

THE MINERAL INDUSTRY OF

MONGOLIA

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Mongolia is a mineral-rich country. As a result of the geologic surveys and preliminary investigations conducted by the joint exploration team of the Government and the Governments of the former Soviet Union and other member countries of the Council for Mutual Economic Assistance in the last 25 years, about 30 minerals had been identified for further exploration and development. These minerals include asbestos, clays, coal, copper, diamond, fluor spar, gold, gemstones, graphite, gypsum, iron, lead, limestone, magnesium, molybdenum, nickel, petroleum, phosphate, platinum, rare earths, salt, sand and gravel, silica, silver, tin, tungsten, uranium, zeolite, and zinc.

Previous exploration conducted by the Government with financial and technical assistance mainly from the former Soviet Union, discovered large mineral resources of coal in the Baga Nuur and Tavan Tolgoit areas; copper and molybdenum in the Erdenetiin Ovoo and Tsagaan Suvraga areas; fluorite in the Bor Ondor area; considerable mineral resources of gold in north-central Mongolia; phosphate in northwestern Mongolia; and petroleum and uranium in northeastern and southeastern Mongolia. However, mineral resources of clays, gemstone, gypsum, lead, nickel, platinum, rare earths, silver, tin, tungsten, zeolite, and zinc, discovered in various parts of the country, are small.

Information on 1,354 mineral deposits and 146 geologic occurrences were registered and stored in the Minerals Board's database. The Board published nine series of maps with an explanation of metallogeny, raw materials of the geologic occurrences, and infrastructure of the area. Geologic maps on a scale of 1:200,000 covered 88% of Mongolia's landmass and maps on scale of 1:50,000 covered 11.3%. Under the 1997 Mineral Resources Law, about 20% of the total landmass was licensed to be explored (Mongolian National News Agency, Headlines, November 19, 1998, 1,353 Mineral deposits and fields registered, accessed December 3, 1998, at URL <http://www.mol.mn/montsame/news/english/thursday.html>).

Under the 1997 Mineral Resources Law, the rights of exploration license holders include: 1) the exclusive right to conduct exploration for minerals within the boundaries of an exploration claim; 2) the exclusive right to obtain a mining license for any part of an exploration area; 3) the right to transfer or pledge all or part of an exploration license; 4) the right to obtain two extensions of the term of an exploration license for 2 years each; 5) the right to have access to, entry on, and to transit through the exploration area and to construct temporary structure necessary for conducting exploration activities; and 6) the right of entry to and transit through the land adjacent to the exploration area for the purpose of gaining

access and entry to the exploration area.

The rights of mining license holders include: 1) the exclusive right to engage in mining of minerals within the mining claim; 2) the right to manage its operations and to market its products; 3) the right to sell mineral products from the mining claim at market prices on domestic and foreign markets; 4) the exclusive right to conduct exploration for minerals within the mining claim; 5) the right to transfer and pledge all or part of the mining license; 6) the right to extend the term of the mining license once for a period of 40 years; 7) the rights of entry to and transit through the mining areas, to use the mining area, to construct necessary structure, and to conduct other activities related to mining and exploration; 8) the right of entry to and transit through the land adjacent to the mining area.

The exploration license fees per hectare are: \$0.05 for the first year, \$0.10 for each of the second and third years, and \$1.00 for each of the fourth and fifth years. The mining license fees per hectare are: \$5.00 for each of the first 3 years of the term of the license, \$7.50 for each of the fourth and fifth years of the term of the license, and \$10.00 for each year of the term of the license commencing from the sixth year. The royalty rate for all minerals is 2.5%. The corporate income tax ranges from 15% to 40% (30% effective 1998). Tax deductions include depreciation of fixed assets over 5 years and amortization of exploration and acquisition costs over 5 years (Mineral Resources Authority of Mongolia, 1998).

