



2013 Minerals Yearbook

ARMENIA

THE MINERAL INDUSTRY OF ARMENIA

By Elena Safirova

Armenia ranked seventh in the world in mine output of molybdenum in 2013. Besides molybdenum, Armenia produced other metals, such as copper, gold, silver, and zinc, and industrial minerals and products, including cement, diatomite, gypsum, limestone, and perlite. The country also produced aluminum foil from aluminum imported from Russia and ferromolybdenum, molybdenum metal, and rhenium salts (ammonium perrhenate and potassium perrhenate) from local ores. It also had developed a diamond-cutting industry based on imported diamond. Armenia possesses resources of copper, gold, iron ore, lead, molybdenum, and zinc. It also has resources of construction materials, 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 (Arm3a.org, 2014; Polyak, 2014).

According to data disclosed at the 2014 conference “Responsible Mining in Armenia—Opportunities and Challenges,” which was organized by the World Bank, Armenia’s resources of copper and molybdenum were sufficient to continue mining, at current production levels, for 100 to 200 years; gold, for 25 to 30 years; and lead and zinc, for 20 to 25 years. These calculations were based only on the largest deposits. As of 2013, 850 mineral deposits with confirmed resources were registered in the country; out of which 37 were metal deposits. More than 400 of the deposits were being exploited by 474 companies and, of those deposits, 26 were metal mines. In 2013, gross domestic product (GDP) produced by the mineral industry was 196.6 billion drams (about \$480 million)¹. The mining of metals contributed 191.3 billion drams (\$466.8 million, or 97.3% of the mining), while production of industrial minerals was responsible for 5.3 billion drams (\$13.2 million, or 2.7%). The Ministry of Energy and Natural Resources of Armenia announced that it was planning to increase the share of industrial minerals in the country’s GDP and developed a targeted program to address this issue (Arka.am, 2014a; MinerJob.ru, 2014).

In September, Armenia announced its intention to join the Eurasian Customs Union and to participate in further development of the Eurasian Economic Union. The Eurasian Customs Union began in January 2010 as a Customs Union of Belarus, Kazakhstan, and Russia and was the first step in a plan to establish closer economic ties among member countries. In December, a roadmap document outlining the steps Armenia needed to follow to join the Union was signed. It was anticipated that Armenia would become a member of the Eurasian Customs Union as soon as the second half of 2014 (Eremkin and Filippova, 2014).

The country had almost no domestic fuel production; most domestically produced electricity was generated by one nuclear

powerplant and several hydroelectric powerplants. Armenia imported uranium fuel for its nuclear powerplant and natural gas from Russia. In 2013, the country was working on the integration of energy systems with neighboring countries, primarily Georgia and Iran, which was one step toward diversification of Armenia’s energy supply. Another step was construction of the Armenia-Iran gas pipeline; however, as of 2013, the price of gas delivered from Iran appeared to be higher than the price of natural gas delivered from Russia. The Government of Armenia thought that joining the Eurasian Customs Union with Belarus, Kazakhstan, and Russia would reduce prices for natural gas and nuclear fuel in the future (Regnum.ru, 2013c).

Minerals in the National Economy

In 2013, Armenia’s real GDP increased by 4.6% compared with an increase of 7.2% in 2012. The nominal GDP in 2013 amounted to \$10.4 billion. The share of industrial production in the total GDP was 37.3%, and the share of the mineral industry in total industrial production was 15.8%. In 2013, mining of metallic ores dominated the mining and quarrying sector, accounting for 97.2% of the value of production in this sector. In 2013, industrial production increased by 6.9% in real terms compared with that of 2012; mining and quarrying increased by 8.0%; and mining of metallic ores increased by 8.5% (National Statistical Service of the Republic of Armenia, 2014; U.S. Central Intelligence Agency, 2014).

Production

In 2013, Armenia produced about 209% more bentonite than it produced in 2012. Production of cut diamond increased by 40%; that of bentonite powder, by an estimated 25%; gold, by 20%; copper concentrate, by 19%; caustic soda, by about 17%; and ferromolybdenum, by 13.4%. Production of perlite decreased by 71%; salt, by 18.4%; and silver, by 12.4%. Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2013, Armenia had a significant trade deficit as the country’s exports, which were valued at \$1.48 billion, were much lower than the country’s imports of \$4.39 billion. Mineral commodities constituted a significant share of the country’s export revenue. The main export commodities were diamond, energy (electric power), foodstuffs, nonferrous metals, pig iron, unwrought copper, and other mineral products. Overall, exports of ores, slag, and ash accounted for \$303 million, or 20.5% of the country’s export revenue; exports of pearls,

¹Where necessary, values have been converted from Armenian drams (AMD) to U.S. dollars (US\$) at an annual average exchange rate of AMD409.83=US\$1.00 for 2013 and AMD401.77=US\$1.00 for 2012.

