

THE MINERAL INDUSTRY OF KAZAKSTAN

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Kazakstan is the second largest country in land area, after Russia, to form from the republics of the former Soviet Union (FSU). It has large reserves of a wide range of minerals and is a major producer of a large number of metals, including beryllium, bismuth, cadmium, chromite, copper, ferroalloys, lead, magnesium, rhenium, titanium, uranium, and zinc. In 1996, it had significant production of a number of other mineral products, including arsenic, barite, coal, gold, molybdenum, natural gas, oil, phosphate rock, and tungsten.

In 1996, for the first time since the breakup of the Soviet Union, Kazakstan registered growth in both its gross domestic product (GDP) and industrial output; both showed a slight increase of under less than 1% compared with that of 1995 (Interfax Statistical Report, 1997a). The majority of direct foreign investment in Kazakstan was in the oil production and refining, and the metals production sectors (Interfax Statistical Report, 1997b).

Kazakstan's main export was mineral products, which comprised 70% of all exports. Metals accounted for 37% of the country's exports. Fuel, energy, and mineral raw materials accounted for 21% of all imports compared with 29% in 1995.

Government Policies and Programs

Beginning in 1994 and continuing through 1996, Kazakstan engaged in a program to restructure the management of its mineral industry enterprises that combined Government ownership, privatization, and foreign management. This program involved the transfer of the majority of Kazakstan's major mining and metallurgical industries to the trust management of foreign companies for a limited number of years. At the end of 1994, Kazakstan began transferring the largest enterprises in the mining and metallurgical industries.

Trust management is considered to be a preparatory stage for privatization and somewhat resembles privatization in the form of a concession. The standard term for a trust management contract is 5 years. The managing company undertakes an obligation to liquidate arrears in nonpayments and salaries, to invest in upgrading equipment, to increase production and profitability, and to maintain a specified number of jobs over the contract period. Foreign management companies are being offered a share of current profits and the future right to purchase stock in these enterprises (Teperman, 1996).

The trust-management program appears to be, for the most part, successful. Some of the country's best production results are being achieved by enterprises managed by foreign companies. For example, at the Sokolovsk-Sarbay iron ore

mining and enrichment combine (GOK), under the management of the Ivedon Company of Iceland, production rose almost fivefold over the year and reached the 1991 level. Sokolovsk-Sarbay not only revived production, but also resurrected the local town and gave jobs to subcontractors. In 1996, at the Zhezkazgantsvetmet copper mining and metallurgical complex managed by Samsung of the Republic of Korea, the volume of refined copper output reached 185,000 metric tons (t), which is 37% more than in 1995 and 95% of annual capacity. On the one hand, not all foreign companies' management contracts were successful. Two management contracts for the Karaganda steel mill, the country's largest steel mill, were canceled (Teperman, 1996).

In 1996, the Government began privatizing certain enterprises under trust management. The first enterprises privatized in 1996 were the Sokolovsk-Sarbay GOK, the Pavlodar Alumina Plant, and Kazkhrom, which controlled the chromite mining and ferroalloys production industries. The foreign companies that had these enterprises under trust management became their strategic investors (Teperman, 1996).

Environmental Issues

In terms of radiation pollution, Kazakstan regards itself as having one of the worst problems in the world. The problem is based not only on the activity of the Semipalatinsk Nuclear Test Range, but on radiation contamination from mining in the form of waste rock and runoffs associated with geologic surveying and extraction at uranium, oil, coal, and rare earth elements deposits and the abundance of ground and underground waters with high radioactive content in the regions of these deposits. On the basis of preliminary calculations, about 350,000 square kilometers (km²) of Kazakstan's territory are in radiation impact zones for uranium and other objects with high natural radioisotope content (Kazakstanskaya Pravda, 1996).

Of all radiation contamination sites, mining dumps are the most prevalent. A danger exists in that the local population often uses radioactive rock to pave roads and as construction material. Open dumps are, moreover, leached out by atmospheric precipitation and contaminated ground waters. Work has not been done to restore areas with mining dumps because of lack of finances (Kazakstanskaya Pravda, 1996).

In April, Kazakstan, Kyrgyzstan, and Uzbekistan, signed an agreement to curb environmental pollution from toxic and radioactive wastes from tailings and dumps. These countries had supplied the Soviet Union with large amounts of uranium and have accumulated large amounts of wastes from uranium

mining. International environmental organizations have expressed great concern about the conditions of these dumps and waste burial sites. Radiation levels at a number of these sites are hundreds of times higher than the permissible norms. Damage to burial sites is resulting in the release of considerable material with a high radium content. The damaged dumps and burial sites pose a considerable threat to the entire basin of the Syr Darya, one of Central Asia's main rivers. The threat from these damaged storage areas is heightened by their location in an area of high seismic activity (Interfax Mining and Metals Report, 1996a).

Production

Kazakstan's increase in industrial production was significantly assisted by some increased production in the nonferrous metals and mineral fuels sectors. However, there were some decreases in output in the ferrous metals and industrial minerals sectors. (See Table 1, Kazakstan: Estimated Production of Mineral Commodities)

Official reported production numbers in table 1 do not always correspond with other also apparently authoritative production numbers reported by different Government sources and enterprises, although the magnitude of difference is not generally great. Although these differences apparently cannot be explained or evaluated, some numbers that differ from those in table 1 will be presented if they are deemed useful in describing the parameters of the industry.

