science for a changing world

2007 Minerals Yearbook

ECUADOR [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

April 2009

THE MINERAL INDUSTRY OF ECUADOR

By Susan Wacaster

Ecuador is the 5th ranked crude oil producer in South America and produced 512,000 barrels per day (bbl/d) in 2007. In 2002, the country implemented the United States (U.S.) dollar as its currency and all values are reported here in current (nominal) dollars. In 2007, the gross domestic product (GDP) was $45.8 billion compared with $41.8 billion in 2006, and the GDP per capita was $3,243 compared with $3,057 in 2006 (Banco Central del Ecuador, 2008a; U.S. Energy Information Administration, 2008).

For 2007, the total value of production by the mineral industry of Ecuador was almost completely (99.8%) accounted for by petroleum and related services. Limestone remained Ecuador's most economically valuable product in the nonmetals sector, followed by sand and gravel for construction, pozzolan, pumice, kaolin, and feldspar. Amid changes in the central Government and the mining and energy sectors, the administration announced that it would send a mining law reform bill to the National Congress. The Ministry of Energy and Mines was split into two agencies; one to oversee mining and petroleum, and the other to oversee electricity and renewable energy. The agency in charge of mining and petroleum is called the Ministry of Mines and Petroleum (MMP) (Banco Central del Ecuador, 2008a).

In 2007, an Ecuadorian economist was inaugurated to the Presidency after having served as the Minister of the Economy in 2005. The former Minister of the Economy made a successful Presidential run on a platform of reforms designed to direct petroleum revenues towards poverty relief and divert money from debt payments to social programs. The candidate announced that he would replace the National Congress with a Constituent Assembly that would rewrite and frame the Constitution to regulate foreign direct investment in energy and strengthen state control of natural resources. After a series of public referendums, 130 members were elected to the assembly and were given up to 240 days to write a draft of the new Constitution (Kosich, 2007c; U.S. Department of State, 2008).

Minerals in the National Economy

Recent discoveries in Ecuador established that the country contains significant undeveloped resources of copper, gold, and silver; however, in 2007, political and investment uncertainty remained high. The country was reported to have estimated resources of 1.5 million metric tons (Mt) of metal-bearing ore that could reach export values of $4 billion per year, yet mining policy revisions delayed projects that were near the production stage. In 2007, the value of the country's production of crude oil and related services was about $10.6 billion and accounted for 23% of the GDP. The value of nonfuel minerals was about $99 million. The value of crude petroleum exports was about $7.4 billion and accounted for about 60% of the total value of exported goods during the year. Exports of petroleum refinery products were valued at $846 million (D'Nan Bass, 2007; Banco Central del Ecuador, 2008b).

Government Policies and Programs

In 2007, the Government announced the second tax increase on foreign oil company windfall profits in 2 years, to 99% from 50%, when oil prices reach above $23 per barrel. Most petroleum contracts were established when international crude prices were about $24 per barrel. The tax on crude petroleum production was about 20%, including windfalls. Ecuadorian officials announced that protecting the Amazon and its inhabitants would be an important goal in balancing exploration and environmental protection. In October, the country was readmitted into the Organization of the Petroleum Exporting Countries (OPEC) after having forfeited membership in 1992 because of nonpayment of fees, and Ecuador agreed to a 3-year repayment plan to resolve its $5.7 million debt. OPEC set a production quota of 520,000 bbl/d for the country, which, in 2007, was not met (Alexander's Gas & Oil Connections, 2007c; Monahan, 2007).

In March, Ecuador announced plans to revise mining concessions by, among other things, creating a royalty system (royalties had been removed from the tax code in the late 1990s). The country had revised its mining code in 2001 to encourage foreign investment, including offering 30-year concessions. The new code allowed investors to hold a concession without an Ecuadorian partner and guaranteed mining rights following a positive feasibility study. After 2002, Ecuador issued 4,112 mining concessions that covered about 2 million hectares, of which about 17% were in production; companies were charged a levy of between $16 and $36 per hectare once a concession was granted. Provincial and local governments could neither collect taxes on mining nor enact mining regulations, and the central Government could not revoke a concession unless the holder consistently failed to comply with the existing mining law (Reuters, 2007b).

