



# 2009 Minerals Yearbook

---

## SOUTH AFRICA

---

# THE MINERAL INDUSTRY OF SOUTH AFRICA

By Thomas R. Yager

The Republic of South Africa remained one of the world's leading mining and mineral-processing countries. In 2009, South Africa's estimated share of world platinum production amounted to 79%; kyanite and other materials, 60%; chromium, 42%; palladium, 41%; vermiculite, 40%; vanadium, 35%; zirconium, 32%; ilmenite and rutile, 19% each; manganese, 14%; gold, 9%; fluorspar, 4%; aluminum, antimony, iron ore, and nickel, 2% each; and phosphate rock, 1%. The country's estimated share of world reserves of platinum-group metals (PGM) amounted to 89%; hafnium, 42%; chromite, 37%; zirconium, 25%; manganese, 24%; vanadium, 23%; fluorspar and rutile, 18% each; gold, 13%; ilmenite and phosphate rock, 9% each; and nickel, 5% (Bray, 2010; Carlin, 2010; Corathers, 2010; Cordier, 2010a, b; Gambogi, 2010a, b; George, 2010; Jasinski, 2010; Jorgenson, 2010; Kuck, 2010; Loferski, 2010; Miller, 2010; Papp, 2010; Polyak, 2010).

## Minerals in the National Economy

The mineral industry accounted for 8.8% of the gross domestic product in 2009; crude and processed mineral products accounted for 38% of the value of total exports. About 73% of crude mineral products and 80% of processed mineral products by value were exported in 2009. Employment in the mineral industry amounted to 491,222 in 2009 compared with 518,519 in 2008 and 437,028 in 1999. In 2009, PGM mining accounted for 37.4% of the mineral industry's employment; gold, 32.5%; coal, 14.4%; iron ore, 2.8%; diamond, 2.4%; and other minerals, 10.5%. In 1999, gold mining accounted for about 54% of the mineral industry's employment, and PGM, 21% (Chamber of Mines of South Africa, 2007, p. 13, 26, 32; 2010, p. 4, 6-7, 12; Martin Kohler, Deputy Director of Statistics, Department of Minerals and Energy of the Republic of South Africa, written commun., September 2, 2010).

## Government Policies and Programs

In 2009, the Government amended the Diamond Export Levy Act of 2007 and the Mineral and Petroleum Resources Royalty Administration Act of 2008. The Government's Black Economic Empowerment program required that black ownership of the mining industry reach 15% by 2009 and 26% by 2014. Recent deals to increase black ownership included Anoroaq Resources Corp.'s acquisition of a 51% interest in the Bokoni Platinum Mine (formerly the Lebowa Mine) from Anglo American Platinum Ltd. and the acquisition of a 24% share in Richards Bay Minerals (RBM) by Blue Horizon Investments and a 2% share by RBM's permanent employees. Royal Bafokeng Resources (Pty) Ltd. increased its share in the Bafokeng-Rasimone Platinum Mine to 67% from 50% in December 2009 (Anglo American Platinum Ltd., 2010, p. 76-78).

## Production

In 2009, mineral pigment production increased by 369%; pyrophyllite, 42%; slate, 19%; shale, 17%; direct-reduced iron (DRI), 16%; andalusite, by an estimated 13%; and iron ore and sodium sulfate, 13% each. The output of diamond decreased by 53%; crude petroleum, 46%; stainless steel, 36%; manganese ore, 33%; silica, 31%; mica, 30%; chromite and vanadium, 29% each; ferrochromium, 28%; granite and norite, 27%; attapulgitite and silicon metal, 25% each; flint clay and kaolin, 21% each; ferrosilicon, 19%; pig iron, 18%; cement and fire clay, 13% each; lime, 12%; and aggregate and sand, 11% (Martin Kohler, Deputy Director of Statistics, Department of Minerals and Energy of the Republic of South Africa, written commun., September 2, 2010).

## Structure of the Mineral Industry

Most of the South African mineral industry was privately owned. The production of diamond and gold, which were produced mostly by artisanal miners in many African countries, was dominated by large-scale producers in South Africa. The leading producer's share of total output varied sharply by commodity; the leading producer of diamond accounted for 78% of national production; iron ore, 71%; nickel, 51%; vanadium, 46%; gold, 28%; and coal, 24%.

## Mineral Trade

In 2009, exports of PGM amounted to \$6.33 billion; gold, \$5.56 billion; coal, \$3.66 billion; iron ore, \$2.99 billion; manganese ore, \$592 million; nickel, \$385 million; chromite, \$142 million; copper, \$121 million; and other crude mineral products, which included diamond, ilmenite, rutile, and zircon, \$1.11 billion. Exports of ferrochromium amounted to \$1.88 billion; manganese metal and alloys, \$429 million; vanadium alloys and other vanadium products, \$165 million; silicon metal and alloys, \$130 million; and other processed mineral products, which included aluminum, \$1.83 billion (Martin Kohler, Deputy Director of Statistics, Department of Minerals and Energy of the Republic of South Africa, written commun., September 2, 2010).