Commodity Review

Metals

Aluminum.—The Pavlodar refinery, the country's only alumina production plant, is 90% owned by White Swan Ltd., a subsidiary of the Trans-World Metals Group of the United Kingdom. White Swan signed a letter of intent with the Kazakstan Government to increase Pavlodar's capacity from 1.1 million to 2 million metric tons per year (Mt/yr). Because Kazakstan has no primary aluminum smelters, Pavlodar supplies two of Russia's largest, the Bratsk with an 850,000-metric-ton-per-year (t/yr) capacity and the Sayansk with a 320,000-t/yr capacity; both smelters are in Siberia (Mining Journal, 1996a).

Pavlodar, in conjunction with the Russian aluminum smelters, formed the Siberian Aluminum Alliance. It includes the Pavlodar alumina refinery and the Bratsk and Sayansk smelters, the Russian commercial bank Zalogbank, and the Trans-World Metals Group. The Alliance hopes to increase efficiency through integration and also to attract foreign investment (Mining Journal, 1996b).

Chromium.—Kazakstan's chromite mining and ferroalloys production industry is under the management of the Japan Chrome Corporation (JCC), an offshore company owned by Trans-World Metals Group. In 1996, the significant decrease in chromite extraction was attributed to the poor state of the world chromite market and difficulties with the power supply in

western Kazakstan to the chromite mines and ferroalloys plant in Aqtobe (formerly Aktyubinsk). Kazakstan's chrome industry includes the Donskoy chromite mining complex, the Ferrokhrom ferroalloy plant in Aqtobe, and the Aksu ferroalloy plant in Ermak (formerly Yermak) (Interfax Business Report, 1997).

Although Russia had been the primary consumer of Kazakstan's chromite, no chromium ore or concentrate had been shipped to Russian metallurgical enterprises since the middle of 1995. Several Russian-Kazakstan resolutions made since then to try to get the chromite shipments restarted have not been implemented. An intergovernmental resolution of May 17, 1996, established quotas, according to which Kazakstan was supposed to supply Russia with 500,000 t of chromium ore in 1996. Nevertheless, in 1996, Kazakstan did not supply Russia with chromite for its metallurgical industry, but did supply chromite for Russian chemical and refractory plants (Interfax Business Report, 1997).

The world ferrochromium market in 1996 also was depressed, in part, because of a general perception of substantial inventory stocks. One reason for this was the increased availability of ferrochrome from Kazakstan, which turned into an exporter to world markets following the assumption of management trusteeship of its ferrochrome industry by the JCC. Previously Kazakstan had been mainly supplying the internal Commonwealth of Independent States (CIS) market.

Copper.—Copper production in Kazakstan had been on a steady decline from 1991 to the middle of 1995, falling by about 50% during this period. The situation, however, began to be reversed when foreign companies acquired management rights to the country's copper producing firms.

In 1996, the Government was considering the possibility of reorganizing Balkhashmys (formerly known as Balkhashmed), one of the FSU's biggest copper producers, to try to restore production at this enterprise. In September, an international consortium won a tender for the right to acquire an 83% stake in Balkhashmys. The consortium consisted of the Swiss metals trader Glencore International; Phelps Dodge Corp., a copper mining and processing company from the United States; and Kazkommertsbank, a major Kazakstan commercial bank.

According to the Kazakstan State Property Committee, the tender rules stipulated an investment requirement of \$650 million in various projects at Balkhashmys by 2005. The winner also had to boost copper production to 180,000 t in 1997, compared with about 135,000 t in 1995.

The consortium spent a few months making a comprehensive financial audit and technical report. The audit revealed Balkhashmys had debts of about \$200 million. In its technical report, Phelps Dodge said that equipment was heavily depreciated and that the ore base was practically depleted, and also thought \$75 million to \$100 million would have to be spent on improving the environmental situation at the plant. The company concluded that Balkhashmys was generally obsolete and would require capital investment of \$600 million to \$900 million to upgrade. The consortium then abandoned its plans to invest in Balkhashmys (Interfax Mining News, 1997).

Balkhashmys again was offered at a tender, and the tender

was awarded to Samsung Deutschland, a subsidiary of Samsung of the Republic of Korea. According to the terms of the tender, Samsung must raise \$700 million between 1997 and 2000 to upgrade the plant and for geologic prospecting to increase its resource base.

Samsung plans to boost metal output at Balkhashmys to 100,000 t of copper in 1997, 140,000 t in 1998, 150,000 t in 1999, and 200,000 t in 2000. Balkhashmys produced 80,000 t of copper in 1996 compared with 135,000 t in 1995. Samsung will settle wage arrears, index wages with inflation, and provide medical services, insurance, and other benefits for workers (Interfax Mining and Metals Report, 1997b).