In April, the Government announced that it would revise both the existing oil and mining contracts. By late December, a comprehensive mining code had not been presented; however, as part of a tax reform bill approved by the Constituent Assembly, a new law would establish levies on nonproductive lands and a 70% windfall tax on future revenues generated by mining companies. By late January 2008, the Government had revoked 587 mining concessions held by companies that failed to pay annual fees and planned to do the same with another 1,000 or more concessions. Officials stated that the industries' largest concessions would be preserved and that a friendly mining policy would be maintained; however, speculation would be curbed (Kosich, 2007a; Metal Bulletin, 2007a).

Although Ecuador produced substantial quantities of crude oil, its refineries were unable to keep up with fuel demand, and the state-owned petroleum company Empresa Estatal Petroleos del Ecuador (PETROECUADOR) was in need of capital and infrastructure upgrades. The Ecuadorian National Congress controlled the quarterly returns that the company could keep, which hindered the company from making long-term investment plans. After announcing the windfall tax increase on petroleum, the Government stated that the new 70% windfall tax on mining revenues would be applied to oil companies for future contracts. In January 2008, it was announced that Ecuador would invest $2 billion in the oil industry to increase production by 11% in 2008, with $1.7 billion going to PETROECUADOR and $300 million going to the Esmeraldas refinery (Alexander's Gas & Oil Connections, 2007b; De Berliner, M.V., 2007; Reuters, 2007a;).

In March, the Government announced an ecological conservation proposal that involved the country's largest untapped oil reserve, the Ishpingo-Tiputini-Tambococha (ITT) oilfields. The ITT fields, which are estimated to hold nearly 1 billion barrels of heavy crude, are located within the boundaries of Yasuni National Park in the Province of Napo. The 1.7-million-hectare park is a United Nations Educational, Scientific and Cultural Organization (UNESCO) biosphere reserve and is among the most biologically diverse places in the world (United Nations Educational, Scientific and Cultural Organization, 2008).

Several companies had signed agreements with PETROECUADOR to develop the ITT fields. In May, at the United Nations World Environment Day event, Ecuadorian officials announced a plan to seek $350 million per year for 10 years from the international community, which is equal to an estimated 50% of the revenues that could be generated by mineral fuel exploitation, as compensation for never drilling in the ITT. The proposal involved swapping foreign debt for a commitment to protect the Amazon region. Drilling was suspended for 1 year while the Government sought support, but drilling would proceed if the plan did not succeed, as the ITT fields accounted for 25% of Ecuador's reserves (Kosich, 2007b; Rizvi, 2007; United Nations Educational, Scientific and Cultural Organization, 2008).

Production

In 2007, production of gold decreased to 3,186 kilograms (kg) from 5,168 kg in 2006, and silver mine output was recorded at 449 kg compared with 159 kg in 2006 (table 1). Dhanoa Minerals, Ltd. reported production of 6,165 grams (g) of gold, the value of which allowed the company to cumulatively exceed the first $1 million worth of production from three mines in Bella Rica. In the petroleum sector, crude oil extraction was down by 4.7% from that of 2006, to 187 million barrels (Mbbl) from 196 Mbbl, and the average daily production was 511,000 barrels. PETROPRODUCCIÓN, which was the exploration and production subsidiary of state-owned PETROECUADOR, accounted for about 94 Mbbl, or 51% of the country's total production compared with 90 Mbbl, or 46%, respectively, in 2006. Private companies produced about 92 Mbbl of crude, or 49% of the country's total production compared with 105 Mbbl, or 54%, respectively, in 2006. The two entities maintained inverse production levels since 2001 with the state-owned companies producing 21% more in 2001 and 22% more in 2002. Production by private companies increased by as much as 40% in 2004 and remained high through 2005, but dropped in 2006 to the current level, which was about 2% less than the state-owned companies (Dhanoa Minerals Ltd., 2007a; Banco Central del Ecuador, 2008b).

