

ARGENTINA

By Pablo Velasco

The Republic of Argentina, located in southern South America, has an area of about 2.77 million square kilometers. In 1998, the area supported a population of 36.7 million. The gross domestic product (GDP) was estimated to be \$374 million¹ (purchasing power parity); the per-capita purchasing power parity was \$10,300. Increasing investor anxiety over Brazil, its largest trading partner, produced the highest domestic interest rates in more than 3 years and slowed the GDP growth to 4.3%. Despite the high level of growth in recent years, double-digit unemployment rates have persisted largely because of rigidities in Argentina's labor laws (Central Intelligence Agency, 1999, Argentina—Economy, World Factbook 1999, accessed February 29, 2000, at URL <http://www.odci.gov/cia/publications/factbook/ar.html>).

Joining the Mercado común del Sur (MERCOSUR) in 1991 has been very beneficial for the national economy, particularly in terms of exports. Mercosur was one of the largest and most dynamic integrated markets in the developing world.

In recent years, mining has contributed less than 0.3% to Argentina's GDP. The annual value of mineral production was about \$750 million, with mineral exports valued at about \$30 million (Mining Journal, 1998a). Of the \$750 million total nonfuel mineral exports, construction materials exports represented 60%; metallic minerals, 18%; nonmetallic minerals, 18%; mineral fuel (coal), 3%; and semiprecious stones, 1%.

A few junior mining exploration companies continued to explore in Argentina, but a number of companies withdrew. This sharp slowdown in exploration activity was worrisome to the country (Mining Journal, 1999). Foreign investment in Argentina, however, remained strong; the 1998 balance-of-payment deficit was due to the continued influx of capital goods.

In an underpopulated country with natural resources, mining was finally taking its place as a major part of Argentina's economy. Apart from construction materials, the principal commodities mined in Argentina were borates, copper, lead, lithium brine, precious metals, uranium, and zinc.

Government Policies and Programs

Argentina welcomes foreign direct investment, which has become an essential element in the growth of the economy. Argentina's climate for foreign investment was among the most favorable in Latin America. The Administration encouraged foreign investment through national treatment under a free foreign exchange and capital movement regime without wage or

price controls. Foreign investors, including many U.S. corporations, operated in major economic sectors.

The Governments of Argentina and the United States signed an agreement for reciprocal promotion and protection of investments in 1991. The agreement was amended, ratified by the Congresses of both countries, and went into effect on October 20, 1994. Argentina also concluded investment promotion and protection agreements with Canada, Chile, China, Egypt, most European Union countries, Poland, Switzerland, Tunisia, and Turkey.

The Mining Investment Law guarantees 30-year fiscal stability for mines. As the system is implemented, however, imperfections will need to be fixed. Specifically, national tax reforms in late 1998 raised the withholding tax on foreign interest payments, and legislation to bring the mines back in the guaranteed fiscal regime was being considered. Because the national Government has not succeeded in forcing all the provinces to eliminate the stamp tax, this will now become an issue for several new projects approaching the feasibility stage. Catamarca Province was the sole province that sought to impose royalties, capped by Federal law at 3% of pit-head value on a gross-product rather than an after-cost royalty, and has not challenged the manner in which Minera Alumbra Ltd. was paying its royalties, which was consistent with the Federal law.

Argentina lagged far behind Chile and Peru in exploration expenditures, meters of core drilled, and discoveries made during the recent boom years of 1996 to 1998. Three world-class mines developed during the mining boom all reached full production, and only one feasibility study was undertaken in 1998.

The cross-border mining treaty with Chile signed by both presidents as part of the Mercosur integration has not yet been approved by either Congress and will not be until the boundary dispute in southern Patagonia over the Hielos Continentales glacier field is settled. This is expected to take several years (Mining Journal, 1998b).

Argentina's Legal Framework for Mining covers an abstract of the Mining Code, the Legal Framework for Investment in Argentina, Mining Investment Law No. 24196, Regulating Law of Mining Investment (Decree No. 2686/93), Mining Reorganization Law No. 24224, Federal Mining Agreement Law No. 24228, VAT Funding Law No. 24402, Regulation of Law No. 24402 (Decree No. 779/95), Mining Updating Law No. 24498, and Environmental Protection for the Mining Industry Law No. 24585.

The Mining Code, approved by the Argentine Congress on November 25, 1986, regulates the rights, obligations, and procedures for the acquisition, exploitation, and use of mineral substances. It has undergone several amendments, the latest being law No. 24402/94 (Financing Regime for the Payment of Value Added Tax) and its Regulatory Decree Nos. 779/95,

¹ Where necessary, values have been converted from Argentine pesos to U.S. dollars at the rate of 1.00 peso=US\$1.00, the average exchange rate in 1998.

24498/95 (Mining Updating), and 2485/95 (Environmental Protection) (Directorio de Oportunidades, 1996).

Environmental Issues

The Environmental Protection Mining Code Law No. 24585 was approved by Congress on November 1, 1995, and was enacted on November 21, 1995.

In the last few years, Argentina's mining sector has gained momentum as the required underlying conditions for its development were created, the most important of which was the legal framework. Accordingly, all mining projects being implemented are required to be environmentally sustainable; that is, that mineral extraction processes be compatible with the protection of human and natural ecosystems. To that end, Environmental Protection for Mining Activities No. 24585 provides investors with the appropriate legal framework and requires each provincial administration to create an enforcement authority within the jurisdiction.

