



2009 Minerals Yearbook

ARMENIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF ARMENIA

By Richard M. Levine

Armenia was a major producer of molybdenum and ranked an estimated seventh in the world in mine output in 2009 (Polyak, 2010). Besides molybdenum, Armenia produced other metals, which included copper, gold, silver, and zinc, and industrial minerals, which included cement, diatomite, gypsum, limestone, and perlite. The country also was producing aluminum foil based on aluminum imported from Russia, and ferromolybdenum, molybdenum metal, and rhenium salt from local ores, and it had developed a diamond-cutting industry based on imported raw materials. The country had almost no domestic fuel production and relied for electric power on a domestic nuclear powerplant and hydroelectric plants. It imported fuel for its nuclear powerplant and natural gas from Russia.

Armenia possesses significant resources of copper, gold, iron, lead, molybdenum, and zinc. It also has resources of construction material, such as basalt, granite, limestone, marble, and tuff; semiprecious stones, such as agate, jasper, and obsidian; and other nonmetallic minerals, such as bentonite, diatomite, perlite, and zeolite. The copper, copper-molybdenum, and copper-polymetallic deposits in the north of Armenia contain about 475 million metric tons (Mt) of ore. The Zangezur copper-molybdenum complex possesses large molybdenum reserves that are concentrated in the K'ajaran deposit. Gold reserves at the Sotk deposit, which was being mined by GeoProMining Ltd., are reportedly 80 metric tons (t) (Interfax Russia & CIS Metals and Mining Weekly, 2007c). The country also possesses uranium reserves, which were reported to range from 10,000 to 60,000 t of uranium. Uranium deposits in Armenia were being explored by the Armenian-Russian Mining Co., which was a joint venture formed in 2008 between the Government of Armenia and the Russian company Atomredzoloto (Avagyan, 2008; Interfax, 2009).

The Armenian economy expanded rapidly from 2001 to 2007. The gross domestic product (GDP) increased at an annual average real growth rate of 13%. In 2008, economic and financial conditions worsened in Armenia owing to, among other things, a decrease in international metals prices, and the GDP growth slowed to 6.8%. In 2009, a construction boom that had driven growth in recent years ended, which resulted in a 14.4% decrease in real GDP for the year, and about 80% of this decrease was caused by the decrease in activity in the construction sector (U.S. Department of State, 2010). The industrial sector, of which mining and metallurgical production was a part, composed about one-third of Armenia's GDP in 2008 (the latest year for which data were available) (U.S. Central Intelligence Agency, 2009).

Minerals in the National Economy

The Armenia Nuclear Power Plant (ANPP) at Metsamor provided about 40% of the electricity generated in the country, and hydroelectric powerplants and thermal powerplants provided about 30% each. Armenia was highly dependent

on imported mineral fuels, which came mainly from Russia. Armenia imported most of its natural gas from Russia, which had provided significant discounts to Armenia until 2009. Russia increased the price of gas that Armenia imported to \$154 per thousand cubic meters from \$110 per thousand cubic meters in April 2009, and further increased it to \$180 per thousand cubic meters in April 2010. Nevertheless, the price Russia was charging Armenia was still below the international average price of more than \$300 per thousand cubic meters. In the coming years, the price Russia would charge Armenia for gas was expected to converge with the international average market price (U.S. Department of State, 2010).

In May 2009, Iran began shipping gas to Armenia through a recently constructed pipeline; the pipeline was intended to diversify Armenia's gas supply. The majority of gas imported from Iran was expected to be used for power generation. Armenia imported almost all its refined petroleum products through Georgia. The conflict between Russia and Georgia in 2008 resulted in disruptions of fuel imports and highlighted Armenia's vulnerability to using a single transit corridor for its fuel imports (U.S. Department of State, 2010).

Deforestation caused by mining concerns in certain areas of the country had resulted in protests by environmental groups, and aroused controversy concerning Government policies to support investment in the mining sector. Armenia was under strong pressure from the international community to close the aging ANPP at Metsamor by 2016. If it were to close the ANPP, the Armenian Government suggested that it had no alternative but to construct a new nuclear powerplant. The U.S. Agency for International Development (USAID) funded an initial planning study, which was completed in September 2008, and concluded that a new nuclear powerplant was the least-cost option to replacing the existing facility. The Armenian Government was continuing the planning process for constructing a new nuclear powerplant (U.S. Department of State, 2010).

