one-half of Kazakhstan's oil production came from three large onshore fields—Tengiz, Uzen, and Karachaganak. Kazakhstan was seeking to develop its oil resources through foreign investment. International projects included joint ventures, production sharing agreements, and exploration/field concessions. The largest of these was the Tengizchevroil joint venture concluded in April 1993 to develop the Tengiz oilfield with 6 billion to 9 billion barrels of estimated oil reserves. In 1997, Tengizchevroil exported about 170,000 bbl/d of crude oil through existing Russian pipeline routes as well as by barge and rail (U.S. Department of Energy, January 1999, Kazakhstan, accessed June 8, 1999, at URL http://www.eia.doe.gov/emeu/cabs/kazak.html).

Production Development.—Kazakhstan was addressing two major issues to increase oil production. One was the development of export routes to bring Kazakhstan's oil to world markets. The other was that development of the Kazakhstan's offshore oil potential in the Caspian Sea was slowed by a dispute over ownership rights among Caspian Sea littoral states concerning how the Caspian Sea should be divided under international law (U.S. Department of Energy, January 1999, Country analysis briefs—Kazakhstan, accessed June 8, 1999, at URL http://www.eia.doe.gov/emeu/cabs/kazak.html).

Chevron Oil Corp. of the United States planned to reach peak production of 750,000 bbl/d from Tengiz by 2010. For the Tengizchevroil joint venture to produce at planned capacity, additional pipeline capacity will be required. To meet this requirement, a new pipeline is to be built. Tengiz oil will be exported by the CPC to world markets via a new 900-mile pipeline connecting to the Russian Black Sea port of Novorosiysk (U.S. Department of Energy, January 1999, Country analysis briefs—Kazakhstan, accessed June 8, 1999, at URL http://www.eia.doe.gov/emeu/cabs/kazak.html).

Ownership Status.—Of the large state-owned oil production associations that existed in Kazakhstan in 1991, several attracted foreign investment. The production association, Tengizneftgaz, in 1993 became the base for the Tengizchevroil joint venture with Chevron. Members of the Tengizchevroil joint venture as of 1997, were: Chevron (45%), Kazakhoil (25%), Mobil (25%), and LukArco (5%). In April 1997, Kazakhstan sold a 70% stake in Mangistaumunaigaz to Indonesia's Central Asia Petroleum. In 1996, the Yuzhneftegaz production association was sold by tender to the Canadian firm Hurricane Hydrocarbons Ltd., and the new enterprise was named Hurricane Kumkol Munai (Peck, 1998, p. 41-42). In 1997, shares in the Aktobemunaigaz and Uzenmunaigaz production associations were sold to the Chinese National Petroleum Company, which proposed to construct a pipeline to China. In 1998, the Government transferred its public shares in production and refining companies to the state oil and gas company KazakhOil as a preliminary stage for possible privatization (U.S. Department of Energy, January 1999, Country analysis briefs—Kazakhstan, accessed June 8, 1999, at URL http://www.eia.doe.gov/emeu/cabs/kazak.html). In 1998, the Kazakhstan Government's shares in the joint ventures were transferred to KazakhOil (Peck, 1998, p. 41-42).

Phosphate Rock

Reserves.—Kazakhstan reported economic reserves of phosphate rock as of January 1, 1993, to be 785 Mt of P_2O_5 in reserve categories A, B, and C1. Of these reserves, 650 Mt was in the Karatau basin and the remaining 135 Mt in the Aqtobe (Aktyubinsk) basin. In terms of phosphate rock, reserves in the Karatau basin, as of January 1, 1993, totaled about 2.6 billion metric tons, of which about 600 Mt was deemed suitable for surface mining (Daukeev, 1995, p. 110).

Production Status.—In the 1980's, Kazakhstan had ranked as one of the world's leading phosphate rock producers, although almost all its output was consumed within the Soviet bloc. There was a precipitous drop in phosphate rock production following the dissolution of the Soviet Union. Owing to falling demand in 1993, production ceased at the Chilisay complex in the Aqtobe region, and production at Karatau fell sharply (Daukeev, p. 110). The Karatau mines reportedly were mostly idle in 1997 and the first part of 1998. Plants in Uzbekistan that were the main users of Karatau phosphates were unable to make payments for the phosphate rock (Louis, 1998, p. 35).

