



2011 Minerals Yearbook

AFGHANISTAN

THE MINERAL INDUSTRY OF AFGHANISTAN

By Chin S. Kuo

Afghanistan is a land-locked country. Mineral and energy resources represent a potentially significant source of Afghanistan's wealth. The major mineral resources include chromium, copper, gold, iron ore, lead and zinc, lithium, marble, precious and semiprecious stones, sulfur, and talc. The energy resources consist of natural gas and petroleum. If developed, they could augment the country's economic growth. Resource development would require improvements in infrastructure and security in the country. Investment in infrastructure and transportation projects for mining was a critical aspect of developing the mineral industry.

The Government was undertaking a privatization and licensing program for four of its mineral prospects in 2011. They were the Badakhshan gold project in Badakhshan Province, the Balkhab copper project in Sar-e Pul and Balkh Provinces, the Shaida copper project in Herat Province, and the Zarkashan copper-gold project in Ghazni Province. The Government set a deadline of March 9, 2012, for the submission of expressions of interest in these projects. The tender process for each project was expected to result in the granting of a mining agreement and associated exploration license (Ministry of Mines, 2011).

In an effort to attract foreign investors to help develop Afghanistan's untapped mineral resources, the Government drafted a labor policy that set the minimum age for coal mine workers at 18. The guidelines were scheduled to be implemented in late 2011, and mining inspectors would be employed to ensure that the rules were upheld. Child labor was widespread in Afghanistan, and about 200 children were found to be working in coal mines in central Bamyan Province. Thirty years of conflict has pushed impoverished families to allow children to work in mines. Child labor was also used in small operations, such as cement production (Nichols, 2011b).

The Government planned to build an extensive rail network that would link its borders in a bid to attract investors to its mining projects, such as those for copper and iron ore. In 2010, the first 75-kilometer (km) of the railway was completed. The \$180 million rail line, which was financed by the Asian Development Bank, linked Mazar-i-Sharif to Hayratan near the Uzbek border. The Uzbek national rail company Uzbekistan Temir Yollari built the line and agreed to operate it for 3 years. The line had the capacity to handle one-half of Afghanistan's imports from Uzbekistan. The line's extension from Mazar-i-Sharif to Andkhai on the Turkmenistan border at a cost of between \$450 million and \$500 million was in the planning stage. An Iran-funded line was under construction from Iran to Herat. Other infrastructure projects were also in the planning stage. These included a \$300 million natural gas pipeline project that would link Kandahar to Chaman on the border with Pakistan (Irish, 2011).

Minerals in the National Economy

With international assistance, Afghanistan's economy was recovering from a decade of conflict. In 2011, real gross domestic product (GDP) growth was estimated to be 7.1%; the main contributors to the GDP were the agriculture, industrial, and services sectors. The contribution of the mineral industry to the GDP was insignificant. Afghanistan's mineral industry was at a primitive artisanal stage of development; the operations were all small-scale, and output was supplied mainly to local and regional markets. The country produced cement, coal, natural gas, and some industrial minerals for domestic consumption. Afghanistan exported a small amount of precious and semiprecious gemstones and imported petroleum products.

Production

Owing to the lack of mineral production data reported by the miners, information about Afghanistan's mining activities was not readily available, but the activities in general appeared to be limited in scope except for planned operations by foreign companies. The Government provided only partial output data for 2008 through 2010 (table 1). Production of barite was estimated by the U.S. Geological Survey (USGS) to be about 2,000 metric tons (t); chromite, 6,500 t; and natural gas liquids, 45,000 barrels in 2011. Production of cement was estimated to have increased by 6.7% compared with that of 2010, and petroleum condensate, by 9.4%. Output of gypsum, however, was estimated to have decreased by 1.7%. In the process of reconstruction and infrastructure development, output of construction minerals was estimated to have increased to meet the domestic requirements.

Structure of the Mineral Industry

Privatization of Afghanistan's state-owned companies, which controlled many of the country's mineral resources, was ongoing but not complete. The Government encouraged investment in the mineral sector by private domestic companies and foreign investors. Foreign companies from Canada, China, and India had begun to participate in the country's resource development.

The Ministry of Mines is involved in the exploration for and development, exploitation, and processing of minerals and hydrocarbons. The Ministry is also responsible for protecting the ownership and regulating the transportation and marketing of mineral resources in accordance with the country's new laws. Afghanistan's mineral production facilities are listed in table 2.