The institutional environmental framework relating to mining activities was completed with the establishment of Provincial Environmental Management Units, which are responsible for assisting the enforcement authority pursuant to law No. 24585 in all aspects relating thereto, specifically in assessing the environmental impact reports presented and monitoring mining projects.

As of 1998, more than 1,300 environmental impact reports had been filed nationwide. Argentina's historic low rate of mining development became an advantage in environmental terms compared with the other Latin American mining countries. This circumstance allowed it to learn from their experience and, therefore, to include environmentally preventative measures in its own new legal framework. As a result, Argentina was able to develop mining activities with environmental guidelines included from the very start. With this success, the Government intended to take advantage of mining activity growth, particularly the construction of highway and energy infrastructure works, and to spur growth of potential regional productive activities that would survive the closing or completion of mining projects (Industry, Commerce and Mining Secretariat, [undated], Legal and institutional framework activities, accessed November 25, 1998, at URL <http://www.mecon.ar/index/buding/hoja75i.htm>).

Production

Argentina was self-sufficient in construction materials and some other nonmetallic minerals. In the industrial mining sector, the largest growth was in mining of construction materials, the production value of which increased by about 1.9%. Production of semiprecious stones rose by 0.3% to about \$1.5 million. Argentina also produced gold, lead, silver, uranium, and zinc. About 900 small mining companies were in operation; of these, about 640 were involved exclusively in the production of construction materials. Most Argentine mining companies employed fewer than 50 people with the exception of El Aguilar Mine, owned by Cía. Minera Aguilar, S.A., in Jujuy Province, a subsidiary of Compañía Minera del Sur (Comsur) of Bolivia. El Aguilar Mine mined approximately 1,800 metric tons per day (t/d) of combined 10% lead and zinc ore grading 3% lead, 7% zinc, and 70 grams per metric ton (g/t) silver from

two underground ore bodies. The mine has approximately 5 years of reserves, and the large surrounding land position controlled by Comsur is attractive for zinc exploration. The Bajo de la Alumbrera Mine, owned by Minera Alumbrera Ltd. in Catamarca, was Argentina's flagship mining project.

Production at Alumbrera began in September 1997, and the mine was 1 of the top 15 copper-gold mines in the world in 1998. The deposit contains 767 million metric tons (Mt) of ore grading 0.51% copper and 0.64 g/t gold. Alumbrera was designed to produce 180,000 metric tons per year (t/yr) of copper and 19,906 kilograms per year of gold. By 2000, the mine was expected to move 325,000 t/d of ore and 140,000 t/d waste and to recover 2,000 t/d of copper-gold concentrate (Mining Journal, 1998d).

Aluminios Argentinos, S.A.I.C. (ALUAR), the primary aluminum producer, produced about 190,000 t/yr of aluminum ingot, billet, and slab. Crude steel production increased by 1.1% to about 4.2 Mt in 1998, and domestic consumption decreased to 4.1 Mt from 4.3 Mt in 1997. The largest producer of steel in the private sector was Empresa Siderúrgica de Argentina. Production of crude oil increased by nearly 0.2% in 1998, and refinery products remained at about the same level as that of 1997. (See table 1.)

Trade

According to the preliminary mining statistics released by the Dirección de Evaluación Minera de la Secretaría de Industria, Comercio y Minería of Argentina reported that the value of exported metallic minerals, mineral-related products, and industrial minerals, including construction materials export in 1998 amounted to \$750 million, an increase of 31.7% compared with that of 1997.

In 1998, nonfuel minerals and mineral-related products were exported to 51 countries, including Brazil, 30.5%; the United States, 15.1%; Belgium, 12.7%; Japan, 8.6%; Chile, 6.1%; Uruguay, 5.1%; Morocco, 4.7%; and Bolivia, 1.1%. Mining exports reached \$750 million. Exports of copper increased owing to the start-up of the Alumbrera copper mine. Exports of gold doré, containing gold and silver, and lithium were expected to increase; the Salar del Hombre Muerto lithium mine in Catamarca and the Cerro Vanguardia gold mine in Santa Cruz Province were largely responsible for these increases. Borates and lead exports also increased. According to the Secretaría de Industria, Comercio y Minería, mineral exports were expected to increase to \$1.7 billion per year by 2003 (Metals & Mining Latin America, 1998c).

Structure of the Mineral Industry

The Subsecretaría de Minería, a unit of the Secretaría de Industria, Comercio y Minería, defines and controls the tasks performed by the Dirección Nacional de Minería and the Servicio Geológico Minero Argentino. It also promotes and coordinates mining technology policy, establishes the development and incorporation of new technologies, and monitors and preserves a single data bank of mining and geologic information.

Since 1996, the nuclear powerplants formerly under La Comisión Nacional de Energía Atómica have been privately operated by Nucleoeléctrica Argentina S.A. The construction of

the third nuclear powerplant, Atucha II, was discontinued owing to budgetary constraints.