Production

Data on mineral production are in table 1.

Structure of the Mineral Industry

Foreign investors controlled a significant share of Armenia's mineral industry. ARMENAL, which operated a foil mill in K'anak'err, was a subsidiary of United Company RUSAL of Russia. The Zangezur copper-molybdenum complex was privatized at the end of 2004, and was owned by Cronimet Mining GmbH of Germany, 60%; the Open Joint Stock Company (OJSC) Yerevan Pure Iron Works, 15%; and Armenian Molybdenum Production LLC (AMP) and Zangezur Mining LLC (which represented the enterprise's former management), 12.5% each (Interfax Russia & CIS Metals and Mining Weekly, 2007b).

GeoProMining Ltd, which was a privately owned mineral resources company established in 2001, had assets in Armenia that included the Agarak copper-molybdenum mining and processing complex, the Sotk gold mine, and Ararat gold recovery plant. It bought the Agarak copper-molybdenum mining and processing complex in December 2007 and the Sotk gold mining complex in 2008. GeoProMining produced gold in the form of dore and antimony, copper, and molybdenum concentrates (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

The country's copper smelter at Alavderdi was owned by the CJSC Armenian Copper Programme (ACP). A Liechtenstein-registered firm Valex F.M. Establishment owned 81% of ACP and a Russian businessman owned the remaining 19% (Interfax Russia & CIS Metals and Mining Weekly, 2007a). AMP, which produced ferromolybdenum, molybdenum metal, and rhenium salts, was 51% owned by Cronimet Mining and the remaining shares were owned by Armenian residents (Interfax Russia & CIS Metals and Mining Weekly, 2008). Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Aluminum.—The ARMENAL aluminum foil rolling mill was one of the leading production facilities in Armenia and was the only producer of aluminum foil in the Caucasus and Central Asian regions. ARMENAL, together with two Russian foil mills—Sayanal in the Republic of Khakasiya and Urals Foil in the Sverdlovsk region—formed RUSAL's Packaging Division. ARMENAL employed more than 600 people (United Company RUSAL, 2007). In 2009, ARMENAL increased aluminum foil production by 83.57% to 21,456 t from 11,646 t in 2008. Most of ARMENAL's output was exported to the United States. The foil mill had been closed for an overhaul between 2004 and 2006 and it did not achieve its full production capacity of 25,000 metric tons per year (t/yr) of foil until the start of 2009. In 2009, ARMENAL produced 44.1 t of other aluminum products compared with 188.2 t in 2008 (Interfax Russia & CIS Metals and Mining Weekly, 2010c).

Copper and Molybdenum.—The leading producer of copper and molybdenum concentrates was the Zangezur copper-molybdenum complex followed by the Agarak copper-molybdenum mining and processing complex. Copper mining took place at the Kapan mining complex. GeoProMining bought the Agarak copper-molybdenum complex in December 2007. Agarak processed 1.3 Mt of ore in 2009, which was a 5% increase compared with production in 2008. The company said that its growth resulted from an increase in efficiency. In 2009, Agarak produced 248 t of molybdenum concentrate and 13,500 t of copper concentrate. The global economic crisis disrupted operations at the Agarak complex in 2008. The complex suspended operations in February 2009 and did not resume operations until June 30, 2009. In 2010, Agarak planned to mine and process between 3 Mt and 3.5 Mt of ore. It was modernizing its concentrating plant and performing other upgrades to augment throughput capacity

and the metal recovery rate (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

In 2009, the country's consolidated copper producer ACP increased blister copper production to 6,858 t, or by 5.8% compared with that of 2008. All copper ACP produced was exported to Europe. ACP produced 35,366 t of copper concentrate, which was a 3.2% increase compared with the 34,258 t it produced in 2008 (Interfax Russia & CIS Metals and Mining Weekly, 2010a).

ACP engaged in exploration, development, production, processing, and marketing of minerals and metals. The company owned the Alavderdi copper smelter, which was the only copper smelting facility in the Caucasus region. Alavderdi was designed to produce up to 10,000 t/yr of blister copper from copper concentrate. The company was also involved in the acquisition, exploration, and development of mining properties in Armenia. ACP was engaged in the development of the Teghout copper-molybdenum deposit. This deposit contains about 450 Mt of ore at an average grade of 0.36% copper and 0.022% molybdenum, totaling more than 1.6 Mt of copper and more than 100,000 t of molybdenum. In the first stage of operation at Teghout, ACP planned to produce about 30,000 t/yr of copper and 1,000 t/yr of molybdenum from processing 7 Mt/yr of ore. The first stage of the project required investment of \$280 million. ACP had already invested \$30 million in the project. The company had also signed a credit agreement with CJSC VTB Bank (Armenia) for a loan of \$245 million (American Chamber of Commerce in Armenia, 2010).

