

2010 Minerals Yearbook

ARMENIA

THE MINERAL INDUSTRY OF ARMENIA

By Elena Safirova

Armenia was a significant producer of molybdenum and ranked seventh in the world in mine output in 2010 (Polyak, 2012). 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 produced aluminum foil from aluminum imported from Russia, ferromolybdenum, molybdenum metal, and rhenium salt (potassium perrhenate) from local ores; it also had developed a diamond-cutting industry based on imported diamond. Armenia possesses 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 zeolites (Sarmakeshyan, 2011; U.S. Central Intelligence Agency, 2012).

The country had almost no domestic fuel production; most of domestically produced electricity was generated by one nuclear powerplant and several hydroelectric powerplants. It imported fuel for its nuclear powerplant and natural gas from Russia. Since 2006, Armenia also had received natural gas from Iran through a direct pipeline between the two countries, in addition to tanker trucks. Armenia and Iran continued to participate in a program of direct exchange of natural gas for electric power (U.S. Department of State, 2012).

Minerals in the National Economy

In 2010, Armenia's gross domestic product (GDP) increased by 2.1%. Although a big improvement compared with the 14.1% decrease of 2009, the 2010 growth rate was much lower than the annual growth rates for the period 2000 through 2007, which averaged 13%. The share of industrial production in the total GDP was 37.7%, and the share of the mining industry in total industrial production was 13.8% (National Statistical Service of the Republic of Armenia, 2011a, b; U.S. Department of State, 2012).

Armenia's political isolation from two of its nearest neighbors, Azerbaijan and Turkey, made the country especially vulnerable to changes in the global economic environment. Armenia's severe trade imbalance was somewhat offset by foreign direct investment, international aid, and remittances from Armenians working abroad. In 2010, the country's exports, which were valued at \$1.04 billion, were much lower than the country's imports of \$3.75 billion. Mineral commodities played an important part in the country's exports. The main export commodities were copper, diamond, energy, foodstuffs, nonferrous metals, and other mineral products. Overall, nonprecious metals and products made out of them accounted for \$332 million, or 30% of the country's export revenue; mineral products accounted for \$307 million, or 27.7%; and precious stones and metals contributed \$134 million, or 12.1%. The main export partners of Armenia were Russia (which accounted for 15.4% of export revenue), Bulgaria (15.0%), Germany (12.7%), the Netherlands (9.5%), and Iran (8.1%). In 2010, Armenia imported diamond, foodstuffs, natural gas, petroleum, and tobacco products. The main trade partners for imports were Russia (which accounted for 22.3%, by value, of Armenia's imports), China (10.8%), Ukraine (6.1%), Germany (5.6%), and Turkey (5.6%) (National Statistical Service of the Republic of Armenia, 2011a, b; U.S. Central Intelligence Agency, 2012).

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 Kanaker, was a subsidiary of United Company RUSAL of Russia. Cronimet Mining AG of Germany was the main shareholder of the Zangezur copper-molybdenum complex and the Yerevan Pure Iron Works. GeoProMining Ltd. of Russia, which was a privately owned mineral resource company established in 2001, had assets in Armenia that included the Agarak copper-molybdenum mining and processing complex, the Ararat gold recovery plant, and the Sotk gold mine. GeoProMining produced gold in the form of dore and antimony, copper, and molybdenum concentrates. The electricity distribution system was privatized in 2002 and purchased by Russia's United Energy System (RAO-UES) in 2005 (GeoProMining Ltd., 2012; United Company RUSAL, 2012; U.S. Department of State, 2012). 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 Asia regions. It was formed from the Kanaker aluminum plant in Yerevan in 2000 and was currently a part of RUSAL's packaging division. In the mid-2000s, ARMENAL underwent a \$70 million modernization, and in 2010, had the technical capability to manufacture thin foil (6 to 9 microns thick). ARMENAL's annual capacity was 18,000 metric tons (t) of thin foil and 7,000 t of household foil. As of 2010, ARMENAL employed 700 people with an average monthly wage of about \$650. Most of the plant's output was exported to the United States, Europe, and the Middle East (Azom.com, 2005; United Company RUSAL, 2012). **Copper and Molybdenum.**—The leading producer of copper and molybdenum concentrates in Armenia was the Zangezur copper-molybdenum complex followed by the Agarak copper-molybdenum mining and processing complex. The Zangezur Copper Molybdenum Combine (ZCMC) was established in 1951 to develop the Kajaran deposit, and it was a major employer in the city of Kajaran. In 2010, ZCMC employed 3,200 people. Cronimet Mining AG held 60% of the shares in ZCMC (Novostink.ru, 2010a, b).