The percentage of domestic consumption of mineral commodities produced in South Africa varied sharply by commodity. In 2009, PGM exports by volume amounted to 92% of domestic production; gold, 91%; silver, 90%; manganese ore, 87%; vermiculite, 85%; iron ore, 81%, nickel, 79%; coal, 24%; zinc, 17%; chromite, 15%; and feldspar, lime, and silica, less than 1% each (Martin Kohler, Deputy Director of Statistics, Department of Minerals and Energy of the Republic of South Africa, written commun., September 2, 2010).

## Commodity Review

### Metals

**Aluminum.**—South Africa produced primary aluminum from alumina imported from Guinea. BHP Billiton Ltd. operated the Bayside and the Hillside primary aluminum smelters at Richards Bay. In 2009, BHP Billiton's production remained nearly unchanged at 809,000 metric tons (t). The smelters' electricity consumption accounted for 2,150 megawatts (MW) of state-owned utility Eskom's capacity (Ryan, 2008; BHP Billiton Ltd., 2009b, p. 6; 2010, p. 6).

Rio Tinto Alcan of Canada planned to build a new aluminum smelter at Coega in Eastern Cape Province with a capacity of 360,000 metric tons per year (t/yr). The company planned to increase capacity to 720,000 t/yr in the second phase of the project. In its first stage, the smelter's electricity consumption was expected to account for 670 MW of capacity, and in the second stage, 1,350 MW of capacity. In October 2009, Rio Tinto Alcan cancelled development of the smelter because of power supply concerns (Ryan, 2008; O'Donovan, 2010).

**Chromium.**—Xstrata plc of Switzerland and its joint-venture partner Merafe Resources Ltd. operated the Boshhoek, the Helena, the Horizon, the Kroondal, the Thorncliffe, and the Waterval Mines, which had a total (combined) capacity of 5.57 million metric tons per year (Mt/yr) of chromite. The company's production in South Africa decreased to 1.92 million metric tons (Mt) in 2009 from 4.15 Mt in 2008. The Boshhoek, the Horizon, and the Waterval Mines shut down in 2009; production declined sharply at the Helena, the Kroondal, and the Thorncliffe Mines (Xstrata plc, 2010, p. 93).

Xstrata and Merafe operated the Boshhoek, the Lion, the Lydenburg, the Rustenburg, and the Wonderkop ferrochromium plants. These plants had a total combined capacity of 1.98 Mt/yr. In 2009, output decreased to 1 Mt from 1.42 Mt in 2008. The decline was broadly based, with production decreasing at all plants in 2009 (Xstrata plc, 2010, p. 94).

Samancor Chrome Ltd. (a subsidiary of Kermas Group Ltd. of the United Kingdom) produced chromite at the Eastern Chrome Mines in Mpumalanga Province and the Western Chrome Mines in North West Province. The majority of the company's output was consumed in its ferrochromium plants. In November 2009, the mines were operating below their capacity of 3.5 Mt/yr (Ryan's Notes, 2009g; Tex Report, The, 2009).

Samancor Chrome operated the Ferrometals plant in Witbank, the Middelburg plant in Middelburg, and the Tubatse plant in Steelpoort. The company's ferrochromium plants were shut down in the first quarter of 2009 because of reduced worldwide demand for stainless steel. By October, Samancor Chrome was operating at about 94% of its capacity of 1.3 Mt/yr of ferrochromium. In early November, the company reduced production to about 65% of capacity because of low ferrochromium prices (Ryan's Notes, 2009g; Tex Report, The, 2009).

Assmang Ltd. [African Rainbow Minerals Ltd. (ARM), 50%, and Assore Ltd., 50%] operated the Dwarsrivier Mine in Mpumalanga. In fiscal year<sup>1</sup> 2009, production decreased to

684,000 t from 849,000 t in fiscal year 2008 because of reduced demand for ferrochromium (African Rainbow Minerals Ltd., 2009, p. 48).

Assmang produced ferrochromium at the 290,000-t/yr Machadodorp plant in Mpumalanga Province. In fiscal year 2009, output decreased to 169,000 t from 270,000 t in fiscal year 2008. In the first quarter of 2009, the Machadodorp plant was producing at about 30% of capacity. As of the end of August 2009, Assmang announced plans to keep 150,000 t/yr of ferrochromium capacity idle until world market conditions improved (African Rainbow Minerals Ltd., 2009, p. 48; Ryan's Notes, 2009a; Tex Report, The, 2009).

