

2008 Minerals Yearbook

ARGENTINA

THE MINERAL INDUSTRY OF ARGENTINA

By Susan Wacaster

In 2008, Argentina was estimated to be the world's second ranked producer of boron and South America's leading producer. It was the world's fourth ranked producer of lithium. The mineral industry in Argentina grew significantly during the past 15 years. The growth was attributable to the development of a national regulatory framework that was conducive to mining investments and to increased demand for minerals from emerging economies. Of Argentina's 23 Provinces, Catamarca Province experienced the greatest economic growth related to the advancement of mining; in 2007 (the latest year for which data were available), 23% of the provincial gross domestic product (GDP) was accounted for by mining revenue compared with 0.7% in 1993. Jujuy, San Juan, and Santa Cruz Provinces also benefited economically from this growth. In Santa Cruz Province, mining revenue accounted for 1% or less of the provincial GDP in 1993, but by 2007, that amount had grown to as much as 8% (Camara Argentina de Empresarios Mineros, 2009; Jaskula, 2009; Polyak, 2009).

Minerals in the National Economy

The mining and quarrying sector of the economy accounted for 2.8% of Argentina's GDP in 2008 compared with 4.4% in 2007. In December 2007, the Government implemented a new fiscal plan that increased the taxes on mineral exports to between 5% and 10% (depending on the level of domestic processing of mineral products) from the 3% ceiling previously established in the Mining Code in the mid-1990s (along with 30-year tax stability on mining projects). Several companies disputed the tax increase, claiming that it was unconstitutional because it had not been passed as a law. Disputes continued through 2008, although some companies paid the increased fees to prevent losing their import and export licenses (iStockAnalyst, 2007; Pouiller, 2009).

Government Policies and Programs

Argentina's Mining Code (El Codigo de Mineria) was enacted by the Argentine Congress on November 25, 1886. It is a national policy that governs the acquisition and maintenance of mining rights and the loss of those rights; the Provinces carry out formal rules pertaining to such rights. The Mining Code underwent significant revisions in 1995 with the passage of law No. 24,498 (mining update), law No. 24,523 (national commercial mining), and law No. 24,585 (environmental protection), and in 1997 with the passage of law No. 25,225 (modifications). Mineral resources in Argentina are the property of the Nation and the Provinces. Any person or entity (domestic or foreign) capable of doing so may obtain exploration and mining rights. Concessions are granted in units of 500 hectares (ha) or a fraction thereof. No person may own more than 20 concessions. The exploration period is granted for 150 calendar days for the first unit of 500 ha (or fraction thereof) and 50 more

days are added for each additional unit (or fraction thereof); the maximum possible time granted is 1,100 days for a 10,000-ha concession. To exploit a deposit, the discovery must be registered with the mining authority. The location and proposed work area must be identified by coordinates on official maps. Concession holders must submit an environmental impact report to the mining authority before the commencement of activities, and the report must be updated biannually. As of December 2008, publicly available information regarding the mining law stated that in recent years some Provinces established royalties on mineral production that were not uniform. Passage of law No. 24,296 (mining investment) set a ceiling on royalties of 3% of the value of the ore and required the Provinces to regulate the terms and manner of calculation and payment of royalties. The procedures for exercising the rights provided by the Mining Code were to be set by the Provinces; however, national and regional initiatives would be implemented to create a more homogenous system (Secretaría de Minería de la Nación, 2009).

Production

With the exception of a few mineral commodities, production of metals generally increased in 2008 compared with that of 2007 (not including mineral commodities for which only a production estimate was available). Silver production increased by 39% compared with that of 2007 and production of primary aluminum increased by 38% for the same time period. Zinc mine output increased by 12%, but production of refined zinc products decreased by 8%. The averaged production increase of cadmium mine and refinery output was about 10.5%. Copper production decreased by 13%, and gold production remained virtually the same compared with production in 2007. Lead mine and refinery products decreased by an average of about 19%, and mercury production decreased by 70%. The country recorded its first molybdenum production in 2008 (table 1).

Metals were produced in the following nine Provinces: Catamarca, Jujuy, La Rioja, Neuquen, Rio Negro, San Juan, San Luis, Santa Cruz, and Santiago del Estero. All reported cadmium and zinc production came from Jujuy Province. All reported copper, lithium, and molybdenum production came from Catamarca Province. San Juan Province led gold production (44%) followed by Catamarca Province (38%), and Santa Cruz Department (16%), and the remainder was accounted for by Neuquen Province and artisanal mining operations throughout the country.

