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The Mineral Industry of Ecuador

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In 2009, the Republic of Ecuador maintained its position as the fifth ranked petroleum producer in Latin America and had the third largest reserves of petroleum in Latin America after Venezuela and Brazil. Starting in 2007, agencies of the Ecuadorian Government began to be significantly reorganized by the new administration, and much of that activity was directly related to the mining and hydrocarbon sectors, especially with respect to the management of the country's still relatively unexploited precious and base-metal deposits. Ecuador's Constitution and its mining and hydrocarbon laws were rewritten between 2007 and 2009, and on April 18, 2008, the Government enacted a mining mandate that resulted in an immediate suspension of mining fieldwork activities. Much of the legislative change that took place was promoted by the Administration as a means to increase the standard of living among the country's population by ensuring sustainable development of the mining and petroleum industries. A new mining law was enacted on January 29, 2009, and additional regulations and provisions were issued on November 4, 2009. By the end of 2009, there was still uncertainty regarding the general atmosphere of mining in Ecuador, especially in terms of how new legislation would be applied and the extent to which foreign investment and private sector contracts would be affected.

Government Policies and Programs

In 2009, the Government of Ecuador created a new agency called the Ministerio de Recursos Naturales no Renovables [Ministry of Nonrenewable Natural Resources] (MRNR), which was given the responsibility for the exploitation of nonrenewable natural resources in the country, policy management, and research and development. In 2009, the MRNR made several new official documents publically available, including the Reglamento ambiental para actvidades mineras en la República del Ecuador [Environmental regulation for mining activities in the Republic of Ecuador], the Reglamento del régimen especial de la pequeña minería y minería artisanal [Regulation for special arrangements of small and artisanal mining], the Reglamento General de Ley de Minería [General Regulations of the Mining Law], and the Ley Minera [Mining Law] (Ministerio de Recursos Naturales no Renovables, 2010a).

Minerals in the National Economy

The Central Bank of Ecuador reported that the value contributed to the gross domestic product (GDP) from the exploitation of mines and petroleum in 2009 decreased by 3.3% to about $2.96 billion, which accounted for about 12.3% of the GDP, compared with a revised $3.06 billion in 2008 (at constant prices and using 2000 as the base year). The value contributed to the GDP from petroleum refinery products increased by about 3.0% to about $479 million and accounted for about 2% of the GDP compared with $465 million in 2008. The decreased value contributed to the GDP from petroleum production was likely a result of the decrease in international petroleum prices as well as a decrease of about 4% in the volume of domestic production in 2009 compared with that of 2008. Further, as the value contribution to the GDP of refinery products increased, crude oil and refinery product exports decreased and refinery product imports increased, so it appears that internal demand was higher in 2009 than in 2008. This would also reflect the increased ability of the country to afford to import more fuel and fuel products to be marketed after the rebalancing of international fuel prices in 2009. The value contribution of mining and quarrying was just 0.4% of the GDP in 2009, which was about the same as in most recent years (Banco Central del Ecuador, 2010).

Production

In 2009, according to the Central Bank of Ecuador, total crude petroleum production was about 177 million barrels (Mbbl) with an average daily production of 486,000 barrels per day (bbl/d) compared with about 185 Mbbl and 505,000 bbl/d, respectively, in 2008. State-owned Empresa Estatal Petróleos del Ecuador (Petroecuador) produced about 103 Mbbl in 2009 compared with private companies that produced about 75 Mbbl. Since 2005, the volume of petroleum produced by private companies had steadily decreased as the volume produced by Petroecuador had steadily increased. Production of refinery products in Ecuador had increased since about 2003, and in 2009, production increased by about 1.5% to 68.5 Mbbl compared with about 67.5 Mbbl in 2008 (Banco Central del Ecuador, 2010).

Structure of the Mineral Industry

Petroecuador was responsible for managing the country's hydrocarbon sector through the exploration, production, refining, transportation, storage, and retailing of petroleum products both domestically and internationally. In 2009, approximately 25 to 30 private companies were working in the country with Petroecuador under various types of contacts, including operational, participant, and service-specific contracts. Most exploration and mining for precious and base metals in Ecuador had been conducted by junior international mining companies before 2009, and the Direccion Nacional de Geologia [National Geological Service] (DINAGE) had been the state agency responsible for geology and mining development in the country. On December 31, 2009, a new state mining company, Empresa Nacional Minera (ENAMI EP) was created by Executive decree. It was unclear how the creation of a state-run mining company would affect the private mining companies that were already invested in the country and had survived the mining sector reorganization. Although the Government did not rule out developing projects with private concession holders in Ecuador it reportedly was interested in forming joint ventures with other foreign state companies, especially those in Chile

and Venezuela (Empresa Estatal Petróleos del Ecuador, 2010; FoxBusiness.com, 2010; Ministerio de Recursos Naturals no Renovables, 2010a).