ARM and its joint-venture partner OJSC MMC Norilsk Nickel of Russia operated the Nkomati chromite mine. In fiscal year 2009, production decreased to 528,000 t from nearly 1.18 Mt in fiscal year 2008. ARM and Norilsk planned to maintain production of about 500,000 t/yr at Nkomati (African Rainbow Minerals Ltd., 2009, p. 35-36).

International Ferro Metals Ltd. (IFM) operated the Buffelsfontein chromite mine and ferrochromium plant in North West Province. In fiscal year 2009, IFM produced 110,364 t of ferrochromium compared with 205,607 t in fiscal year 2008. Ferrochromium operations were shut down in the first quarter of 2009; production restarted in April. In September 2009, IFM was producing ferrochromium at the rate of about 120,000 t/yr, of which approximately 50% was exported to China. The company planned to mine 1.5 Mt/yr of chromite through early 2012 (Ryan's Notes, 2009c; Tex Report, The, 2009).

In 2009, ASA Metals (Pty) Ltd. (Sinosteel Corp. of China, 60%, and Limpopo Economic Development Enterprise, 40%) completed the expansion of its ferrochromium plant near Pietersburg. The plant's capacity was increased to 400,000 t/yr from 120,000 t/yr. ASA Metals also initiated the expansion of its Dilokong Mine in October 2009; the company planned to finish sinking two new shafts at the end of 2011 or the beginning of 2012 (International Resource Journal, 2010, p. 128, 130, 135).

Hernic Ferrochrome (Pty) Ltd. (a subsidiary of Mitsubishi Corp. of Japan) operated a ferrochromium plant with a capacity of 420,000 t/yr. The plant was shut down during the first quarter of 2009. By the end of August, Hernic reopened all its furnaces; the company was producing ferrochromium at the rate of about 370,000 t/yr in September. Hernic also planned to develop a new underground chromite mine at Bokfontein (Ryan's Notes, 2009i; Tex Report, The, 2009).

In 2009, Ruukki Group Oyj of Finland purchased the Mogale plant, which had a total capacity of 110,000 t/yr of ferrochromium and silicomanganese. Ruukki planned to increase capacity at Mogale to 360,000 t/yr by 2013; the expansion depended on access to additional power supplies (Ryan's Notes, 2009h).

Aquarius Platinum Ltd. planned to reopen the Everest PGM mine in the third quarter of 2010; chromite production was likely to start in the third quarter of 2011. The company expected to produce 200,000 t/yr of chromite at Everest (Aquarius Platinum Ltd., 2010, p. 1, 10).

Impala Platinum Holdings Ltd. (Implats) and Marula Community Chrome formed Makgomo Chrome, which was a joint venture to produce chromite from tailings at Implats' Marula

<sup>1</sup>Fiscal years run from the end of June in one year through the end of June in the following year unless otherwise specified.

PGM mine in Limpopo Province. Production was expected to be 125,000 t/yr (Impala Platinum Holdings Ltd., 2009, p. 60).

**Gold.**—The long-term decline in the country's gold output continued in 2009, with national gold mine production decreasing to 197,628 kilograms (kg) from 212,571 kg in 2008 (table 1). Difficulties in mining at greater depths, lower ore grades, power supply constraints, and safety-related stoppages contributed to the decline.

AngloGold Ashanti Ltd. operated the Great Noligwa, the Kopanang, the Moab Khotson, and the Tau Lekoa Mines in the Vaal River area near Klerksdorp; and the Mponeng, the Savuka, and the Tau Tona Mines in the West Wits area near Carletonville. AngloGold Ashanti's gold production decreased to about 55,900 kg in 2009 from 65,300 kg in 2008. In 2009, production decreased at the Great Noligwa, the Kopanang, the Mponeng, and the Tau Lekoa Mines. Production shut down temporarily at Savuka because of seismic activity and at Tau Tona for safety reasons. In 2009, output increased at the Moab Khotson Mine and at the Vaal River surface mining operations (AngloGold Ashanti Ltd., 2010, p. 44, 52, 66, 69).

In 2010, AngloGold Ashanti expected to produce a total of between 53,600 and 56,000 kg of gold. At the Mponeng Mine, the company planned to increase production to between 11,000 and 11,500 kg in 2010 from 10,481 kg in 2009; at Moab Khotson, to between 8,400 and 8,800 kg from 7,686 kg; and at Tau Tona, to between 8,500 and 8,800 kg from 6,800 kg. Production at Savuka was expected to increase to 8,700 kg in 2011 from 924 kg in 2009. At Great Noligwa and the Vaal River surface operations, output was likely to decrease modestly in 2010 (AngloGold Ashanti Ltd., 2010, p. 21, 33, 55, 57, 63, 67).