Since the middle of 1995, Samsung also has been the trustee manager of Kazakhstan's other major copper producing enterprise, Zhezkazgantsvetmet in the Zhezkazghan (formerly Dzhezkazgan) region in central Kazakhstan. The Zhezkazgantsvetmet copper mining and metallurgical complex, the management of which was signed over to Samsung in mid-1995, has since then striven to raise average monthly production levels on a par with that of 1991 when Zhezkazgan produced 200,000 t of copper. For the first 7 months of 1996, Zhezkazgan raised copper cathode production by 53% and mine output by 37% compared with the same period in 1995. The 1996 production target was set at 191,000 t of cathode copper, of which 186,000 t was to be produced from Zhezkazgan's own raw material. Before Samsung took over, Zhezkazgan was producing only 80,000 t/yr. Samsung has raised considerable capital to increase output at Zhezkazgan, including nearly \$14 million to finish development of the Annensky mine started about 20 years ago and \$34 million that was spent on new mining equipment with twice the productivity. Samsung plans to upgrade the milling capacity to enable Zhezkazgan to process 24 Mt/yr of ore to produce 200,000 t/yr of cathode copper (Interfax Business Report, 1996b).

Gold.—During the Soviet period, most of Kazakhstan's gold output was a byproduct of nonferrous metals production. Following the collapse of the Soviet Union, Kazakhstan began a concerted effort to develop its native gold deposits and to attract foreign investment for this development.

The Vasilkovskoye deposit in the Kokchetav region of northern Kazakhstan is reportedly the country's biggest gold lode with an estimated 382 t of gold. A Western investor for the Vasilkovskoye project has been sought for 2 years. The first attempt was made in April 1995 when Kazakhstan signed an agreement with Canada's Placer Dome for a joint venture to mine Vasilkovskoye. The first stage called for development of an open pit to a depth of 360 meters (m). Local geologists estimated the open pit could contain resources of about 50 million metric tons (Mt) of ore with an average grade of 2.9 grams per ton (g/t) gold, and a minimum grade of 1.5 g/t gold. Geologists, reportedly, later identified another 30.8 Mt of ore with an average grade of 5.15 g/t below 360 m.

After studying its own geologic data, Placer Dome deduced that the profit margin from the Vasilkovskoye project would be lower than expected. In October 1995, the company assigned its rights to the project to Canada's Princess Resources. Owing

to the fact that Placer Dome and Princess Resources were not able to reach final agreement on terms for developing Vasilkovskoye, the Kazakhstan authorities decided to call a new tender to find investors.

The winner of the new Vasilkovskoye investment tender, announced in May 1996, was a consortium led by Canada's TECK Corp., and included the United Kingdom's Bakyrchik Gold PLC and First Dynasty Mines Ltd. In June, the consortium was awarded the exclusive right to sign a contract with Kazakhstan to develop Vasilkovskoye. It was thought the contract would be signed by July 1 by which date TECK had intended to conclude negotiations with the Kazakhstan Government on the terms of a 25-year lease on Vasilkovskoye.

According to the terms of the tender, the consortium would invest \$360 million in the project and increase output at the site from 360 kilograms (kg) in 1995 to 17,000 kg in 1999. Kazakhstan also required that the tender winner reimburse \$35 million to Placer Dome at the time of signing.

Discussions between the Kazakhstan Government and TECK stalled, however, and in August, the Kazakhstan State Property Committee announced it was taking away the consortium's exclusive right to conduct negotiations on the project and sent offers to the runners-up in the tender.

The consortium made an effort to retain its position and confirmed that it would do all it had promised. The Kazakhstan Government restarted negotiations in September and again deemed TECK's proposals better than other contenders. Then, in September, Bakyrchik Gold announced that it was leaving the consortium because it wanted to concentrate its resources on its Bakyrchik gold project in Kazakhstan, in which it owns a 40% share. The departure of Bakyrchik Gold evidently had financial repercussions on the consortium.

In January 1997, the Government of Kazakhstan notified the international consortium led by TECK that it was ending negotiations on the joint project to mine the Vasilkovskoye gold lode. The State Property Committee stated that it had no immediate plans to continue talks with other Western companies interested in the Vasilkovskoye project (Interfax Mining and Metals Report, 1997b).

In 1996, gold from the Ust-Kamenogorsk refinery was accepted as meeting the standards required to qualify for the "good-delivery list" of the London Bulletin Market Association (LBMA). This enables gold from Ust-Kamenogorsk to be traded on world markets. Ust-Kamenogorsk became the second refinery in the FSU outside of Russia to earn this qualification; the other is the Navoi mining and metallurgical complex in Uzbekistan. Ust-Kamenogorsk had been already certified on the LBMA delivery list for silver (Mining Journal, 1996b).

Lead and Zinc.—Kazakhstan was the major producer of lead and zinc in the FSU. In 1996, an effort was made to improve integration of the country's lead and zinc production enterprises.

The joint-stock company KazZinc was established by a resolution of the Government of Kazakhstan on November 29 and combines the three largest lead-zinc producers—Ust-Kamenogorsk, Leninogorsk, and Zyryanovsk. According to a report entitled "Information Memorandum Joint Stock Company

KazZinc" issued in Almaty, 1997, the characteristics of each of the enterprises is as follows. The Ust-Kamenogorsk enterprise has the capacity to produce 145,900 t of refined lead, 215,000 t of metallic zinc, and 37,100 t of blister copper and 6,600 t of cathode copper. The Leninogorsk enterprise has the capacity to mine 3.9 Mt of ore, to process 4.36 Mt of ore, and to produce 106,500 t of metallic zinc. The Zyryanovsk lead enterprise has the capacity to mine 6.4 Mt of ore, to process 5.2 Mt of ore, and to produce copper, lead, and zinc concentrates. Reported production from these three enterprises between 1993 and 1996 is shown in table 2.

