

MONGOLIA

By Pui-Kwan Tse

After 2 consecutive years with disastrous winters that killed millions of livestock, a milder winter helped Mongolia's economy improve in 2002. In spite of unfavorable global markets, the economy grew by 3.9%. Agricultural output declined by 10.5% after an 18.5% contraction in 2001. Industrial output increased moderately by 3.9%, which was lower than the 11.8% growth in 2001. The growth rate of the mining and quarrying sector declined by 7.4%; the sector, however, still accounted for 50.4% of the total industrial output, followed by manufacturing, 29.6%, and energy, 20.0% (National Statistical Office of Mongolia, 2002, p. 61).

The Government continued to follow its Action Program of the Government of Mongolia for 2000 to 2004. The program emphasized stabilizing the macroeconomic situation, reducing Government spending while improving service delivery, and restructuring the industrial sector by privatizing state-owned enterprises. The Asian Development Bank (ADB) and the World Bank provided loans and assistance to the Mongolian Government to reform the public sector. Assistance was concentrated in the sectors of health, education, social welfare, and urban development. A systematic public reform system was implemented to improve public administration and public financial management. Despite difficulties in 2002, the Government made an effort to reach its targets. The Government sold its share in the Trade and Development Bank to an international joint venture between the Banca Commerciale Lugano of Switzerland and Gerald Metals of the United States. The Government introduced and passed the amendment of foreign investment law of Mongolia and submitted the amendment of mineral law to the Parliament for approval in 2002. The ADB also provided a \$500,000 technical assistance grant to Mongolia and China for establishing an effective institutional framework to promote and coordinate economic cooperation between the two countries (Asian Development Bank, 2002, p. 8; Foreign Investment and Trade Agency, 2002a§,¹ b§, Open Government, 2002§).

Mongolia has extensive and largely untapped mineral resources. Only about 25% of the country's natural resources have been explored thoroughly. The mining sector is expected to play an important role in the country's future economic development. The Government adopted a number of long-term programs to explore for and develop metallic and nonmetallic minerals, such as coal, copper, fluor spar, gold, oil, and silver. Foreign investment and participation in exploration, exploitation, and processing of minerals were encouraged. The Government announced 47 potential prospective mineral projects for domestic and foreign investor participation in the 2002 Investment Forum (Mineral Resources Authority, 2002§).

¹References that include a section mark (§) are found in the Internet References Cited section.

Known as "the land of blue sky," Mongolia is landlocked between Russia to the north and China to the south. The country's trade has been heavily influenced by economic developments in China and Russia. In 2002, Mongolia's total trade increased by 0.1% to \$1.16 billion. Because of weak global metal market prices, exports declined to \$500.9 million. Owing to an increased demand for agricultural products, imports increased to \$659.0 million. Values of metal and mineral exports and imports accounted for about 40% of total trade. Mongolia exported nearly all its output of copper concentrates and molybdenum concentrates to China and nearly all its fluor spar to Russia. Petroleum and its products remained the leading imported commodities followed by textile and flour. China and Russia were two major trading partners. China accounted for 42% of Mongolian total exports followed by the United States with 31%. Mongolia imported about 34% of its products from Russia followed by China with 24% (National Statistical Office of Mongolia, 2002, p. 37-42).

Erdenet Mining Corp.'s copper and molybdenum mine, which is located about 400 kilometers (km) northwest of Ulaanbaatar, was the largest mining operation in Mongolia in 2002. Erdenet mined more than 23 million metric tons per year (Mt/yr) of ore and produced concentrates that contained more than 130,000 metric tons (t) of copper and 1,500 t of molybdenum. Because of the decline in average ore grade, the output of copper in concentrates decreased by 2.4% to 131,705 t in 2002. Owing to improving recovery efficiency, the output of molybdenum in concentrates increased by 11.2% to 1,590 t (Erdenet Mining Corp., 2002§).

Ivanhoe Mines Ltd. of Canada continued work on its Oyu Tolgoi (Turquoise Hill) project at Oyu Tolgoi in the southern Gobi area. The Oyu Tolgoi project is located in the South Gobi desert. No roads or infrastructure have been put in place. It takes about 12 hours in a four-wheel-drive vehicle along a track road to reach the deposit from Ulaanbaatar. In 2002, the company secured an additional \$50.7 million in private funds to finance drilling and feasibility studies of the project. Since the discovery of copper and gold occurrences at Oyu Tolgoi in 2001, Ivanhoe raised \$160 million to finance this Oyu Tolgoi project and other exploration activities in Mongolia. Porphyry-style mineralization has been found in four separate areas—the central, north, south, and southeast Oyu of the main Oyu Tolgoi concession within a 3- by 2-km area that contains inferred resources estimated to be 1.6 billion metric tons of ore at a grade of 0.63% copper and 0.17 gram per metric ton (g/t) gold. The company selected a team that included mineral engineers from Australia and Canada to undertake prefeasibility studies of the Turquoise Hill project. Other exploration activities included the Kharmagtai prospect, which is located approximately 120 km north of Oyu Tolgoi; the Ovoot Hyar (Turquoise