Production Development.—The future of the industry is uncertain with mining capacity idle for long periods at Karatau and the closure of the Chilisay mining complex. Reserves are adequate, but the industry cannot revive until there is a revival in demand. The country again could become a regional supplier of phosphate raw materials when the economies of the Central Asian countries are in a position to produce and purchase fertilizer. In 1999, the Kazakhstan firm Aktal Ltd. intends to develop the Kok-Dzhon phosphate rock deposit in the Karatau basin (Interfax Mining and Metals Report, 1999e).

Ownership Status.—The closure or idling of most production capacity coupled with the fact that the industry served primarily regional markets kept Kazakhstan from being a prime target of foreign investment. However, two mills at the Karatau deposit, although idle, were under the management of the Hong Kong firm Texuna (Interfax Mining and Metals Report, 1999e).

Steel

Production Status.—Kazakhstan was of only regional importance as a steel producer. It had one steel mill that, in 1990, produced more than 6.7 Mt of crude steel. Since then, however, steel production has fallen by more than 50%.

Production Development.—Under the foreign management and ownership of Ispat International N.V. of the United Kingdom, production appeared to be reviving. In 1998, the Karaganda steel mill, renamed Ispat-Karmet, succeeded in attracting \$473 million in investment from the European Bank for Reconstruction and Development and the International Finance Corp. to upgrade production facilities (Metal Bulletin, 1998). In 1998, Ispat-Karmet's exports were affected by falling demand in Southeast Asia, and the company was seeking new export markets. Following a small drop in production in 1998 compared with 1997, plans called for Ispat-Karmet to increase production by 15% to more than 3 Mt in 2000 (Metal Bulletin, 1998).

Ownership Status.—In November 1995, Ispat-International acquired the management contract for the Karaganda steel mill following the failure of an initial contract with the Eisenberg Group, a subsidiary of the U.S. Steel Group. Ispat also exercised its option to purchase the steel mill and also purchased the Karaganda powerplant and 15 coal mines in the Karaganda region, a number of which will be closed by Ispat-Karmet (Peck, 1998, p. 23-25).

Titanium

Reserves.—Prior to the breakup of the Soviet Union, Kazakhstan had received all its raw material for titanium production from the Ukraine and Russia. It received titanium slag from the Ukraine and carnallite from Russia. Following the dissolution of the Soviet Union, Ukraine and Russia curtailed shipments to Kazakhstan. Kazakhstan then began importing slag from the West and magnesium metal and liquid chlorine instead of carnallite from Russia.

Kazakhstan has identified a number of ilmenite deposits. Specialty Metals Company S.A., the owner of Kazakhstan's Ust-Kamenogorsk Titanium-Magnesium Plant (UKTMP), was seeking a pool of investors to develop these deposits (Gehler, 1998). Development of domestic placer deposits in the north and west of the country with identified reserves of about 3 Mt TiO₂ has reportedly begun (Kruse and Parchmann, 1998, p. 57).

Production Status.—In the late 1980's, Kazakhstan and Russia were the world's leading producers of titanium sponge. UKTMP had the capacity to produce more than 40,000 t/yr of sponge, which made it the world's largest titanium sponge plant. In 1990, Kazakhstan produced 38,822 t of sponge. By 1994, production at UKTMP had fallen to less than 4,000 t of sponge (Gosudarstvennyy Komitet Respubliki Kazakhstan Po Statistike I Analizu, 1996, p. 179). Production then began increasing, doubling the next year. In 1997 and 1998, Kazakhstan was thought to be the world's third largest producer of titanium sponge (Gambogi, 1999). Capacity at UKTMP, however, was less than during the Soviet period.

Production Development.—Efforts have been made by UKTMP to meet the requirements of the western titanium industry. Quality controls were introduced that resulted in certification of sponge from UKTMP by airplane engine manufacturers, including Pratt Whitney, Rolls Royce, General Electric, and SNECMA. UKTMP has been developing titanium slag production and pigment production on the basis of production of excess slag (Gehler, 1998).