Commodity Review

Metals

Preliminary work indicated that a number of metallic deposits occur in the country. A high-grade chromite ore deposit was

discovered in the Eocene Kabul ophiolite in Logar Province. Mercury was known to be present in an epithermal-type mineralization at Kharnak in Ghor Province along with a mineral assemblage of cinnabar, realgar, and stibnite. Known lead-zinc deposits included the Nalbandan fault-related deposit and the Darra-i-Nur and the Kalai-Assad skarn deposits in east-central Afghanistan. Tin and tungsten deposits were found to be fault-zone, pegmatite, or skarn related; these included the Farah skarn tungsten-copper deposit in Farah Province and the Misgaran skarn tin deposit in Herat Province. A uranium prospect was found in veinlets with uraninite in the Khanneshin carbonatite volcanic complex in Helmand Province (Afghanistan Geological Survey, 2011).

Copper.—The Afghan copper belt, which is comparable in extent to the Zambian copper belt, is located in Kabul and Logar Provinces and extends for a length of 600 km; it hosts 3 known copper deposits and 35 known mineral occurrences. The most explored of these deposits was the Aynak deposit, which had an indicated reserve of 240 million metric tons (Mt) at a grade of 2.3% copper, for a total of 5.52 Mt of contained copper. Other known deposits in the belt were the Darband (east of Aynak) and the Jawkar (north of Aynak) deposits. Other significant copper mineralization with gold occurred in the Kundalyan skarn-type deposit in Ghazni and Zabul Provinces in east-central Afghanistan (Afghanistan Geological Survey, 2011).

Metallurgical Corp. of China Ltd. (MCC) expected its \$4 billion Aynak copper mine south of Kabul to start production in 2014. The copper project, in which MCC owned a 75% interest and Jiangxi Copper Co. Ltd. held the remaining 25% interest, was delayed for several years by the discovery of historic artifacts at the site. The construction of a rail linking Aynak to Kabul was planned (Reuters, 2011).

Gold.—Gold mineralization was identified in the Zarkashan skarn deposit in Ghazni Province in east-central Afghanistan. Skarn occurred in pockets or as a sheet-like deposit. The Vekadur gold-silver deposit in Badakhshan Province also indicated gold mineralization with a podiform orebody. Placer gold mineralization was found in the Samti deposit where two gold-bearing horizons had been discovered. This alluvial deposit was confined to floodplain and the first terrace of the Panj River (British Geological Survey, 2006).

Afghan Krystal Natural Resources, which was a local company backed by foreign investors from Indonesia, Turkey, the United Kingdom, and the United States, planned to develop a second gold project at Qara Zaghan in Baghlan Province with an investment of \$50 million. Exploration activities were expected to intensify in the next 2 years, and production was expected to begin in 2013. The Government would earn 26% in royalties and taxes from the mine. The agreement was facilitated by JPMorgan Chase & Co. of the United States. Westland General Trading LLC of the United Arab Emirates was developing the Nor Aaba gold mine near the Tajik border in Takhar Province (Nichols, 2011a).

Iron Ore.—Four iron ore deposits in addition to Hajigak had been identified in the Afghan iron belt. The largest was the Khaish iron ore deposit in Bamyan Province. Two deposits, the Furmurah and the Syakh Jar, had been discovered in Badakhshan Province, and both were tabular skarn-type

deposits. The fourth was the Zerak deposit in Baghlan Province; it occurs in a fault zone with three hematite-magnetite ore zones (Afghanistan Geological Survey, 2011).

Kilo Goldmines Ltd. of Canada and a group of companies from India, which were led by Steel Authority of India Ltd. and National Mineral Development Corp. Ltd., were awarded a \$6 billion contract to mine the Hajigak iron ore deposit in the Provinces of Bamyan, Parwan, and Wardak. The deposit extends for more than 32 km, covers 16 separate ore zones, and contains 1,800 Mt of ore at a grade of 62% to 63% iron; it was considered to be the world's leading iron ore resource. The primary ore (which made up 80% of the deposit) contained magnetite and pyrite with a minor amount of chalcopyrite, and the remaining 20% was oxidized hematitic ore. The Government awarded three of the four Hajigak blocks to the Indian companies, which also included Ispat Industries Ltd., Jindal Steel & Power Ltd., JSW Steel Co. Ltd., and Tata Steel. The fourth block was awarded to Kilo Goldmines (Topf, 2011).