The mineral industry in the private sector comprised several mining and manufacturing companies, such as ALUAR, Cementos Loma Negra C.I.A.S.A., Cía. Boroquímica S.A.M.I.C.A.F., Cía. Minera Aguilar, Cía. Minera Tea S.A.M.I.C.A.F., Sulfacid S.A.C.I.F., Minera Alumbraera, FORMICRUZ-Cerro Vanguardia S.A., FMC Minera del Altiplano S.A., and El Pachón S.A. Additionally, hundreds of small metallic and industrial mineral companies were engaged in mining activities throughout Argentina. (See table 2.)

At yearend, 10.9 million people were employed nationwide, 36,000 of whom worked in metallurgical plants; 21,000, in the oil and gas industry; 16,000, in the mining sector; and 7,000, in the cement industry.

Commodity Review

Metals

Aluminum.—Primary aluminum was produced by ALUAR in Puerto Madryn, Chubut Province, at an installed production capacity of 190,000 t/yr. In 1998, ALUAR's smelter expansion was going smoothly, according to officials. The 124 additional cells were expected to start producing an additional 72,000 t/yr of aluminum for the export market in April 1999. When the plant reaches full capacity after the expansion, it will produce 262,000 t/yr of aluminum (Metal Bulletin, 1998).

Copper and Gold.—The Bajo de la Alumbraera copper-gold project was constructed on behalf of a joint venture between Minera Alumbraera and Yacimientos Mineros de Agua de Dionisio (YMAD). The project had been developed by Minera Alumbraera, a company owned by MIM Holdings Ltd. of Australia (50%), Australia's North Ltd. (25%), and Rio Algom Ltd. of Canada (25%). Property ownership rested with YMAD, which retained a 20% net proceeds royalty interest in the project. The mine had been commissioned in late 1997 (Mining Journal, 1998c).

In 1998, the Minera Alumbraera copper-gold mine was operating at close to its design capacity of 180,000 metric tons (t) of copper and 19,900 kilograms (kg) of gold in concentrates. According to the president of Minera Alumbraera various problems in reaching targets for the amount of ore and overburden mined were due to delays in mobile equipment delivery and a work force that was not fully trained. Targets will be achieved within the first 3 months of 1999. There was a minor dispute concerning Alumbraera's royalty payments. The Catamarca provincial government was claiming that royalties should be paid against mine-mouth production in contravention of the Federal Government's insistence that deduction of the cost be allowed (Metals & Mining Latin America, 1998b).

BHP of Australia reduced activities at the Agua Rica copper project in Argentina. Weak copper market conditions and the reshaping of BHP's global asset portfolio have led to Argentine copper activities being reduced from active field program status to care and maintenance with low-cost district exploration. Although staff reductions were initiated at yearend 1998, work will continue. Agua Rica was a large porphyry copper-gold-silver molybdenum deposit in Catamarca not far from Alumbraera. BHP Copper, which had a 70% interest in the joint

venture, and Northern Orion Exploration Ltd. of Canada, which had a 30% interest, undertook a final feasibility study of the project and agreed to a \$8.4 million budget for the year starting in June 1998. An initial feasibility study had been completed in November 1997 (Metals & Mining Latin America, 1998g).

Gold and Silver.—Barrick Gold Corp. made a hostile takeover bid for Argentina Gold Corp., which valued the company at \$142 million; Barrick owned 9.9% of Argentina Gold's common shares. Prior to Barrick's announcement, the two Canadian companies held discussions that failed to win the support of the directors of Argentina Gold. During the discussions, Barrick offered to purchase all the shares of Argentina Gold for \$5.50 per share if the support of the company and the principle shareholders was given. When this approach was rejected, Barrick announced a hostile offer to pay \$4.00 per share in cash. According to Barrick, this lower offer still represented a 70% premium to the average trading price of Argentina Gold's shares in the previous 20 days of trading on the Vancouver Stock Exchange. It said its offer was conditional on its acquiring at least 50.1% of the company's common shares on a fully diluted basis. Barrick has been the 40% joint-venture partner with Argentina Gold at the Veladero property in San Juan Province since 1994. The property is close to Barrick's Pascua project, which is just over the border in Chile's El Indio Belt. A mine developed at Veladero would be able to make use of the infrastructure at Pascua, which was due to come into operation in 2001 (Metals & Mining Latin America, 1998d).

Argentina Gold released results from three drill holes that extended the mineralization at the Veladero project. At the Amable target, mineralization, which was extended to the east, has a north-south extent of 440 meters (m) and an east-west extent of 250 m; hole 92 returned 105 mm of mineralization grading 7.67 g/t gold and 52.5 g/t silver. At the Filo Federico target, hole 91, which was drilled on the eastern side of the target, returned 64 m of mineralization grading 0.84 g/t gold and 2 g/t silver (Metals & Mining Latin America, 1998b).

Minera Andes S.A. began a new round of work in advance of a drilling campaign at its El Pluma/Cerro Saavedra silver-gold property in Santa Cruz in the first quarter of 1999. A 3,000-m trenching program was under way at the Halves Verde Zone. Sampling of the property continued (Metals & Mining Latin America, 1998e).

Iron and Steel.—Compared with 1997, crude steel production increased by 1.1% to about 4.2 Mt; output of semimanufactured products increased by about 13.8% to 4.16 Mt; apparent domestic consumption of rolled steel products was estimated to have increased by about 4% to about 3.9 Mt by the Instituto Argentino de Siderurgia; and per capita apparent consumption of steel increased by 1.5% to 135 kg.