Among all the oil companies in Ecuador, PETROPRODUCCIÓN led crude petroleum production in 2007 with 62 Mbbl from 26 fields, which was a 9% decrease from that of 2006. Of those 26 fields the leading producers were the Sacha and Shushufindi oilfields, both of which produced about 16 Mbbl, and the Auca field, which produced about 6 Mbbl. Nine fields produced between 1 Mbbl and 3 Mbbl each, 14 fields produced between 100,000 and 900,000 bbl, and the remaining fields were reported to have no production. Total production from PETROECUADOR's Block 15 fields (formerly Occidental Petroleum Block 15) produced about 32 Mbbl, which was an increase of about 30% from 2006. Spain's Repsol YPF S.A. was the leading privately owned producer with 23 Mbbl, followed by Andes Petroleum Ecuador Ltd., which produced about 17 Mbbl, and Brazil's Ecuador TLC, which produced about 11 Mbbl. Italy's Azienda Generale Italiana Petroli (AGIP) Oil and French Perenco S.A. each produced about 9 Mbbl. Sipec Ecuador (Chile) and PetroOriental S.A. produced between 5 and 6 Mbbl each. Six other companies, which included Belayim Petroleum Co. (PETROBELL), City Oriente, Inc., PETROECUADOR with Perenco S.A., Necon S.A., Petroleos Sudamerianos S.A., and TECPEcuador S.A., produced between 1 and 2 Mbbl each. The Coastal Polytechnic University (ESPOL) and Canada Grande Inc. produced less than a million barrels total from offshore fields (Dirección Nacional de Hidrocarburos, 2008).

Structure of the Mineral Industry

Information on the structure of the mineral industry in Ecuador is presented in table 2. Ecuador had neither a state-owned metals mining industry nor a major privately owned metals mining company; however, numerous foreign companies had invested a combined total of approximately $100 million in exploration since 2002. Some companies that had made large investments in exploration and public relations, and were willing to negotiate with the Government, were expected to retain their concessions; most others faced uncertainty (Metal Bulletin, 2007a).

Colombia, Ecuador, and Venezuela discussed the creation of a natural gas pipeline that would connect the three nations. Energy ministers from Ecuador and Venezuela signed a letter of intent to build a 300,000-bbl/d refinery on Ecuador's coast. Nacionales del Ecuador (ANDEC) announced that it would expand its crude steel production capacity to 135,000 metric tons per year (t/yr) from 91,000 t/yr effective January 2008. In December, Corriente Resources, Inc. received approval from the Government for its environmental impact assessment (EIA) on a proposed port site. The 27-acre site was connected to the Mirador copper project by a 400-kilometer (km) paved highway (Alexander's Gas & Oil Connections, 2007c; Corriente Resources, Inc., 2007a; Metal Bulletin, 2007b).

Dhanoa Minerals Ltd. acquired 80% interest in three mines from Grupo Minero Bonanza; the mines reportedly hosted more than 24,000 kg of gold. Dhanoa also acquired a processing and refining plant to increase its recovery rate and announced that it was reprocessing tailings. The company was in negotiation for another mine package, had increased its labor force to 180 miners, and planned to connect all its mines to a central expanded production facility (Dhanoa Minerals Ltd., 2007b).

Mineral Trade

In 2007, crude petroleum sales were down by 3.7% to 182 Mbbl from 189 Mbbl in 2006. Of the 182 Mbbl sold in 2007, 55 Mbbl was delivered to domestic refineries, as follows: Esmeraldas, 33 Mbbl; Libertad, 15 Mbbl; Amazonas, 7 Mbbl; and Lago Agrio, 375,000 bbl. Crude exports decreased by 9% compared with those of 2006 to 124 Mbbl from 137 Mbbl. The United States received 58% of the exports, which was down from 75% in 2006; Peru and Chile received 18% and 7%, respectively; and the remainder was distributed to other countries, including Nicaragua, Panama, and Venezuela. PetroChina Co. Ltd. and Geneva-based Taurus Ltd. both agreed to purchase a total of 720,000 barrels of PETROECUADOR's crude, and Madrid-based Repsol YPF committed to purchase a total of 2 Mbbl (China Economic Net, 2007).