Ridges) prospect, which is located about 15 km west of the Kharmagtai; the Shuteen prospect, which is located 100 km east of Kharmagtai; and the Oyut Ulaan and the Chandman Uul prospects, which are located in the southeastern Gobi region. Ivanhoe Mines Mongolia (Ivanhoe's subsidiary) held the right to explore 15,600 square kilometers (km²) of the Gobi porphyry copper-gold belt (Metal Bulletin, 2002; Mining Journal, 2002a).

In 2002, QGX Ltd. of Canada reacquired the Uhaa Hudaag prospect, which is located 40 km northeast of Kharmagtai in the south-central Gobi desert in Mongolia. During 1995 and 1997, QGX did extensive work in the area under the Hartaag License, which had been acquired in 1994. Visible gold was found in the quartz veins within an area 120 meters (m) wide by 2.5 km long. Because core recovery in the immediate area of the intercepts was poor, evaluating the potential of the target was difficult and the drilling program was abandoned in 1997. Under the terms of the agreement, the total purchase price was \$60,000, of which \$18,000 had been paid, \$18,000 was due in October 2003, and the balance was due in April 2004. QGX also explored in the areas of Kharmagtai, Shuteen, and Ovoot Hyar where QGX had joint-venture properties with Ivanhoe and retained a carried interest in these properties. In addition, QGX explored the Golden Hills prospect at an undisclosed location in Mongolia. Initial drilling samples indicated that the area contained an average grade of 11.1 g/t gold. QGX could earn an 80% interest in the lease by spending \$450,000 on the property by 2005 and could increase its interest to 100% by making a payment of \$1 million after completion of the earn-in. Besides the joint-venture properties with Ivanhoe, QGX acquired an additional area of 20,000 km² in Mongolia in 2002 (QGX Ltd., 2002a, b).

In 2002, the Mongolian Government issued a total of 58 exploration licenses, which covered an area of 4.8 million hectares, to the International Uranium Corp. of Canada through its subsidiary International Uranium Co. (Mongolia) Ltd. The company planned to explore for base metals and gold in these areas. In southeastern Mongolia, the licenses covered two large concession areas at Chandman Uul and Ulziit where potential porphyry copper-gold mineralization may be located. In northern Mongolia, the licenses were in four blocks, Erdenet, Huvsgol, Tomor Tolgoi, and West Huvsgol. The Erdenet block is located on the northeastern extension of the Erdenet mine. The company believed that copper may be found within the licensing area similar to the Erdenet porphyry copper. In Huvsgol and West Huvsgol, the company discovered numerous gold stream-sediment anomalies and combined showings of copper skarns, iron skarns, and rare-earth prospects. In northwestern of Mongolia at the Burkheer Khar and Davaa areas, porphyry copper and molybdenum occurrences were discovered, and copper and gold in mesothermal deposits might be present. The company planned to map and sample during the 2003 field season (International Uranium Corp. 2002a, b, c; 2003).

Troy Mongolia Alt Resources (subsidiary of Troy Resources Ltd. of Australia) formed a strategic alliance with Rio Tinto Mining and Exploration Ltd. for exploration in Mongolia. Under the terms of the agreement, Troy will provide support to Rio Tinto's geologists in the evaluation of its copper and copper-gold exploration projects in Mongolia. The two companies will share technical information about copper and

gold prospects in Mongolia. In 2002, Troy had drilled eight diamond holes for a total of 902 m in three prospects in Bor Ondor and Tas Uul/Tsagaan Chuluut, which are located 500 km northeast of Ulaanbaatar. The drilling intersected significant hydrothermal alteration; only a few narrow intervals of gold mineralization, however, had been recorded. The company planned to continue exploration of the area in 2003 (Gold Gazette, 2002).

Bell Coast Capital Corp. of Canada announced that exploration would continue at the Suudert Uul (Shadow Mountain) prospect in 2002. The company explored the Bayanovoo property, which covered an area of 233,000 hectares in the southern Gobi Desert. The property was landlocked by Ivanhoe on the north and west and Harrods Minerals Mongolia Ltd. on the east. Initial drilling results indicated that the area contained as high as 2.76% copper, 1.64 g/t gold, and 0.27% molybdenum. The company also completed induced polarization and magnetic surveys in the area. An additional survey and drilling in target areas will continue in 2003 (Bell Coast Capital Corp., 2002).