Industrial minerals were produced in all Provinces. The production volumes of relatively fewer industrial mineral commodities increased than decreased in 2008 compared with production in 2007. Commodities for which there was an increase in production of greater than 10% included semiprecious gemstones (604%), celestite (204%), rhodocrosite (170%), fluorspar (55%), dolomite (54%), boron (17%), lithium carbonate (13%), and shell or marl (14%). Those commodities

for which production volumes decreased were primarily those of relatively less economic value, such as a variety of aggregate stones and construction materials. Barite production decreased by 92%; however, that decrease brought the production level back in line with recent years' totals after a large, unexplained increase in 2007. The 604% production increase of semiprecious gemstones was owing to the rebound of production in Missiones Province, which brought the production volume back in line with recent years' totals after a dramatic decrease in 2007.

Structure of the Mineral Industry

Argentina's Secretaría de Minería de la Nación [Mining Secretariat], which, along with the Public Works, Communications, Energy, and Transportation Secretariats, was a branch of the Ministerio de Planificaión Federal Inversión Pública y Servicio [Ministry of Federal Planning, Public Investment, and Services], was also the entity with oversight of the mining industry. The Mining Secretariat was responsible for the administration, development, and promotion of mining and mining investment. The Dirección Nacional de Minería [National Directorate of Mining], the Dirección Nacional de Planificación Estrategica Regional [National Directorate of Regional Strategic Planning], and the Servicio Geológico Minero Argentino (SEGEMAR) [Geological and Mining Service of Argentina], the latter of which operated as a dependent decentralized agency, were under the authority of the Mining Secretariat. SEGEMAR was the scientific and technological arm of the mining industry and was composed of the Institute of Geology and Mineral Resources and the Institute of Mining Technology, both of which were responsible for the production of geologic information needed to promote investment in mineral exploration, as well as provide technical assistance to the mining sector. In 2008, about 256,000 people were employed, either directly or indirectly, by the mineral industry in Argentina (Ministerio de Planificación Federal Inversion Publica y Servicios, 2009; Servicio Geologico Minero Argentino, 2009).

Plant expansion was undertaken in 2008 at the San Jose gold and silver mine, which is located in Santa Cruz Province; the expansion doubled the plant's capacity to 1,500 metric tons per day (t/d) from 750 t/d. In 2008, San Jose was a joint venture between Hochschild Mining plc of the United Kingdom (51%) and Minera Andes Inc. of Canada (49%) (Hochschild Mining, plc, 2009, p. 10-11). In December, startup and commissioning took place at Yamana Gold Inc. of Canada's Gualcamayo gold mine, which is located in San Juan Province (Yamana Gold Inc., 2009). In 2008, a new molybdenum plant was commissioned at the Bajo de la Alumbrera Mine, which is a polymetallic porphyry deposit located in Catamarca Province at which 450 metric tons (t) of molybdenum concentrate was mined and transported to Chile for processing. Bajo de la Alumbrera was a joint venture of Xstrata plc of Switzerland (50%), Goldcorp Inc. of Canada (37.5%), and Yamana Gold (12.5%), which were the parent companies of Minera Alumbrera Ltd., the operator of the mine (Goldcorp Inc., 2009, p. 17). Panamerican Silver Corp. of Canada completed construction and commissioning of the 2,000-t/d processing plant at the Manantial Espejo gold

and silver mine in Santa Cruz Province. The first gold and silver doré bars were poured on December 29, 2008. The company expected to reach commercial production by the end of the first quarter of 2009 and to produce about 130,000 kilograms per year (kg/yr) of silver and about 2,000 kg/yr of gold (Pan American Silver Corp., 2009).

Mineral Trade

Argentina was a net exporter in 2008 as it had been since 2000, although the country had a trade deficit with Brazil, China, and the United States, which, in terms of value, were its top three trading partners. Argentina maintained a trade surplus with Chile in 2008, which was Argentina's fourth ranked trading partner. Argentina's total trade balance for 2008 included \$70.02 billion worth of exports and \$57.42 billion worth of imports compared with \$55.98 billion and \$44.71 billion, respectively, in 2007. Brazil received Argentine exports valued at \$13.26 billion and total imports valued at \$17.69 billion compared with \$10.5 billion and \$14.52 billion, respectively, in 2007. China (excluding Hong Kong and Macao) was Argentina's second ranked trading partner; it received Argentine exports valued at \$6.39 billion and supplied imports valued at \$7.1 billion compared with \$5.17 billion and \$5.09 billion, respectively, in 2007. The United States was Argentina's third ranked trading partner; it received Argentine exports valued at \$5.21 billion and supplied imports valued at \$6.89 billion compared with \$4.15 billion and \$5.26 billion, respectively, in 2007. Chile received Argentine exports valued at \$4.72 billion and supplied imports valued at \$952 million compared with \$4.18 billion and \$708 million, respectively, in 2007 (Office of the United States Trade Representative, 2009; Instituto Nacional de Estadistica y Censos de la Republica Argentina, 2010).