For 2007, Ecuador's supply of petroleum derivative products totaled 84 Mbbl, of which 52 Mbbl, or 62%, was domestic refinery products and 32 Mbbl, or 38%, was imports. Exports of petroleum refinery products increased to 15 Mbbl from 14 Mbbl in 2006. Derivatives imports were up by 21% compared with those of 2006. Derivatives imports included diesel oil, 10 Mbbl; liquefied petroleum gas (LPG), 10 Mbbl; naphtha, 8 Mbbl; premium diesel, 2 Mbbl; low-grade stock, 1 Mbbl; and solvent, 1 Mbbl. Internal consumption of derivative products totaled 56 Mbbl; the products consisted of diesel oil, 23 Mbbl; gasoline, 16 Mbbl; fuel oil no. 4, 9 Mbbl; Jet A-1, 2.5 Mbbl; and other, 5.5 Mbbl (Dirección Nacional de Hidrocarburos, 2008).

Commodity Review

Metals

Copper.—In February, Corriente Resources Inc. extended the date on which it planned to start production at its Mirador copper project, in southeastern Ecuador to mid-2009. The Government had suspended activities at Mirador in 2006 in response to public protests. In April, a coalition of communities lobbied the Government to lift the suspension of mining activities and expressed support for the responsible mining activities of Corriente. In November, the MMP confirmed that Corriente's concessions were in good standing. Inferred resources for the company's Panantza-San Carlos project, which is located 40 km north of Mirador, were estimated as follows: Panantza (0.4% Cu cutoff), 463,000 t grading 0.66% copper, and San Carlos (0.4% Cu cutoff), 600,000 t grading 0.59% copper, for total estimated inferred resources at Panantza and San Carlos of 1,063,000 t grading 0.62% copper (Corriente Resources, Inc., 2007b-e).

In early 2007, Ascendant Copper Corp. reentered its Junin copper-molybdenum porphyry property after it received an order to halt activities in December 2006 amidst public protests. The project was opposed by communities likely to face relocation and by those concerned with protecting the ecologically diverse areas of the Imbabura Province, which was estimated to contain 1 billion metric tons of ore in porphyry deposits. In September, Ascendent Copper announced that it had determined the existence of 1% copper grades at the Caucha copper-molybdenum project and the company began a Phase III 5,000 to 6,000-meter (m) drilling program in the Naranjos sector of the project (Ascendant Copper Corp, 2007; Metal Bulletin, 2007a).

Gold.—In March, Aurelian Resources Inc. reported one of the world's largest recent gold discoveries. The Fruta del Norte (FDN) deposit is a sandstone-covered intermediate sulfidation epithermal gold-silver deposit that is hosted by andesites at one end of a regional shear zone in a pull-apart basin. By October, the company had completed 45,000 m of drilling. The resource was split into four zones with varying gold grades and was estimated to hold greater than 388,000* kg of contained gold (Mining Journal, 2007).

Exploration continued in 2007 at IAMGOLD Corp's Quimsacocha project after drilling increased resources by more than 20% from a 2006 estimate. The estimated gold resource was greater than 96,000 kg; however, the Government requested that IAMGOLD abandon 30% of the project on the grounds of water supply safety. The company gave up 23% of the concession and reduced the resource estimate to 32.6 billion kg of ore grading 3.2 grams per metric ton gold. Prefeasibility and feasibility studies were expected by mid-2009, and production was expected to begin in 2012 (IAMGOLD Corp., 2007a, b)

Industrial Minerals

Cement.—In 2007, four companies produced cement: Cemento Chomborazo C. A., Holcim Ecuador S.A., Industrias Guapán S.A., and Lafarge Cementos S.A. The national industry supplied nearly all the cement consumed in the country, but some white and specialty cements were imported. Cement consumption increased by about 7% to 4.4 Mt in 2007 from 4.1 Mt in 2006. In addition to two cement plants (one integrated and one grinding), Holcim had operated eight concrete plants and three aggregate plants. The company produced about 3 Mt of cement, which was a 10.8% increase from 2006, and more than 2 Mt of clinker, which set new records. Concrete sales increased by 6.6% to 588,000 cubic meters and the aggregate plants produced 1.4 Mt of aggregate (Holcim Ecuador, S.A., 2008; Instituto Ecuatoriano del Cemento y el Concrete, 2008).