According to this KazZinc Information Memorandum, Zyryanovsk supplies lead and zinc concentrates to the metallurgical enterprises of KazZinc and copper concentrate to Balkhashmys, Zhezhkazganatvetmet, and enterprises in Russia and Uzbekistan on a tolling basis. Zyryanovsk consists of three mines (Maleevsk, Grekhovsk, and Zyryanovsk) and a concentration plant.

The Ust-Kamenogorsk enterprise contains KazZinc's metallurgical facilities for producing copper, lead, zinc, and byproduct metals. It receives concentrates not only from KazZinc, but also from other enterprises in Kazakhstan—copper, gold, and silver concentrates from the East Kazakhstan copper and chemical plant, zinc concentrates from the Zhezkent mining and beneficiation complex, and gold and silver concentrates from the Zhezhkazgantsvetmet and the Balkhashmys copper complexes.

All the enterprises of KazZinc are located within a 300-kilometer radius and are connected by rail. Energy is supplied by three hydroelectric powerplants in the vicinity. Ore is mined mainly from underground mines. KazZinc also produces rare earths and precious metals, and refines gold and silver. As of October, KazZinc employed 18,773 persons.

The Tekeli lead and zinc mining and beneficiation complex in the Taldy-Kurgan region of eastern Kazakhstan is a small producer. It mines the Koksyu lead-zinc and the Tuyuk lead-zinc and barite deposit. Tekeli's major customers are the Chimkent zinc smelter in southern Kazakhstan and the Ust-Kamenogorsk lead and zinc complex in eastern Kazakhstan. Tekeli comprises three mines and two beneficiation plants. Reportedly, the average lead and zinc contents of ore are 1.8% and 3.5%, respectively, and the beneficiation plants have the capacity to produce 15,600 t/yr of lead in concentrate and 29,600 t/yr of zinc in concentrate with recovery rates of 69% for lead and of 75% for zinc. In 1996, the United Nations' International Organization for the Development of Industry (UNIDO) completed an assessment of the financial and technical state of the Tekeli complex. According to UNIDO's assessment, if Tekeli would invest \$20 million to develop new deposits, then it would have adequate raw materials for another 25 years of operations (Interfax Mining and Metals Report, 1996b).

Mineral Fuels

Coal.—According to the Interstate Statistical Committee of the CIS, coal production in 1996 fell by 8% compared with

1995 to 76.6 Mt; production had been 130 Mt in 1991 (Interfax Statistical Report, 1997a). Coal production is centered in the Karaganda and Ekibastuz basins. Karaganda, located in north-central Kazakhstan, produces high quality coking coal that supplies the Russian and Ukrainian iron and steel industries. Ekibastuz, located in northern Kazakhstan, is the third largest coal basin in the FSU, and produces mainly subbituminous coal for use in powerplants.

In 1996, the Government was selling coal mines in the Ekibastuz mining district. The Vostochnyy mine and 30% of the Stepnoy mine were sold to JCC which was already heavily invested in the Kazakhstan mineral sector. JCC agreed to invest \$140 million in the two mines and to raise output at Vostochnyy to its rated capacity of 30 Mt/yr from the current level of about one-half of this amount. In early October, Access Industries of the United States bought another part of Stepnoy and the Bogatyr mine, and the Russian joint-stock company Sverdlovskenergo bought the Severnyy mine and the No. 9 coalfield at the Bogatyr mine (Coal Age, 1996; East-West Commersant, 1996).

Natural Gas.—According to the Interstate Statistical Committee of the Commonwealth of Independent States, Kazakhstan produced 6.4 billion cubic meters of natural gas in 1996, which was an 8% increase compared with that of 1995 (Interfax Statistical Report, 1997a). In general, the Kazakhstan gas sector lacks infrastructure, especially pipelines connecting gas producing areas in the northwest with gas consuming areas in the south and east. As a consequence, Kazakhstan has been forced to export its gas production to Russia and to meet 90% of its own natural gas consumption needs by imports which come mainly from Russia, Turkmenistan, and Uzbekistan (Energy Administration, 1996).

Kazakhstan reportedly contains an estimated 2.35 trillion cubic meters of natural gas reserves, of which about 1.9 trillion cubic meters are associated with oil or other liquids. The giant Karachaganak field in the northwest alone contains about 1.3 trillion cubic meters of natural gas. In 1992, British Gas Plc and Agip S.p.A. of Italy won a tender for exclusive rights to arrange development of the Karachaganak field, which is an extension of Russia's Orenburg field. British Gas and Agip also have an agreement with Russia's Gazprom to develop this field and to use Russia's cross-border Orenburg gas refinery. Unlike Karachaganak gas, which is aimed primarily at export markets, the almost 370 billion cubic meters of gas reserves under development in the Tengiz field are to be used primarily for domestic consumption (Energy Information Administration, 1996).

Petroleum.—According to the Interstate Statistical Committee of the Commonwealth of Independent States, production of oil and gas condensate in 1996 was 22.9 Mt, which was 1.68 Mt less than that of 1995. Joint ventures produced 5.32 Mt of this total, which was 11.1% under the planned target. The major Tengizchevroil joint venture in 1996 produced 4.98 Mt which was slightly under its target of 5.01 Mt (Interfax Petroleum Report, 1997). Kazakhstan is important to

world energy markets because it contains significant oil reserves. In particular, Tengiz is estimated to contain between 500 and 800 Mt of oil reserves. After Russia, Kazakhstan was the second largest oil producer in the FSU in 1996. Most of this oil is produced by Kazakhstan's two state holding companies, Munaigaz and Kazakgaz; production is mainly from the Mangghyshlaq (formerly Mangyshlak) area near the Caspian Sea.

