THE MINERAL INDUSTRY OF COLOMBIA

By Susan Wacaster

In 2009, Colombia was estimated to be the world’s sixth ranked nickel producer and had nickel reserves of 1.7 million metric tons (Mt) of nickel in ore. The country was also a regionally significant coal producer and, at yearend, had 6.8 billion metric tons of proven coal reserves, which represented 0.8% of the world total, and were the second largest proven reserves of coal in Latin America after Brazil. Although Colombia was not a globally significant producer of natural gas or petroleum, those commodities were produced in more than one-half of Colombia’s 33 Departments, and the hydrocarbon industry was important to the country’s economy. Yearend proven reserves of natural gas and petroleum were 120 billion cubic meters and 1.7 billion barrels, respectively (BP p.l.c., 2010; Kuck, 2010).

Minerals in the National Economy

Colombia’s gross domestic product (GDP) (reported as the nominal GDP at current prices unless otherwise stated) maintained a positive growth rate of about 4% during the international economic downturn in 2008-09. In 2009, the coal, metallic, and nonmetallic mineral industries combined accounted for 4.5% of Colombia’s GDP compared with 4.2% in 2008. The growth in the GDP was attributed to a 13.4% increase in the aggregate value of crude petroleum, natural gas, thorium, and uranium production, and a 17.6% increase in the value of metallic minerals produced, which correlated with a significant increase in gold production (Banco de la República de Colombia, 2010). With respect to the increased value and production of gold, it was not possible to identify all the entities that were producing gold in Colombia, nor to quantify the contribution of informal mining to the total reported gold production, and those companies for which production data were available are estimated to represent less than 20% of all reported gold in 2009. In its March 2010 GDP report for the fourth quarter of 2009, the Departamento Administrativo Nacional de Estadística (National Administrative Department of Statistics (DANE)) identified a 17.6% increase in the value of gold production for 2009 based upon the then-known totals of production. Data later released by the Sistema de Informacion Minero Colombiano (Colombian Mining Information System (SIMCO)) provide updated and revised gold production numbers for 2008 and 2009 that indicate a 39% increase in gold production. The Government’s estimate of a 17.6% increase in the value of gold production and sales as they contributed to the GDP in 2009, therefore, was assumed to be lower than the actual contribution, but a precise value was not available (Departamento Administrativo Nacional de Estadística, 2010, p. 16).

A 24% increase in ferronickel production and an 18% increase in silver production also contributed to the value added to the GDP from metallic minerals. In 2009, there was a reported 8.8% increase in the value of nonmetallic minerals that was attributed to a 26.1% increase in the production of rocks and materials used in the construction industry, although the exact materials that were being referred to was unclear, and production data for construction materials were not available in many cases (Departamento Administrativo Nacional de Estadística, 2010, p. 16).

Yearend totals for the contribution of the hydrocarbon industries to the GDP in 2009 were not available from the Central Bank of Colombia. Data for both fuel and nonfuel commodities were available for the first two quarters of the year, however, and indicate that the value contributed to the GDP by mining (including hydrocarbons) decreased by 10% to $8.5 billion during that period. For the same period of time, the value contributed to the GDP by mining (not including hydrocarbons) increased by 35% to $3.6 billion. Coal products contributed $2.1 billion to the GDP in the first two quarters of 2009, which was an increase of 61% compared with the first two quarters of 2008. The contribution to the GDP from the production of other hydrocarbons was valued at about $4.1 billion, which was a decrease of 31% compared with that of 2008, and was owing to the decrease in petroleum prices in 2009 compared with the surge in prices in 2008 (Banco de la República de Colombia, 2010; Forero, 2010).