Harmony Gold Mining Company Ltd. produced gold at numerous mines; the company's output was 45,437 kg in fiscal year 2009 compared with 47,419 kg in fiscal year 2008. Decreased production was attributable to numerous factors that included decreased ore grades, difficult geologic conditions, flooding, labor disputes, power supply constraints, and seismic activity. In fiscal year 2009, production decreased at the Bambanani, the Doornkop, the Evander, and the Tshepong Mines. Harmony planned to increase its South African gold production to nearly 61,000 kg by fiscal year 2012. The company planned to increase production at the Doornkop Mine to 7,800 kilograms per year (kg/yr) by March 2015 from 1,311 kg in fiscal year 2009. The Phakisa Mine produced 691 kg in fiscal year 2009; full output of 7,900 kg/yr was expected by June 2011. At the Elandsrand Mine, production was likely to increase to nearly 9,700 kg/yr by July 2013 from 5,422 kg in fiscal year 2009 (Harmony Gold Mining Company Ltd., 2009, p. 7, 23, 25, 33, 35, 37-38, 43, 45-46, 60, 67).

Gold Fields Ltd. of South Africa produced gold at the Beatrix, the Driefontein, the Kloof, and the South Deep Mines. Production at the Driefontein Mine decreased to 25,041 kg in 2009 from 25,807 kg in 2008; at the Kloof Mine, to 20,321 kg from 20,623 kg; and at the Beatrix Mine, to 12,443 kg from 12,696 kg. At the South Deep Mine, production increased to 7,373 kg from 5,124 kg. Gold Fields planned to increase production at South Deep to between 23,000 and 25,000 kg/yr of gold by July 2014. Resources at South Deep were estimated to be about 2,000 t of contained gold, of which 900 t was

reserves. The mine was expected to remain in production beyond 2050 (Ruffini, 2009b; Gold Fields Ltd., 2010).

In 2009, gold production by DRDGold Ltd. amounted to 7,277 kg. DRDGold produced gold at the Blyvooruitzicht, the Crown, the East Rand Proprietary, and the Ergo Mines. Production was constrained by labor disputes and seismic activity at Blyvooruitzicht. In the fourth quarter of 2009, the company announced plans to sell a 60% share in the Blyvooruitzicht Mine to Aurora Empowerment Systems (DRDGold Ltd., 2010).

Simmer and Jack Mines Ltd. acquired the Buffelsfontein Mine from DRDGold in 2005 and agreed to acquire the Tau Lekoa Mine from AngloGold Ashanti in 2010. The company produced about 3,100 kg of gold at Buffelsfontein in its 2009 fiscal year (which ran from the beginning of April to the end of March) and about 800 kg from its Transvaal Gold Mining Estate (TGME) project and surface mining operations. Production at Buffelsfontein was likely to reach nearly 4,700 kg in fiscal year 2013, 7,800 kg in fiscal year 2016, 9,600 kg in fiscal year 2020, and to exceed 8,000 kg/yr through fiscal year 2025 (Simmer and Jack Mines Ltd., 2010).

The Tau Lekoa Mine was expected to produce at least 3,000 kg/yr from fiscal year 2011 to fiscal year 2016; average production during the remaining 10-year life of the mine was likely to be 2,600 kg/yr. Simmer and Jack was conducting a prefeasibility study on the Weltevreden project, which could increase production at Tau Lekoa and extend the life of the mine by 6 years. Total output at Buffelsfontein, Tau Lekoa, TGME, and the surface mining operations could reach more than 9,500 kg in fiscal year 2012, 14,000 kg in fiscal year 2015, and exceed 12,000 kg/yr between fiscal years 2014 and 2024 (Simmer and Jack Mines Ltd., 2010).

First Uranium Corp. of Canada (a subsidiary of Simmer and Jack) produced 2,138 kg of gold at the Ezulwini Mine and the Mine Waste Solutions (MWS) project in the first three quarters of fiscal year 2010. Gold production was expected to reach 4,100 kg in fiscal year 2011, 6,000 kg in fiscal year 2012, and 8,200 kg in fiscal year 2013. First Uranium planned to recover nearly 1,800 kg at MWS in fiscal year 2011 and 2,000 kg in fiscal year 2012. Further increases in production to nearly 4,400 kg/yr depended on additional financing (First Uranium Corp., 2010, p. 10, 18-19).

Gold One International Ltd. opened its new Modder East underground mine in the second quarter of 2009. The company produced 343 kg of gold in 2009 and planned to increase output to between 3,100 kg and 3,700 kg in 2010 and to 5,600 kg in 2011 (SA Mining, 2009).

Central Rand Gold Ltd. reopened underground mines in the Central Rand gold field, where production was shut down in the mid-1970s. The company originally planned to start gold production at a rate of 3,100 kg/yr in 2009. By 2012, Central Rand expected to increase production to more than 31,000 kg/yr. Central Rand revised its mining plan to 620 kg in 2009 and about 1,200 kg/yr for the first 7 years of mine life because high costs rendered most of the company's resources subeconomic (Ryan, 2009a).