Kazakhstan's oil production is currently exported to Russia as part of a swap arrangement whereby Russia supplies crude oil to two of Kazakhstan's three refineries at Pavlodar and Shymkent (formerly Chimkent). Crude oil exported to Russia is generally refined at Samara and Ufa. In April 1996, the presidents of Iran and Kazakhstan discussed a plan to export Kazakhstan oil from Caspian fields to northern Iran in exchange for Iranian oil exports from the Persian Gulf (Energy Information Administration, 1996).

In April 1993, the Chevron Corp. of the United States concluded the historic \$20 billion Tengizchevroil joint venture with Kazakhstan to develop the Tengiz oil field in the North Caspian Basin. Crude oil produced from Tengiz is to be exported. The income from these sales will be distributed over 40 years; 80% of the revenues will go to Kazakhstan, and 20%, to Chevron (Chevron Corp., 1997b).

Production at Tengiz has been constrained by lack of an adequate export pipeline. Nevertheless, production at the Tengiz field in 1996 was up from about 8,160 tons per day (t/d) [60,000 barrels per day (bbl/d)] at the beginning of the year to more than 21,750 t/d (160,000 bbl/d) by yearend (Chevron Corp., 1997b). The goal is to expand output to at least 24,500 t/d (180,000 bbl/d) by yearend 1997. Given adequate export outlets, Chevron believes it can reach peak production of 102,000 t/d (750,000 bbl/d) from the field by 2010 (Energy Information Administration, 1997).

In April 1996, the Mobil Corp. of the United States announced that it had purchased a 25% share in the consortium developing Tengiz from the Kazakhstan Government. Following this agreement, the equity ownership of Tengizchevroil was Chevron, 45%; Kazakhstan and Mobil, 25% each; and Russia's LUKoil, 5% (Chevron Corp., 1997a). Chevron, which has spent nearly \$1 billion on Tengiz development, has reduced spending significantly on the project owing to disagreements over export routes for any oil produced.

Most Tengiz production is exported via Russia's Black Sea port of Novorossiysk, but the pipeline has only enough capacity to handle about one-half of Chevron's output at Tengiz. In October, Chevron began exporting some oil from Tengiz by rail through Azerbaijan and Georgia. A first consignment of 20,000 t of crude oil was shipped to the Georgian Black Sea port of Batumi and on to Western markets. The oil is brought to Baku in Azerbaijan from Tengiz field by tanker across the Caspian Sea and then loaded onto rail cars and sent to Batumi. Chevron has also turned to shipping oil by rail to Novorossiysk in Russia and to Odessa in Ukraine (Chevron Corp., 1996).

To resolve the problem of the lack of pipeline transport capacity, the Caspian Pipeline Consortium (CPC) was formed in 1992; it initially consisted of Kazakhstan, Oman, and Russia.

Plans called for building a 900-mile oil export pipeline via Kropotkin in Russia to a new oil terminal near the Russian Black Sea port of Novorossiysk. In an effort to break a financial deadlock over financing of the pipeline, it was announced in March 1996 that Chevron and Mobil had reached a tentative agreement with Kazakhstan, Oman, and Russia (the original Caspian Pipeline Consortium) whereby these countries will no longer own all shares for the new pipeline, but rather a portion of the shares would be distributed among a consortium of international companies, and there would be a major reduction in Oman's shares.

The CPC pipeline will initially carry 28 Mt/yr of Kazakhstan oil, but this will be boosted to 67 Mt/yr with the addition of capacity for carrying Russian crude oil. The CPC plans to start the pipeline in late 1997 and complete it in 1999 (Interfax Business Report, 1996a). If constructed, then the pipeline would represent a major link between Tengiz and European export markets (Interfax Business Report, 1996a). Another option is to route Caspian oil along a pipeline through Azerbaijan and Georgia to the proposed new Georgian terminal of Supsa (Energy Information Administration, 1997).

Besides the pipeline issues, a broader debate was occurring between Russia and other Caspian region states concerning how this Sea should be treated under international law. Russia cited a 1940 treaty between the Soviet Union and Iran, which stated that the Caspian is not a sea and, therefore, should be developed in common by all five coastal states. Kazakhstan disputed this view and countered that each state should have rights to oil and gas resources developed in its own offshore area.

Mobil is part of two other projects besides Tengiz. One is to explore for oil and gas in the 16,200 km² Tulpar bloc located in the northwestern part of the country. The other, the Caspian Sea Consortium, is a group of seven international companies chosen to conduct a seismic survey of Kazakhstan's sector of the Caspian Sea by 1997.

Other petroleum-development joint ventures in Kazakhstan include development of the Karakuduk oilfield in the west by Chaparral Resources Inc. of the United States. Karakuduk reportedly is estimated to contain more than 1 mt (74 million barrels) of proved oil reserves. Also Canadian Occidental Petroleum Ltd. (Canoxy) is involved in developing a reportedly estimated 20.4 Mt (150 million barrels) of proved and probable reserves in central Kazakhstan's Turgay Basin (Energy Information Administration, 1997).