Government Policies and Programs

Colombia’s mining law is Law 685 of 2001 (La Ley 685 de 2001), which states that all mineral resources are the property of the state. In 2009, 22 Articles of Law 685 were amended (added to). Article 16 of Law 685 was amended to require applicants for a mining concession to indicate whether any type of mining already exists in the area of interest and to note the location and how the existence of such mining was determined. The Mining Authority would certify any existing mining within a period not to exceed 3 months. If informal mining practices were being carried out in the area of interest, Article 31 (which applies to the establishment of mining reserve areas where informal mining is already taking place) and other applicable provisions of the mining code would apply. When an area is recognized as being mined using informal mining practices and is subsequently established as a reserve area with a formal resolution to that effect, no mining concession applications are accepted for that area for a period of up to 2 years to allow the Government time to assess the area geologically and mineralogically for the purpose of developing mining projects. Three such resolutions were passed in 2009 that together classified a total of about 1,400 hectares (ha) in the Departments of Boyaca, Cundinamarca, and Risaralda as coal reserve areas. If, in the application process for a new concession, an applicant fails to notify the appropriate authorities of known informal mining practices, the applicable articles of the mining code and other penal code rules would apply and could result in rejection of the application, suspension of the concession contract, monetary fines, and possible criminal proceedings.
depending upon the stage in the process at which the informal mining is discovered and the given circumstances. An addition to Article 31 of Law 685 states that, in accordance with existing geologic information, the Mining Authority may delimit other special reserve areas not yet under concession and may publicly solicit bids for the right to make a technical assessment of the property. A company would not automatically receive an exploration or mining permit by performing an assessment, however, but the company that offered the best technical assessment as outlined by the policies of the Mining Authority would have an option to contract with the Mining Authority for a period of up to 5 years for exploration and mining. Other additions to Articles of the mining law address such issues as environmental exclusion zones, a national mining plan (in coordination with the Ministry of Environment, Housing and Territorial Development) to be completed within 3 years from the publication date of the document that outlined the additions (June 17, 2009), an extension of time limits on mining concessions, efforts to quantify the production of emerald, overlapping mining concessions, and others (Informacion Minera de Colombia, 2009).

Production

In 2009, copper production increased by 9% to 5,700 metric tons (t) from a revised 5,248 t in 2008. Continental Gold Ltd. of Canada’s Buritica gold mine—an advance exploration project in 2009—may have come online with limited production during the year; however, no production data were available and the country’s copper production increase is thus assumed to have been from Minas El Roble Ltda.’s El Roble Mine in Choco Department, which was the only other known producing copper mine in the country. In 2008, however, El Roble was reported to have been planning to wind down operations at some point in the near future. Gold production increased by 39% in 2009 compared with that of 2008 and was carried out by at least five companies at their respective properties, including Gran Colombia Gold Corp. of Canada’s Frontino Mine; Minas el Roble’s El Roble Mine, which was thought to be under limited production; Minatura Gold of Nevada’s Remedios Mine; and Mineros S.A.’s Antioquia property, which was undergoing expansion. All these mines, except for El Roble, were located in Antioquia Department. Production of nickel from ferronickel production increased by 24%, all of which was attributed to BHP Billiton Ltd. of Australia’s Cerro Matoso laterite nickel operation in Montebello. Reported emerald production increased by 37% in 2009 compared with that of 2008; however, no information was available regarding the source of the production, which typically had been reported as the volume of emerald that was recorded as exports and not the production of emerald in the country (table 1).

Structure of the Mineral Industry

The Ministry of Mines and Energy (MME) is the Government agency that is responsible for the management and regulation of nonrenewable resources in Colombia. The majority of mines and mineral production facilities in the country are owned by the private sector. Even the national petroleum company Ecopetrol S.A. has a mixed ownership format whereby the Government owns about 90% of the company and the remaining 10% is publicly held shares that were first made available in 2007 to help grow the company during the next 5 years. In March 2009, it was announced that Ecopetrol had acquired Hocol S.A., which was the Colombian subsidiary of France’s Maurel & Prom Co., for about $580 million and about $160 million in working capital. In 2009, Hocol was producing about 20,000 barrels per day (bbl/d) of crude petroleum and reported the discovery of a significant gas condensate field in the Niscota Block, which is located about 300 kilometers northeast of Bogota and of which France’s Total S.A. owned 50%. Maurel & Prom reported that it would keep several exploration permits in which it held different percentage shares. The transaction was reported to include Hocol’s 36.1% and 21.7% share in the Alto Magdalena and the Oleoducto de Colombia pipelines, respectively (Crooks, 2009; Rigzone.com, 2009; Ecopetrol, S.A., 2010).