Great Basin Gold Ltd. (GBG) was engaged in construction of the Burnstone underground gold mine in Mpumalanga Province

in 2009. The company planned to start mining at Burnstone in mid-2010; estimated capital expenditures for 2010 were \$121 million. Production was likely to be nearly 2,600 kg of gold in 2010 and 4,700 kg in 2011. During the estimated 19-year life of the mine, GBG planned to produce an average of 7,900 kg/yr (Chadwick, 2010).

Rand Refinery Ltd. in Germiston (AngloGold Ashanti, 53%; Gold Fields, 33%; DRDGold, 10%; and Avgold Ltd. and Western Areas Ltd., 2% each) refined all the newly mined gold in South Africa; the company also refined gold that was mined in other African countries, including Ghana, Mali, and Tanzania. Nearly 40% of the gold produced by Rand Refinery was sourced from outside South Africa (Holman, 2009).

**Iron and Steel.**—ArcelorMittal South Africa Ltd. accounted for most of South Africa's production of crude steel at its Newcastle, Saldanha, Vanderbijlpark, and Vereeniging plants. About 69% of the company's production was consumed domestically, especially in the building and construction industry. In 2009, ArcelorMittal's crude steel production decreased to 5.31 Mt from 5.77 Mt in 2008 because of declining steel demand during the worldwide economic crisis. National steel consumption was estimated to be 4.6 Mt in 2009 compared with 5.3 Mt in 2008 (ArcelorMittal South Africa Ltd., 2010, p. 7, 11, 13).

Crude steel capacity at Vanderbijlpark was increased by 220,000 t/yr in 2009. At yearend, ArcelorMittal's plans to increase the total capacity of its South African plants to 10 Mt/yr from 8.2 Mt/yr were on hold (ArcelorMittal South Africa Ltd., 2010, p. 15, 28-29).

Highveld Steel and Vanadium Corp. Ltd. (Evraz Group S.A. of Luxembourg, 79%) operated a steel mill at Witbank; the company's production of crude steel was 699,000 t in 2009 compared with 796,000 t in 2008. Columbus Stainless (Pty) and Scaw Metals (a subsidiary of Anglo American plc) also produced crude steel (Evraz Group S.A., 2010).

**Iron Ore.**—Kumba Iron Ore Ltd. operated the Sishen Mine in Northern Cape Province and the Thabazimbi Mine in Limpopo Province. In 2009, production from the Sishen Mine increased to 39.4 Mt from 34 Mt in 2008; most of the increase was attributable to the new jig plant. The jig plant reached its full capacity of 13 Mt/yr of iron ore by the end of 2009. At the Thabazimbi Mine, production decreased to 2.5 Mt from 2.7 Mt (Kumba Iron Ore Ltd., 2010, p. 22, 25-26).

Kumba planned to produce between 12.5 Mt and 13 Mt at the jig plant in 2010. The company was also considering a further expansion of the Sishen Mine's capacity by 2017; full production of 10 Mt/yr from the expansion could be reached by 2019. The expansion project remained unapproved at the end of 2009 (Anglo American plc, 2010, p. 21).

At the end of 2009, Kumba had completed 45% of the work on developing the new Kolomela Mine (formerly the Sishen South Mine). Kumba planned to start mining at Kolomela in the first half of 2012 and to reach the mine's full capacity of 9 Mt/yr of iron ore in 2013. The life of the project was estimated to be 30 years. The estimated capital costs of the project were \$1 billion (Kumba Iron Ore Ltd., 2010, p. 30, 33).

In 2009, Kumba opened a new pit to extend the life of the Thabazimbi Mine beyond 2014. The company was engaged in

a feasibility study on increasing production to 3.4 Mt/yr and extending the life of the mine by an additional 20 years (Kumba Iron Ore Ltd., 2010, p. 29).

Assmang produced iron ore at the Beeshoek Mine in Northern Cape Province, which had a rated capacity of 6 Mt/yr. In fiscal year 2009, production decreased to 2.66 Mt from 4.49 Mt in fiscal year 2008. Most mining activity ceased at Beeshoek; production continued from ore stockpiles (African Rainbow Minerals Ltd., 2009, p. 41, 46).

In fiscal year 2009, production increased at Assmang's Khumani Mine to 6.65 Mt from 1.85 Mt in fiscal year 2008. Assmang planned to increase production to the Khumani Mine's full capacity of 10 Mt/yr in fiscal year 2010. The company also completed a feasibility study on increasing capacity to 16 Mt/yr; the expansion was approved by the board of directors in August 2009. Full production was likely to be achieved in fiscal year 2013. Capital costs of the project were estimated to be about \$790 million (African Rainbow Minerals Ltd., 2009, p. 9, 39, 46).