Mineral Fuels

Petroleum.—In 2007, 109 oil production wells were drilled compared with 141 in 2006. PETROECUADOR and PETROPRODUCCIÓN were responsible for 32 of the wells, and 77 of the wells were held by private companies (Dirección Nacional de Hidrocarburos, 2008). The state's average crude oil output was about 260,000 bbl/d and private companies averaged about 253,000 bbl/d. The total net volume of crude oil transported through pipelines was 176 Mbbl. About 121 Mbbl, or 69%, was transported by the Sistema Oleducto Trans-Ecuatoriano (Trans-Ecuadorian Oil Pipeline System, or SOTE).

[1]Correction posted April 22, 2009.

The SOTE was a 500-km upgraded light crude pipeline that ran from the Lago Agrio Oilfied in northeastern Ecuador to the port city of Esmeraldas. The Oleoducto de Crudos Pesados (Heavy Crude Pipeline, or OCP) carried 54.3 Mbbl, or 31% of the oil transported through pipelines. The OCP was a 450,000-bbl/d, 483-km heavy crude pipeline that ran from the Amazon region to the Port of Balao. It had been in operation since 2003 and was used by international companies (Alexander's Gas and Oil Connections, 2007a; Dirección Nacional de Hidrocarburos, 2008; Hydrocarbons-technology.com, 2008).

Outlook

The outlook for the mineral industry in Ecuador remains uncertain at the end of 2007. While the country is on the verge of a production boom in metals mining, the Government is taking careful steps to strengthen its control over the sector, protect the environment, increase the Government share of revenues generated by the extractive industries, and require socially responsible mining practices. New legislation is expected to limit the duration of exploration concessions and to require stringent environmental impact assessments.

At yearend, private petroleum companies were unsure if the announced 70% windfall tax was going to replace the previously stated windfall tax increase to 99% of revenues. There was concern that existing operating contracts, which allowed companies to produce and market the crude oil, would be renegotiated as service-provider contracts whereby the state would pay the company a fee to produce petroleum, but the state would keep the petroleum.

Ecuador could develop both a national private metals industry and maintain contracts with international companies that had invested significantly in the country. It was uncertain whether the ITT oilfields would be exploited. To ensure that the oilfields would remain unexploited would require significant financial input from the international community, and countries that face roadblocks to production in Ecuador would likely be reluctant donors. With upgrades to the oil infrastructure in Ecuador, even with the dwindling supply, the country could boost total production and strengthen trade alliances with neighboring countries.

References Cited

Alexander's Gas & Oil Connections, 2007a, Colombia, Ecuador and Venezuela begin gas pipeline talks: Alexander's Gas & Oil Connections, December 6. (Accessed October 31, 2008, at http://www.gasandoil.com/goc/news/ntl74946.htm.)

Alexander's Gas & Oil Connections, 2007b, Ecuador is taking steps to boost oil production: Alexander's Gas & Oil Connections, August 21. (Accessed October 31, 2008, at http://www.gasandoil.com/goc/news/ntm73429.htm.)

Alexander's Gas & Oil Connections, 2007c, OPEC accepts Ecuador as active member: Alexander's Gas & Oil Connections, November 8. (Accessed October 31, 2008, at http://www.gasandoil.com/goc/news/ntm74516.htm.)

Ascendant Copper Corp, 2007, News release—Ascendant Copper announces new drill campaign to define resource at Chaucha copper/moly project: Lakewood, Colorado, Ascendant Copper Corp., September 12. (Accessed on November 21, 2008, at http://coppermesacorp.com/_resources/news/07-24Chaucha.pdf.)

Banco Central del Ecuador, 2008a, Estadística—Cuentas anuales—Publicacion 22, Serie 1993-2007, miles de dolares: Banco Central del Ecuador (Accessed November 24, 2008, http://www.bce.fin.ec/frame.php?CNT=ARB0000167.)

Banco Central del Ecuador, 2008b, Estadística—Hidrocarburos—Estadísticas petroleras—Producción nacional de petróleo crudo y sus derivados: Banco Central del Ecuador. (Accessed November 24, 2008, at http://www.bce.fin.ec/frame.php?CNT=ARB0000984.)