Mineral Trade

In 2009, as the total value of exported goods and services decreased by 12.7% compared with that of 2008 to about $32.9 billion, the value of mineral and mineral product exports increased by 11% compared with that of 2008 to about $7.3 billion, accounting for 24.8% of total exports in 2009 compared with 19.5% in 2008. In 2009, Colombia exported coal and (or) coal products totaling about 69 Mt, which was valued at about $5.4 billion. In terms of volume and value, the leading recipients of Colombian coal were the United States followed by the Netherlands, the Falkland Islands [United Kingdom], Chile, and Turkey, which together accounted for 65% of the exported coal. Colombia exported a total of about 773,000 Mt of cement products, including clinker, hydraulic cement, and white and gray portland cement, which was valued at about $71 million. In terms of value and volume, the United States was the leading importer of Colombian cement products followed by Guyana, Panama, and Suriname, which together accounted for about 64% of total cement exports. Colombia exported a total of about 15,600 t of copper ore and concentrate worth a reported value of about $49 million. The leading importer was Hong Kong followed by Mexico and China, which were the only countries that were reported to have received copper imports from Colombia (Ministerio de Minas y Energia, 2010).

Commodity Review

Metals

Gold.—In 2009, Colombia’s gold production increased to 47,800 kilograms (kg), or by 39% compared with that of 2008. Antioquia Department continued to be the leading producer followed by Choco Department, which together accounted for about 80% of the gold production for the year. In July 2009, Greystar Resources Ltd. of Canada announced that it had acquired surface rights to about 1,000 ha of land that were the proposed location for one of two major heap-leach pads and most of a rock storage site for its Angostura gold and silver
deposit located in Bucaramanga. The acquisition brought the total surface area of the project to about 3,500 ha of surface rights and about 30,000 ha of mineral rights. The Angostura project was a feasibility-stage project with estimated measured and indicated mineral resources of about 359,000 kg of gold as of May 2008. In 2009, Mineros S.A. reported that it was investing about $12 million in infrastructure, including development of the underground Y Mine at its Antioquia property and a dredge system that was being built to begin exploration for alluvial gold by the end of 2009. When completed, production at Antioquia was expected to increase by about 1,500 kilograms per year (kg/yr) from a production volume of about 700 kg/yr (Greystar Resources Ltd., 2008, 2010).

**Nickel.**—There were six identified nickel deposits in Colombia in 2009; the three located in Cordoba Department were Cerro Matoso, Planeta Rica, and Ure, and the three located in Antioquia Department were Ituango, Medellin, and Morro Pelon. In 2009, Colombia’s ferronickel production increased to 51,800 t, or by 24% compared with output in 2008. The increased production in 2009 compared with that of 2008 brought the production volume back in line with recent years, and the decrease in 2008 was attributed to a month-long strike by mine workers at the Cerro Matoso Mine that resulted in depleted stockpiles. In 1987, the Instituto Colombiano de Geología y Minería (INGEMINAS) estimated Colombia’s nickel reserves to be about 38 Mt of nickel ore for the six recognized nickel deposits, of which Cerro Matoso accounted for 21 Mt of ore in what was then referred to as measured reserves. Another 46.5 Mt was estimated for what was referred to as indicated reserves, almost all of which was attributed to the deposit at Cerro Matoso. In 2009, BHP Billiton reported total proven reserves of 23 Mt of ore grading 0.2% nickel for 46,000 t of contained metal, 96 Mt of laterite ore in proven and probable reserves grading 1.27% for 1.2 Mt of contained metal, and 29 Mt of proven stockpiled ore grading 1.38% for 400,000 t contained nickel (Unidad de Planeacion Minero Energetica, 2009, p. 17).