Gallant Minerals Services Ltd. (formerly Harrods Natural Resources Inc.) and WMC Resources Ltd. formed a joint-venture partnership to explore within an "area of mutual interests" in Mongolia. Under the terms of the joint-venture agreement, WMC retained exclusive option rights to exploration projects, which included the Bor Khairhan and the Toste porphyry copper prospects in southwestern Mongolia. In 2002, the partners acquired 23 exploration projects in Mongolia (Mining Journal, 2002b).

Entree Gold Inc. of Canada reached an agreement with Mongol Gazar Co. Ltd. to acquire three contiguous mineral exploration licenses in the southern Gobi Desert. The Shivee Tolgoi (Lookout Hill) concessions have a total area of 179,594 hectares and were completely surrounded by Ivanhoe's Oyu Tolgoi prospect. Under the terms of the agreement, Entree will be entitled to earn up to 60% undivided interest in the concessions by reimbursing \$200,000 in expenditures that Mongol Gazar has spent, spending up to \$12 million on the properties by the fifth anniversary of the agreement, and issuing up to 4 million common shares to Mongol Gazar. Entree planned to conduct geochemical and geophysical surveys in the southern part of the property in 2003 (Entree Resources Inc. 2002).

Coal was the main fuel source for energy and accounts for about 80% of primary commercial energy use in Mongolia. Coal output was mainly for domestic consumption. In 2002, Mongolia exported 10,900 t of coal. Mongolia produced only a small amount of oil, but domestic production was expected to grow as local oilfields are developed. Geologists estimated that the Tamsag Basin in the eastern part of the country would contain about 1.5 billion barrels of oil. SOCO International plc of the United Kingdom explored on the contract block areas of XIX, XXI, and XXII in the Tamsag Basin and planned to have 15 extraction wells and to produce 60,000 t of oil by 2004. Dongsheng Petroleum of China and Roc Oil Co. of Australia jointly explored on the contract block areas of XIII and XIV in the eastern Gobi Basin under a production-sharing contract (Foreign Investment and Foreign Trade Agency, 2002a§).

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Major Source of Information

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Major Publications

National Statistical Office of Mongolia, Ulaanbaatar:
Statistical Bulletin, monthly.
Mongolian Statistical Yearbook, annual.

TABLE 1
MONGOLIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	1998	1999	2000	2001	2002
Cement, hydraulic thousand tons	109	104	92	68	148
Coal do.	5,057	4,952	5,185	5,141	5,307
Copper:					
Mine output, Cu content	125,400 ³	126,700 ³	125,227	133,503	131,705
Metal, refined	2,322	1,545	641	1,476	1,500
Fluorspar:					
Acid grade thousand tons	123	100	111	127	86
Submetallurgical and other grades do.	46	55	87	72	99
Total do.	169	155	198	199	185
Gold, mine output, Au content ⁴ kilograms	9,531	10,146	11,808	13,675	12,097
Gypsum ^e thousand tons	10	25	25	25	25
Lime, hydrated and quicklime do.	56	50	37	30	41
Molybdenum, mine output, Mo content	2,000 ^e	1,910 ^e	1,335	1,514	1,590
Petroleum, crude thousand 42-gallon barrels	50	72	65	74	139
Salt, mine output	1,400 ^e	1,516	1,293	1,800 ^r	1,268
Silver, mine output, Ag content ^{e,5} kilograms	19,700	19,900	25,000	27,200	27,000
Steel, crude	16,300	13,100	13,000	10,000	15,900
Tin, mine output, Sn content ^e	40	--	--	--	--
Tungsten, mine output, W content	35 ^e	27	52	63	35

^eEstimated, estimated data are rounded to no more than three significant digits. ^rRevised. -- Zero.

¹Table includes data available through July 30, 2003.

²In addition to the commodities listed, crude construction materials, such as sand and gravel; varieties of stone, such as limestone; and silica are produced, but available information is inadequate to make reliable estimates of output levels.

³Reported figure based on 27.5% Cu and 50% Mo content, on copper and molybdenum concentrates, respectively.

⁴Reported raw gold production but excluded gold contained in copper concentrate.

⁵Based on 55 grams of silver per metric ton of copper concentrate.

Sources: National Statistical Office of Mongolia (Ulaanbaatar), Mongolian Statistical Yearbook 1998-2002; Mineral Resources Authority of Mongolia, Mining Office, Output of Mineral Commodities (Minerals Questionnaire 1998-2002).