Ownership Status.—As of 1998, the Belgium firm Specialty Metals Company S.A. owned a 65% share of UKTMP, with 15.5% of the shares still held by the State, 14.5% by the management and staff of the plant, and 0.5% in the hands of local funds (Gehler, 1998).

Uranium

Reserves.—According to Kazakhstan's Ministry of Energy and Natural Resources, the country's natural uranium reserves were assessed at 469,700 t in categories B and C1, of which 456,000 t were assessed as being capable of being produced at less than \$80 per kilogram. Five major deposits are located in six regions—the Kokshetauskaya in East Kazakhstan region, the Mangyshlakskaya in the Prikaspiyskaya region, the Kendyktas-Chuili-Bekpakdalinskaya in the Pribalkhashskaya region, and the Illiiyskaya in the Chu-Syrday'inskaya region. In total, 53 deposits are known (Uzhkenov, 1997).

Production Status.—Kazakhstan was the largest producer of uranium in the Soviet Union, but since the dissolution of the Soviet Union, production has been estimated to have fallen by more than two-thirds. Kazakhstan's final product was U_3O_8 with a natural uranium content of about 87% produced at the Tselinny mining and metallurgical complex. Production was limited by demand on world markets. In 1992, Kazakhstan's main customer, Russia, practically ceased purchases, and there is almost no domestic demand (Uzhkenov, 1997).

Production Development.—The situation in the industry should improve with the planned development of a series of domestic nuclear powerplants. There is much spare capacity to meet demand domestically and internationally. To increase output to former levels of 3,200 to 3,500 t/yr U, however, will require renovation of existing enterprises, development of new mines, and introduction of underground leaching technology (Uzhkenov, 1997).

Ownership Status.—The Government firm KazAtomProm held the state share in uranium mining and processing enterprises. In 1996, the Canadian firm World Wide Minerals Ltd. entered into an agreement to manage Tselinny with the option to purchase a 90% stake in Tselinny (Carlson On-Line Profile, World Wide makes "go" decision on Kazakhstan uranium project, November 15, 1996, accessed June 7, 1999, at URL http://www4.techstocks.com/~wsapi/investors/subject-11296). The management contract with World Wide Minerals was canceled in 1997 and has resulted in a legal dispute (Corporate Profile-World Wide Minerals Ltd., May 31, 1999, accessed June 7, 1999, at URL http://www.worldwideminerals. com/WWS/InvRel.nsf/Public/CorporateProfile). In 1999, Sabton Ltd., which was owned by Africa Israel Investment Ltd., purchased the Tselinny complex (Interfax Mining and Metals Report, 1999). The Inkai joint venture was formed in 1966 with the Canadian company Cameco Corp. and the German firm Uranearth Exploration and Mining to develop the Inkai deposit; the Katco joint venture was formed in 1966 with Kogema of France to develop a deposit in the Zhambyl region (Peck, 1998, p. 48-50).

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Major Sources of Information