In 1996, Kazakhstan put its second-largest oilfield, Uzen, up for tender. Uzen accounted for 15% of Kazakhstan's output. With one-half of its wells idle, however, production at Uzen has dropped from 23,000 t/d (170,000 bbl/d) in 1989 to about 6,800 t/d (50,000 bbl/d) in 1996. Projections call for output to be tripled to 20,400 t/d (150,000 bbl/d) in 3 years through increased water injection and other improvements. Currently, about 40% of the Uzen crude oil is piped north to the Atyrau refinery, with most of the balance going to Russia and small volumes to Ukraine. Up to 20,400 t/d (150,000 bbl/d) could be exported via the proposed CPC pipeline to the Black Sea of Novorossiysk, and there is a potential to revive shipments across the Caspian to Baku in Azerbaijan. The tender has a broad

scope, allowing for a range of direct investment or joint venture participation in Uzen.

Kazakhstan has three refineries at Pavlodar, Atyrau, and Shymkent, which supply population centers in the northern, western, and southern areas of the country respectively. In addition, Kazakhstan exports refinery products to Kyrgyzstan and southern Siberia in Russia. Pavlodar and Shymkent are supplied mainly from Russia's West Siberian oil fields by pipeline, and Atyrau runs solely on domestic crude oil. Kazakhstan is planning to upgrade the country's refining capacity by building a new refinery on the Mangghystau (formerly Mangys-Tau) Peninsula, reconstructing the refinery at Atyrau, and adding a catalytic refining unit at Shymkent. Kazakhstan has granted a contract to France's Krebs-Eurysis to modernize Atyrau, enabling it to produce more light products, and to upgrade its overall throughput capacity from about 14,300 to about 16,300 t/d (103,800-120,000 bbl/d). Also, the Kazakhstan government has arranged for the London-based Vitol S.A. to build a new catalytic cracker at the Shymkent refinery.

In recent years, Kazakhstan has concluded deals for two other large refining projects. Japan's Sumitomo Corp. and Canada's SNC-Lavalin Group have a contract to build a large oil export refinery at the Zhanazhol oilfield near Aqtobe. In April 1994, a Japanese consortium, consisting of Mitsui, Mitsubishi, and Toyo Engineering, agreed to construct a 8,150-t/d (60,000 bbl/d) refinery on the eastern Caspian shore (Energy Information Administration, 1997).

Uranium.—Kazakhstan reportedly contains 45% of the FSU's prospected uranium reserves. The Ulba enrichment plant in Oskemen used to supply a large percentage of the FSU's needs for enriched nuclear fuel. Since the breakup of the Soviet Union, however, uranium production has fallen by one-half, and the Ulba plant reportedly is currently not producing enriched nuclear fuel. Kazakhstan is attempting to revive its uranium industry by attracting foreign management (Mining News, 1996).

In October, it was announced that Canada's World Wide Minerals (WWS-T) had assumed management for a 2-year period of one of Kazakhstan's major uranium mining complexes, the Tselinny uranium mining and beneficiation complex. According to the management contract, WWS-T can continue to manage Tselinny at the end of 1998 in exchange for 6% of gross revenue or buy a 90% share for \$47.25 million. This complex reportedly includes several underground mines with estimated reserves of 75 Mt of ore averaging 0.12% uranium, processing facilities, and a coal-fired powerplant. Plans call for WWS-T to increase the mill-head grade to at least 0.3% by using a selective mining plan. At this cut-off grade, Tselinny reportedly will process about 1 Mt/yr of ore, which is about one-half the mill's design capacity. WWS-T also plans to expand existing on-site heap-leaching facilities to utilize additional low-grade ore (Northern Miner, 1996).

Outlook

Kazakhstan's natural resources, particularly its oil reserves,

should contribute significantly to its economy. Completion of a new oil pipeline from the Caspian Sea to a port on the Black Sea, expected to be completed by 1999, will significantly boost Kazakhstan's crude oil exports. By taking an innovative approach to attracting foreign investment through its program of entrusting its mineral industry enterprises to foreign management, Kazakhstan appears poised to regain its position as both a large regional and world producer of nonferrous metals. Unlike the past, however, when Kazakhstan mineral wealth was used to supply the needs of the FSU in what amounted to an internal barter trade, Kazakhstan now will focus on supplying world markets with its minerals and will receive needed revenues for the country's economic growth and transformation.