**Lead and Zinc.**—Minero Zinc (Pty) Ltd. planned to reopen the Pering Mine in 2009; the mine closed in 2003. In October, the company announced that it was delaying its plans because of a lack of financing. Minero planned to start production at an initial rate of 16,000 t/yr of zinc and 1,500 t/yr of lead 18 months after finalizing funding for the project (Ryan, 2009b).

**Manganese.**—Assmang produced manganese ore at the Gloria and the Nchwaning Mines. Capacity at Nchwaning was 3 Mt/yr, and at Gloria, 600,000 t/yr. In fiscal year 2009, production at these mines remained nearly unchanged at 3.14 Mt. Assmang completed a feasibility study on expanding capacity at Nchwaning in fiscal year 2009; the company planned to complete a new processing plant with a capacity of 1.5 Mt/yr in fiscal year 2010 (African Rainbow Minerals Ltd., 2009, p. 39, 47).

Assmang operated the Cato Ridge ferromanganese plant in Kwa-Zulu Natal, which had a rated capacity of 300,000 t/yr. In fiscal year 2009, output decreased to 216,000 t from 261,000 t in fiscal year 2008 because of the worldwide economic crisis. About 40% of the plant's capacity was shut down in October 2008 (African Rainbow Minerals Ltd., 2009, p. 42, 47).

Samancor Manganese (Pty) Ltd. (BHP Billiton, 60%, and Anglo American, 40%) operated the Mamatwan open pit mine and the Wessels underground mine near Hotazel in Northern Cape Province. In 2009, Samancor's production of manganese ore decreased to 1.6 Mt from 3.44 Mt in 2008. The company planned to increase ore production at Mamatwan by 1 Mt/yr by 2010, and at Wessels, by 700,000 t/yr by 2012. Higher production depended on successful negotiations with the state-owned railroad operator Transnet Freight Rail (Ryan's Notes, 2009b).

In 2009, Samancor Manganese produced 162,000 t of manganese alloys at its Meyerton plant compared with 494,000 t in 2008. In October 2009, the Meyerton plant operated at 100% of its silicomanganese capacity and 30% of its high-carbon ferromanganese capacity. The company was restarting a furnace that would increase high-carbon ferromanganese capacity utilization to 70% (BHP Billiton Ltd., 2009b, p. 4; 2010, p. 4; Ryan's Notes, 2009d).

Renova was engaged in a joint-venture project with domestic companies Chancellor House and Pitsoe ya Setshaba to mine

the Kalahari manganese ore deposit. Manganese from the Kalahari deposit was consumed domestically in the production of silicomanganese. Transnet Freight Rail allocated rail capacity to allow Renova to export as much as 1 Mt/yr of manganese ore starting in November 2009 (Ryan's Notes, 2009b).

ArcelorMittal was engaged in a joint venture with Kalagadi Manganese (Pty) Ltd. (Kalahari Resources Ltd., 80%) and Government-owned Industrial Development Corp. (IDC) to develop Kalagadi's manganese resources. Arcelor and Kalahari (which was a Black Economic Empowerment company) planned to start production at a new underground mine at Hotazel by June 2011. Output was expected to be 3 Mt/yr of manganese ore; the companies planned to beneficiate the mine's output into 2.4 Mt/yr of sintered ore. Arcelor and Kalahari also planned to build a new ferromanganese plant at Coega with a capacity of 320,000 t/yr by October 2010; the plant was expected to consume nearly 30% of the mine's sintered output (Ryan's Notes, 2009e).

Joint-venture partners Black Economic Empowerment company Ntsimbitntle Mining (50.1%) and Pallinghurst Resources (49.9%) planned to develop the Tshipi e Netle manganese project, which was adjacent to the Mamatwan Mine. The companies planned to start construction on a new mine in 2010 and to start producing between 2.2 Mt/yr and 2.3 Mt/yr of run-of-mine manganese ore by early 2013. Reserves at the mine were estimated to be 163 Mt at a grade of 37.1% manganese. Development of the project depended on successful negotiations with Transnet Freight Rail; plans to open the mine before 2013 were constrained by insufficient rail and port infrastructure. In October 2009, OM Holdings of Singapore acquired a 59.9% share in the project (Ryan's Notes, 2009f).

**Nickel.**—Most of South Africa's nickel mine production was a coproduct of PGM mining. Anglo Platinum produced 19,500 t of refined nickel at Rustenburg Base Metal Refiners in 2009 compared with 15,500 t in 2008. About 17,300 t was attributable to the company's PGM mining operations compared with 13,900 t in 2008. Anglo Platinum planned to complete the expansion of its refinery in the fourth quarter of 2011; nickel production was expected to increase by 11,000 t/yr. Implats produced 14,500 t of refined nickel in 2009, of which 6,200 t was attributable to the company's PGM mining operations (Impala Platinum Holdings Ltd., 2009, p. 229; Anglo American Platinum Ltd., 2010, p. 132; Anglo American plc, 2010, p. 21).