In 1997-98, the capital of Kazakhstan was moved from Almaty to the new capital of Astana (formerly Akmola). Addresses for many of the agencies in Astana are not yet available, and a number of the phone numbers are still connected to Almaty. Owing to the fact that many of the agencies are in the process of moving and a number of them appear to be undergoing organizational changes, the names and addresses listed may not be current or complete. In Astana, the main address of the National Government of Kazakhstan is 11 Mira St., Astana 473000, Republic of Kazakhstan. National Agency for Statistics at the Ministry of Economy and Trade 125 Abai Ave. Almaty, 480008 Kazakhstan Telephone: 7-(3272) 62 13 23 Information and Presentation Center of the Mineral Sector of the Republic of Kazakhstan 85 Dostyk Ave., 1st floor, Room 103 Almaty, 480100 Kazakhstan Telephone: 7-(3272) 63 33 23; 63 54 16 Fax: 7-(3272) 63 87 73 Ministry of Natural Resources and Ecology Astana Kazakhstan Ministry of Economy 115 Zheltoksan St. Astana, 480091 Kazakhstan Telephone: 7-(3272) 62 65 00 Fax: 7-(3272) 63 66 05 Ministry of Industry and Trade 111 Gogolya St. Almaty, 480003 Kazakhstan Telephone: 7-(3272) 60 28 92 Fax: 7-(3272) 62 37 48 Ministry of Finance 97 Abylay Khan Ave. Astana, 480091 Kazakhstan Telephone: 7-(3272) 62 40 75 Fax: 7-(3272) 62 27 70 (Note: As of December 1997, there was a merger of the State Property Committee with the Privatization Committee, with the latter becoming the Privatization Department within the Ministry of Finance. The Department was to monitor privatization contracts and supervise fulfillment of the terms of tenders). Ministry of Energy, Economy, Trade 142 Bogenbay Batyr St. Astana, 480091 Kazakhstan Telephone: 7-(3272) 62 64 10 Fax: 7-(3272) 62 66 30

Committee of Earth Resources Management Astana Kazakhstan Telephone: 7-(3272) 32 02 11 State Committee for Investments Telephone: 7-(3272) 62 59 03 Fax: 7-(3272) 69 22 37 State Customs Committee 555 Seyfullina St. Almaty, 480012 Kazakhstan Telephone: 7-(3272) 39 99 24 Fax: 7-(3272) 32 82 34 State Tax Committee 93/95 Ablai Khan St. Almaty, 48091 Kazakhstan Telephone: 7-(3272) 62 04 32 Fax: 7-(3272) 62 48 63 Chamber of Commerce and Industry of the Republic of Kazakhstan 50 Kazybek Bi St. Almaty, 48091 Kazakhstan Telephone: 7-(3272) 62 14 46, 62 19 10 Fax: 7-(3272) 50 70 29 United States-Kazakhstan Council 531 Seyfullina St., Room 405 Almaty, 480083 Kazakhstan Telephone: 7-(3272) 63 70 98 Fax: 7-(3272) 69 48 03 In the United States: Suite 200, 2000 L St. NW Washington, DC 20036 Telephone: (202) 416-1624 Fax: (202) 416-1865 Central Asian-American Enterprise Fund 531 Seyfullina St., 2d floor Almaty Kazakhstan Telephone: 7-(3272) 65 46 95, 63 88 15 Fax: 7-(3272) 69 45 89