China Economic Net, 2006, Ecuadorian oil deal: China Economic Net, June. (Accessed November 21, 2008, at http://en.ce.cn/subject/chinamarkets/marketpic/200706/25/t20070625_11928936.shtml.)

Corriente Resources Inc., 2007a, Current news—Ecuador ministry of environment approves Machala Port EIA: Vancouver, British Columbia, Canada, Corriente Resources Inc., December 10. (Accessed November 21, 2008, at http://www.corriente.com/news/news.php.)

Corriente Resources Inc., 2007b, Current news—Mirador project timeline extended: Vancouver, British Columbia, Canada, Corriente Resources Inc., January 25. (Accessed November 21, 2008, at http://www.corriente.com/news/news.php.)

Corriente Resources Inc., 2007c, Recent news—Communities push Federal Government to lift suspension at Mirador: Vancouver, British Columbia, Canada, Corriente Resources Inc., April 25. (Accessed November 21, 2008, at http://www.corriente.com/news/news.php.)

Corriente Resources Inc., 2007d, Recent news—Ministry of Mines and Petroleum confirms that Corriente's mining claims are in good standing: Vancouver, British Columbia, Canada, Corriente Resources Inc., November 14. (Accessed November 21, 2008, at http://www.corriente.com/news/news.php.)

Corriente Resources Inc., 2007e, Recent news—Preliminary assessment for Panantza-San Carlos copper project demonstrates positive economics and major copper investment potential in Ecuador: Vancouver, British Columbia, Canada, Corriente Resources Inc., November 19 (Accessed November 21, 2008, at http://www.corriente.com/news/news.php.)

De Berliner, M.V., 2007, Latin Trade Solutions Inc.—Regional Focus©: Latin Intelligence Corp., March 25. (Accessed April 26, 2007, at http://www.latrasol.com/analysis/?p=133.)

Dhanoa Minerals Ltd, 2007a, News archive—Dhanoa gold production exceeds first million dollars for 2007: Dhanoa Minerals Ltd., December 12. (Accessed November 11, 2008, at http://dhanoaminerals.com/en/download_news/News.pdf.)

Dhanoa Minerals Ltd, 2007b, News archive—Dhanoa Minerals receives equity financing commitment from institutional investors for additional $2.3 million: Dhanoa Minerals Ltd., December 12. (Accessed November 11, 2008, at http://dhanoaminerals.com/en/download_news/News.pdf.)

Dirección Nacional de Hidrocarburos, 2008, Estadísticas hidrocarburiferas 2007: Dirección Nacional de Hidrocarburos, October 30. (Accessed October 30, 2008, at http://www.menergia.gov.ec/secciones/hidrocarburos/HidroEstadisticas.html.)

D'Nan Bass, C., 2007, Buried treasures, hidden curses: Miami Herald, July 16, p. 11.

Holcim Ecuador S.A., 2008, Nuestra empresa—Cifras y datos claves: Guayaquil, Ecuador, Holcim Ecuador S.A. (Accessed November 21, 2008, at http://www.holcim.com/EC/ECU/id/52737/mod/gnm0/page/editorial.html.)

Hydrocarbons-technology.com, 2008, Trans-Ecuadorian Oil Pipeline System (SOTE), Ecuador: SPG Media Limited. (Accessed October 31, 2008 at http://www.hydrocarbons-technology.com/projects/sote/.)

IAMGOLD Corp., 2007a—IAMGOLD announces further drill results at Quimsacocha: Toronto, Ontario, Canada, IAMGOLD Corp. press release no. 18/07, July 10. (Accessed November 21, 2008, at http://www.iamgold.com/images/products/PR 18 - Quimsacocha 349-363 FINAL.pdf.)

IAMGOLD Corp., 2007b, IAMGOLD reaches agreement on environmental protection in Ecuador: Toronto, Ontario, Canada, IAMGOLD Corp. press release no. 30/07 November 15, 2007. (Accessed November 21, 2008, at http://www.iamgold.com/images/products/PR 30 - Quimsacocha agreement FINAL.pdf.)

Instituto Ecuatoriano del Cemento y el Concrete, 2008, La industria del cemento en Ecuador: Quito, Ecuador, Instituto Ecuatoriano del Cemento y el Concrete, 5 p.