In 2008, Argentina's leading mineral product exports included \$6.72 billion worth of mineral fuels, mineral oils, distillation products, bituminous substances, and mineral waxes; \$1.86 billion worth of articles of iron and steel; \$1.12 billion worth of ores (unspecified), slag, and ash; \$805 million worth of aluminum and aluminum products; \$783 million worth of natural or cultured pearls, precious or semiprecious stones, precious metals, metals clad with precious metal, imitation jewelry, and coin; and \$355 million worth of inorganic chemicals, compounds of precious metals, rare-earth metals, and radioactive elements or isotopes (Instituto Nacional de Estadistica y Censos de la Republica Argentina, 2010).

Argentina was the United States' 32d ranked goods export market and its 40th ranked trading partner in 2008. Mineral fuels valued at \$832 million was the third ranked category of U.S. exports received by Argentina. The top ranked import categories received by the United States from Argentina included mineral fuels and oil valued at \$2.1 billion, aluminum valued at \$291 million, and iron and steel products valued at \$238 million. U.S. foreign direct investment (FDI) in Argentina (stock) was \$14.9 billion in 2007 (the latest year for which data available), which was a 7.2% increase compared with the U.S. investment in 2006. Investments were mostly in the manufacturing and mining sectors and in nonbank holding companies. Argentina's FDI in the United States (stock) was \$247 million in 2007

(the latest year for which data available), which was a 49.1% decrease compared with Argentina's investment in 2006 (Office of the United States Trade Representative, 2009).

Commodity Review

Metals

Aluminum.—Argentina's only primary aluminum producer was Aluar Aluminio Argentino S.A.I.C. Primary aluminum production in Argentina increased by 38% in 2008 compared with that of 2007. The increase was attributable to the completed expansion of the company's primary smelter. Production in 2008 reached 393,900 t, which was close to the smelter's expanded capacity of 410,000 t (Aluar Aluminio Argentino S.A.I.C., 2010).

Copper.—As of December 31, 2008, ore reserves at Bajo de la Alumbrera included proven reserves of 352 million metric tons (Mt) grading 0.40% copper and probable reserves of 10 Mt grading 0.33% copper for a total of 1.5 Mt of contained copper metal. Included within the proven reserves was a 75-Mt stockpile grading 0.32% copper that accounted for 240,000 t of the contained copper metal. Copper production from Bajo de la Alumbrera in 2008 included 156,900 t of copper concentrate from 37.5 Mt of ore, which represent a 3% and a 15% increase, respectively, compared with the volumes of concentrate and ore production in 2007 (Goldcorp Inc., 2009; Hennessey, Verma, and Wells, 2009, p. 4; Xstrata plc, 2009, p. 78). Lumina Copper Corp. released new inferred mineral resource estimates for the Taca Taca copper, gold, and molybdenum deposit, which is located in Salta Province. The estimate included 841 Mt grading 0.64% copper equivalent and containing 3.95 Mt of copper, 92,000 kilograms (kg) of gold, and about 151,400 t of molybdenum at a 0.4% copper equivalent cutoff (Lumina Copper Corp., 2009).

Gold.—AngloGold Ashanti Ltd. produced about 5,000 kg of gold in 2008 from its Cerro Vanguardia Mine in Santa Cruz Province compared with production of nearly 7,000 kg in 2007. The company experienced problems with agitators in the leach tanks in 2008. About 1,700 kg of gold was produced from Hochschild Mining's San Jose Mine in 2008, which was a 263% increase compared with the output in 2007. The inventory of gold in mined material was about 1,400 kg at the end of December 2008 with the first gold pour at the end of the year. Completion of the primary crusher at Yamana Gold's Gualcamayo Mine was expected by the end of February 2009, and gold production for the year was expected to be about 6,000 kg. The company also expected to complete construction and be in production at the Amelia Ines and Magdalena open pit satellite deposits by the second half of 2009. As of December 31, 2008, grade estimates in proven and probable ore reserves at Bajo de la Alumbrera included 0.40 grams per metric ton (g/t) gold and 0.29 g/t gold, respectively, for a total of about 145,000 kg of contained gold metal. Stockpiled ore accounted for about 25,000 kg of the proven reserve estimate. Gold production from the Bajo de la Alumbrera Mine in 2008 included 13,800 kg of concentrate and 1,900 kg of doré, which was about a 22% increase compared with production in 2007. In 2008, Barrick Gold Corp. of Canada produced 16,700 kg of