TABLE 1 KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1994	1995	1996	1997	1998 e/
METALS	1777	1775	1770	1))//	1770 6/
Alumina thousand tons	900 r/ e/	1.022 r/	1.083	1.095 r/e/	1.085.2/
Arsenic trioxide e/	1 500	1,500	1,500	1,500	1,009 2/
Bauxite	2425000 r/	3 071 000 r/	3 140 000 e/	3 380 000 r/e/	3 400 000 2/
Bervllium metal e/	100	100	100	100	100
Bismuth metal	85	33	50 r/e/	50 r/e/	50
Cadmium metal	1 097	794 r/	800 r/ e/	800 r/e/	900
Chromite	2 103 000	2 417 000	1 190 000	1 800 000 r/	1 600 000
Cohalt_mine_output_metal_content_e/	2,103,000	300	300	300	300
Copper:	500	500	500	500	500
Mine output metal content	210 000 r/	200.000 r/	250.000 e/	316.000 e/	337 400 2/
Metal:	210,000 1/	200,000 1/	230,000 0	510,000 0	557,100 2/
Smelter undifferentiated	285.000 e/	242,800	245,000	325.000 r/	351.336.2/
Refined, primary	280.000 r/	255.600	267.100 r/	301.000 r/	324.783 2/
Gold:	,	,	,	,	
Mine output, metal content e/ kilograms	14.483 2/	18.200	12.500	18,700	18.000 2/
Metal, refined do.	10.444	10.921	9.000 e/	9.700 e/	8.900 2/
Iron and steel:			.,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-,,,
Iron ore, marketable	10.521.000	14.900.000	13.200.000	12.627.000 r/	8.693.000 2/
Metal:	- ,- ,	, ,	-, -,	,,	-,
Pig iron 3/	2,432,000	2,528,000	2,536,000	3,000,000 e/	2,594,000 2/
Ferroallovs:					
Ferrochromium	373,300 r/	511,600 r/	352,000	600,000 r/	535,000 2/
Ferrochromiumsilicon	26,900	21,300	20,000 e/	48,600 r/ e/	33,550 2/
Ferrosilicon e/	208,000 r/	256,000	119,000	133,000 r/	92,000 2/
Silicomanganese e/	40,000	20,000	50,000	55,000 r/	57,000 2/
Other e/	10,000	10,000	10,000	9,000	8,000
Total	658,200	818,900	551,000	845,600	725,550
Steel:					
Crude	2,969,000	2,963,000	3,142,000	3,900,000	3,120,000 2/
Finished	2,300,000	2,100,000	2,200,000	3,000,000	2,400,000
Lead:					
Mine output, metal content	57,000	40,000	35,000 e/	31,000 r/ e/	30,000 2/
Metal, refined, primary and secondary	137,700 r/	88,500 r/	70,000 r/ e/	76,000 r/ e/	90,000
Magnesium		9,000 e/	9,000 e/	8,972	9,000
Manganese ore:					
Crude e/	400,000	428,000	430,000	350,000	560,500 2/
Marketable	295,000 r/	284,000 r/	285,000 r/ e/	230,000 r/ e/	399,000 2/
Molybdenum, mine output, metal content e/	100 r/	75 r/	100 r/	100 r/	100
Nickel, mine output, metal content e/	8,500	9,900 2/	7,000 r/	7,000 r/	6,000
Silver:					
Mine output, metal content e/	506,000	489,000	467,700 r/ 2/	690,000 r/	724,800 2/
Metal, refined	408,359	370,993	380,000 e/	390,000 e/	535,800 2/
Tin, mine output, metal content e/	24	15			
Titanium, metal	3,809	9,592	12,500	13,000 e/	12,000
Tungsten, mine output, metal content	122 r/	249 r/	r/	r/	
Vanadium, mine output, metal content	878	924	900 e/	900 e/	1,000
Zinc:					
Mine output, metal content e/	190,000	225,000	225,000	225,000	225,000
Metal, smelter, primary and secondary	172,400 r/	169,200	190,000 r/	190,000 r/ e/	241,000 2/
INDUSTRIAL MINERALS					
Asbestos, all grades	130,000 e/	128,400	128,700	125,000 e/	125,000
Barite	90,200	83,000	50,000 r/ e/	38,000 r/ e/	9,000 2/
Boron e/	30,000 r/	30,000 r/	30,000 r/	30,000 r/	30,000
Cement 3/	2,000,000	2,616,000	1,120,000	661,000 e/	600,000
Phosphate rock e/	1,700 2/	1,700	1,700	1,700	1,600
Sultur: e/					
Pyrites	200,000	71,000	71,000		
Byproduct:		101		100	
Metallurgy	261,000	131,000	139,000	139,000	200,000
Natural gas and petroleum	219,000	255,000	515,000	806,000	900,000
	680,000	457,000	725,000	945,000	1,100,000
	112,000,000 r/	109,000,000 r/	83,000,000 r/	//,000,000 r/	72,000,000

See footnotes at end of table.

TABLE 1--Continued KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1994	1995	1996	1997	1998 e/	
MINERAL FUELS AND RELA	ATED MATERIALS						
Natural gas 3/	million cubic meters	4,531 r/	4,814 r/	4,248 r/	6,230 r/	NA	
Petroleum, crude:							
Gravimetric units		18,000,000 r/	18,500,000 r/	20,600,000 r/	23,800,000 r/	25,900,000	
Converted, volumetric units	42-gallon barrels	132,000,000	136,000,000	151,000,000	175,000,000	190,000,000	
Uranium concentrate, U content		2,240	1,630	1,320	1,000	1,250	

e/Estimated. r/ Revised. NA Not available.