Enactment of the Mineral Resources Law in 1997 had resulted in exploration boom in the past 2 years and the total exploration expenditures were expected to reach between \$40 million and \$50 million by the year 2000 (Mineral Resources Authority of Mongolia, March 22, 1998, Information, accessed March 24, 1999, at URL http://www.mram.mn/info_s~1.html). The number of foreign investors engaged in geologic prospecting and exploration in Mongolia increased considerably in 1998. A total of 29 new companies were incorporated in Ulaanbaatar for geologic prospecting, mineral exploration, development, and processing in 1998. In the past 2 years, the major western mining companies with exploration licenses conducting exploration in Mongolia included BHP World Minerals Inc. of Canada, BHP Minerals International Exploration, Inc. and Phelps Dodge Corp. of the United States, RTZ Mining and Exploration Co. of the United Kingdom, and General De Materis Nakleris of France (Board of Foreign Investment, 1998).

In 1998, coal, copper, fluorite, gold, gypsum, limestone, molybdenum, salt, sand and gravel, silica, tin, and tungsten were produced. (*See table 1.*) Production of uranium ceased in

1996 because of low prices of uranium on the world market. Production of coal, copper, fluor spar, and molybdenum was by large-scale joint-venture operations, and the rest of the minerals were produced by small- and medium-scale joint-venture and private operations. Most of the mining operations were in the north-central and eastern parts of the country. In 1998, Mongolia was the third largest producer of fluorite in the world and was the fourth largest mine producer of copper in the Asia and Pacific region.

The mining industry comprised 2 large, joint-venture companies that mine and process copper, fluor spar, gold, and molybdenum; 3 large, state-owned companies that mine coal; and more than 120 medium- and small-sized, state-owned and privately owned companies that mine mainly gold and other minerals, such as coal, gypsum, limestone, sand and gravel, salt, silica sand, tin, and tungsten. In 1998, the mining industry continued to play a major role in the industry sector as well as in the Mongolian economy. The output of the mining industry contributed about 55% to the output of the industrial sector. The output of the industry sector contributed about 21% to Mongolia's gross domestic product. The mining industry also contributed about 30% to the state budget revenues. In minerals trade, exports of mineral products accounted for about 58% of Mongolia's total exports, and imports of mineral products accounted for about 20% of the country's total imports. The major export mineral products were gold, ore and concentrates of copper, fluorite, and molybdenum. The major import mineral products were coal and refined petroleum products. The major minerals trading partners of Mongolia were China, Russia, and Switzerland in 1998.

Mine production of copper and molybdenum by Erdenet Mining Corp. (EMC) from the Erdenet Mine, about 365 kilometers (km) north-northeast of Ulaanbaatar, reached a record high level of 22 million metric tons (Mt) of ore in 1998. To increase efficiency and cut production costs, EMC's milling facilities at the Erdenet Combine had been upgraded with flotation equipment purchased from Outokumpu Technology, a subsidiary of Outokumpu Oy of Finland, in 1997. The Erdenet mill produced about 450,000 metric tons (t) of copper concentrates containing about 129,000 t copper and 4,500 t of molybdenum concentrate containing about 2,000 t molybdenum. The copper concentrate averages 28% to 30% Cu, 33% S, 22% Fe, 9% SiO₂ plus 50 to 70 grams per metric ton (g/t) Ag, 50 g/t Se, 9 g/t Te, and 0.3 to 0.5 g/t Au. The molybdenum concentrate contains 50% to 54% Mo, 32% to 35% S, plus 450 g/t Re, 90 to 100 g/t of Se, and 2 to 3 g/t Te. A small, but increasing quantity of tungsten concentrate had been produced from the mill (Mineral Resources Authority of Mongolia, March 22, 1998, Mineral potential of Mongolia, accessed March 25, 1999, at URL http://www.mram.mn/Min_po~1.html).