The Agarak Copper Molybdenum Combine (ACMC) included the Agarak Mine and a beneficiation plant. ACMC was acquired by GeoProMining in 2007. GeoProMining specialized in the extraction and processing of polymetallic ores (antimony, copper, and molybdenum) and precious metals (gold and silver). During 2010, ACMC increased its production of copper and molybdenum concentrates by 110%. As of 2010, ACMC was in the process of implementing an investment program aimed at technical re-equipment of the deposit and reconstruction of the plant. The reconstruction was expected to increase the processing capacity from 3 million metric tons (Mt) to 3.5 Mt as well as reduce production costs by 10% (PanARMENIAN.net, 2010; Infogeo.ru, 2011).

Armenian Molybdenum Production LLC (AMP) in Yerevan was founded in 2003 and specialized in ferromolybdenum production. The company had the capacity to produce 3,600 metric tons per year of ferromolybdenum; in addition to processing Armenian concentrate, AMP imported concentrates from Chile, China, Peru, Russia, and other countries. AMP was owned by Cronimet Mining AG (51%) and Armenian residents (49%) (Armenian Molybdenum Production, 2012; Cronimet Mining AG, 2012).

Yerevan Pure Iron Works produced pure molybdenum (99.6% grade), ferromolybdenum (70% Mo content), and potassium perrhenate (rhenium salt with 64% Re content). The entire production of the plant was exported, mostly to Europe. The company processed mainly molybdenum concentrate mined by ZCMC from the Kajaran copper-molybdenum deposit. The company also owned a 15% stake in the Zangezur complex.

Gold.—The Ararat Gold Recovery Co. (AGRC) continued to mine the Sotk deposit. As of 2010, AGRC was a subsidiary of GeoProMining. AGRC had a gold processing facility in the city of Ararat. AGRC also owned a large open pit gold mine at Zod in eastern Armenia, close to the border with Azerbaijan. In the late 1990s, Azerbaijan protested when AGRC started mining at Zod because it was thought that a significant portion of the resources were located on Azerbaijani territory. The local population was also concerned about the environmental consequences of gold extraction, such as the effect of cyanide used in gold production on land and water pollution (Cooke, 2008; Miningexpo.ru, 2010).

GeoProMining was planning to reconstruct AGRC's beneficiation plant to be able to apply new Albion technology to process the remaining sulfide ores. The construction of the new plant was expected to be completed in 2013 (Metalinfo.ru, 2011).

Outlook

In the next few years, Armenia is likely to continue developing its facilities for processing copper, gold, and molybdenum. Although the country has made significant efforts to attract foreign investment, some of the impediments for potential investors, such as lack of transparency in the tax system and customs operations and unequal competition between domestic and foreign firms, remain. Continued economic growth in all sectors, including the mineral sector, is likely to depend on the ability of the Government to strengthen its macroeconomic management, including improving the investment climate and combatting corruption.

References Cited

- Armenian Molybdenum Production, 2012, About us: Armenian Molybdenum Production. (Accessed June 12, 2012, at http://www.amp.am/.)
- Azom.com, 2005, RUSAL starts aluminum foil production at its Armenian plant: Azom.com, December 7. (Accessed June 12, 2012, at http://www.azom.com/ news.aspx?NewsID=4489.)
- Cooke, Kieran, 2008, Armenia's controversial gold rush: BBC News, January 9. (Accessed June 12, 2012, at http://news.bbc.co.uk/2/hi/business/7153794.stm.)

Cronimet Mining AG, 2012, What we do: Cronimet Mining AG. (Accessed June 12, 2012, at http://www.cronimet.de/web/unternehmensgruppe_2/ was_wir_tun_en_167.html.)

- GeoProMining, Ltd., 2012, Armenia: GeoProMining, Ltd. (Accessed June 12, 2012, at http://www.geopromining.com/en/our-business/geography/armenia/.)
- Infogeo.ru, 2011, Agarakskiy MMK—Proizvodstvo v 2010 godu [Agarak MMK—Production in 2010]: Infogeo.ru, February 9. (Accessed June 12, 2012, at http://www.infogeo.ru/metalls/news/?act=show&news=36517.)
- Metalinfo.ru, 2011, GeoProMining budet poluchať zoloto po innovazionnoy texnologii [GeoProMining will extract gold using innovative technology]: Metalinfo.ru, July 7. (Accessed June 12, 2012, at http://www.metalinfo.ru/ru/ news/50370.)
- Miningexpo.ru, 2010, Zolotodobyvayushaya gruppa GeoProMining na travil'nom puti [Gold-mining group GeoProMining is on the right track]: Miningexpo.ru, November 24. (Accessed June 12, 2012, at http://www.miningexpo.ru/news/14902.)
- National Statistical Service of the Republic of Armenia, 2011a, Armenia in figures: National Statistical Service of the Republic of Armenia. (Accessed June 12, 2012, at http://www.armstat.am/en/?nid=82&id=1300.)
- National Statistical Service of the Republic of Armenia, 2011b, Statistical yearbook of Armenia: National Statistical Service of the Republic of Armenia. (Accessed June 12, 2012, at http://www.armstat.am/en/?nid=45&year=2011.)