Kosich, Dorothy., 2007a, Ecuador's President contemplates mining law change to benefit nation's treasury: Reno, Nevada, Mineweb, March 26. (Accessed November 11, 2008, at http://www.mineweb.net/mineweb/view/mineweb/en/page59?oid=18633&sn=Detail.)

Kosich, Dorothy., 2007b, Ecuador's President Correa to help indigenous communities in Chevron pollution litigation: Reno, Nevada, Mineweb, March, 23. (Accessed November 11, 2008, at http://www.mineweb.net/mineweb/view/mineweb/en/page38?oid=18551&sn=Detail.)

Kosich, Dorothy., 2007c, Ecuador to submit tough mining law reform bill to Congress: Reno, Nevada, Mineweb, March 26. (Accessed November 11, 2008, at http://www.mineweb.net/mineweb/view/mineweb/en/page60?oid=22554&sn=Detail.)
Metal Bulletin, 2007a, Ecuador beckons miners but communities resist: Metal Bulletin no. 8984, February 26, p. 6.
Metal Bulletin, 2007b, Ecuador mini-mill Acerías: Metal Bulletin no. 8990, January 29, p. 22.
Mining Journal, 2007, Aurelian outlines major Fruta del Norte resource: Mining Journal, October 12, p. 11.
Monahan, Jane, 2007, Ecuador throws down oil gauntlet: London, England, BBC News International, December 12. (Accessed November 11, 2008, at http://news.bbc.co.uk/2/hi/business/7132767.stm.)
Reuters, 2007a, Ecuador approves tax reform amid political tension: New York, NY, Reuters, December, 29. (Accessed November 1, 2008, at http://www.reuters.com/article/idUKN2847835420071229.)
Reuters, 2007b, Ecuador to review mine concessions, seek royalties: New York, NewYork, Reuters, March 26. (Accessed November 1, 2008, at http://www.reuters.com/article/bondsNews/idUSN2639024620070326.)
Rizvi, Haider, 2007, Ecuador seeks aid not to exploit Amazon Oil: New York, New York, Interpress Service, May 18. (Accessed November 21, 2008, at http://ipsnews.net/news.asp?idnews=37794.)
United Nations Educational, Scientific and Cultural Organization, 2008, UNESCO—MAB biosphere reserves—Directory—Biosphere reserve information—Ecuador—Yasuni (Accessed November 21, 2008, at http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?mode=gen&code=ECU+02.)
U.S. Energy Information Administration, 2008, Ecuador—Oil: U.S. Energy Information Administration country analysis brief. (Accessed October 30, 2008, at http://www.eia.doe.gov/cabs/Ecuador/Oil.html.)
U.S. Department of State, 2008, Ecuador: U.S. Department of State background note. (Accessed October 30, 2008, at http://www.state.gov/r/pa/ei/bgn/35761.htm.)