gold from its Veladero Mine in San Juan Province, which was a 13% increase compared with production in 2007 (Goldcorp Inc., 2009; Hennessey, Verma, and Wells, 2009; p. 4; Hochschild Mining, plc, 2009, p. 10-11; Pouiller, 2009; Xstrata plc, 2009, p. 78; Yamana Gold, Inc., 2009).

Silver.—About 136,000 kg of silver was produced from the San Jose Mine in 2008, which was a 357% increase compared with the output in 2007. Silver Standard Resources Ltd. increased proven and probable silver reserves by 43% at its Piriquitas silver and zinc project, which is located in Jujuy Province, to greater than 6 million kilograms and extended the projected mine life by 14.5 years. The mine was expected to produce about 300,000 kg/yr of silver. At yearend, Silver Standard reported that it was on track for the commencement of ore delivery to the silver circuit at Piriquitas in the first quarter of 2009. Initial production would focus on the processing of more than 400,000 t of run-of-mine-grade jig tails from historic operations and then transition to material from the open pit. Once the silver circuit was optimized, the company would (based upon the results of metallurgical testing) either bring the zinc circuit on line or use the additional process equipment to increase the silver recovery. As of January 2010, Piriquitas was expected to produce about 300,000 kg of silver and 2,500 t of tin during 15 years of mine life (Silver Standard Resources Inc., 2008, p. 1; Hochschild Mining plc, 2009, p. 10-11).

Industrial Minerals

Boron.—Exploitable concentrations of borate minerals are found in only about a dozen countries in the world. South America accounted for less than 5% of the world's reserves in 2008; however, Argentina was the leading country in South America for borate mineral production. All Argentine borate production came from Catamarca, Jujuy, and Salta Provinces. Argentina's borate products were exported to 28 countries; the leading recipients were (in order of amount received) China and Brazil. Borax Argentina SA was the top producing company. Colemanite, hydroboracite, kernite, tincal, and ulexite were the primary minerals that were mined; the ore was mined at a rate of about 100,000 metric tons per year (t/yr). Argentina's refinery operations produced borax, boric acid, and anhydrous and mineral products, including about 100,000 t/yr of boric acid. Minera Santa Rita produced borate minerals from several salars in the country. Processadora de Boratos Argentinos SA produced borates from the Loma Blanca mineral deposit in Jujuy Province. Other producers included Cia Minera Gavenda SA, which produced borates at the La Inundada Mine in Jujuy Province; Manufactura Los Andes (in Jujuy Province); Triboro SA, which mined ulexite that contained between 11% and 35% B₂O₃ from the Irene Mine in Salta Province; and Ulex SA, which produced colemanite, hydroboracite, and ulexite in Salta Province (Tran, 2008).

Lithium.—Rincon Lithium Ltd., which was a subsidiary of Australian Admiralty Resources Ltd., operated a brine production facility in Salta Province; the company was ramping up production from which it expected to generate revenue by the end of June 2009. On June 30th, Admiralty Resources announced that it had substantially reduced operating

expenditures at the Rincon salar and devised a new technique to produce lithium carbonate with minimal loss, a technique for which it had applied for a patent. By October, however, Admiralty Resources announced that Rincon Lithium had been sold to Charge Resources Pty Ltd. and that the income from the sale would be used to clear debt and as working capital for the company's iron ore, nickel, and zinc businesses that were experiencing economic difficulties. As of November 2008, Charge Resources had failed to deliver the funds, and the sale collapsed. By yearend, Rincon Lithium had been acquired by Sentient Executive GP III Ltd. for \$22.17 million (Admiralty Resources NL, 2008, 2009; Moores, 2008).