Novostink.ru, 2010a, V 2010-om godu eksport mednoi rudy iz Armenii vyros na 52% [In 2010 exports of copper ore from Armenia have increased by 52%]: Novostink.ru, May 6. (Accessed June 12, 2012, at http://novostink.ru/ armenia/6850-v-2010-om-godu-yeksport-mednoj-rudy-iz-armenii.html.)

- Novostink.ru, 2010b, V Armenii rezko vyrosli ob'emy dobychi molibdena [In Armenia the volume of molybdenum production has sharply increased]: Novostink.ru, July 20. (Accessed June 12, 2012, at http://novostink.ru/ armenia/10151-v-armenii-rezko-vyrosli-obemy-dobychi-molibdena.html.)
- PanARMENIAN.net, 2010, ACMC continues increasing production of copper-molybdenum concentrate: PanARMENIAN.net, July 19. (Accessed June 12, 2012, at http://www.panarmenian.net/eng/economy/news/51434/ ACMC continues increasing production of coppermolybdenum concentrate.)
- Polyak, D.E., 2012, Molybdenum: U.S. Geological Survey Mineral Commodity Summaries 2012, p. 106–107.
- Sarmakeshyan, Gayane, 2011, Armeniya bogata poleznymi iskopaemymi, no eti resursy nado ratsional'no ispol'zovat' [Armenia is rich with minerals, but those resources need to be used wisely]: Yerkramas.org, July. (Accessed August 23, 2012, at http://www.yerkramas.org/2011/07/10/armeniya-bogata-poleznymi-iskopaemymi-no-eti-resursy-nado-racionalno-ispolzovat/.)
- United Company RUSAL, 2012, ARMENAL: United Company RUSAL. (Accessed June 12, 2012, at http://www.rusal.ru/en/about/9.aspx.)
- U.S. Central Intelligence Agency, 2012, Armenia, *in* The world factbook: U.S. Central Intelligence Agency, May 23. (Accessed June 12, 2012, at https://www.cia.gov/library/publications/the-world-factbook/geos/am.html.)
- U.S. Department of State, 2012, Armenia: U.S. Department of State background note, March 22. (Accessed June 12, 2012, at http://www.state.gov/r/pa/ei/ bgn/5275.htm.)

TABLE 1 ARMENIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

| Commodity | | 2006 | 2007 | 2008 | 2009 | 2010 |
|-------------------------------|----------------------|-----------------------|-----------------------|----------------------|------------------------|---------------------|
| METALS | 5 | | | | | |
| Aluminum, foil | | 945 | 12,256 | 11,646 | 21,456 | 24,617 |
| Copper: | | | | | | |
| Concentrate, Cu content | | 18,000 e | 17,600 e | 18,800 | 23,233 r | 31,062 |
| Blister, smelter, primary | | 8,791 | 6,954 | 6,480 | 6,858 | 7,644 |
| Ferroalloys: | | | | | | |
| Ferromolybdenum | | 4,865 | 5,977 | 5,323 | 5,144 | 5,126 |
| Ferrotungsten ^e | | 42 ² | 45 ² | 45 | 40 | 40 |
| Gold, mine output, Au content | kilograms | 1,300 ^{r, e} | 1,300 ^{r, e} | 1,359 ^r | 944 ^r | 2,000 |
| Molybdenum: | | | | | | |
| Concentrate, Mo content | | 4,088 ^r | 4,295 ^r | 4,472 ^r | 4,365 ^r | 4,335 |
| Metal | | 487 | 500 | 520 | 500 | 469 |
| Rhenium ^e | kilograms | 1,200 | 400 r | 400 r | 400 r | 400 |
| Silver | do. | 40,434 ^r | 37,324 ^r | 40,434 ^r | 52,876 ^r | 68,428 |
| Zinc, concentrate, Zn content | | 2,932 ^r | 2,585 ^r | 4,200 | 3,800 ^r | 4,298 |
| INDUSTRIAL MINERALS | | | | | | |
| Barite ^e | | 600 | 600 | 600 | 500 | 550 |
| Caustic soda | | 4,166 | 5,484 | 4,476 | 1,138 ^r | 960 |
| Cement | thousand metric tons | 625 | 722 | 770 | 467 | 488 |
| Clays: | | | | | | |
| Bentonite | | 37,000 | 40,000 | 40,000 | 38,000 | 41,000 |
| Bentonite, powder | | 720 | 1,129 | 1,100 e | 1,000 | 1,100 |
| Diamond, cut | carats | 184,000 | 123,000 | 100,945 ^r | 49,573 ^r | 67,992 |
| Diatomite | | 180 | 200 | 200 ^e | 180 | 220 |
| Gypsum | | 43,700 | 54,600 | 45,900 | 40,100 r | 45,000 ^e |
| Limestone | thousand metric tons | 17,000 ^e | 18,000 | 18,000 ^e | 15,000 | 18,000 |
| Perlite ^e | | 35,000 | 35,000 | 35,000 | 35,000 | 35,000 |
| Salt | | 37,000 | 34,800 | 37,300 | 37,000 ^{r, e} | 40,000 e |
| MINERAL FUELS AND REI | LATED MATERIALS | | | | | |
| Natural gas, dry ^e | million cubic meters | 1,596 2 | 2,285 2 | 3,000 | 3,000 | 3,000 |
| | | | | | | |