Gold.—Sterlite Gold Ltd. of Canada had held the license to operate the Sotk gold operations until it sold its interest in Sotk to a Russian-backed Georgian Group called Madneuli in early 2007; Madneuli then transferred the license to its subsidiary GeoProMining. GeoProMining was planning to construct a gold processing plant about 10 kilometers (km) from the shores of Lake Sevan, which is one of the world's largest high-altitude freshwater lakes and the sole source for 90% of Armenia's freshwater supplies.

Growing environmental concerns about GeoProMining's plans were prompting opposition to the project. The proposed plant reportedly would include a reservoir for cyanide and toxic chemicals and a dump for cyanide waste; the concern was that these toxins could seep into underground water conduits and enter the 1,200-square-meter lake. Contamination to Lake Sevan could pose a risk to the agricultural industry in the Ararat Valley, which provides about 70% of Armenia's fruits and vegetables and which takes needed irrigation waters from Lake Sevan. According to the chairperson of the Ecolur information center in Yerevan, warnings raised by Ecolur and other concerned social activists led Armenia's Energy and Natural Resources Minister and its Economic Minister to raise concerns about the project. The president of the Lake Sevan Committee also expressed opposition to building the processing plant so close to Lake Sevan. GeoProMining wanted to build the processing plant at its proposed location to reduce transportation costs for ore processing, as ore from Sotk otherwise would have to continue to be transported 263 km south to another GeoProMining processing center in Ararat.

The Armenian Government had not officially endorsed the project. GeoProMining maintained that it shared the concern for Lake Sevan's environment. The chairman of GeoProMining Gold's (a subsidiary of GeoProMining) Board of Directors stated that the company planned to use mining technologies that would eliminate the risk of environmental damage to Lake Sevan and would refuse to exploit the mine and would stop work there if there was the slightest environmental hazard. The former director of the Sevan National Park, however, argued that the area's landslides and seismic activity would negate any such technologies as no one, he claimed, could guarantee that the toxic waste dump would not be compromised in an earthquake. The smallest crack, he stated, would be enough to have the toxins penetrate into underground water. In addition, fears were raised about potential shelling from neighboring Azerbaijan, which had only a truce arrangement in its war with Armenia (Asbarez Staff, 2009; MAC—Mines and Communities, 2009).

Outlook

Armenia is positioned to increase production of copper and molybdenum; work is being planned to increase the amount of copper and molybdenum ore extracted and to increase the degree to which the metal is processed so the country can export semifinished metal products instead of raw material. Armenia expects to increase its energy supply as it is scheduled to receive additional natural gas from Iran from a pipeline through which gas shipments began in 2009. If Armenia proceeds to develop domestic uranium deposits under exploration by the Armenian-Russian Mining Co., it could be able to supply its entire uranium raw material needs for its nuclear powerplant.

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TABLE 1
ARMENIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2005	2006	2007	2008	2009
METALS					
Aluminum, foil	--	945	12,256	11,646 ^r	21,456
Copper:					
Concentrate, Cu content ^e	16,256 ²	18,000	17,600	18,800	19,000
Blister, smelter, primary	9,881	8,791	6,954	6,480	6,858
Ferrous alloys:					
Ferromolybdenum	2,260	4,865	5,977	5,323	5,144
Ferrotungsten	8	42	45	45 ^e	40
Gold, mine output, Au content	kilograms	1,400	1,400	1,400 ^e	1,400 ^e
Molybdenum:					
Concentrate, Mo content	3,000 ^e	3,900	4,080	4,250	4,100
Metal	270	487	500	520	500
Rhenium ^e	kilograms	1,200	1,200	1,200	1,200
Silver ^e	do.	4,000	4,000	4,000	4,000
Zinc, concentrate, Zn content	3,196	4,454	4,924	4,200 ^e	3,400
INDUSTRIAL MINERALS					
Barite ^e	590 ²	600	600	600	500
Caustic soda	6,200	4,166	5,484	4,476	4,000
Cement	thousand metric tons	605	625	722	770
Clays:					
Bentonite	38,000	37,000	40,000	40,000	38,000
Bentonite, powder	732	720	1,129	1,100 ^e	1,000
Diamond, cut	thousand carats	222	184	123	120 ^e
Diatomite	190	180	200	200 ^e	180
Gypsum	44,200	43,700	54,600	45,900	40,000
Limestone	thousand metric tons	17,000	17,000 ^e	18,000	18,000 ^e
Perlite ^e	49,963 ²	35,000	35,000	35,000	35,000
Salt	34,682	37,000	34,800	37,300	35,000
MINERAL FUELS AND RELATED MATERIALS					
Natural gas, dry	million cubic meters	NA	1,596	2,285	3,000 ^e