During the almost 3 years since privatization, Aceros Zapla S.A. has been in the process of financial and technological restructuring. Andina S.A.I.C. was planning to revamp its fourth 18-megawatt furnace to produce silicon metal.

Because Argentina did not produce any silicon, it imported silicon from Brazil (Metal Bulletin, 1996).

Lead and Zinc.—A \$1.5 million exploration program at El Aguilar was cut by 30% in the face of the metal's falling price. Since July 1997, zinc prices have fallen to between \$940 and

\$950 per metric ton from \$1,050 per ton. To compensate, only \$1.05 million will be spent to explore for zinc to extend the mine's life (Metals & Mining Latin America, 1999).

Low prices have limited exploration, and results have been slow. Exploration will carry on for at least a year on the basis of initial indications of an expanding ore body (Metals & Mining Latin America, 1999).

El Aguilar, which is located on a plateau 4,100 m above sea level, has produced more than 30 Mt of ore since the early 1930's. Annual production was 72,000 t of zinc concentrate grading 49% zinc and 19,000 t of lead concentrate with silver credits. In 1998, reserves were 4.5 Mt, which should be sufficient for another 8 years at full production or 15 to 20 years at a lower output. Zinc concentrates were processed at the Sulfacid Smelter in Rosario, Santa Fe, which was part of the same group. Exports to Asia, Europe, other Latin American countries, and North America accounted for 20% of the mine's production. In 1998, overall sales were \$30 million (Metals & Mining Latin America, 1999).

Pacific Rim Mining Corp. of Canada received assay results from its La Colorada project in northwestern Argentina. Lead, silver, and zinc show a strong correlation, and copper is ubiquitous throughout the system. Gold appears to halo zinc-rich intervals, although it occurs in anomalous concentrations throughout the system. Pacific Rim Mining reported a few significant intersections as a result of the drilling. One hole intersected 6.65 m of ore grading 3.72% zinc, 0.73% lead, 0.03% copper, 12.9 g/t silver, and 0.04 g/t gold. Another intersected 10.8 m of ore grading 4.13% zinc, 1.95% lead, 0.14% copper, 10.1 g/t silver, and 0.07 g/t gold. Geologic mapping of the property indicated the presence of two or three massive sulfide horizons on the surface, and geophysical surveys suggested that these persist at depth (Metals & Mining Latin America, 1998f).

Tin.—Sunshine Mining and Refining Co. increased the proven and probable reserve estimates for the Piriquitas silver and tin project in northwestern Argentina. The recalculation, which included data from the 11,000 m drilled during the 1998 program, put the reserves at 15.1 Mt of ore grading 199 g/t silver and 0.3% tin. The company expected to complete the drilling program, targeting areas considered to be on trend and extensions of existing reserves, and condemnation drilling by the end of September 1998. The estimated capital cost of the project was between \$90 million and \$100 million. A feasibility study was expected to be completed in October 1998 (Mining Journal, 1998d).

Sunshine Mining and Refining has completed a planned 4,200 m of core drilling at La Joya del Sol gold project in the Huemules gold-silver property in Chubut. Preliminary metallurgical test work indicated that vat cyanide leaching will recover 90% of the contained gold and 75% of the contained silver with low cyanide consumption (Mining Engineering, 1998).

Industrial Minerals

According to statistics released by the Portland Cement Manufacturers' Association, Argentina's production of cement increased by 32% to 6.8 Mt compared with that of 1997. The Argentine production base had an effective clinker production

capacity of 8.44 Mt in 17 cement works, including 3 grinding units. Nearly 51% of this capacity was owned by Loma Negra C.I.A.S.A. (International Cement Review, 1999).

Loma Negra C.I.A.S.A., Argentina's premier cement company and part of the country's Fortabat Group, operated integrated cement works at Barker, Catamarca, Olavarria, San Juan, and Zapata, as well as two grinding units at Pipinas and Yacyretá. Loma Negra had a 40% market share in the crucial Buenos Aires market. Juan Minetti, S.A., operated three works in the central and northwestern regions of the country that brought its total production capacity to 1.66 Mt. In October 1998, Holderbank Financiere Glarus of Switzerland signed a memorandum of understanding with Suma Huaico S.A. to form a strategic alliance; this caused renewed speculation about a linkup between Corporacion Cementara Argentina, S.A. (Corcemar), and Juan Minetti. Holderbank subsequently increased its stake in Juan Minetti to 74%. This deal was made through Holderbank's operation in Polpaico, Chile, and involved the purchase of shares held by Suma Huaico, which had a 53% stake in Juan Minetti. Corcemar divided its 1.60-million metric tons per year (Mt/yr) production capacity between its 0.85-Mt/yr Capdeville and its 0.75-Mt/yr Yocsina, Codoba, works (International Cement Review, 1998).

Mineral Fuels

Natural Gas.—In 1998, gross production of natural gas increased by 7.1% to about 37 billion cubic meters (Gm³). Proven reserves of natural gas were reported by the privatized Yacimientos Petroliferos Fiscales S.A. (YPF) to be about 246 Gm³. About 53% of the natural gas used in Argentina was produced by YPF, and the rest, either imported from Bolivia or produced under service contracts with private production companies. Natural gas imports from Bolivia amounted to less than 2.0 Gm³.