precious or semiprecious stones, precious metals and articles made of them accounted for \$188 million (12.7%); ferrous metals accounted for \$105 million (7.1%); copper and articles made of it, accounted for \$95 million (6.4%); and aluminum and articles made of it, accounted for \$85 million (5.8%). The main export partners of Armenia were Russia (which accounted for 22.6% of Armenia's export revenue), Bulgaria (10.3%), Belgium (8.9%), Iran (6.4%), the United States (6.0%), Canada (5.9%), Georgia and Germany (5.8% each), China (4.7%), and the Netherlands (4.5%). In 2013, Armenia's imports of mineral products included rough diamond, natural gas, and petroleum. The main trade partners for imports were Russia (which provided 23.4%, by value, of Armenia's imports), China (8.8%), Germany (6.4%), Ukraine (5.2%), Turkey (4.8%), Iran (4.5%), Switzerland (3.7%), Italy (3.4%), and the United States (3.1%) (National Statistical Service of the Republic of Armenia, 2014; U.S. Central Intelligence Agency, 2014).

Commodity Review

Metals

Aluminum.—The ARMENAL aluminum foil rolling mill was one of the leading production facilities in Armenia and the only producer of aluminum foil in the Caucasus and Central Asia regions. Together with Sayanal, Sayan Foil, and Urals Foil plants, the ARMENAL plant was a part of United Company RUSAL's packaging division. The plant employed about 670 workers at an average monthly wage of between 300,000 and 350,000 drams (between \$732 and \$854) (Arka.am, 2014b).

In 2013, ARMENAL produced 27,700 metric tons (t) of aluminum foil, which was an increase of 5.6% compared with the 2012 production volume. The plant was planning to increase production to 29,000 t in 2014 and to 33,600 t in 2015. In 2013, the company initiated a new investment project to reduce the use of lubricating and cooling fluid in the production process. The annual savings from the new project would amount to \$3.23 million, and the total investment in new technology was estimated to be about \$9.5 million. To support the company, the Government agreed to postpone for 3 years the payment of the value-added tax for the equipment that ARMENAL imported for this project (Regnum.ru, 2013a; United Company RUSAL, 2014).

Gold.—In 2013, Armenia produced 3,473 kilograms (kg) of gold, which was a 20% increase compared with 2012 production volume. Production of gold-polymetallic ores increased to 2.16 Mt in 2013 from 1.95 Mt in 2012. In 2013, Armenia had 13 gold and gold-polymetallic deposits with active mining licenses and 22 gold and polymetallic deposits with active exploration licenses (Armenpress.am, 2014; Ecolur.org, 2014).

The Ararat Gold Recovery Co. (AGRC), which was also known as GPM Gold, continued to mine the Sotk (Zod) deposit. AGRC, a subsidiary of GeoProMining of Russia, had a gold processing facility in the city of Ararat. In 2013, AGRC was implementing a technical modernization that would cost a total of \$100 million and would include the application of Albion Process™ technology and completion of a new beneficiation plant in Ararat City. The Albion Process™ was initially

developed by Glencore plc of Switzerland and was first used in Germany, then in Spain and the Dominican Republic; Armenia would be the fourth place in the world where the technology would be used to treat refractory gold. The company was also involved in social projects in the village of Sotk. In particular, since 2012, it was building a gas pipeline to bring natural gas to the village. It was expected that the availability of natural gas for heating would crowd out the use of wood for heating and improve environmental conditions (MinerJob.ru, 2013b).

In 2013, ZAO Geoteam of Armenia, which represented Lydian International Ltd. of the United Kingdom, was continuing exploration and preparation for development of the Amulsar gold deposit located in southeastern Armenia between the Arpa and the Vorotan Rivers. According to the most recent estimates, the proved and probable reserves of Amulsar were 70.3 t of gold and 300 t of silver; measured and indicated reserves of gold were estimated to be 74.6 t, and inferred reserves of gold, 53 t. The company was planning to start mine construction in 2014 and to begin producing gold on a commercial scale in 2016. The company already invested about \$46 million in exploration and the cost of mine construction was estimated to be \$270 million. During the first 3 years of production, Geoteam was planning to produce about 3,700 kg of gold. Among the shareholders of Lydian International were the International Financial Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD) (Mineral.ru, 2013a; MinerJob.ru, 2013a, e; Mineral.ru, 2014a).

The Amulsar project is located within 10 kilometers (km) of the resort town of Jermuk, and the local residents have expressed concerns about the project. In 2012, a committee of town elders filed a complaint with Armenia's Ministry of Nature Protection to demand a complete cessation of exploration work at the deposit. Their main concern was that the deposit is located in a tectonically active zone, and exploration and mining in the area, especially controlled explosions, could trigger earthquakes. Environmental activists in Armenia were also concerned about the project because the Amulsar deposit is located in close proximity to the Vorotan River and to Spandaryan Lake and exploitation of the deposit could lead to water pollution (MinerJob.ru, 2013a).