Mineral Trade

Petroleum exports accounted for about 50.4% of total exports in 2009 compared with about 63% in 2008. In 2009, the volume of crude petroleum exported from Ecuador decreased by about 6% compared with that of 2008 to about 86 Mbbl, of which about 50 Mbbl was produced by Petroecuador and the remainder was produced by private companies. Four countries acquired 98% of Ecuador's petroleum exports, including the United States (53.5%), Panama (22%), Chile (12.7%), and Peru (10.3%). The remainder was received by China and El Salvador. Refinery products accounted for about 5% of exports in 2009 compared with about 6% in 2008 (Banco Central del Ecuador, 2010; Ministerio de Recursos Naturales no Renovables, 2010b).

Commodity Review

Metals

Gold.—In April, Dynasty Metals & Mining Inc. of Canada announced that it had received notice from the Government that the company's Zaruma gold project was in compliance with Ecuador's new Mining Act and that the commissioning of the company's gold processing plant had commenced. The Zaruma project was composed of 46 concessions located in El Oro Province in southwestern Ecuador. The company reported that the plant would be commissioned in phases and that the entire circuit was expected to be tested later in April. Plant commissioning was expected to ramp up production to 800 metric tons per day of ore, or about 300,000 metric tons per year (t/yr), but the installed capacity of the crushing and conveying system was about 1 million metric tons per year and that of the milling section was 800,000 t/yr. Full commissioning was delayed because of power generation problems, but by August, all sections of the plant were operational. Dynasty also owned the Jerusalem project, which was an advanced stage project, and the Dynasty Goldfield, which was described as a highly prospective exploration project. Resource estimates for the three projects included about 43,600 kilograms (kg) of measured resources, 42,000 kg of indicated resources, and 100,000 kg of inferred gold resources (Dynasty Metals & Mining Inc., 2010a, b).

IAMGOLD Corp. of Canada's Quimsacocha project was in an advanced stage of exploration. In February, the company reported probable reserves at Quimsachocha totaling 8.1 million metric tons grading 6.5 grams per metric ton gold. By August, the project was in full compliance with all requirements under the transitional regulations put in place by the Government and the company was awaiting authorization to resume mining activities. Drilling and feasibility work were planned to start after the receipt of authorization. IAMGOLD had positioned drill rigs on site ready to begin exploration work; however, exploration, feasibility, and environmental impact assessment-related work were placed on hold pending review and confirmation of water permits for the project area (IAMGOLD Corp., 2009, p. 30; 2010, p. 27).

Mineral Fuels

Petroleum.—In 2009, Ecuador produced about 178 Mbbl of petroleum, which was a 3.9% decrease compared with production in 2008. Average daily production in 2009 was about 487,000 bbl/d. Petroecuador's petroleum production subsidiary, Petroproducción S.A., was the leading production company in Ecuador; it produced about 63.6 Mbbl of crude from 35 oilfields, which was a 2% increase compared with that of 2008. Petroproducción's leading oilfields were the Shushufindi and the Sacha, which produced about 16.3 Mbbl and 14.9 Mbbl, respectively (Ministerio de Recursos Naturales no Renovables, 2010b).

Outlook

During the past 2 years, little to no information was available from the Government of Ecuador regarding the production of or exploration for Ecuador's mineral commodities. In 2009, however, the restructuring effort had progressed to the point at which some organization was in place. The private companies that are likely to be successful in Ecuador in the near future are those that are well funded, are far enough along in their project development to have already made significant investment, and have developed their projects in accordance with internationally accepted mining practices. Basic problems in the mining sector remained to be addressed, including environmental issues and the management of potentially large-scale mining operations that were to be developed in the next 5 to 10 years. How those projects will be handled in terms of private versus state ownership and royalties issues was still unclear. It was clear, however, that a significant mining industry is slated to be developed in Ecuador in the future. Despite the importance of the country's nonfuel mineral resources to the country's future economic development, however, only a few metals mining companies seemed positioned to come into production in the next 1 to 2 years.