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

¹Table includes data available through March 20, 2012.

²Reported figure.

TABLE 2 ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010¹

(Metric tons unless otherwise specified)

| | | | | Annual |
|-------------------------|----------------------|---------------------------------------------------------|--------------------------|-----------------------|
| Commodity | | Major operating companies, main facilities, or deposits | Location or deposit name | capacity ^e |
| Aluminum, rolled and | d foil | ARMENAL (formerly Kanaker aluminum plant) (United | Kanaker | 25,000 |
| | | Company RUSAL) | | |
| Cement | | Aarattsement Group | Ararat region | NA |
| Do. | thousand metric tons | Mika-Cement | Hrazdan | 1,200 |
| Copper: | | | | |
| Mine output, Cu content | | Facilities in operation: | | 30,000 ² |
| | | Agarak copper-molybdenum mining and processing | Agarak | |
| | | complex (GeoProMining Ltd.) | | |
| | | Kapan mining complex (Deno Gold Mining Co.) | Kapan | |
| | | Zangezur copper-molybdenum complex [Cronimet | Kajaran | |
| | | Mining AG, 60%; Yerevan Pure Iron Works, 15%; | | |
| | | Armenian Molybdenum Production LLC (AMP), | | |
| | | 12.5%; Zangezur Mining LLC, 12.5%] | | |
| | | Facilities not in operation: | | |
| | | Akht'ala mining complex | Akht'ala | |
| | | Shamlugh mining complex | Shamlugh | |
| Blister | | CJSC Armenian Copper Programme (ACP) (Valex F.M. | Alaverdi | 15,000 |
| | | Establishment, 81%, and Russian businessman, 19%) | | |
| Diamond, cut stones | | Aghavni diamond-cutting works ³ | Nor Geghi | NA |
| Do. | | Amma group diamond-cutting works ³ | 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 ³ | Melik'gyugh | NA |
| Do. | | Punji diamond-cutting works ³ | 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 | NA | NA |
| | | Terterasarskoye deposits | | |
| Iron ore | | Hrazdan deposit | Hrazdan region | NA |
| Molybdenum: | | | | • • • • • |
| Mine output, Mo content | | Agarak copper-molybdenum mining and processing | Agarak | 2,000 |
| | | complex (GeoProMining Ltd.) | | 20.400 |
| Do. | | Zangezur copper-molybdenum complex [Cronimet | Kajaran | 20,400 |
| | | Mining AG, 60%; Yerevan Pure Iron Works, 15%; | | |
| | | Armenian Molybdenum Production LLC (AMP), | | |
| Metal, ferromolybdenum | | 12.370, Zaligezui Willing LLC, 12.370] | NΛ | 3 600 |
| | | (Cronimet Mining AG, 51% and | 11/1 | 3,000 |
| | | Armonian regidents (40%) | | |
| Do | | Armenian residents, 4970) | Vereven | NI A |
| Perlite | thousand metric tons | Aragats perlite mining_heneficiation complex | Aragats denosit | 1 110 |
| Zinc, mine output Zr | n content | Kapan mining complex (Deno Gold Mining Co.) | Kapan | NA |
| , | | | | |

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

¹Many 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.

²Capacity estimates are totals for all enterprises that produce that commodity.

³Current existence of enterprise cannot be confirmed.