TABLE 1
ECUADOR: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2003	2004	2005	2006	2007
METALS						
Copper, mine output, Cu content		--	242	--	--	--
Gold, mine output, Au content	kilograms	4,819	5,128	5,338	5,168 r	3,186
Silver, mine output, Ag content	do.	--	372	283	159 r	449
Steel, crude, continuously cast, electric furnace[e]		79,794 [2]	72,000	84,000	85,000 r	87,000
INDUSTRIAL MINERALS						
Barite		2,139	3,695	--	--	--
Carbon dioxide (CO_2)		329	685	589	592 r	70
Cement, hydraulic[e, 3]	thousand metric tons	3,140 r	3,470 r	3,690 r	4,110 r	4,420
Clays:[4]						
Common	do.	340	903	1,318	1,309 r	873
Kaolin		11,884	5,646	25,078	11,504 r	18,618
Feldspar		44,268	53,469	38,250	67,844 r	14,308
Gypsum, crude		--	232	1,311	1,478 r	-- e
Pozzolan		190,747	612,256	540,318	700,007 r	582,560
Pumice		88,830	183,119	107,178	8,730 r	153,500
Salt, common[e]		75,000	75,000	75,000	75,000	75,000
Sand:						
Silica (quartz) sand		38,856	32,148	37,790	36,208 r	-- e
Ferruginous		-- r	11,325	9,252	-- r	-- e
Stone, sand and gravel:						
Limestone[4]	thousand metric tons	4,688	4,700	4,855	5,457 r	5,374
Marble		1,890	1,431	3,033	31,840 r	-- e
Sand and gravel, for construction	thousand cubic meters	3,272	5,834	5,662	4,997 r	1,920 e
Travertine[e]		--	--	7,250	-- r	--
Sulfur:[e]						
Native		4,000	4,000	4,000	4,000	4,000
Byproduct, petroleum refining		3,000	3,088 [2]	3,008 [2]	3,000	3,000
Zeolites		1,679	3,300	2,400	-- r	-- e
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	1,287	1,181	1,347	1,309	1,196
Of which, marketable	do.	249	240	262	281	295
Liquefied natural gasoline	thousand 42-gallon barrels	514	542	458	300 e	299
Petroleum:						
Crude	do.	153,539	192,517	194,169	195,948	186,669
Refinery products:						
Liquefied petroleum gas	do.	2,358	2,412	2,259	2,311 r	1,614
Gasoline	do.	9,338	8,816	6,954	7,273 r	7,311
Jet fuel	do.	1,897	2,235	2,500	2,699 r	2,913
Distillate fuel oil	do.	11,752	13,397	13,064	12,677 r	11,789
Residual fuel oil	do.	23,622	22,851	21,255	21,969 r	23,052
Asphalt	do.	1,200	1,158	990	1,025 r	990
Turpentine	do.	8	19	23	35 r	45
Solvents, including rubber solvent	do.	13	21	32	41 r	62
Other, including oils and lubricants	do.	64	88	102	5,310 r	4,447
Total	do.	50,252	50,997	47,179	53,340 r	52,223

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.
[1]Table includes data available through September 2008.
[2]Reported figure.
[3]Estimated figures equal to reported consumption minus imports of cement and clinker.
[4]No reports of separate quantities for clay or limestone used in cement production were available.

TABLE 2
ECUADOR: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(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	Small-scale and artisanal mining operations (private, 100%)	Western and eastern Cordilleras, southern Ecuador	8,000
Petroleum:				
Crude	thousand 42-gallon barrels	PETROPRODUCCIÓN [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.	ENAP Sipec [Empresa Nacional del Petróleo S.A., 40%, and Empresa Estatal Petróleos del Ecuador (PETROECUADOR, 60%)]	Biguno, Huachito, Mauro Davalos Cordero, and Paraiso Fields, Napo Province	7,000
Do.	do.	Andes Petroleum Ecuador Ltd. [Andes Petroleum Co. Ltd. (Chinese National Petroleum Corp., 55%, and China Petroleum Corp., 45%)]	9 fields led by Dorine, Fanny 18-B, and Alice Tarapoa Block, Sucumbios Province	20,000
Do.	do.	City Oriente Ltd., 100%	Three fields, led by Tipishca-Huaico, Block 27, Sucumbios Province	3,000
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.	Petrobell Inc., 100%	Tiguino field, Block 30, Pastaza Province	1,900
Do.	do.	Petróleos Sudamericanos S.A., 100%	Mascarey Field, Block 11, Sucumbios Province	2,900
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 Conoco Phillips Co. Block 7 (Perneco PLC, 57.5%, and Conoco Phillips Co., 42.5%) Block 21 (Perenco PLC, 53.7%, and Conoco Phillips, 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
Do.	do.	Agip Petroleum Ecuador Ltd. (Eni S.p.A., 100%)	Villano Field, Block 10, Pastaza Province	15,000
Do.	do.	Ecuador TLC S.A. (Petróleo Brasileiro S.A., 100%)	Palo Azul and Pata Fields, Block 18, Napo Province	12,400
Do.	do.	TecpEcuador S.A. [Tecpetrol S.A. (Techint S.A., 100%)]	Bermejo Field, Block 11, Sucumbios Province	3,200
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
Steel, crude	metric tons	Complejo Siderurgico ANDEC - FUNASA (Acerías Nacionales del Ecuador-Fundiciones Nacionales S.A.) (HOLDINGDINE S.A. and other private, 100%)	Complex of plants in Port of Guayaquil, Guayas Province	91,000

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