Potash.—In January 2009, Vale S.A. of Brazil announced that it had entered into a purchase and sale agreement to acquire potash assets from Rio Tinto plc for a total of \$850 million. Vale was to purchase 100% of the Rio Colorado project, which is located in Mendoza and Neuquen Provinces. The Rio Colorado Mine was expected to be developed with an initial capacity of 2.4 million metric tons per year (Mt/yr) of potash (which would be expanded to 4.4 Mt/yr), a 350-kilometer (km) railway spur; port facilities; and a powerplant. Vale expected to begin operations in mid-2009 (Vale S.A., 2009).

Mineral Fuels and Related Materials

Uranium.—Wealth Minerals Ltd. announced the discovery of polymetallic porphyry and uranium deposits at its 100%-owned Pampa Coria property in northwest Argentina. The Pampa Coria property is located about 250 km west of the city of Salta and about 30 km to the north of Lumina Copper Corp.'s Taca Taca project. Results from the Catena target included samples grading up to 1.46% copper, 2.26 g/t gold, 124 g/t silver, 194 g/t molybdenum, 0.65% lead, and 0.33% zinc. Samples collected from the Laborum target averaged about 200 g/t U₂O₆ (0.022%) uranium), ranging from below detection to a maximum of about 700 g/t U₂O₈ (0.073% uranium). The company also reported the discovery of two new zones at its Bororo Nuevo Project in Chubut Province. Mineralization is typical of sandstone-type uranium deposits, such as those in Niger and the central United States, which are globally significant uranium sources (Wealth Minerals Ltd., 2008a, b). Calypso Uranium Corp. reported the discovery of a sandstone-hosted copper, uranium, and vanadium mineralized paleo-river system at Campesino Norte in Neuquen Province. The deposit is zoned so that some areas have more copper than uranium and vice versa, with variable vanadium concentrations. The highest uranium value returned was from a 2-meter section grading 333 g/t U₂O₉. In December 2007, Calypso Uranium filed a claim with the Supreme Court of Argentina to challenge law No. 7,222 that prohibited the use of such substances as cyanide, mercury, and sulfuric acid in Mendoza Province, a prominent wine-producing region. The company claimed that the law was unconstitutional on the grounds that it was arbitrary, discriminatory, and violated the company's rights to conduct a lawful business. The lawsuit also claimed that the law breached the principle of separation of powers and the guarantee of fair and equitable treatment set forth in the Argentina-Canada Bilateral Investment Treaty. The status of

the case was not apparent by yearend, but the company was still developing projects in the country (Calypso Uranium Corp., 2008, a, b).

Outlook

Argentina's Government began to strengthen its mining industry about 15 years ago through mining code revisions, composition of long-term national mining plans, and massive public relations efforts, all designed to attract investments that would project the country onto the global mining stage. As a result of those actions, there are at least 100 mining projects at various stages of development for the production of vital industrial minerals, energy materials, and metals. Many of those projects are owned by junior companies, some of which had difficulty weathering the economic downturn of 2008, so that ownership of properties may remain fluid in the short term; however, major mining companies have significant investments in the country. Barrick Gold's huge Pascua Lama project, which is a binational endeavor involving both Argentina and Chile because of the deposit's location on the border of the two countries, received construction approval in early 2009. Production was expected to commence in the first quarter of 2013. That project alone, with proven and probable reserves of about 300,000 t of copper and more than 500,000 kg of gold and a 25-year mine life, would improve Argentina's rank among metals-producing companies, especially in Latin America. At Bajo de la Alumbrera, general decreases in copper and gold production were expected for 2009 owing to the downward trend in metals production during the mine's remaining life (about 5,000 kg of gold was expected to be produced from the mine in 2009). Yamana Gold expected to produce about 7,000 kg of gold from the Gualcamayo Mine in 2010 (Goldcorp Inc., 2009, p. 17; Yamana Gold, Inc., 2009).

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 $\label{eq:table 1} \textbf{TABLE 1} \\ \textbf{ARGENTINA: PRODUCTION OF MINERAL COMMODITIES}^{1}$