**Mineral Fuels**

**Coal.**—In 2009, Colombia produced 72.8 Mt of coal, which was about a 1% decrease compared with output in 2008. Cesar and La Guajira Departments produced 34.1 Mt and 31.4 Mt, respectively, in 2009, accounting for a combined total of 90% of the coal produced in the country. Subsidiaries of Cerrejón Coal Co., which was a joint venture of Anglo American Plc of the United Kingdom, BHP Billiton, and Xstrata plc of Switzerland, including Carbones Colombianos del Cerrejón, Carbones del Cerrejón, Cerrejón Zona Norte, and Consorcio Cerrejón, produced most if not all of the reported coal from Guajira Department where the Cerrejón coal mine was in operation. Drummund Ltd. of the United States was the top-ranked coal producing company in Cesar Department; it produced about 20.6 Mt, or 60% of the total for the Department, mostly from La Loma Mine, but also from El Descanso Mine (Sistema Informacion Minero Colombiano, 2010).

**Natural Gas.**—In 2009, Colombia produced about 10 billion cubic meters of natural gas, which was about a 15% increase compared with production in 2008. According to the Ministerio de Minas y Energia, there were about 40 different companies, including several local subsidiaries of Ecopetrol that reported producing some quantity of natural gas from about 18 Departments. The leading producer of marketed natural gas was BP p.l.c.’s Colombian subsidiary, BP Exploration Co., which reported about 73% of the total production, most or all of which was from Casanare Department. Chevron Petroleum Co. was the second ranked producer of natural gas and reported about 21% of the country’s natural gas production, most or all of which came from Guajira Department.

**Petroleum.**—In 2009, average daily production of petroleum in Colombia was about 671,000 bbl/d for a total of about 245 million barrels in 2009, which was an increase of about 14% compared with that of 2008. In order of decreasing volume, the Departments of Meta, Casanare, and Arauca produced 34%, 19%, and 14% of the petroleum in Colombia in 2009, respectively. Other Departments produced less than 7% each of the total. About 49 individual companies were involved in crude oil production in Colombia in 2009, six of which accounted for 70% of the reported crude oil production for the year, including two of those that were subsidiaries of Ecopetrol, which was the country’s majority Government-owned petroleum and natural gas corporation (Ministerio de Minas y Energia, 2010).

**Outlook**

According to the World Bank, the effect of the global economic downturn of 2008 and its lingering effects in 2009 were minimized in Colombia because of economic reforms, including tax, pension, and budget reforms, and monetary and fiscal stimulus; however, it reported that recovery could lag behind the regional average if its export markets in Ecuador, the European Union, the United States, and Venezuela performed weakly. According to INGEMINAS, Colombia’s coal production was expected to reach 76 Mt in 2010, which would be about a 4% increase compared with production in 2009 and would continue the steady upward trend in coal production of at least the past 5 years. Ecopetrol had developed a strategic plan with objectives set out in both the upstream and downstream businesses for the period between 2011 and 2020 that it believed would significantly elevate the company’s position in the international petroleum industry, including increased production and reserves and increased domestic and international sales (Crowe, 2010; Ecopetrol S.A, 2010; World Bank, The, 2010).