ARM produced 4,495 t of nickel at the Nkomati Mine in fiscal year 2009 compared with 5,136 t in fiscal year 2008. The company planned to commence its expansion of the Nkomati Mine in fiscal year 2010 and increase mine production to 20,000 t/yr of nickel in the second half of 2011 (African Rainbow Minerals Ltd., 2009, p. 9, 35-36).

**Platinum-Group Metals.**—In 2009, Anglo Platinum produced 147,800 kg of refined PGM compared with 140,900 kg in 2008. About 118,500 kg was attributable to the company's mining operations in 2009 compared with 114,900 kg in 2007. Platinum produced from Anglo Platinum's mining operations amounted to 61,174 kg; palladium, 34,152 kg; rhodium, 8,650 kg; and other PGM, about 14,500 kg (Anglo American Platinum Ltd., 2010, p. 132).

In 2009, Anglo Platinum reorganized the Rustenburg mining rights area into the Bathopele, the Khomanani, the

Khuseleka, the Siphumelele and the Thembelani Mines, and the Amandelbult mining rights area into the Dishaba and the Tumela Mines. Production increased at the Bathopele, the Dishaba, the Khomanani, the Kroondal, the Mogalakwena, and the Thembelani Mines in 2009. At the Bafokeng-Rasimone Platinum, the Bokoni, the Khuseleka, the Siphumelele, the Tumela, the Twickenham, and the Union Mines and the Western Limb Tailings Retreatment project, output decreased in 2009. Anglo Platinum planned to produce nearly 78,000 kg of refined platinum in 2010, which included toll refining (Anglo American Platinum Ltd., 2010, p. 57, 150).

At the start of July 2009, Anoroaq Resources Corp. purchased a 51% share in the Bokoni Platinum Mine from Anglo Platinum. The mine produced at the rate of about 2,100 kg/yr of PGM in the first half of 2009. Anoroaq planned to increase production to about 8,400 kg/yr of PGM by 2014 (Anglo American Platinum Ltd., 2010, p. 150; Anoroaq Resources Corp., 2010, p. 6-7).

Implats operated the Impala Mines near Rustenburg in North West Province and the Marula Mine in Limpopo Province. In fiscal year 2009, production of refined PGM at Impala decreased to 55,678 kg from 57,265 kg, and platinum, to 29,564 kg from 32,472 kg. Implats planned to increase production of platinum to between 31,000 kg/yr and 34,000 kg/yr by 2011. In fiscal year 2009, the company completed a feasibility study on increasing the capacity of the Precious Metals Refinery to about 87,000 kg/yr of refined platinum from about 71,500 kg/yr; however, Implats decided to put the expansion on hold because of the worldwide economic crisis (Impala Platinum Holdings Ltd., 2009, p. 55).

In fiscal year 2009, platinum output at Marula increased to 2,301 kg from 2,190 kg in fiscal year 2008; production was constrained by labor disputes and the closures of shafts for safety reasons. Implats planned to reach Marula's full capacity of 3,900 kg/yr of platinum by fiscal year 2014. The company's planned expansion of the Marula Mine was put on hold in 2009. Implats also put the Leeuwkop project near Brits on hold (Impala Platinum Holdings Ltd., 2009, p. 60-61, 63).

Implats operated a refinery located northeast of Johannesburg; production at this plant was from concentrates produced at Marula and other company operations, recycling, and toll refining. In fiscal year 2009, output decreased to 50,951 kg of PGM from 56,077 kg in fiscal year 2008 (Impala Platinum Holdings Ltd., 2009, p. 81).

Lonmin plc of the United Kingdom mined PGM at its Marikana operations east of Rustenburg in North West Province and at the Limpopo and the Pandora Mines. From September 2008 to September 2009, these mines produced a total of 20,625 kg of platinum compared with 22,772 kg in the previous 12 months. Total production of PGM decreased to 38,855 kg from 42,818 kg, most of which was produced at Marikana. The Limpopo Mine was placed on care-and-maintenance status in 2009; surface mining operations at Marikana were also shut down. Lonmin planned to increase platinum production to between 24,900 kg/yr and 26,400 kg/yr by 2013; the company planned to mine from new shafts at Marikana. The feasibility study on increasing platinum production at Pandora to nearly 1,600 kg/yr from about 400 kg/yr was expected to be completed in late 2010 (Lonmin plc, 2009, p. 5, 7-8, 14, 138).