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
METALS					
Aluminum:					
Primary	272,048	270,714	272,942	286,386 r	393,900
Secondary	r	r	r	r	
Antimony, refined, secondary	1,967	2,200	2,208	2,726	2,500 e
Cadmium:					
Mine output, Cd content	111	124	122	111	124
Refined	39	3	6	35	38
Copper:					
Mine output, Cu content	177,143	187,317	180,144	180,223	156,893
Refined, secondary ^e	16,000	16,000	16,000	16,000	NA
Gold, mine output, Au content kilograms	28,466	27,904	44,131	42,021	42,046
Iron and steel:					
Metal:					
Pig iron thousand metric tons	2,392	2,644	2,481	2,593 ^r	2,500 e
Sponge iron (direct reduction) do.	1,755	1,823	1,947	1,810 ^r	2,000 e
Total do.	4,147	4,467	4,428	4,403 ^r	4,500 e
Ferroalloys, electric furnace: ^e					
Ferrosilicomanganese	r	r	r	r	
Ferrosilicon	r	r	r	r	
Steel, crude thousand metric tons	5,133	5,386	5,533	5,387 ^r	5,543
Semimanufactures do.	6,239 r	6,376 r	6,715 ^r	6,740 r	6,646
Lead:	,	,	,	,	,
Mine output, Pb content	9,551	10,683	12,064	17,045	20,788
Smelter, primary	11,000	10,607	12,064	11,568 ^r	13,482
Refined:	,	/	,	,	,
Primary	11,111	10,607	12,064	11,568	13,482
Secondary ^e	48,000	35,000	37,000	49,000	59,000
Total ^e	59,100	45,600	49,100	60,600	72,500
Manganese		r			
Mercury				3,484	1,028
Molybdenum	r	r	r	r	228
Silver, mine output, Ag content kilograms	172,387	263,766	245,124	255,567	355,596
Tin, refined, secondary ^e	r	r	r	r	
Zinc:					
Mine output, Zn content	27,220	30,227	29,808	27,025	30,349
Metal, smelter:	27,220	30,227	27,000	27,023	30,319
Primary	35,461	37,460	42,584	42,876	39,479
Secondary	2,837	2,997	3,407	3,430	3,158
Total	38,298	40,457	45,991	46,306	42,637
INDUSTRIAL MINERALS	30,270	40,437	73,771	40,500	42,037
Asbestos	267	260	299	282	298
Barite	2,762	3,355	6,276	37,979	3,170
Boron materials, crude	821,031	632,792 ^r	533,535 ^r	669,578 ^r	785,553
Cement, hydraulic thousand metric tons	6,254	7,595	8,929	9,602	9,703
Clays:	0,234	1,393	8,929	9,002	9,703
Bentonite	163,028	247,101	246,165	250,260	256,182
Common	2,348,895	6,373,687	6,117,199 ^r	7,854,569 ^r	7,126,720
Kaolin	39,072	54,903	49,619	69,354	73,539
Diatomite	26,912	34,045	38,543	49,604	36,996
Feldspar	125,684	151,307	170,728	291,562	220,234
Fluorspar	6,437	7,502	8,278	9,735	15,098
			1,202,812		
Gypsum, crude	836,298 1,500,000	1,073,286	1,202,812	1,226,530	1,257,310 NA
Lime ^e See footnotes at end of table	1,300,000	1,500,000	1,000,000	1,800,000	INA

See footnotes at end of table.

$\label{total loss} TABLE~1\\ \hbox{---Continued}$ ARGENTINA: PRODUCTION OF MINERAL COMMODITIES 1