**References Cited**


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### TABLE 1

**COLOMBIA: PRODUCTION OF MINERAL COMMODITIES**

(Metric tons unless otherwise specified)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>METALS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper, mine output, Cu content</td>
<td>8,756</td>
<td>2,902</td>
<td>4,196</td>
<td>5,248</td>
<td>5,700</td>
</tr>
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<td>Gold</td>
<td>35,786</td>
<td>15,683</td>
<td>15,482</td>
<td>34,321</td>
<td>47,800</td>
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<tr>
<td><strong>Iron and steel</strong></td>
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<td>Iron ore and concentrate</td>
<td>608</td>
<td>644</td>
<td>624</td>
<td>473</td>
<td>300</td>
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<tr>
<td>Pig iron</td>
<td>325</td>
<td>360</td>
<td>341</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Steel, crude</td>
<td>842</td>
<td>1,221</td>
<td>1,260</td>
<td>1,125</td>
<td>1,100</td>
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<tr>
<td>Semimanufactures, hot-rolled</td>
<td>694</td>
<td>1,598</td>
<td>1,598</td>
<td>1,435</td>
<td>1,454</td>
</tr>
<tr>
<td>Lead, refined (secondary)</td>
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<td>10,000</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Nickel</td>
<td>89,000</td>
<td>94,100</td>
<td>75,864</td>
<td>64,200</td>
<td>90,000</td>
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<td>Ferronickel, Ni content</td>
<td>52,749</td>
<td>51,137</td>
<td>49,314</td>
<td>41,636</td>
<td>51,800</td>
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<td>Platinum</td>
<td>1,082</td>
<td>1,438</td>
<td>1,526</td>
<td>1,370</td>
<td>1,370</td>
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<tr>
<td>Silver</td>
<td>7,142</td>
<td>8,399</td>
<td>9,765</td>
<td>9,162</td>
<td>10,800</td>
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<td><strong>INDUSTRIAL MINERALS</strong></td>
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<td>Cement, hydraulic</td>
<td>9,918</td>
<td>10,038</td>
<td>11,068</td>
<td>10,456</td>
<td>9,100</td>
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<td>Clay</td>
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<td>8,500</td>
<td>8,500</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Common clay and kaolin</td>
<td>8,400</td>
<td>8,400</td>
<td>25,811</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Feldspar</td>
<td>81,000</td>
<td>86,000</td>
<td>91,000</td>
<td>86,000</td>
<td>86,000</td>
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<tr>
<td>Gemstones, emerald</td>
<td>6,746</td>
<td>5,734</td>
<td>3,899</td>
<td>2,122</td>
<td>2,900</td>
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<td>Gypsum</td>
<td>173,300</td>
<td>186,300</td>
<td>200,400</td>
<td>200,000</td>
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<td>Magnesite</td>
<td>38,000</td>
<td>40,000</td>
<td>42,000</td>
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<td>NA</td>
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<td>Phosphate rock:</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Gross weight</td>
<td>43,000</td>
<td>43,000</td>
<td>24,000</td>
<td>27,000</td>
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<tr>
<td>P₂O₅ content</td>
<td>12,900</td>
<td>12,900</td>
<td>7,200</td>
<td>8,100</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Salt</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rock</td>
<td>215,962</td>
<td>248,245</td>
<td>204,090</td>
<td>245,170</td>
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<tr>
<td>Marine</td>
<td>428,957</td>
<td>389,630</td>
<td>309,557</td>
<td>386,461</td>
<td>356,800</td>
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<tr>
<td>Total</td>
<td>644,919</td>
<td>637,875</td>
<td>513,647</td>
<td>631,631</td>
<td>612,100</td>
</tr>
<tr>
<td>Stone and sand, limestone for cement</td>
<td>12,018</td>
<td>11,993</td>
<td>13,229</td>
<td>12,699</td>
<td>11,300</td>
</tr>
<tr>
<td>Sulfur</td>
<td>69,082</td>
<td>47,438</td>
<td>48,999</td>
<td>56,892</td>
<td>54,400</td>
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<tr>
<td>Byproduct, from petroleum</td>
<td>8,047</td>
<td>5,860</td>
<td>5,085</td>
<td>6,277</td>
<td>73,100</td>
</tr>
<tr>
<td>Total</td>
<td>77,129</td>
<td>53,298</td>
<td>54,084</td>
<td>63,169</td>
<td>127,500</td>
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See footnotes at end of table.
TABLE 1—Continued
COLOMBIA: PRODUCTION OF MINERAL COMMODITIES