1/ Table formatted by Glenn J. Wallace, International Data Unit; includes data available through August 18, 1999.

2/ Reported figure.

3/ Data are for the year ending June 30 of that stated.

TABLE 2KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity e/
Alumina	Pavlodar aluminum plant	Pavlodar	1,200,000.
Arsenic, trioxide	Chimkent polymetallic enterprise and	Shymkent (Chimkent) 1/	3,500.
	other nonferrous metallurgical enterprises		
Asbestos	Dzhetygara complex	Qostanay (Kustanay) region 1/	1,000,000 total.
	Chilisay complex	Aqtobe (Aktyubinsk) phosporite	
		basin 1/	
Barite	Karagaylinskiy and Zhayrem mining	Karagayliy region, Zhayrem deposit	300,000 total.
	and beneficiation complexes		
	Tujuk Mine	Almaty region	
	Achisay polymetallic complex	Kentau region	
Bauxite	Turgay, Krasnooktyabr bauxite mining complexes	Central Kazakstan	600,000 total.
Beryllium, metal	Ulbinskiy metallurgical plant	Oskemen (Ust-Kamenogorsk) 1/	NA.
Bismuth, metal	Ust-Kamenogorsk lead-zinc metallurgical plant	do.	70 total.
	Leninogorsk lead smelter	Leninogorsk	
Cadmium	Leninogorsk mining and beneficiation complex	do.	1,200.
Chromite	Donskoy mining and beneficiation complex	Khromtau region	3,800,000.
Coal	Karaganda Basin	Central and north-central parts	50,000,000.
		of the country	
Do.	Ekibastuz Basin	do.	85,000,000.
Do.	Maykuben Basin	do.	10,000,000.
Do.	Turgay Basin	do.	1,000,000.
Copper, mining, recoverable	Balkhash	Zhezkazgan (Dzhezkazgan) region 1/	200,000.
copper content			
Do.	Dzhezkazgan	Zhezkazgan region	250,000.
Do.	Irtysh	Ertis (Irtysh) region	10,000.
Do.	Leninogorsk	Leninogorsk region	15,000.
Do.	Zhezkent	Zhezkent region	25,000.
Do.	Zyryanovsk mining and beneficiation complexes	Zyryanovsk region	5,000.
Do.	East Kazakhstan copper-chemical complex	East Kazakhstan region	10,000.
Copper, metallurgy, metal	Balkhash	Zhezkazgan region	150,000.
Do.	Zhezkazgan	do.	250,000.
Do.	Irtysh smelting and refining complex	Ertis region	40,000.
Do	Ust-Kamenogorsk plant	Oskemen	37,100 (blister copper) 2/.
			6,600 (refined copper) 2/.
Ferroalloys	Aktyubinsk plant	Aqtöbe	High-carbon 60% ferrochrome,
			150,000; medium-carbon 60%,
			ferrochrome, 130,000.
Do.	Aksu (Yermak) plant	Aksu (Yermak) 1/	Ferrosilicon 700,000;
			ferrosilicochrome, 700,000;
			high-carbon ferrochrome 400,000;
			silicomanganese, 90,000.
Gallium	Pavlodar aluminum plant	Pavlodar	NA.
Gold	Byproduct of polymetallic ores and native	Byproduct gold colocated with	30.
	gold mining	nonferrous metals mining	

See footnotes at end of table.

TABLE 2--Continued KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Metric tons unless otherwise specified)