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
INDUSTRIAL MINERALS—Continued					
Lithium: ²					
Carbonate	4,961	7,288	8,228	3,584 ^r	4,037
Chloride	6,315	8,416	8,416 ^r	3,107 ^r	2,746
Mica	2,518	4,101	6,223	10,171	8,790
Nitrogen, N content of ammonia	705,318	654,786	726,969	726,000	NA
Peat, agricultural (turba)	9,110	11,452	15,119	13,665	9,948
Perlite	21,193	21,991	25,146	35,838	26,545
Phosphate rock:	,	•	,		ŕ
Gross weight	70	225	65		
P ₂ O ₅ content	21	67	20		
Pozzolan	250	2,001	3,994	4,207	5,839
Pumice	9,188	15,361	17,665	16,200	6,500
Salt:	>,100	10,501	17,000	10,200	0,200
Common	1,371,969	1,845,833	1,917,656	2,357,674	1,681,261
Rock	177	254	242	179	229
Sand and gravel:	1 / /	237	272	1//	229
Sand:					
Construction	17,975,085	20,194,111	21,143,480	29,122,031 ^r	28,532,557
Silica sand (glass sand)	473,207		446,240	456,666 ^r	472,612
Gravel	10,752,425	461,242	10,832,689	19,423,869 ^r	
	10,732,423	10,078,475	10,832,089	19,423,809	20,383,579
Stone:	(15.412	(22.215	5.42.475	0.41, 502	747.025
Basalt	615,412	633,215	542,475	841,503	747,825
Calcareous:	101060	40.700	55.000	121.25	120 110
Calcite, nonoptical	104,960	49,700	57,800	131,357	139,119
Dolomite, including crushed	437,290	346,537	392,681	680,895 ^r	1,047,874
Limestone	10,644,948	12,267,049	12,993,352	16,757,861 ^r	15,631,899
Crushed, unidentified	7,935,563	11,533,468	12,269,384	22,586,494	23,851,939
Marble, onyx, travertine	49,739	148,192	160,535	151,306 ^r	151,889
Flagstone	531,769	193,308	550,529	268,662	237,684
Granite, in blocks	54,950	62,215	71,395	100,697 ^r	73,888
Quartz, crushed	88,334	170,668	206,282	287,138	220,979
Quartzite, crushed	512,400	784,900	854,560	959,053 ^r	1,017,938
Rhyolite	8,596		26,544	14,661	
Rhodochrosite kilograms	109,476	118,200	78,832	50,593	136,371
Gemstones (agate, amethyst, and so forth) do.	50,599	81,579	54,505	12,745 ^r	89,675
Sandstone	25,980	69,001	22,452	15,000	
Serpentine, crushed	1,200	1,500	1,725	184,480	150,470
Shell, marl	263,269	261,183	276,233	314,113 ^r	357,952
Tuff (toba) thousand metric tons	18,576	77,788	108,567	97,108	63,845
Strontium minerals, celestite	6,727	7,233	19,822	4,909	14,910
Sulfates, natural:	*,	,,	,	-,	,
Magnesium (epsomite)	8,490	1,440	1,440	1,730	NA
Sodium (mirabilite)	12,405	51,190	43,854	27,957	21,222
Talc and related materials:	12,100	31,170	15,051	21,551	21,222
Pyrophyllite	12,594	8,470	9,340	9,880	9,230
Steatite	12,574	^r	7,540 ^r	7,000	7,230
Talc	7,620	12,603	13,773		12,988
Total	20,214 ^r	21,073 ^r		14,956	
			23,113 ^r	24,836 ^r	22,218
Vermiculite	1,293	1,403	1,585	1,726	1,813
Zeolites	836,298	1,073,286	1,202,812	1,226,530	1,200,000
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen:					
Natural (asphaltite)	521	923	1,475	6,758	6,190
Byproduct of refinery	645,619	675,102	658,389	680,821	675,000

See footnotes at end of table.

$\label{total loss} TABLE~1\\ \hbox{---Continued}$ ARGENTINA: PRODUCTION OF MINERAL COMMODITIES 1

(Metric tons unless otherwise specified)

Commodity		2004	2005	2006	2007	2008
MINERAL FUELS AND RELATE	*					
Coal, bituminous	thousand metric tons	120	320	295	220	208
Coke, all types, including breeze	do.	1,546	1,496	1,191	1,200 e	NA
Gas, natural:						
Gross	million cubic meters	50,254	48,738	51,665	50,891	50,500 ^e
Marketed	do.	45,000	45,600 ^r	46,100 ^r	44,800 ^r	44,100
Natural gas liquids ^e	thousand 42-gallon barrels	r	r	r	r	
Petroleum:						
Crude	do	252,536	241,044	240,579	233,824	229,723
Refinery products:						
Liquefied petroleum gas	do.	12,652	11,624	11,464	11,027	11,000 e
Motor gasoline	do.	53,828	53,642	54,319	54,300 e	54,000 ^e
Aviation gasoline	do.		22			e
Jet fuel	do.	9,560	9,980	9,385	10,111	10,000 e
Kerosene	do.	231	191	178	167	200 e
Distillate fuel oil	do.	1,416	963	819	764	700 ^e
Residual fuel oil	do.	15,478	18,227	22,498	28,268	28,000 e
Lubricants	do.	2,665	2,443	2,435	2,150	2,000 e
Other	do.	30,087	30,170	34,823	34,900	35,000 ^e
Total	do.	125,917 ^r	127,262 ^r	135,921 ^r	141,687	140,900

Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. Revised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through December 15, 2009.

²In recent years, information available from Argentine sources prompted major revisions in how lithium production is reported.