(Reports tons unless otherwise specified)

<table>
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<tr>
<th>Commodity</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<td>MINERAL FUELS AND RELATED MATERIALS</td>
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<td></td>
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</tr>
<tr>
<td>Coal, all types</td>
<td>1,037</td>
<td>803</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Gas, natural, gross</td>
<td>3,793</td>
<td>3,958</td>
<td>7,679</td>
<td>9,033</td>
<td>10,400</td>
</tr>
<tr>
<td>Natural gas liquids (propane)</td>
<td>7,639</td>
<td>7,255</td>
<td>6,515</td>
<td>7,275</td>
<td>7,300</td>
</tr>
<tr>
<td>Petroleum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude</td>
<td>191,990</td>
<td>193,085</td>
<td>193,815</td>
<td>214,620</td>
<td>244,800</td>
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<td>Refinery products:</td>
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<tr>
<td>Gasoline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aviation</td>
<td>508</td>
<td>388</td>
<td>136</td>
<td>106</td>
<td>100</td>
</tr>
<tr>
<td>Motor (extra)</td>
<td>3,279</td>
<td>1,739</td>
<td>1,560</td>
<td>1,568</td>
<td>1,500</td>
</tr>
<tr>
<td>Motor (regular)</td>
<td>32,275</td>
<td>28,239</td>
<td>25,271</td>
<td>25,217</td>
<td>34,400</td>
</tr>
<tr>
<td>Jet fuel</td>
<td>7,300</td>
<td>6,421</td>
<td>6,275</td>
<td>7,560</td>
<td>8,400</td>
</tr>
<tr>
<td>Kerosene</td>
<td>113</td>
<td>112</td>
<td>120</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Medium distillate fuel oil</td>
<td>26,451</td>
<td>30,376</td>
<td>32,787</td>
<td>30,286</td>
<td>26,700</td>
</tr>
<tr>
<td>Residual fuel oil (black oil)</td>
<td>20,240</td>
<td>23,379</td>
<td>24,437</td>
<td>23,312</td>
<td>21,700</td>
</tr>
<tr>
<td>Asphalt</td>
<td>1,117</td>
<td>1,000</td>
<td>1,000</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Refinery fuel and losses and unspecified products</td>
<td>10,205</td>
<td>10,000</td>
<td>10,000</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Total</td>
<td>101,488</td>
<td>101,654</td>
<td>101,586</td>
<td>88,149</td>
<td>93,000</td>
</tr>
</tbody>
</table>

1Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. 2Preliminary. 3Revised. 4Do. Ditto.
5Not available.
6Table includes data available through September 15, 2010.
7Data from Sistema de Informacion Minero Colombiano.
8Reported figure
9Excludes white portland cement.
10Based on Colombian Institute of Geology and Mines (INGEOMINAS) production reports as determined by payments of royalties and other economic considerations prior to export.
### TABLE 2
**COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009**