Natural gas represented an important and growing market for YPF in Argentina and neighboring countries. YPF was in a strong competitive marketing position because of its extensive long-lived reserves and dominant position in basins close to major population centers. "Argentina has the second largest proven reserves of natural gas in South America after Venezuela. Because most of these reserves were discovered as a result of oil exploration, gas production is concentrated in the same five basins as oil production. Argentina's largest gasfield is Repsol-YPF's Loma de la Lata. Repsol-YPF is the largest producer of domestic natural gas, with about 32% of the total, followed by Total Austral (a unit of France's Total), Pérez Companc, Bidas and Pluspetrol (itself controlled by Repsol-YPF). The natural gas industry—production, transportation, distribution, and marketing—is in hands of the private sector and is operated within a competitive market structure. There is free access to transmission and distribution pipelines, and there [were] no restrictions on imports and exports of natural gas" (U.S. Energy Information Administration, August 1999, Argentina—Natural gas, Country Analysis Briefs at a Glance, accessed September 23, 1999, at URL <http://www.eia.doe.gov/emeu/cabs/argentina.html>).

Transportadora de Gas del Sur S.A. (TGS), which was 23.3% owned by Enron of the United States and 46.7% by Pérez Companc of Argentina, was South America's largest pipeline company with 53.8 million cubic meters per day of capacity in

three pipelines. TGS delivered two-thirds of the Argentina's total gas consumption to southern Argentina and greater Buenos Aires. In 1998, TGS received about \$500 million in loans from the Inter-American Development Bank to fund a badly needed expansion and upgrade of 6,598 kilometers of pipelines that accounted for the bulk of TGS's operations (U.S. Energy Information Administration, August 1999, Argentina—Natural Gas, Country Analysis Briefs at a Glance, accessed September 23, 1999, at URL <http://www.eia.doe.gov/emeu/cabs/argentina.html>).

Petroleum.—Argentina has around 2.6 billion barrels of proven oil reserves distributed among 19 sedimentary basins. Most of Argentina's oil was produced in two onshore basins—Neuquén in southwestern Argentina and Golfo San Jorge in the southeast. Other producing basins were Norwest (Northwest), Guyana, and Austral. To date, there has been little activity offshore. Puerto Hernandez, in the Neuquén basin, serves as the starting point for three major pipeline routes transporting crude oil north to the Luján de Cuyo refinery near Mendoza; over the Andes to Concepción, Chile; and east to Puerto Rosales on the Atlantic. The pipeline terminus at the port of Concepción, Chile, provides an outlet for shipments to the U.S. Gulf Coast or the Pacific Rim, but so far, only small volumes have been shipped to these distant customers. Argentina's oil production increased by about 80% within a 7-year period, from less than 500,000 barrels per day (bbl/d) in 1991 to more than 836,000 bbl/d in 1998. About one-third of Argentina's oil was exported mainly to Brazil, Chile, and Uruguay. Argentina's oil exports reached 350,000 bbl/d in 1998 compared with 52,000 bbl/d in 1992.

“YPF is Argentina's largest producer of crude oil, followed by Pérez Companc and Petrolera San Jorge. Pérez Companc had about 11% of oil production in 1998 with about 109,000 bbl/d, and a market capitalization of about \$4.8 billion. Both Pérez Companc and YPF and others are actively seeking deals with Petrobrás, the Brazilian state-run oil company. Other important companies in the Argentine oil sector include Royal Dutch-Shell, Exxon, Tecpetrol, CGC, Eg3, Bidas (60%-owned by BP-Amoco), Repsol's Astra, BP-Amoco, Germany's Deminex, and France's Total. Pan American Energy is joint venture between U.S. Amoco and local firm Bidas” (U.S. Energy Information Administration, August 1999, Argentina—Oil, Country Analysis Briefs at a Glance, accessed September 23, 1999, at URL <http://www.eia.doe.gov/emeu/cabs/argentina.html>).

“Three companies control the downstream oil sector in Argentina: Repsol-YPF, Esso, and Shell. These three companies are investing in upgrading capacity to produce lighter products as the country completes the switch to unleaded gasoline and complies with more stringent environmental requirements. Argentina's 12 oil refineries produce petroleum products primarily for the domestic market. In addition to these largest refiners, the much smaller Eg3 consortium (Astra, Isaura, and Puma)—itself controlled by Repsol-YPF—controls 14% of the retail fuel market. Pérez Companc also has stakes in two Argentine refineries at San Lorenzo and El Norte, as well as a substantial retail network. Repsol-YPF accounts for around 48% of the country's total refining capacity, mainly from its ownership in La Plata and Lujan de Cuyo refineries in the Greater Buenos Aires region, among the largest in the country.

The remaining capacity is split among Shell's one refinery (18%), Esso's two refineries (16%), and the six refineries of five small companies (18%)” (U.S. Energy Information Administration, August 1999, Argentina—Downstream—Refining and petrochemicals, Country Analysis Briefs at a Glance, accessed September 23, 1999, at URL <http://www.eia.doe.gov/emeu/cabs/argentina.html>).