For the past 2 years, EMC had suffered from substantial financial difficulties because of low copper prices, high overhead costs, and unsettled payment by the Balkhashmi smelter of Kazakhstan for nondelivery of \$12 million-worth of refined copper to EMC (Far Eastern Economic Review, 1999). To continue its normal operation and regain its financial stability, EMC had secured a \$20 million credit from the Credit

Lyonnais of France, and taken steps to restructure the company and reduce production costs (Mongolian National News Agency, Headlines, December 14, 1998, Largest joint venture celebrates 20th year mark, accessed December 14, 1998, at URL <http://www.mol.mn/montsame/news/english/monday.htm>). On December 13, EMC, a 51-49 joint venture between the Mongolian and Russian Governments, celebrated its 20th anniversary of mining and mineral processing at the Erdenet complex. Over the past 20 years, the Erdenet complex had produced a total of about 2 Mt of copper. The mill capacity with an initial capacity of 4 million metric tons per year (Mt/yr) in 1978 was expanded to 16 Mt/yr in 1983 and to 21.5 Mt/yr in 1997. In December, EMC's joint-venture council had decided to expand the mill capacity to 24 Mt/yr by 2004.

Erdmin Co. Ltd. continued operation of its 3,600-metric-ton-per-year (t/yr) solvent-extraction and electrowinning pilot plant to extract copper from pregnant solution in the mine leach dump near the Erdenet Mine. According to information provided by the Mining Office of Mineral Resources Authority of Mongolia (MRAM), the Erdmin copper pilot plant produced 2,319 t of copper cathode in 1998, down 15.7% from 2,751 t in 1997. According to an official of the pilot plant at the Erdenet, the total production cost of copper cathode in 1998 was about \$0.80 per pound or about \$0.36 per kilogram (kg).

Armada Gold Corp., the 49% owner and operator of the copper pilot plant, reported that the feasibility study on its Phase II copper operation to produce 20,000 t/yr of copper cathode had been completed by Kilborn, CMPS&F of Australia and Chiyoda Corp. of Japan in November. The estimated project cost was \$61.4 million with operating costs of \$0.32 per pound or about \$0.145 per kilogram for the first 4 years, then, will increase to \$0.41 per pound or about \$0.186 per kilogram for the following 6 years. The 10-year project life was based on existing stockpiles of waste rocks at the dumps. However, at the present mining rate, the waste rocks at the dumps would be sufficient to last about 80 years. Erdmin has the right to all waste rock from the Erdenet Mine for the next 40 years. Construction works on the Phase II operation was expected to start in March 1999, and the leaching operation was expected to begin in November 1999 with full operation to begin in July 2000 (Armada Gold Corp., 1998).

According to the National Statistical Office, exports of copper and molybdenum concentrates totaled 454,000 t and 4,400 t, and were valued at \$119 million and \$13 million, respectively, in 1998. Copper concentrate was exported to China, Finland, Japan, the Republic of Korea, Russia, Switzerland, and the United States. Molybdenum concentrate was exported to China, Japan, Russia, Switzerland, and the United States. Copper cathode was being transported through China for export mainly to Japan by Marubeni Corp., a major Japanese trading company that financed the Erdmin project.

Mine production of gold rose to a record high level of 9.8 t in 1998. Despite low prices of gold on the world market, the gold mining sector continued to grow in 1998. Following the 1992-96 national gold policy, a new Government policy, called Gold-2000, was launched by the Ministry of Agriculture and Industry (MAI) in 1997. As a result, a large and growing number of low-cost placer gold miners were operating in the

mining districts of Bayankhongor, Irongol, and Zaamar and along the Tuul River in Central Mongolia. According to MAI, under this new policy, gold production is expected to reach 11 t in 1999, 14 t in 2000, and 20 to 25 t in 2003 (Mongolian National News Agency, September 9, 1998, Headlines, Gold extraction up 10 times in the last 6 years and Mongolia is expected to extract 20-25 tons of gold in 2003, accessed September 9, 1998, and November 10, 1998, at URL <http://www.mol.mn/montsame/news/english/wednesda.tuesday.html>).