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TABLE 1
ECUADOR: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[p]
METALS						
Gold, mine output, Au content	kilograms	5,338	5,168	3,186	800	--
Silver, mine output, Ag content	do.	283	159	449	112	--
Steel, crude, continuously cast, electric furnace[e]		84,000	85,000	87,000	85,000 [r]	85,000
INDUSTRIAL MINERALS						
Carbon dioxide (CO_2)		589	592	70	NA	NA
Cement, hydraulic[e, 2]	thousand metric tons	3,690	4,110	4,420	5,493 [3]	5,000
Clays:[4]						
Common	do.	1,318	1,309	873	800	800
Kaolin		25,078	11,504	18,618	15,000	15,000
Feldspar		38,250	67,844	14,308	14,000	14,000
Gypsum, crude		1,311	1,478	--	--	--
Pozzolan		540,318	700,007	582,560	580,000	580,000
Pumice		107,178	8,730	153,500	100,000	100,000
Sand:						
Silica (quartz) sand		37,790	36,208	--	NA	NA
Ferruginous		9,252	--	--	NA	NA
Stone, sand and gravel:						
Limestone[4]	thousand metric tons	4,855	5,457	5,374	NA	NA
Marble		3,033	31,840	--	NA	NA
Sand and gravel, for construction	thousand cubic meters	5,662	4,997	1,920	1,600	1,600
Sulfur, byproduct of petroleum refining[e]		NA [r]	NA [r]	NA [r]	NA [r]	NA
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	1,347	1,309	1,196	1,200	1,200
Of which, marketable	do.	650	680	830	680 [3]	600
Liquefied natural gasoline	thousand 42-gallon barrels	458	300	299	300	300
Petroleum:						
Crude	do.	194,169	195,948	186,669	184,780 [r]	177,620
Refinery products:						
Liquefied petroleum gas	do.	2,259	2,311	1,614	1,924 [3]	2,200
Gasoline	do.	6,954	7,273	7,311	17,090 [3, 5]	18,600 [3, 5]
Jet fuel	do.	2,500	2,699	2,913	NA [6]	NA [6]
Distillate fuel oil	do.	13,064	12,677	11,789	8,561 [3, 7]	8,000 [3, 7]
Residual fuel oil	do.	21,255	21,969	23,052	13,251 [3, 8]	10,400 [3, 8]
Asphalt	do.	990	1,025	990	NA [6]	NA [6]
Turpentine	do.	23	35	45	NA [8]	NA [8]
Solvents, including rubber solvent	do.	32	41	62	NA [6]	NA [6]
Other, including oils and lubricants	do.	102	5,310	4,447	12,267 [3, 6]	15,100 [3, 6]
Total	do.	47,179	53,340	52,223	53,093	54,300

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

[1]Table includes data available through October 15, 2010. Limited 2008 Ecuadorian mineral production data were publically available because of a mining moratorium and restructuring among data reporting groups.

[2]Estimated figures equal to reported consumption minus imports of cement and clinker.

[3]Reported figure.

[4]No reports of separate quantities for clay or limestone used in cement production were available.

[5]2008 data for gasoline are reported as a sum total of two grades of gasoline—super and extra.

[6]2008-09 data for other refinery products were reported to include asphalt, jet fuel, turpentine, and solvents.

[7]Reported as Fuel Oil #4.

[8]Reported as Fuel Oil #6.

TABLE 2
ECUADOR: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Cement		Holcim Ecuador S.A. (Holcim Ltd., 92.1%, and other private, 7.9%)	Cerro Blanco Plant, Guayaquil, Guayas Province, and San Rafael grinding plant, Latacunga, Cotopaxi Province	3,500
Do.		Cementos Selva Alegre S.A. (Lafarge S.A., 98.2%, and other private, 1.8%)	Cement plant near capital city of Quito, Pichincha Province	700
Gold	kilograms	Dynasty Metals & Mining Inc. (private, 100%)	Zaruma Mine, 25 kilometers northeast of Zaruma in El Oro Province	300
Petroleum:				
Crude	thousand 42-gallon barrels	Petroproducción S.A. [Empresa Estatal Petróleos del Ecuador (Petroecuador) (Government, 100%)]	About 26 active fields, led by Sacha, Sucumbios Province, and Shushufindi, Napo Province	71,000
Do.	do.	Empresa Nacional del Petróleo S.A. (ENAP), 40%, and Empresa Estatal Petróleos del Ecuador (Petroecuador), 60%	Biguno, Huachito, Mauro Davalos Cordero, and Paraiso fields, Napo Province	7,000
Do.	do.	Empresa Estatal Petróleos del Ecuador (Petroecuador) (Government, 100%)	Most production from Eden Yuturi field, Block 15, Napo Province, but also from Indillana and Yanaquincha wells; Limoncocha field, Block 15, Sucumbios Province	37,000
Do.	do.	Petro Oriental S.A. [Andes Petroleum Co. Ltd. (Chinese National Petroleum Corp, 55%, and China Petrochemical Corp., 45%)]	Hormiguero, Nantu, Wanke fields, Block 14, Napo Province; fields in Block 17, Napo and Pastaza Provinces	3,200
Do.	do.	Perenco PLC and ConocoPhillips Co. Block 7 (Perneco PLC, 57.5%, and ConocoPhillips Co., 42.5%) Block 21 (Perenco PLC, 53.7%, and ConocoPhillips Co., 46.3%)	Six fields in Blocks 7 and 21 led by the Yuralpa field, Block 21, Pastaza Province	9,500
Do.	do.	Repsol YPF, S.A.	Amo, Bogui-Capiron, Daimi, Ginta, and Iro fields; three other small fields, Block 16, Napo Province	23,300
Refinery products	do.	Empresa Estatal Petróleos del Ecuador (Petroecuador) (Government, 100%)	Esmeraldas refinery, Esmaraldas Province	40,200
Do.	do.	do.	Libertad refinery, Guayas Province	16,800
Do.	do.	do.	Amazonas refinery and gas plant, Napo Province	7,300
Do.	do.	do.	Lago Agrio refinery, Sucumbios Province	375
Sand and gravel (aggregates)		Holcim Agregados S.A. (Holcim Ecuador S.A., 100%)	Two plants near Manta and Portoviejo, Manabi Province, and one plant near the capital city of Quito, Pichincha Province	2,500

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.