(Thousand metric tons unless otherwise specified)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Major operating companies and major equity owners</th>
<th>Location of main facilities</th>
<th>Annual capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>Cia. Colombiana de Clinker S.A. (Cementos Argos Colombia S.A., 100%)</td>
<td>Plant at Cartagena, Bolivar Department</td>
<td>1,250</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos del Caribe S.A. (Cementos Argos Colombia S.A., 74%)</td>
<td>Barranquilla, Atlantico Department</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos del Valle S.A. (Cementos Argos Colombia 70%)</td>
<td>Yumbo, Valle del Cauca Department</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>Do. Cales y Cementos de Toluvié S.A. (Cementos Argos Colombia S.A., 95%)</td>
<td>Toluvié, Sucre Department</td>
<td>980</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos del Nare S.A. (Cementos Argos Colombia S.A., 100%)</td>
<td>Puerto Nare, Antioquia Department</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos El Cairo S.A. (Cementos Argos Colombia S.A., 100%)</td>
<td>Montebello, Antioquia Department</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos Paz del Rio S.A. (Cementos Argos Colombia S.A., 62%)</td>
<td>Belencito, Boyaca Department</td>
<td>880</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos Rióclaro S.A. (Cementos Argos Colombia S.A., 99%)</td>
<td>Sonson, Antioquia Department</td>
<td>1,400</td>
</tr>
<tr>
<td></td>
<td>Do. Cementos Boyacá S.A. (Holcim Group, 100%)</td>
<td>Nobsa, Boyaca Department</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>Do. CEMEX Colombia S.A. (CEMEX S.A.B. de C.V., 99.7%)</td>
<td>Bucaramanga, Santander Department; Buenos Aires, Tolima Department; Pamplona, Norte de Santander Department; La Calera, Cundinamarca</td>
<td>3,980</td>
</tr>
<tr>
<td>Coal</td>
<td>Carbonos del Cerejeón LLC (Anglo American Plc, 33.3%; BHP Billiton plc, 33.3%; Xstrata plc., 33.3%)</td>
<td>Cerrejón Centro Mines, Cerrejón Sur Mines, Cerrejón Zona Norte, and Oreganal Mines, La Guajira Department</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>Do. Drummond Ltd. (Drummond Co. Inc., 100%)</td>
<td>La Loma Mine, Cesar Department</td>
<td>23,000</td>
</tr>
<tr>
<td></td>
<td>Do. C.I. Predecó S.A. (Glencore International AG, 100%)</td>
<td>Calenturitas Mine, Cesar Department</td>
<td>11,000</td>
</tr>
<tr>
<td></td>
<td>Do. Carbonos de La Jagua S.A. (Glencore International AG, 100%)</td>
<td>La Jagua Mine, La Jagua de Ibirico, Cesar Department</td>
<td>2,500</td>
</tr>
<tr>
<td></td>
<td>Do. Coalcorp [Coalcorp Mining Inc., 100% (Caypa, 60%, and Xira Investment Co., 40%)]</td>
<td>La Francia Mine, Cesar Department, and Caypa Mine, La Guajira Department</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>Do. Acerías Paz del Río S.A. (Votorantim Group, 52%)</td>
<td>Paz del Río Mine, Boyaca Department</td>
<td>350</td>
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<tr>
<td>Copper</td>
<td>Minera El Roble S.A.</td>
<td>El Roble Mine, El Carmen, Choco Department</td>
<td>3</td>
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<tr>
<td>Gemstones, emerald</td>
<td>Minerales de Colombia S.A. (MINERALCO) (Government, 100%)</td>
<td>Chivor, Coscuez, Muzo, and Quipama Mines, Boyaca Department</td>
<td>NA</td>
</tr>
<tr>
<td>Gold</td>
<td>Frontino Gold Mines Ltd. (private, 100%)</td>
<td>Frontino Mine, Antioquia Department</td>
<td>1,500</td>
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<tr>
<td></td>
<td>Do. Grupo de Bullet S.A.</td>
<td>El Limon Oronorte Mine, Segovia, Antioquia Department</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>Do. Mineros de Antioquia S.A. (private, 100%)</td>
<td>El Bagre, Rio Neche, Antioquia Department</td>
<td>2,000</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>Do. Diaco S.A. (Gerdau S.A., 98%)</td>
<td>Tuta and Duitama, Boyaca; Cali, Valle del Cauca; Tocancipa, Cundinamarca; Muna, near Bogota</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Do. Siderúrgica del Pacifico S.A. (private, 100%)</td>
<td>Plant at Yumbo, Valle de Cauca Department</td>
<td>60</td>
</tr>
<tr>
<td>Iron ore</td>
<td>Acerías Paz del Río S.A. (Votorantim Group, 62%)</td>
<td>Paz del Río Mine, Boyaca Department, and plants, Boyaca Department</td>
<td>800</td>
</tr>
<tr>
<td>Kaolin</td>
<td>Cermicas del Valle Ltda. (private, 100%)</td>
<td>Mine at Yumbo, Valle del Cauca Department</td>
<td>NA</td>
</tr>
<tr>
<td>Natural gas</td>
<td>Ecopetrol S.A. (Government, 100%)</td>
<td>North coast, La Guajira Department (national gasfields)</td>
<td>4,500</td>
</tr>
<tr>
<td>Nickel</td>
<td>Cerro Matoso S.A. (BHP Billiton Ltd., 99.4%, and Mineworkers, 0.6%)</td>
<td>Cerro Matoso Mine and ferronickel plant, Montelibano, Cordoba Department</td>
<td>55</td>
</tr>
</tbody>
</table>