Mongolrostsvetmet Corp. (MONROS), Mongolia's largest gold producer, operated two gold mines in the Tolgoit and Tuulgol areas and produced about 2,500 kg; followed by Shijiarart Co., 1,402 kg; Gatsuurt Co., 1,013 kg; and Bugant Co., 536 kg. Other important gold producers were the state-owned companies, Almass, Bayangol Jalga, Erdes, Ikh Alt, Ikh Uvuljuu, Jargalant Ikh, Khavchuu Alt, Khailaast, Mongol Erdene, and Shoroon Ord, and about 100 other small, state-owned and privately owned companies. The major gold mining areas were at Tolgoit, Sharin Gol, Havchuu, Ikh Uvuljuu, and Burhant in north-central Mongolia; at Mukhar Ereg and Uvur Chuluut in the Bayakhongor area of southwestern Mongolia; and at Bumbat, Khailaast, Nariin Gol, Tsagan Chulut, Tosongin Gol, and many other placer deposits along the Tuul River in the Zaamar District of north-central Mongolia.

Mongolia Gold Resources Ltd. (MGR), in joint venture with Mongol Alt Corp. (MAC) of Mongolia, shutdown its operations at the Bumbat Mine in the Zaamar District in mid-January owing to MAC's inability or unwillingness to provide their financial contribution. In November, MAC, the 51% owner of the Bumbat Mine, reached an agreement to sell their entire interest in the Bumbat Mine to the Trade and Development Bank of Mongolia (TDBM) in satisfaction of their indebtedness to TDBM of \$3 million (Mongolian Gold Resources Ltd., 1998).

To reduce the federal budget deficit, the Government backed by the International Monetary Fund, finally decided to impose a 10% value added tax on sales and exports of gold beginning on November 6, 1998, despite strong opposition by the industry officials. Earlier on August 28, the State Ikh Hural (Parliament) approved a 13% tax on sales and exports of gold, but was vetoed by the President following advice from the Government and industry officials concerning over the tax impact on the foreign investment climate (Mongolian National News, Headlines, November 6, 1998, Set 10 percent of value added tax on gold, accessed November 10, 1998, at URL <http://www.mol.mn/montsame/news/english/friday.htm>).

Metal production of steel by the state-owned Darhan Minimetals, south of Darhan, about 220 km north of Ulaanbaatar, was about 25,000 t of steel products in 1998, compared with the installed capacity of 120,000 t/yr. Since the plant began operation in mid-1994, the accumulated losses amounted to about \$1.5 million because of a small domestic market, inexperienced management, and inadequate amount of working capital. The Government had taken steps to restructure the company with a new management team in 1996 and had converted about \$36 million of debt into equity in 1997. The Government was considering to fully or partially

privatize the company by 1999. The production facilities comprised semimanual scrap melting, continuous casting, and rolling processing equipment; a manual scrap-sorting yard; two cranes for scrap handling; a mechanized metal breaking plant; a finished goods storage and loading area; two 25-t electric furnaces; a scrap preheating plant; a storage facility for alloys; an industrial wastes treatment plant; coal-fired boilers; and a power station (State Property Committee, April 4, 1998, Brief description of Darhan Minimetals plant, accessed April 8, 1998, at URL <http://www.spc.gov.mn/company/Darkhan/darkhaniitumur.html>).

Production of tin and tungsten remained small in 1998. According to MRAM, production of tin was by Bayan Mod Co. Ltd. at the Bayan Mod Mine in Tsenkhermandal, Khentiy Aymag and by Och Impex Co. Ltd. at the Mongon Mine in Khuh Mort, Umnugobi Aymag. Production of tungsten was by Mongolminimetals Co. Ltd. in Bayanchandman, Tov Aymag and Mongolexport Co. at the Khovd Gol Mine in Tsengel, Bayan Olgii Aymag of western Mongolia. The Ulaan Uul Mines in Bayan Olgii in western Mongolia and the Tsagaan Davaa Mine in Tov Aymag in north-central Mongolia remained closed in 1998.