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

¹Table includes data available through December 7, 2010.

²Reported figure.

TABLE 2
ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009^{1,2}

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Aluminum, rolled and foil	ARMENAL (formerly Kanaker aluminum plant) (United Company RUSAL)	K'anak'err	25,000
Cement	Aarattsement Group (Multi Group)	Ararat region	NA
Do. thousand metric tons	Mika-Cement	Hrazdan	1,200
Copper:			
Mine output, Cu content	Facilities in operation:		30,000 ³
	Agarak copper-molybdenum mining and processing complex [Comsup Commodities, Inc. (United States)]	Agarak	
	Kapan mining complex [Deno Gold Mining Co. (Switzerland)]	Kapan	
	Zangezur copper-molybdenum complex [Cronimet Mining GmbH (Germany), 60%; OJSC Yerevan Pure Iron Works, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%] mining Kadzharan deposit	Kadzharan K'ajan	
	Facilities not in operation:		
	Akht'ala mining complex	Akht'ala	
	Shamlugh mining complex	Shamlugh	
Blister	CJSC Armenian Copper Programme (ACP) (Valex F.M. Establishment, 81%, and Russian businessman, 19%)	Alaverdi	15,000
Diamond, cut stones	Aghavni diamond-cutting works ⁴	Nor Geghi	NA
Do.	Amma group diamond-cutting works ⁴	Artashat	NA
Do.	Andranik-Dashk diamond-cutting works	Nor Hachyn	NA
Do.	Arevakn diamond producing plant	do.	NA
Do.	Diamond Company of Armenia (DCA)	Yerevan	NA
Do.	Diamond Tech	Talin	NA
Do.	Lori diamond-cutting works	Nor Hachyn	NA
Do.	Lusampor ⁴	Melik'gyugh	NA
Do.	Punji diamond-cutting works ⁴	Yerevan	NA
Do.	Sapphire diamond-cutting works	Nor Hachyn	NA
Do. thousand carats	Shoghakan gem-cutting plant	do.	120
Gold kilograms	Zod mining complex	Zod	2,000
Do.	Megradzor deposit	Meghradzor	NA
Do.	Lichkvazkoye, Shaumyanskiy Rayon, Sotkskoye, and Terterasarskoye deposits	NA	NA
Iron ore	Hrazdan deposit	Hrazdan region	NA
Molybdenum:			
Mine output, Mo content	Agarak copper-molybdenum mining and processing complex [Comsup Commodities, Inc. (United States)]	Agarak	2,000
Do.	Zangezur copper-molybdenum complex [Cronimet Mining GmbH (Germany), 60%; OJSC Yerevan Pure Iron Works, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%] mining Kadzharan deposit	Kadzharan K'ajan	20,400
Metal, ferromolybdenum	Armenian Molybdenum Production LLC (AMP) [Cronimet Mining GmbH (Germany), 51%, and Armenian residents, 49%]	NA	3,600
Do.	OJSC Yerevan Pure Iron Works	Yerevan	NA
Perlite thousand metric tons	Aragats-Perlite mining-beneficiation complex	Aragats deposit	1,110
Zinc, mine output, Zn content	Kapan mining complex [Deno Gold Mining Co. (Switzerland)]	Kapan	NA

See footnotes at end of table.

TABLE 2—Continued
ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009^{1,2}

⁶Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Table includes data available through December 7, 2010.

²Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

³Capacity estimates are totals for all enterprises that produce that commodity.

⁴Current existence of enterprise cannot be confirmed.