See footnotes at end of table.
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Major operating companies and major equity owners</th>
<th>Location of main facilities</th>
<th>Annual capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum^{2}</td>
<td>Ecopetrol S.A.</td>
<td>16 fields in various Departments</td>
<td>70,000</td>
</tr>
<tr>
<td>Petroleum products</td>
<td>do.</td>
<td>do.</td>
<td>81,400</td>
</tr>
<tr>
<td>Do.</td>
<td>do.</td>
<td>Barrancabermeja refinery, Norte de Santander Department</td>
<td>1,825</td>
</tr>
<tr>
<td>Do.</td>
<td>do.</td>
<td>Tibu, Norte de Santander Department</td>
<td>875</td>
</tr>
<tr>
<td>Do.</td>
<td>do.</td>
<td>Orito, Putumayo Department</td>
<td>28,000</td>
</tr>
<tr>
<td>Phosphate rock</td>
<td>Fosfatos de Colombia S.A. (private, 100%)</td>
<td>Neiva, Huila Department</td>
<td>30</td>
</tr>
<tr>
<td>Do.</td>
<td>Fosfatos Boyacá S.A. (private, 100%)</td>
<td>Iza, Boyaca Department</td>
<td>60</td>
</tr>
<tr>
<td>Do.</td>
<td>Fosfatos del Huila S.A. (private, 100%)</td>
<td>Neiva, Huila Department</td>
<td>30</td>
</tr>
<tr>
<td>Do.</td>
<td>Siderúrgica del Boyacá S.A. (private, 100%)</td>
<td>Santa Fe de Bogota</td>
<td>NA^{3}</td>
</tr>
<tr>
<td>Do.</td>
<td>Siderúrgica del Medellín S.A. (private, 100%)</td>
<td>Medellín, Antioquia Department</td>
<td>NA^{3}</td>
</tr>
<tr>
<td>Do.</td>
<td>Siderúrgica del Muna S.A. (private, 100%)</td>
<td>Chusaca, Federal District</td>
<td>NA^{3}</td>
</tr>
<tr>
<td>Do.</td>
<td>Siderúrgica del Pacífico S.A. (private, 100%)</td>
<td>Cali, Valle del Cauca Department</td>
<td>NA</td>
</tr>
<tr>
<td>Sulfur</td>
<td>Industrias Purace S.A. (private, 100%)</td>
<td>El Vinagre Mine, Cauca Department</td>
<td>NA</td>
</tr>
<tr>
<td>Do.</td>
<td>Ecopetrol S.A.</td>
<td>Barrancabermeja, Santander Department</td>
<td>NA</td>
</tr>
</tbody>
</table>

^{1}Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
^{2}White cement only.
^{3}Colombia has more than 3,000 producing wells drilled by national and private companies; these wells have combined capacities that exceed 755,000 barrels per day of oil.

Steel companies whose production results in slag with a high percentage of P_{2}O_{5}.