${\bf TABLE~2}$ ARGENTINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

	Major operating companies		Annual
Commodity	and major equity owners	Location of main facilities	capacity ¹
Aluminum	Aluar Aluminio Argentino S.A.I.C. (private, 100%)	Abasto, Buenos Aires Province, and Puerto Madryn, Chubut Province	410.
Boron	Rio Tinto Minerals-Argentina (Rio Tinto	El Porvenir Mine and plant, Jujuy Province;	100.
	Borax, 100%)	Sije and Tincalayu Mines and plants, and Campo Quijano refinery, Salta Province	
Do.	Procesadora de Boratos Argentinos S.A.	Loma Blanca, Jujuy Province, and plant	36.
	(Ferro Corp. and JEM Resources)	at Palpala, Jujuy Province	
Do.	Ulex S.A. (private, 100%)	Pastos Grandes, Salta Province	2.
Do.	Norquímica S.A.	Salta Province	5.
Cement	Cementos Loma Negra C.I.A.S.A. (private, 100%)	Buenos Aires, Cordoba, Corrientes, Salta, Salta Juan, Mendoza, and Jujuy Provinces	6,000.
Do.	Cementos Avellaneda, S.A. (Corporación	La Caldera plant, San Luis Province, and	2,800,
20.	Uniland S.A. and C. Molins International S.A.)	Olavarria plant, Buenos Aires Province	220 lime.
Do.	Juan Minetti S.A. (Holcim Ltd., 100%)	Cordoba, Jujuy, and Mendoza Provinces	1,700.
Coal	Yacimientos Carbonífero Río Turbio S.A. (private, 100%)	Rio Turbio, Santa Cruz Province	210.
Copper and gold ²	Minera Alumbrera Ltd. (Xstrata plc, 50%;	Bajo de la Alumbrera Mine, Catamarca	160 Cu,
o office more form	Goldcorp Inc., 37.5%; Yamana Gold Inc., 12.5%)	Province	13,000 Au.
Gold and silver kilogra		Cerro Vanguardia Mine, Santa Cruz	100,000 Ag,
	Ashanti Ltd., 92.5%, and Government	Province	10,000 Au.
<i>p</i>	of Santa Cruz Province, 7.5%)	VIII M. C. I. B	21 000 4
Do.	do. Minera Argentina Gold (Barrick Gold Corp., 100%)	Veladero Mine, San Juan Province	21,000 Au, Ag, NA.
Do.	do. Yacimientos Mineros de Agua de Dionisio	Farallon Negro, Hualfin, and Belen,	4,600 Au,
	(Government, 100%)	Catamarca Province	50,000 Ag.
Do.	do. Small mines (private, 100%)	Jujuy Province	5,000 Ag.
fron and steel	Siderar S.A.I.C. (Ternium S.A., 60.93%)	San Nicolas, Buenos Aires Province	2,600 steel, 1,100 pig iron.
Do.	Acindar S.A. (AcelorMittal Group, 65%)	Plant Nos. 1 and 3, Buenos Aires Province;	1,350 steel,
	• • • • • • • • • • • • • • • • • • • •	and Plant No. 2, near Rio Parana, Santa Fe Province	1,000 DRI.
Do.	Siderca S.A.I.C. (Techint Group)	Buenos Aires Province	900 steel,
	, 17		670 DRI.
Lead and silver, refinery ³	Glencore International AG, 100%	Refineria Aguilar, Palpala Industrial Park,	18,000 Ag.
r d -:1 d · · 3	do	Jujuy Province	15 Pb.
Lead, silver, and zinc ³	do.	Estacion Tres Cruces, El Aguilar, Jujuy Province	49,800 Ag, 24 Pb.
Lithium metric to	ons Minera del Altiplano S.A. (FMC Corp.)	Salar del Hombre Muerto, Salta Province	7,260 chloride, 11,350 carbonate
Natural gas mill	1 /	Neuquen, Rio Negro, Salta, Santa Cruz,	18,000.
cubic met	•	and Tierra del Fuego Provinces	
Petroleum mill	ion do.	Chubut, Formosa, Jujuy, La Pampa,	366.
42-gallon barı	rels	Mendoza, Neuquen, Rio Negro, Salta, Santa Cruz, and Tierra del Fuego Provinces	
Zinc, refinery	Aguilar AR Zinc Group (Glencore International AG, 100%)	Rosario, Santa Fe Province	44.

Do., do. Ditto. NA Not available.

¹Abbreviations used in this table for commodities include the following: Ag—silver; Au—gold; Cu—copper; DRI—direct-reduced iron; and Pb—lead.

²Gold data reported in kilograms.

³Silver data reported in kilograms.