Industrial Minerals

The USGS investigated and studied the occurrence of industrial minerals in Afghanistan and showed that the country held deposits of asbestos, barite, clays, dolomite, graphite, limestone, potash, rare earths, sand, and talc. Undiscovered graphite deposits were estimated to be about 1 Mt and were likely to be found in northeastern Afghanistan. Undiscovered potash deposits could be as much as 27.5 Mt in the northern part of the country (Lismore, 2011).

Rare Earths.—The USGS reported a significant deposit of light rare-earth elements (LREE), which was estimated to be as much as 1 Mt, within the Khanneshin carbonatite complex in the Registan desert of Helmand Province. The deposit was comparable in grade to the world-class LREE deposits of Mountain Pass in the United States and Bayan Obo in China. The LREE included cerium, lanthanum, neodymium, and praseodymium. In addition to LREE, the deposit also contained barium, phosphorus, strontium, and uranium. The primary area of mineralization covered 0.74 square kilometer and was first identified by Soviet geologists in the 1970s (Tucker and others, 2011).

Mineral Fuels

Petroleum.—The Government of Afghanistan had decided to award its first international oil-production contract to China National Petroleum Corp. (CNPC) for three blocks in the Amu Darya Basin in the northwest of the country. Other bidders included Buccaneer Energy of Australia, Shahzad International of Pakistan, and Tethys Petroleum Ltd. of the United Kingdom. The three blocks—the Bazarkhami, the Kaskari, and the Zamarudsay—held an estimated 80 million barrels (Mbbbl) of oil. CNPC offered to pay a 15% royalty on each barrel of crude oil and a 30% corporate tax on its profits, as well as to build a \$300 million refinery. The Government also was planning to conduct seismic surveys before tendering blocks in the Afghan Tajik basin, which was estimated to contain 1,800 Mbbbl of oil (Petroleum Economist, 2011).

Outlook

Afghanistan's economic growth is expected gradually to rely on the development of its rich mineral resources. Foreign investment in infrastructure and transportation for mining is a key factor to develop its mineral industry. Some copper and gold projects are in the development stage and are expected to start production in 2013 or later. Contracts for iron ore and petroleum projects have been awarded. The country is expected to offer more tenders of bids for resource development in the near future.

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TABLE 1
AFGHANISTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity	2007	2008	2009	2010	2011	
Barite	2,000	2,000	2,000	2,000	2,000	
Cement, hydraulic	30,000	37,300 ³	31,500 ³	35,600 ³	38,000	
Chromite	6,800	7,000	6,000	6,000	6,500	
Coal, bituminous	250,000	346,900 ³	500,100 ³	724,900 ³	750,000	
Gas, natural:						
Gross	million cubic meters	135	155 ³	142 ³	142 ³	145
Marketed	do.	130	145	140	140	142
Gypsum		35,000	48,700 ³	46,400 ³	63,100 ³	62,000
Marble		30,000	36,900 ³	26,600 ³	28,900 ³	30,000
Natural gas liquids	thousand 42-gallon barrels	45	45	45	45	45
Nitrogen, N content of ammonia		16	18 ³	22 ³	27 ³	28
Petroleum, condensate	42-gallon barrels	100	156 ³	104 ³	64 ³	70
Salt, rock		170,000	158,200 ³	180,300 ³	186,100 ³	190,000

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¹Estimated data are rounded to no more than three significant digits.

²Table includes data available through June 28, 2012.

³Reported figure.

TABLE 2
AFGHANISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
Aluminum:			
Extrusion and powder coating	Qader Najib Ltd.	Kabul	NA
Manufacture	Salam Bilal Ltd.	Kandahar	360
Copper, in concentrate	Aynak Minerals Co. Ltd. (China Metallurgical Group Corp., 75%, and Jiangxi Copper Co. Ltd., 25%)	Aynak, Logar ¹	180,000
Fertilizer, urea	Kud Bergh Fertilizer Ltd.	Qala Jangi near Mazar-i-Sharif	105,000
Lapis-lazuli	kilograms Government owned	Sary-Sang, Badakhshan	9,000
Steel, manufacture	Khalil Najeeb Steel Mills Ltd.	Jalalabad, Kabul, and Mazar-i-Sharif	36,000

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

¹The Aynak Mine is expected to start production in 2014.