TABLE 2
MONGOLIA: MINERAL DEPOSITS AND OCCURRENCES CLASSIFIED FOR INVESTMENT AND DEVELOPMENT

Commodity	Location	Latitude	Longitude
Coal:			
Khuut	Bayanjargalan Soum in Dundgovi (Middle Gobi) Province (Aimag)	NA	107°39' E
Tugrug	Bay Soum in Tuv Province	45°55' N	108°00' E
Copper:			
Ariin Nuur Mo-Cu	100-110 km southwest of Choibalsan in Sukhbaatar Province	47°13' N	113°57' E
Huh Adar	14 km south of Tolbo Soum in Bayan-Ulgii Province	48°17' N	90°22' E
Tsagaan Suvarga	220 km southwest of Sainshand in Dornogobi Province	43°48' N	108°18' E
Gold:			
Barlag Gol	300 km southwest of Altai in Khovd Province	46°03' N	93°22' E
Davkhyn Khar	285 km southwest of Altai in Govi-Altai Province	45°30' N	97°58' E
Ereen	580 km northwest of Ulaanbaatar in Bulgan Province	NA	NA
Humul	Batshireet Soum in Hentii Province	49°03' N	110°00' E
Ikh Tokhoirol	Between the Buregkhangai Soum in Bulgan Province and Zaamar Soum in Tuv Province	NA	NA
Khulman Nuur	On the border of Khovd and Govi-Aivu Provinces	46°07' N	93°30' E
Khunkher	280 km southeast of Altai in Govi-Altai Province	45°15' N	97°50' E
Sukhait	Khovd Province at the border of Mongolia and China	46°10' N	91°01' E
Tavt	600 km northwest of Ulaanbaatar in Bulgan Province	NA	NA
Tsagaan Tolgoi	30 km from Myangad Soum in Hovd Province	48°27' N	91°47' E
Uherchuluut	Shinejinst Soum in Bayanhongor Province	43°29' N	99°15' E
Iron:			
Tumur Tolgoi	30 km southeast of Darhan City in Darhan Province	49°18' N	106°10' E
Tumurtei	40 km east of Eroo Soum in Selenge Province	49°40' N	107°14' E
Lead and Zinc:			
Boorj	Most Soum in Hovd Province	46°33' N	94°46' E
Har Tolgoi	93 km southwest of Nomgon Soum in Ummugobi Province	42°08' N	104°55' E
Salhit	Choibalsan Soum in Dornod Province	48°57' N	115°41' E
Tsav	120 km northeast of Choibalsan City in Dornod Province	48°55' N	115°20' E
Tumurtey and Kharaat Uul	210 km southeast of Ulaanbaatar in Middle Gobi Province	45°58' N	107°38' E
Ulaan	Dashbalbar Soum in Dornod Province	49°45' N	114°05' E
Lithium:			
Huh Del Ulaan	Bayanjargalan Soum in Middle Gobi Province	46°00' N	108°52' E
Munhetiin Tsagaan Derveljin	do.	45°53' N	108°22' E
Magnesite:			
Bideriin Gol	50 km southeast of Altai City in Gobi-Altai Province	NA	NA
Marble:			
Tsagaan Chuluut	108 km northwest of Moron of Alag-Erdene Soum in Khuvsgul Province	50°21' N	99°45' E
Phosphate:			
Alagiin Davaa and Tsakhir Uul	Aldarkhaan Soum in Zavkhan	42°30' N	96°20' E
Burenkhaan	23 km northwest of Murun City in Khubsgul Province	NA	NA
Rare earths:			
Halzan Buregtei	Myangad Soum in Hovd Province	48°23' N	91°55' E
Shar Tolgoi	145 km southeast of Ulaangom Soum in Uvs Province	49°03' N	92°44' E
Salt:			
Shuden Uul	160 km in north of Ulaangom Soum in Uvs Province	NA	NA
Silver:			
Asgat	Nogoon Nuur Soum in Bayan-Olgii Province	49°52' N	89°38' E
Mungun Undur	80 km from Undurkhan Town of Umnudelger Soum in Khentii Province	47°51' N	110°11' E
Tungsten:			
Tsunheg	29 km northeast of Olgii City in Bayan-Olgii Province	49°10' N	90°03' E
Ulaan Uul	50 km northeast of Olgii City in Bayan-Olgii Province	49°13' N	90°13' E
Undur-Tsagaan	Umundelger Soum in Khentiy Province	47°54' N	110°07' E
Yuguzer	Erdene-Tsagaan Soum in Sukh-Baatar Province	NA	NA
Zeolite:			
Tsagaan-Tsav	45 km southwest of Sain-Shand railway station in Dornogovi (East Gobi) Province	44°38' N	109°48' E
NA Not available			

Sources: Foreign Investment and Foreign Trade Agency and Mineral Resources Authority.