In 1998, production of fluorspar by MONROS totaled 612,000 t, of which about 90% of the ore was processed into fluorspar concentrate, and the remainder was exported as direct-shipping ore. Production of fluorspar concentrate increased to 157,700 t in 1998. MONROS operated two fluorspar mines at Bor Ondor and Berkh and a fluorspar concentrator at Bor Ondor in Khentiy Aymag. The company also operated two fluorspar mines at the Airag, Khajuu Ulaan, and Urgen in Dornogovi Aymag. The fluorspar concentrator has a capacity of producing 140,000 t/yr of acid-grade concentrate and 40,000 t/yr of metallurgical-grade concentrate. The concentrator produced three types of acid-grade concentrate with calcium fluorite (CaF₂) content ranging from 95% to 97% and impurities of SiO₂ ranging from 2% to 3%; CaCO₃, from 1% to 2%; S, 0.05%; and P, from 0.03% to 0.06%. The concentrator also produced eight types of metallurgical-grade concentrate with CaF₂ ranging from 75% to 92% and impurities of SiO₂ ranging from 5% to 20%; S, 0.05% to 0.1%; and P, 0.04% to 0.1%. The company planned to expand the capacity to 155,000 t/yr acid-grade and 45,000 t/yr metallurgical-grade by 2000. Almost 100% of fluorspar concentrates and direct-shipping ore was exported to Russia as raw materials for the chemical, iron and steel, and nonferrous metals industries. Export earnings from fluorspar concentrate were estimated at \$16.5 million in 1998, down considerably from that of 1996 because of downward price pressure from Chinese producers (Mongolrostsvetmet Corp., 1998).

Cement production remained at a low level in 1998 because of a small domestic market and weak demand by the construction industry. The cement industry comprised only two cement works in north central Mongolia. The 100% state-owned Hutul Cement and Lime Co. operated a 500,000 t/yr plant at Hutul in Saikhan, Selenge Aymag. The Hutul plant was virtually shut down during 1992-94, but reopened in 1995. Hutul plant produced 41,000 t of cement and 44,800 t of lime in 1997. Because of the severe winter, the plant's capacity

utilization was at the rate of less than 10%. Most cement and lime output was consumed by EMC at the Erdenet complex (State Property Committee, September 10, 1998, Introduction to the Hutul Cement-Lime, accessed April 8, 1999, at URL <http://www.spc.gov.mn/company/Selenge/Hutulcem.html>). The 51% state-owned Arbet Co. Ltd., operated a 200,000 t/yr plant near Darhan, also produced at a fraction of its installed capacity. In 1998, Arbet Co. Ltd. was undertaking a \$1 million upgrading project (International Cement Review, 1998). Mongolia's per capita cement consumption was about 50 kg, compared with China, 400 kg; Japan, 650 kg; and the Republic of Korea, 1,320 kg in North Asia (Japan Cement Association, 1998).

Coal production remained below 5 Mt in 1998. The two large-scale coal mines, operating in 1998 were the Baga Nuur Mine with a capacity of 4 Mt/yr and the Shariyn Gol Mine at 1.5 Mt/yr. The medium-scale coal mines producing between 200,000 and 400,000 t/yr were the Aduunchuluun Mine and the Shivee Ovoo Mine. Many small-scale coal mines produced less than 100,000 t/yr, mainly at Bayanteeg, Mogoingol, Talbulag, Tevshingobi, and Hudlun. Most of the coal produced in Mongolia was steam (brown) coal. There were three major metallurgical-grade coal mines producing between 50,000 and 170,000 t/yr at Nuursthogor and Har Tarvagataj in Uvs Aymag and at Tavan Tolgoit in Omnogovi Aymag.

Consumption of coal totaled about 4.9 Mt, of which the thermal powerplants accounted for 3.7 Mt; industry and construction, 756,000 t; communal housing, 282,000 t; transportation and communication, 95,000 t; and agriculture and other end users, 129,000 t (National Statistical Office, 1998).