Outlook

On the basis of the scale of exploration and development interest in recent years, Argentina's mining officials predicted that the value of mineral production could reach \$2.3 billion within 10 years, and mineral exports could increase to as much as \$1.4 billion per year. The exploration boom of the early 1990's has ended, and Argentina will not see the return of speculative junior mining company activity at previous levels. Nonetheless, metal exploration by a smaller number of companies with long-term commitment to Argentina will continue, and these exploration ventures will have an excellent chance of success in one of Latin America's most advanced and stable countries (Mining Journal, 1998).

Although behind agroindustrial production and beef, mine products will soon be among Argentina's top five exports but will have stiff competition from automobile exports and also natural gas exports via five new pipeline projects to Chile. The increase of mining's contribution has been projected to be just under 1% of Argentina's GDP by 2000 (Mining Journal, 1998d).

After completion of the 6-month feasibility study of a proposed copper smelting and refining project by Fluor Daniel paid for by a loan from the U.S. Trade and Development Agency. Argentina will invite mining companies to consider investing in the \$400 million to \$440 million project that would be located in either Bahia Blanca or Rosario. The initial production capacity would be 175,000 t/yr of refined copper and 525,000 t/yr of sulfuric acid (Mining Journal, 1998b).

Mining projects to be completed in the near future were the Agua Rica, the Alumbra expansion, El Carmen, the Cerro Vanguardia, the Fenix-Salar del Hombre Muerto, Las Flechas, El Pachón, the Rio Colorado, the San Jorge, and the Sunshine Pirquitas.

Argentina's energy resources, which are abundant and diverse, include crude oil, natural gas, hydropower, and uranium; the potential has not been fully determined. New investments in Argentina are directed toward several promising projects, including copper, gold, crude oil, gas pipelines, natural gas, and petrochemicals. Significant copper, gold, silver, lithium carbonate, and potassium chloride projects being evaluated include Cerro Amarillo, consisting of seven properties that lie in the southern extension of Chile's El Teniente copper belt.

Argentina welcomes foreign direct investment, which has become an essential element of the country's economic growth. Argentina's climate for foreign investment is among the most favorable in Latin America. National and provincial laws encourage the development of mining by private enterprises, including foreign companies. Several major mining companies and more than 60 junior companies are exploring the whole range of the Argentine Andean chain. Argentina's mineral

resources will be important in the future of worldwide investment, development, and mineral-resource analyses.

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Major Sources of Information

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Major Publications

Estadística Minera de la República Argentina, Subsecretaría de Minería, annual report.

Panorama Minero, monthly magazine.

TABLE 1
ARGENTINA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1994	1995	1996	1997	1998 e/
METALS					
Aluminum:					
Primary	175,000	185,500	183,900	187,200 r/	186,700 3/
Secondary	14,400	10,000	15,800	15,800	16,000
Cadmium concentrate:					
Gross weight	68	82	127	136 r/	145
Cd content	27	43	40	45	34
Copper:					
Mine output, Cu content	--	--	-- e/	30,421 r/	170,273 3/
Refined e/	16,000	16,000	16,000	16,000 3/	16,000
Gold, mine output, Au content kilograms	937	837	723	2,289 r/	19,459 3/
Iron and steel:					
Iron ore and concentrate:					
Gross weight thousand tons	80	--	--	-- e/	--
Fe content do.	28	--	--	-- e/	--
Metal:					
Pig iron do.	1,410	1,568	1,966	2,066	2,148 3/
Sponge iron (direct reduction) do.	1,269	1,328	1,422	1,501	1,538 3/
Total do.	2,679	2,896	3,388	3,567	3,686 3/
Ferroalloys, electric furnace:					
Ferromanganese	8,117 r/	5,836	7,374 r/	8,381 r/	8,000
Ferrosilicomanganese	29,358	27,344	24,654 r/	26,134 r/	27,000
Ferrosilicon	11,669	14,017	22,452 r/	17,835 r/	17,000
Total	49,144 r/	47,197	54,480 r/	52,350 r/	52,000
Steel, crude thousand tons	3,314	3,581	4,075	4,169 3/	4,216 3/
Semimanufactures 4/ do.	3,249	3,549	3,600 e/	4,258 3/	4,131 3/
Lead:					
Mine output, Pb content	9,981	10,521	11,272	13,760 r/	15,004 p/
Smelter, primary e/	14,600	14,000	14,100	14,200	14,150 3/
Refined:					
Primary	7,785	2,430	396	3,282	300
Secondary	17,600	26,298	27,705	28,834	30,100
Total	25,385	28,728	28,101	32,116	30,400
Silver:					
Mine output, Ag content kilograms	38,032	47,787 r/	50,399	52,550 r/	50,000
Metal, smelter e/ do.	108,000	110,000	140,000	145,000 3/	100,000
Tin, metal, smelter e/	100	100	100	100	100
Uranium, mine output, U ₃ O ₈ content kilograms	94,000	68,000	27,000	41,000	40,000
Zinc:					
Mine output, Zn content	26,933	32,104	31,093	32,400 r/	32,400
Metal, smelter:					
Primary	35,214	35,767	36,392	38,672	38,677 3/
Secondary e/	2,800	2,800	2,900	3,100 3/	3,100
Total	38,014	38,567	39,292	41,772	41,777 3/
INDUSTRIAL MINERALS					
Asbestos	260	300 e/	446	400 e/	380
Barite	27,828	28,907	14,038	13,121 r/	13,500
Boron materials, crude	215,021	244,933	342,210	422,556 r/	350,000
Cement, hydraulic thousand tons	6,276	5,447	5,117	6,858	7,100
Clays:					
Ball clay (plastic clay) e/ do.	90	90	90	90	--
Bentonite	113,407 r/	111,011	134,588	113,572 r/	115,000
Foundry earth e/	119,179 3/	120,000	100,000	100,000	100,000
Fuller's earth (decolorizing clay) e/	1,600	1,600	1,600	1,500	1,500
Kaolin	50,471	39,860	64,241	47,365 r/	45,000
Refractory e/	30,000	--	--	--	--
Other 5/ thousand tons	2,600 e/	--	--	-- e/	--
Diatomite	6,260	4,938	8,647	9,449 r/	9,500
Feldspar	42,516	37,095	72,539	105,320 r/	80,000
Fluorspar	3,585	5,105	5,666	7,168 r/	7,200