In January, a junior exploration company, Orogen Gold of the United Kingdom, signed a contract with Georaid Co. of Armenia to conduct exploration work at the Mutsk deposit in southern Armenia. The deposit is located 2,000 meters above sea level. The exploration of the area of 24 square kilometers was expected to last through August and cost about \$150,000. If the first stage of exploration was successful, Orogen would go on to the second stage of drilling, which would continue through 2014. Then, Orogen had an opportunity to acquire an 80% option to develop the deposit through August 2016; the total cost of development was estimated to be \$2.5 million (Mineral.ru, 2013b; MinerJob.ru, 2013c, d).

Iron and Steel.—In October, a new metallurgical plant opened in the city of Charentsavan in the Kotaiks region, which is located 25 km to the northeast of Yerevan, and it would be the first such plant in Armenia. The construction was performed by ASCE Group Armenia, and the equipment was supplied by a German company whose branches were

located in Austria, Italy, and Russia; the total investment was estimated to be \$30 million, more than 70% of which was the cost of the equipment itself. The new plant was producing steel-reinforcing bars (rebar) from metal scrap collected in Armenia. The rolling mill of the plant would have the capacity to produce 125,000 metric tons per year (t/yr) of steel starting in 2014; at the time of opening the plant was operating at about 30% of its full capacity. The total area of the plant was planned to be 100,000 square meters, and it was expected to employ a total of about 500 workers with an average wage of about 180,000 drams (about \$440) per month. The majority of the product would be sold on the domestic market, and about 40% would be exported to Georgia and Iran (Arka.am, 2013b; Metallorg.ru, 2013).

Molybdenum.—In 2013, Armenia had two plants producing ferromolybdenum from molybdenum concentrate. OAO Yerevan Pure Iron Plant (PIP), which is located at Yerevan, also produced pure molybdenum metal and extracted rhenium from molybdenum concentrate in the form of potassium perrhenate. The average molybdenum content in ferromolybdenum produced at PIP was 68.5%. All of PIP's output was exported to Germany. In 2013, the plant employed 600 workers at an average monthly wage of 220,000 drams (about \$537). Another ferromolybdenum producer, Armenian Molybdenum Production, was majority owned by Cronimet of Germany (51%); the rest of the company (49%) was privately owned. The company produced ferromolybdenum and ammonium perrhenate (69.4% rhenium content), and all output was exported to Europe. The company employed 500 workers with an average monthly wage of 208,400 drams (about \$508). Despite the fact that both companies increased production volume in 2013, world prices for ferromolybdenum decreased and negatively affected the company's revenues (Arka.am, 2013a; Arminfo.am, 2013; Delovoy Ekspres, 2013b; Regnum.ru, 2013b; Versia.am, 2013).

Silver.—OOO Victoria Silver, a private Armenian company, intended to prepare the Marziget gold-polymetallic deposit for development. The Marziget deposit is located in the Lori region of Armenia. At the early stages, Victoria Silver planned to explore the Marts-Prvashen-Budagidzor mineralization; resources were estimated to be 2.7 million metric tons (Mt) grading 4.3 grams per ton (g/t) gold, 11 g/t silver, 0.34 g/t copper, 0.7 g/t lead, and 1.8% zinc. The total resources were expected to contain 11.6 t of gold, 30 t of silver, and about 9,000 t of copper. The resource estimates were to be revised during exploration. The company planned to conduct a technical and economic assessment of the deposit development by 2018 (Mineral.ru, 2014b).

Industrial Minerals

Perlite.—In 2013, Armenia produced only 53 t of perlite. The only producer of perlite in the country, OAO Aragats Perlit, was mining the Agarats perlite deposit. The company was owned by Dicalite Co. of the United States, a privately held company specializing in diatomaceous earth and perlite products. Since 1998, Dicalite invested about \$500,000 in plant modernization, particularly in production of fine fractions of perlite. Because

of high transportation costs, the company was unable to profitably export perlite and, over the years, was accumulating commodity perlite at its storage facilities; as of yearend 2013, it had 140,000 t of marketable product stored. In 2013, the cost of delivered perlite from Armenia to the European and Russian markets was about 40% higher than the cost of delivered perlite from Greece and Turkey. It was not known when the market situation would change. One potential possibility was development of a domestic construction market, but, as of 2013, Armenia had no domestic demand for perlite (Delovoy Ekspres, 2013a, 2014).

Outlook

In the next few years, Armenia is likely to significantly increase its gold production, at which time it might consider building its own gold refinery. Armenia is also likely to continue producing copper, molybdenum, and rhenium. The country's ability to increase production of industrial minerals in the near future depends on many factors, including the building of better infrastructure to facilitate exports of those materials. Finally, if Armenia is successful in joining the Eurasian Customs Union in the near future, its economy would receive a boost from cheaper energy prices and better access to the capital markets of Kazakhstan and Russia.