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TABLE 1
KAZAKSTAN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996
METALS					
Alumina	1,100,000	1,091,000 r/	822,300 r/	1,022,000 r/	1,083,000 2/
Arsenic trioxide e/	2,000	2,000	1,500	1,586 2/	1,500 2/
Bauxite	2,953,000 r/	2,983,000 r/	2,950,000 r/	3,071,000 r/	3,300,000
Beryllium, metal	NA	NA	NA	NA	NA
Bismuth, metal kilograms	200,000 r/ e/	1,800,300 r/	117,000	166,000 r/	160,000
Cadmium, metal	1,000 e/	773 r/	995	1,209,000 r/	1,200
Chromite	3,500,000 e/	2,970,000 r/	2,100,000 r/	2,871,000 r/	1,190,000
Cobalt, mine output, metal content e/	1,500	1,500	1,394 2/	1,400 2/	1,300
Copper:					
Mine output, metal content	359,000 r/ e/	325,000 r/ e/	285,000	270,000 r/	270,000
Metal:					
Smelter, primary e/	310,000 r/	300,000 r/	250,000 r/	242,800 r/ 2/	245,000 2/
Refined, primary	328,000 r/	317,000 r/	278,000 r/	255,600 r/	263,300
Gold, mine output kilograms	26,000 r/	20,000 r/	25,000 r/	18,200 r/	12,000
Iron and steel:					
Iron ore, marketable e/	18,000,000 r/	17,700,000 r/ 2/	14,000,000 r/ 2/	15,000,000 r/	14,500,000
Metal:					
Pig iron	4,659,000	3,544,000	2,432,000	2,528,000 r/	2,536,000
Ferroalloys:					
Ferromanganese	400,000 e/	328,000	373,000 r/	486,000	352,000
Ferrosilicon	500,000 e/	418,200 r/	208,200 r/	256,000	119,000 2/
Silicomanganese e/	--	--	40,000	20,000	NA
Steel:					
Crude	5,700,000 r/ e/	4,300,000 r/ e/	2,900,000 r/	3,000,000 r/	3,200,000
Finished	4,300,000	3,400,000	2,300,000	2,100,000	2,250,000
Lead, metal, refined, including secondary	260,000 r/ e/	255,000 r/	138,000 r/	88,500 r/	67,000
Magnesium	3,000	2,000	--	--	--
Manganese ore, crude ore	372,000 r/	471,000 r/	452,000 r/	428,100 r/	430,000
Molybdenum, mine output, metal content e/	600	600	534 2/	400 r/	400
Nickel, mine output, metal content e/	10,000	10,000	8,500 2/	9,900 2/	9,000
Silver	495 r/	550 r/	550 r/	489 r/	480
Tin, mine output, metal content	100 e/	100 r/	100 r/	100 r/	NA
Titanium, sponge	NA	NA	3,800 r/ 2/	9,600 r/ 2/	12,500 2/
Tungsten, metal, W content	100 e/	100 e/	114	228	222
Vanadium e/	1,400	1,200	878 2/	924 2/	900
Zinc, metal, smelter	260,000 e/	238,000 r/	173,000 r/	168,300 r/	170,000
INDUSTRIAL MINERALS					
Asbestos, all grades	300,000 e/	225,000 e/	187,500	128,400 r/	128,700
Barite	200,000	200,000	200,000 r/	286,000 r/	250,000
Boron	10,000 r/ e/	8,000 r/	7,000 r/	8,400	5,700
Cement	6,400,000	4,000,000	2,000,000	1,800,000 r/	1,100,000
Fluorspar e/	100,000	90,000	80,000	75,000	65,000
Phosphate rock e/	3,500,000	2,500,000	1,700,000 2/	1,700,000 r/	1,650,000
Sulfur, byproduct e/	200,000	200,000 r/	500,000 r/	1,000,000 r/	1,000,000
MINERAL FUELS					
Coal	127,000,000	112,000,000	105,000,000	83,300,000 r/	76,600,000
Natural gas million cubic meters	8,100	6,700	4,500	5,800 r/	6,400
Petroleum, crude	25,800,000	23,000,000	20,300,000	20,500,000 r/	23,000,000
Uranium concentrate, U content e/	1,500 r/	1,500 r/	1,300 r	1,134 r/ 2/	NA

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

1/ Table includes data available through Feb. 18, 1998.

2/ Reported data.

TABLE 2
REPORTED PRODUCTION AT KAZZINC ENTERPRISES FOR 1993 TO 1996

(Thousand metric tons)

Enterprise	Output	1993	1994	1995	1996
Ust-Kamenogorsk	Refined lead	105.2	47.8	44.8	55.2
	Metallic zinc	158.8	117.5	95.7	85.0
	Blister copper	32.9	27.4	21.7	13.8
	Cathode copper	NA	2.3	5.3	4.5
Leninogorsk	Polymetallic ore	2,246.2	1,681.6	2,147.6	2,300.0
	Processed ore	2,462.8	1,723.0	2,120.0	2,350.0
	Metallic zinc	79.7	55.0	72.5	83.0
Zyryanovsk	Polymetallic ore	2,155.8	1,788.6	1,706.2	1,464.0
	Processed ore	2,638.4	2,060.2	1,883.1	1,654.4
	Copper concentrate	8.9	8.1	9.6	11.2
	Lead concentrate	11.2	10.4	11.3	11.8
	Zinc concentrate	26.1	31.8	39.7	52.2

NA Not available.

Source: Information Memorandum Joint-Stock Company KazZinc, Almaty, Kazakstan, 1997.

TABLE 3
KAZAKSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity e/
Alumina	Pavlodar alumina refinery	Pavlodar	1,200,000.
Arsenic, trioxide	Chimkent polymetallic enterprise and other nonferrous metallurgical enterprises	Shymkent (Chimkent) 1/	3,500.
Asbestos	Dzhetygara complex	Qostanay (Kustanay) region 1/	1,000,000 total.
Do.	Chilisay complex	Aqtobe (Aktubinsk) phosphorite basin 1/	
Barite	Karagailinskiy mining and beneficiation complex	Karagayly region	300,000 total.
Do.	Tujuk Mine	Almaty region	
Do.	Achisay polymetallic complex	Kentau region	
Bauxite	Turgai, 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.
Do.	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 of the country	50,000,000.
Do.	Ekibastuz Basin	do.	85,000,000.
Do.	Maykuben Basin	do.	10,000,000.
Do.	Turgay Basin	do.	1,000,000.
Copper, mining, recoverable copper content	Balkhash	Balqash (Balkhash) region 1/	200,000.
Do.	Dzhezkazgan	Zhezkazghan (Dzhezkazgan) region 1/	250,000.
Do.	Irtysk	Irtysk 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	Oskemen region	10,000.
Copper, metallurgy, metal	Balkhash	Balqash region	150,000.
Do.	Dzhezkazgan	Zhezkazghan region	250,000.
Do.	Irtysk smelting and refining complex	Irtysk region	40,000.
Do.	Ust-Kamenogorsk plant	Oskemen	37,100 (blister copper) 2/ 6,600 (refined copper) 2/

See footnotes at end of table.