According to the State Property Committee, 100% state-owned Saikhan Ovoo Mining in Bulgan, 93% state-owned Khotgor Co. in Bayan Ulgy, 90% state-owned Shivee Ovoo in Gobisumber and Aduunchuluun Co. in Dornod, 80% state-owned Shariyn Gol in Darhan Uul, and seven other partially state-owned coal companies were expected to be privatized by 2000 (State Property Committee of Mongolia, October 1, 1997, List of large, fully and partially State-owned enterprises to be privatized, accessed April 8, 1999, at URL <http://www.spc.gov.mn/largea.htm>). For the first time in more than 30 years, Mongolia began production of crude petroleum in 1998. London-based SOCO International, Inc., through its operator, SOCO Tamtsag Mongolia, Inc. (SOTAMO), brought on-stream its 19-3 well in Block XIX in Tamtsag basin in January. According to the company, the well tested and stabilized at 687 barrels per day (bbl/d). A gathering station and a 5,000 bbl/d-processing plant had been installed near the well. Under a sale contract signed with China National Petroleum Corp., SOTAMO started selling and transporting crude petroleum from its 19-3 well by truck to Aershan pipeline terminal in Inner Mongolia at the rate of 10,000 barrels per month in February. The crude petroleum was then delivered via pipeline and rail car to a refinery at Hohhot, China. During 1993-97, SOCO had drilled eight wells in Blocks XIX and XXI. Six wells encountered hydrocarbons—all except one are economically viable (Oil & Gas Journal, 1998).

According to the Petroleum Authority of Mongolia (PAM), SOTAMO had spent a total of about \$26.4 million for oil exploration by the end of 1997. The company planned to spend \$20 million for drilling seven wells in Block XIX and one in Block XXI in 1998 and considered building a 300-km pipeline from a producing oilfield to the Mongolia-China border in 1999 (Petroleum Authority of Mongolia, March 30, 1998, Recent upstream activities in Mongolia—Tamtsag basin, accessed June 16, 1998, at URL http://www.pam.mn/Petroeul_Industry_Overview.html).

In 1998, SOCO International and Territorial Resources of Canada, an equal partner, signed an agreement with the PAM for oil exploration and development in Block XI in the East Gobi basin. Gulf Canada Resources Ltd. (75%) and ROC Oil of Australia (25%) acquired from Nescor Energy Co. of the United States all the rights and assets under production-sharing contracts for oil exploration on Blocks XIII and XIV, including 6 million barrels of proven oil reserves and existing infrastructure in East Gobi (World Oil, 1998). According to PAM, a production-sharing contract was signed between PAM and Mantaur Petroleum Corp. of Canada for oil exploration in Block XII in the East Gobi basin and Block XVII in the northern part of the Tamtsag basin. PAM also signed a production-sharing contract with Gulf Canada and ROC Oil for oil exploration in Block X-north and Block XV in the southeastern Mongolia.

To meet the domestic requirements for refined petroleum products such as gasoline, jet fuel, diesel, and fuel oil, Mongolia reached an agreement with a Chinese supplier to import refined petroleum products from China, with the first delivery by railway beginning in November. In the past years, Mongolia relied 100% on imports from Russia (Mongolian News Agency, November 10, 1998, "NIC" to import petrol from China, accessed November 11, 1998, at URL <http://www.mol.mn/montsame/news/english/tuesday.htm>).

Mongolia stopped uranium production in 1996 because of low prices of uranium in the world market. Previous uranium mining carried out by Erdes, a Russian company, was in the Mardai district, about 120 km north of Choibalsan in Dornod Aymag, northeastern Mongolia. Mining operations began in 1988 and continued on and off until 1996. The Dornod uranium mine had a normal output of about 113,398 kilograms per year (kg/yr) of U₃O₈ or 250,000 pounds per year (lb/yr) (Mining Journal, 1998). During 1988-95, the mine produced a total of about 1.2 million pounds or about 544,310 kg of U₃O₈. All output was shipped by railway to the Priargunskiy mill in Krasnokamensk, Russia for further processing into uranium concentrate.