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TABLE 1
ARMENIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity		2009	2010	2011	2012	2013
METALS						
Aluminum, foil		21,456	24,617	25,289 ^r	26,243 ^r	27,700
Copper:						
Concentrate, Cu content		23,233	31,062	33,597	41,220	48,887
Blister, smelter, primary		6,858	7,644	8,876	10,075	10,771
Ferromolybdenum		5,144	5,126	5,525	5,836	6,619
Gold, mine output, Au content	kilograms	944	974	2,736	2,896	3,473
Molybdenum:						
Concentrate, Mo content		4,365	4,335	4,817	6,500	6,900
Metal		500	469	486	675	700 ^c
Rhenium ^c	kilograms	400	400	400	350	345 ²
Silver	do.	52,876	68,428	25,227	22,200	19,458
Zinc, concentrate, Zn content		3,800	7,808	8,475	10,700	10,530
INDUSTRIAL MINERALS						
Barite ^c		500	550	600	600	600
Caustic soda		1,138	960	63	82	96
Cement	thousand metric tons	467	488	422	438	431
Clays:						
Bentonite		38,000	1,397	835	4,987	15,387
Bentonite, powder		1,000	1,100	1,100	1,200	1,500 ^c
Diamond, cut	carats	49,573	65,000	65,000	67,000	94,000
Diatomite ^c		180	220	220	220	220
Gypsum		40,100	38,700	34,000	30,400 ^r	28,700
Limestone	thousand metric tons	15,000	18,000	18,000	17,500	18,000
Perlite		35,000 ^c	95	229	181	53
Salt		29,400	29,400	35,600	38,000	31,000

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

¹Table includes data available through December 22, 2014.

²Reported figure.

TABLE 2
ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies or main facilities and major equity owners	Location	Annual capacity ^c
Aluminum, rolled and foil	ARMENAL (formerly Kanaker aluminum plant) (United Company RUSAL)	Kanaker	25,000
Cement	Ararat Cement Factory CJSC	Ararat region	NA
Do.	Mika-Cement	Hrazdan	NA
Copper:			
Mine output, Cu content	Agarak copper-molybdenum mining and processing complex (ACMC) [GeoProMining, Ltd. (GPM)]	Agarak	NA
Do.	Dundee Precious Metals Kapan (Dundee Precious Metals Inc.)	Kapan	NA
Do.	Zangezur copper-molybdenum complex (ZCMC) [Cronimet Mining GmbH, 60%; OAO Yerevan Pure Iron Plant, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%]	Kajaran	
Blister	ZAO Armenian Copper Programme (ACP) (Vallex Group)	Alaverdi	15,000
Diamond, cut stones	Aghavni diamond-cutting works ²	Nor Geghi	NA
Do.	Amma group diamond-cutting works ²	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 ²	Melik'gyugh	NA
Do.	Punji diamond-cutting works ²	Yerevan	NA
Do.	Sapphire diamond-cutting works	Nor Hachyn	NA
Do.	Shoghakan gem-cutting plant	do.	120
Gold	Ararat Gold Recovery Co. (AGRC) [GeoProMining, Ltd. (GPM)]	Sotk (Zod)	2,000
Do.	Dundee Precious Metals Kapan (DPMK) (Dundee Precious Metals Inc.)	Shahumian deposit, Kapan	NA
Molybdenum:			
Mine output, Mo content	Agarak copper-molybdenum mining and processing complex (ACMC) [GeoProMining, Ltd. (GPM)]	Agarak	2,000
Do.	Zangezur copper-molybdenum complex (ZCMC) [Cronimet Mining GmbH, 60%; OAO Yerevan Pure Iron Plant, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%]	Kajaran	20,400
Metal, ferromolybdenum	Armenian Molybdenum Production LLC (AMP) (Cronimet Mining GmbH, 51%, and Armenian residents, 49%)	Yerevan	3,600
Do.	OAO Yerevan Pure Iron Plant	Yerevan	NA
Perlite	OAO Aragats Perlit	Aragats deposit	1,110
Rhenium	Agarak copper-molybdenum mining and processing complex (ACMC) [GeoProMining, Ltd. (GPM)]	Agarak	NA
Do.	Zangezur copper-molybdenum complex (ZCMC) [Cronimet Mining GmbH, 60%; OAO Yerevan Pure Iron Plant, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%]	Kajaran	NA
Zinc, mine output, Zn content	Dundee Precious Metals Kapan (Dundee Precious Metals Inc.)	Kapan	NA

^cEstimated; 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 the names of locations.

²Current existence of enterprise cannot be confirmed.