TABLE 3--Continued
KAZAKSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity e/ Annual capacity e/
Ferroalloys	Aktyubinsk plant	Aqtöbe	High-carbon 60% ferrochrome, 150,000; medium-carbon 60%, ferrochrome, 130,000.
Do.	Yermak plant	Ermak (Yermak) 1/	Ferrosilicon 700,000; ferrosilicochrome, 700,000; high-carbon ferrochrome 400,000. silicomanganese, 90,000.
Gallium	Pavlodar alumina plant	Pavlodar	NA.
Gold	Byproduct of polymetallic ores and native gold mining	Byproduct gold colocated with nonferrous metals mining	30.
Iron and steel:			
Pig iron	Karaganda Steelworks	Karaganda	5,000,000.
Steel, crude	do.	do.	6,300,000.
Steel, finished	do.	do.	4,700,000.
Iron ore, marketable	Sokolovsko-Sarbay, and Lisakovskiy mining and metallurgical complexes	Qostanay region	25,000,000 total.
Lead and zinc, mining: (recoverable lead and zinc content of ore)	Achisay	Kentau and Qaratau (Karatau) regions 1/	Lead 40,000, zinc 20,000.
Do.	Akchatau	Balqash region	Lead 10,000, zinc 30,000.
Do.	Irtysk	Oskemen region	Lead 10,000, zinc 50,000.
Do.	Karagaili	Karagayly region	Lead 20,000 zinc 55,000.
Do.	Leninogorsk	Leninogorsk region	Lead 60,000, zinc 120,000.
Do.	Tekeli	Tekeli and Taldyqorgha (Taldi-Kurgan) regions 1/	Lead 20,000, zinc 30,000.
Do.	Zhayrem	Zhayrem region	Lead 20,000, zinc 40,000.
Do.	Zyryanovak complexes	Zyryanovak region	Lead 20,000, zinc 60,000.
Do.	East Kazakhstan copper-chemical complex	Oskemen region	Zinc 15,000.
Lead, refined	Ust-Kamenogorsk plant	Oskemen	145,000.
Molybdenum, mining: (recoverable molybdenum content of ore)	Kounrad Mine	Balqash complex	6,000 total.
Do.	Karaobinskoye deposit	Karaoba region	
Do.	Sayak deposit	Sayaq (Sayak) region 1/	
Molybdenum, metal	Akchatau molybdenum metal plant	Zheqzqazghan region	NA.
Petroleum and natural gas	Aktyubinskneft	Aqtöbe region	28,000,000 (total crude oil). 10 million cubic meters (total natural gas).
Do.	Embaneft	Emba district	
Do.	Mangyshlakneft	Mangghyshlaq (Mangyshlak) Peninsula 1/	
Do.	Tengiz deposit	Tengiz deposit	
Phosphate rock	Karatau production association	Dzhambul and Shymkent regions	10,000,000 total.
Do.	Chilisay mining directorate	Aqtöbe phosphorite basin	
Rare metals (columbium, indium, selenium, tellurium).	Aktau complex	Aqtau (Shevchenko)	NA.
Do.	Belogorsky rare metals plant	Belogor (Belogorsk) 1/	NA.
Do.	Chimkent polymetallic plant	Shymkent	NA.
Do.	Ust-Kamenogorsk lead-zinc plant	Oskemen	NA.
Do.	Akchatau mining and beneficiation complex	Zheqzqazghan	NA.
Rhenium	Balkhash copper mining and metallurgical complex	Balqash	NA.
Tantalum	Yermak ferroalloy plant	Ermak	NA.
Tin	Akchatau mining and beneficiation complex	Akzhal deposit, Zheqzqazghan region	700.
Titanium, metal	Ust-Kamenogorsk titanium-magnesium plant	Oskemen	35,000.
Silver, byproduct	Ust-Kamenogorsk	do.	1,200 total.
Do.	Leninogorsk	Leninogorsk	
Do.	Chimkent metallurgical plants	Shymkent	

See footnotes at end of table.

TABLE 3--Continued
 KAZAKSTAN: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Metric tons unless otherwise specified)

Commodity	Major operating facility	Location	Annual capacity e/
Uranium, U content	Stepnogorsk	Stepnogorsk	3,500 total.
Do.	Shevchenko	Aqtau	
Do.	Taboshara	Taboshara	
Do.	Prikaspiskiy ore enrichment center	Aqtau	
Do.	Tselinny chemical complex	Stepnogorsk	
Zinc, metal	Leninogorsk	Leninogorsk	106,500. 2/
Do.	Ust-Kamenogorsk plant	Oskemen	215,000. 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