In June 1997, World Wide Minerals Ltd. of Canada acquired 58% interest in Central Asian Uranium Co. Ltd. (CAUC). CAUC was formerly a joint venture of WM Mining of the United States (58%), the state-owned Mongol Erdene (21%), and Priargunsky Mining and Chemical Association (21%) of Russia. World Wide Minerals Ltd. had reactivated the open pit mine and completed construction of leach pad No. 1 in mid-1998. However, according to the company, plans for continued

mining and acquisition of additional mining equipment and the leach plant as well as plans to reopen the underground mine have been put off as of August 7, 1998. This was because of unfavorable market conditions and a shortfall in corporate capital, owing to the delay in the recovery of investment from Kazakhstan. Despite the delay, the company indicated that it is still in a position to complete construction of the phase 1 project in time to commence delivery of uranium under existing sales contracts in 1999. Production is still planned for up to 3.3 million metric pounds/yr of U₃O₈ by the year 2000 (World Wide Minerals Ltd., March 2, 1999, World Wide Minerals Ltd.—Uranium project summaries: Mongolia, accessed March 17, 1999, at URL <http://www.worldwideminerals.com/WWS/invRel.nsf/Public/DornodUraniumProject-Mongolia>).

In February, the Denver-based International Uranium Corp. (IUC) acquired 35% more land in central-eastern Mongolia through its 70%-owned Gurvan Saikhan Co. Ltd. (GSC). GSC is a joint venture of IUC and the Governments of Russia and Mongolia for uranium exploration and development in the Gobi Desert (International Uranium Corp., February 5, 1998, International Uranium Corp. announces acquisition of additional exploration land in Mongolia, accessed February 8, 1998, at URL http://biz.yahoo.com/bw/980205/internatio_1.html).

As a result of exploration conducted in 1997, GSC had identified considerable uranium resources of about 28 million pounds of U₃O₈ suitable for in situ leach mining in the Choir, Gurvansaikhan, Olziit, and Ondorshil valleys. The 1997 drilling program conducted by IUC at the Khairhan deposit in Olziit soum, Dundgobi Aymag, had discovered uranium resources of about 10.8 million pounds at a 0.024% U₃O₈ cutoff rate (Engineering and Mining Journal, 1998). IUC's drilling program for 1998 was mainly to confirm and expand the existing reserves in the target area.

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Major Source of Information

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Major Publication

National Statistical Office of Mongolia: Monthly Bulletin of Statistics and Mongolian Statistical Yearbook.

TABLE 1
MONGOLIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1994	1995	1996	1997	1998 p/
Cement, hydraulic thousand tons	86	109	106	112	109
Coal do.	5,158 r/	5,019 r/	5,111	4,952 r/	4,698
Copper:					
Mine output, Cu content 3/	120,159 r/	121,901 r/	123,039 r/	124,400 r/	128,900
Metal, refined	--	--	--	2,751 r/	2,319
Fluorspar:					
Acid grade thousand tons	88	120	130	130	158
Submetallurgical and other grade do.	17 r/	13 r/	37 r/	41 r/	40 e/
Total	105 r/	133 r/	167 r/	171 r/	198 e/
Gold, mine output, Au content 4/ kilograms	1,790 r/	4,504 r/	6,976 r/	8,771 r/	9,790
Gypsum e/ thousand tons	25	25	25	25 r/	10
Lime, hydrated and quicklime do.	66	51	55	58 r/	56
Molybdenum, mine output, Mo content 3/	2,066 r/	1,822 r/	2,201 r/	1,992	1,993
Petroleum, crude thousand 42-gallon barrels	--	--	--	--	45
Salt, mine output	624 r/	726 r/	696 r/	1,354 r/	1,400 e/
Silver, mine output, Ag content e/ 5/ kilograms	18,900	19,100	19,300	22,800 r/	23,600
Steel, crude	12,222	22,239	22,605	22,500 e/	16,300
Tin, mine output, Sn content e/	8 r/	34 r/	18 r/	10 r/	40
Tungsten, mine output, W content e/	-- r/	34 r/	17 r/	26 r/	30
Uranium, mine output, U content e/	100	100	-- r/	-- r/	--

e/ Estimated. p/ Preliminary. r/ Revised.

1/ Table includes data available through April 21, 1999.

2/ In 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.

3/ Based on the company's reported metal content of copper and molybdenum concentrates.

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

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