C II		T	
Commodity	Major operating facility	Location	Annual capacity e/
Iron and steel:	-		
Pig iron	Ispat-Karmet Steelworks	Karaganda	5,000,000.
Steel, crude	do.	do.	6,300,000.
Iron ore, marketable	Sokolovsko-Sarbay, and Lisakovskiy	Qostanay region	25,000,000 total.
	mining and metallurgical complexes		
Lead and zinc, mining	Achisay	Kentau and Karatau regions 1/	Lead 40,000, zinc 20,000.
(recoverable lead and zinc		0	
content of ore)			
	Akchatau	Zhezkazgan region	Lead 10,000, zinc 30,000
 	Irtysh (apparently closed)	Oskemen region	Lead 10,000, zinc 50,000.
 	Kara govily	Vonegovily region	Lead 20,000, zine 55,000.
 			Lead 20,000 Zinc 33,000.
	Leninogorsk	Leninogorsk region	Lead 60,000, zinc 120,000.
Do.	Tekeli	Tekeli and Taldyqorghan (Taldi-	Lead 20,000, zinc 30,000.
		Kurgan) regions 1/	
Do.	Zhezkent	Semey (Semjipalatinsk) region	NA.
Do.	Sary-Arkapolimetal	Zhayrang (Zhayrem) region	Lead 20,000, zinc 40,000.
Do.	Zyryanovsk complexes	Zyryanovsk region	Lead 20,000, zinc 60,000.
Do.	East Kazakhstan copper-chemical complex	East Kazakhstan region	Zinc 15,000.
Lead, refined	Ust-Kamenogorsk plant	Oskemen	145.000
	Chimkent	Shymkent	ΝΔ
Manganese crude ore	Atasurda	Atasu	2 550 000 total
Wangaliese, erude ore	Kazakhmarganata	Zhozdy	2,550,000 total.
	Kazakiniarganets	Zhezuy	
	Sary-Arkaponmetan	Znayrang (Znayrem) region	< 000 · · · 1
Molybdenum, mining	Kounrad Mine	Balqash complex	6,000 total.
(recoverable molybdenum	Karaobinskoye deposit	Karaoba region	
content of ore)	Sayak deposit	Sayaq (Sayak) region 1/	
Molybdenum, metal	Akchatau molybdenum metal plant	Zhezkazgan region	NA.
Petroleum and natural gas	Aktyubinskmunaigaz	Aqtobe region	28,000,000 (total crude oil),
	Embamunaigaz	Emba districk	10 million cubic meters (total
	Huricane Kumkol Munai	Aral Sea region	natural gas).
	Karachaganak field	Northwestern Kazakhstan	8,
	Mangistaumunaigaz	Mangghyshlag (Mangyshlak)	
	i i ungibiuu muhunguz	Deningula 1/	
	Tangizahaurail joint vantura	Tengiz deposit	
	Uzenmunaigaz	Uzen deposit	10.000.000
Phosphate rock	Karatau production association	Zhambyl (Dzhambul) and Shymkent	10,000,000 total.
		regions	
	Chilisay mining directorate	Aqtobe phosphorite basin	
Rare metals (columbium,	Aktau complex	Aktau (Shevchenko)	NA.
indium, selenium, tellurium)			
Do.	Belogorsky rare metals plant	Belgorsiy (Belogorsk) 1/	NA.
Do.	Chimkent polymetallic plant	Shymkent	NA.
Do.	Ust-Kamenogorsk lead-zinc plant	Oskemen	NA.
 	Akchatau mining and beneficiation complex	Zhezkazgan region	NA
Bhenium	Balkhash copper mining and beneficiation complex	do	NA
Tontolum	Varmal: farmallay plant	Alrean	NA.
Tantatum		AKSU	NA
1in The second second	Akchatau mining and beneficiation complex	Akznal deposit, Znezkazgan region	/00.
Titanium, metal	Ust-Kamenogorsk titanium-magnesium plant	Oskemen	35,000.
Silver, byproduct	Ust-Kamenogorsk	do.	1,200 total.
	Leninogorsk	Leninogorsk	
	Chimkent metallurgical plants	Shymkent	
Uranium, U content	Stepnogosk	Stepnogosk	3,500 total.
	Shevchenko	Aqtau	
	Taboshara	Taboshara	
	Prikaspiskiv ore enrichment center	Aatau	
	Tselinny chemical complex	Steppogosk	
Zinc metal	Leninggorsk	Leninogorsk	106 500 2/
	Lat Vamana agents plant	Oshomon	215.000.2/
D0.	Usi-Kamenogorsk plant	Oskeilleli	213.000. 2/

e/ Estimated. NA Not available.

1/ New names and spellings are given when available. The old name will appear in parentheses the first time the new name is used.

2/ Reported figure.