See footnotes at end of table.

TABLE 1--Continued
 ARGENTINA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1994	1995	1996	1997	1998 e/
INDUSTRIAL MINERALS--Continued					
Gypsum, crude	549,759	590,055	633,121	729,495 r/	650,000
Lithium, spodumene, ambygonite, gross weight e/	400	400	400	697	700
Mica:					
Sheet e/	720	700	297	300	300
Waste and scrap	1,104	2,643	1,840	3,228 r/	3,200
Nitrogen, N content of ammonia e/	73,000	78,700	80,000	106,900	100,000
Phosphates, Thomas slag e/ 6/	50	50	50	50	50
Pumice and related volcanic materials (perlite, pozzolan, toba, etc.)	131,661	74,941	81,283	147,235 r/	140,000
Salt:					
Rock e/ thousand tons	3	1	--	1 r/	1
Solar do.	834	1,009	1,096	841 r/	850
Total do.	837	1,010	1,096	842 r/	851
Sand and gravel:					
Sand:					
Construction do.	14,368	15,726	16,628	18,743 r/	18,000
Silica sand (glass sand) do.	247	286	244	257 r/	260
Gravel do.	8,391	5,819	5,550	6,062 r/	6,000
Soda ash e/	190	200	200	200 e/	200
Stone:					
Basalt thousand tons	1,653	1,975	1,133	1,774 r/	1,800
Calcareous:					
Calcite, nonoptical	49,900	40,099	40,011	73,415 r/	75,000
Calcium carbonate (chalk) e/	20,000	20,000	20,000	20,000	20,000
Dolomite	684,799	1,107,906	1,239,467 r/	1,241,844 r/	1,240,000
Limestone thousand tons	11,970	11,540	12,315	13,439 r/	13,500
Marble:					
Aragonite, broken	57	--	--	-- e/	--
Onyx, in blocks and broken	68	122	--	100 r/	100
Travertine, in blocks and broken	9,790	16,718	22,800	14,782 r/	15,000
Unspecified, in blocks and broken	15,338	8,440	11,655	29,775 r/	29,800
Flagstone	55,555	87,576	102,510	55,340 r/	55,500
Granite:					
In blocks	88,215	125,547	113,456	95,013 r/	95,000
Crushed thousand tons	5,232	7,030	7,809	11,974 r/	12,000
Quartz, crushed	69,605	95,121	130,951	117,976 r/	118,000
Quartzite, crushed thousand tons	618	1,841	899	900 e/	900
Rhodochrosite	46	69	73	14 r/	15
Gemstones (agate, amethyst, apolo, tourmaline, etc.) kilograms	4,800	3,134	3,100	13,420 r/	13,500
Sandstone e/	230	200	200	200	200
Serpentine, crushed	27,516	78,107	71,989	141,410 r/	140,000
Shell, marl	238,037	869,650	883,990	287,670 r/	290,000
Tuff, (tosca) thousand tons	6,234	7,002	8,268	6,183 r/	6,300
Strontium minerals, celestite	8,484	9,325	3,775	3,049 r/	3,100
Sulfates, natural:					
Aluminum (alum)	131	352	306	300 e/	300
Magnesium (epsomite)	1,160	720	1,440	7,200 r/	7,000
Sodium (mirabilite)	7,978	10,604	21,726	9,133 r/	9,500
Talc and related materials:					
Pyrophyllite	1,996	4,189	2,180	4,242 r/	4,000
Steatite e/	500	300	300	300	300
Talc	16,850	12,474	11,777	13,380 r/	13,500
Total	19,346	16,963	14,257	17,922 r/	17,800
Vermiculite	32	44	40	822 r/	100
Water, mineral-containing e/	130,000	135,000	135,000	130,000	130,000
Zeolite e/	90	90	90	90	90
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural (asphaltite)	121	662	3,476	3,500 e/	3,000
Coal, bituminous thousand tons	347	305 r/	310 r/	250 r/	300
Coke, all types, including breeze e/ do.	200	300 r/	200	200	200

See footnotes at end of table.

TABLE 1--Continued
 ARGENTINA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1994	1995	1996	1997	1998 e/
MINERAL FUELS AND RELATED MATERIALS--Continued					
Gas, natural:					
Gross million cubic meters	27,470	30,472	34,651 r/	37,081 r/	41,000
Marketed 7/ do.	24,021	26,972	29,121	30,670 r/	32,000
Natural gas liquids:					
Butane thousand 42-gallon barrels	7,317	6,935	7,265	7,300	7,300
Propane do.	8,743	8,395	8,795	8,800	8,800
Total do.	16,060	15,330	16,060	16,100	16,100
Peat, agricultural (turba)	2,574	4,000	2,692	9,256 r/	5,000
Petroleum:					
Crude thousand 42-gallon barrels	237,290 r/	260,975 r/	275,933 r/	304,447 r/	305,000
Refinery products:					
Gasoline do.	51,666	44,718	44,895	45,000 e/	45,000
Kerosene do.	2,675	2,480	2,555	2,600 e/	2,600
Jet fuel do.	7,819	7,499	7,665	7,700 e/	7,700
Distillate fuel oil do.	65,631	62,914	62,780	63,000 e/	63,000
Lubricants e/ do.	1,825	1,825	1,825	1,800	1,800
Residual fuel oil do.	20,596	18,025	17,885	18,000 e/	18,000
Other do.	10,324	10,515	10,525	10,600 e/	10,600
Refinery fuel and losses do.	22,029	28,473	28,470	28,500 e/	28,500
Total do.	182,565	176,449	176,600	177,200 e/	177,200

e/ Estimated. p/ Preliminary. r/ Revised.

1/ Table includes data available through March 2000

2/ In addition to the commodities listed, bismuth, carbon black, columbite, lime, natural gasoline, perlite, and potassium sulfate (kalinite) were believed to be produced, but output was not reported quantitatively, and available information was inadequate to make reliable estimates of output levels.

3/ Reported figure.

4/ Hot-rolled semimanufactures only; excludes castings and cold-rolled semimanufactures produced from imported hot-rolled semimanufactures.

5/ Includes plastic, semiplastic, and/or ferruginous clays used totally in the manufacture of portland cement.

6/ Thomas slag production was estimated from the Thomas crude steel reported in La Siderurgia Argentina annual published by the Instituto Argentino de Siderurgia.

7/ Natural gas imported from Bolivia.

TABLE 2
ARGENTINA: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Aluminios Argentinos S.A.I.C. (Government, 52.1%; private 47.9%)	Puerto Madryn, Chubút Province	190.
Boron		Cía. Boroquímica S.A.M.I.C.A.F., (owned by Rio Tinto Zinc Corp. Ltd.)	El Porvenir Mine, Jujuy Province; Tincalayu and Campo Quijano, Salta Province	345.
Cement		Loma Negra C.I.A.S.A., #1; Juan Minetti, S.A., Corporación Cementera Argentina, S.A., (private, 100%)	Buenos Aires, Córdoba, Corrientes, Salta, San Juan, Mendoza, and Jujuy Provinces	6,000.
Coal		Yacimientos Carbóníferos Fiscales (Government, 100%)	Río Turbio, Santa Cruz Province	210.
Copper and gold	kilograms	Minera Alumbrera Ltd. (Mount Isa Holding Ltd. of Australia, 50%; North Limited of Australia, 25%; Rio Algom Ltd. of Canada, 25%)	Bajo de La Alumbrera Mine, Belén Depart- ment, Catamarca Province	180 Cu, 20,000 Au.
Gold and silver	do.	Yacimientos Mineros de Agua de Dionisio (Government, 100%) Small mines (private, 100%)	Farallón Negro, Hualfín, and Belén, Catamarca Province Various in Jujuy Province	4,600 Au, 50,000 Ag, 5,000 Ag.
Iron ore		Hierro Patagónico de Sierra Grade, S.A., Minera (Government, 100%) shutdown in 1998	Sierra Grande, Río Negro Province	1,000.
Lead, silver, zinc	kilograms	Cía. Minera Aguilar, S.A. owned by Cía. Minera del Sur (private, 100%)	Estación Tres Cruces, El Aguilar, Jujuy Province	49,800 Ag, 24,000 Pb, 30,000 Zn.
Natural gas	million cubic meters	Transportadora de Gas del Sur, S.A., and Transportadora de Gas del Norte (private, 100%)	Neuquén Santa Cruz, Tierra del Fuego, Salta, and Río Negro Provinces	41,000.
Petroleum	million barrels	Repsol 97.5%, Yacimientos Petrolíferos Fiscales S.A. 2.5% (private 97.5%)	Chubút, Santa Cruz, Neuquén, Río Negro, Mendoza, Salta, Tierra del Fuego, Jujuy, La Pampa, and Formosa Provinces	366.
Steel		Aceros Paraná, S.A. (private, 79.9%; Government, 20.1%)	7 kilometers from San Nicolás de los Arroyos, Buenos Aires Province	3,300.
Do.		ACINDAR-Industria Argentina de ACEROS, S.A. (private, 100%)	Plant Nos.1 and 3, Buenos Aires Province; Plant No. 2, near Río Paraná, Santa Fé Province	1,500.
Uranium (ore)		Empresa Nuclear Mendoza, subsidiary Nucleoeléctrica Argentina S.A. (NASA)	Sierra Pintada, San Rafael, Mendoza Province	160.
Zinc, refined		Cía. Sulfacid S.A.C.I. y F and Cia Minera Aguilar, S.A., 50%; and private, 50%	Near Rosario on the Paraná River, Santa Fe Province	35.