Northam Platinum Ltd. operated the Zondereinde Mine; PGM production at Zondereinde remained nearly unchanged at about 9,600 kg in 2009. Decreased ore production rates were offset by increased ore grades. Northam was considering the development of the Booyensdal project, which could produce 4,000 kg/yr of PGM, including 2,300 kg/yr of platinum in its first phase. Depending on approval of the project, construction could start in mid-2010, and mining, in mid-2013. Capital costs of the first phase of the project were estimated to be nearly \$360 million (Jollie, 2010, p. 17).

ARM and Implats operated the Two Rivers Mine in Mpumalanga Province; production increased to 7,661 kg of PGM in fiscal year 2009 from 6,423 kg in fiscal year 2008. In fiscal year 2010, total PGM production was expected to increase to about 8,100 kg. Platinum production was likely to increase to more than 4,000 kg in fiscal year 2011 and nearly 4,700 kg in fiscal year 2013 from 3,671 kg in fiscal year 2009 (African Rainbow Minerals Ltd., 2009, p. 29, 34; Smit, 2010).

ARM and Anglo Platinum produced 10,851 kg of PGM at Modikwa in fiscal year 2009 that included 4,233 kg of platinum and 4,109 kg of palladium. Output was expected to remain at about 10,900 kg in fiscal year 2010. By the second half of 2009, ARM also planned to produce 3,400 kg/yr of PGM with the expansion of the Nkomati nickel mine; output amounted to 831 kg in fiscal year 2009 (African Rainbow Minerals Ltd., 2009, p. 9, 29, 33-36).

Aquarius operated the Marikana Mine. In 2009, production of PGM at Marikana amounted to 4,510 kg. The Everest Mine remained closed in 2009 for safety reasons after shutting down in early December 2008. Aquarius planned to reopen the Everest Mine in the third quarter of 2010; production was expected to reach 6,200 kg/yr of PGM by mid-2013. Aquarius also planned to increase production at joint-venture tailings retreatment projects to 1,300 kg/yr of PGM (Mining Review Africa, 2009a; Aquarius Platinum Ltd., 2010, p. 10).

Ridge Mining plc of the United Kingdom and Imbani Platinum (Pty) Ltd. opened the new Blue Ridge Mine in early 2009. Aquarius purchased Ridge Mining in July. In the second half of 2009, production amounted to 1,028 kg of PGM. Aquarius planned to increase output to the mine's capacity of 3,900 kg/yr (Conradie, 2009; Aquarius Platinum Ltd., 2010, p. 17).

In 2009, Xstrata produced about 3,900 kg of PGM at the Eland Mine (formerly the Elandsfontein Mine) compared with about 4,500 kg in 2008. Production decreased because of unusually heavy rains in the first quarter of 2009. The company planned to increase production to about 9,300 kg/yr by 2014. The life of the Eland Mine was estimated to be about 21 years (Xstrata plc, 2010, p. 53, 56-57, 93).

Eastern Platinum Ltd. (Eastplats) of Canada produced PGM at the Crocodile River Mine; output increased to about 4,000 kg of PGM in 2009 from nearly 3,700 kg in 2008. In December 2008, Eastplats put its plans to expand the Crocodile River Mine and open the new Spitskop Mine on hold. The company's expansion plans remained on hold at the end of 2009 (Jollie, 2010, p. 18).

In January 2009, Platinum Australia Pty Ltd. (PLA) of Australia started production at its new Smokey Hills Mine. PLA planned to produce about 2,600 kg of PGM at Smokey Hills in fiscal year 2010; the mine's full capacity was about 3,000 kg/yr.

The life of the mine was expected to be about 7 years. The capital costs of the project were about \$45 million (Avery, 2009; Jollie, 2010, p. 18).

PLA and joint-venture partner ARM also planned to open the new open pit Kalplats Mine in late 2011. Production at Kalplats was expected to be between 3,700 and 4,400 kg/yr of PGM. Capital costs of the project were estimated to be \$120 million. PLA's total production of PGM could reach nearly 7,500 kg/yr by 2014 (Avery, 2009).

In 2009, Platmin Ltd. of Canada shipped 871 kg of PGM from its new Pilanesberg Mine on the western limb of the Bushveld Complex. Platmin planned to increase production to about 5,000 kg in 2010 and to the mine's full capacity of 7,800 kg/yr in 2011. Resources were estimated to be 350,000 kg of contained PGM, of which nearly 140,000 kg was reserves. The life of the mine was expected to be 17 years (Mining Review Africa, 2009b; Jollie, 2010, p. 18).

Platmin was also considering the development of the Mphahlele and the Grootboom projects, which had planned capacities of 7,800 kg/yr and 2,700 kg/yr of PGM, respectively. Full production at Grootboom and Mphahlele could be achieved at a minimum of 3 years after mining licenses were issued. The life of the Mphahlele and the Grootboom Mines was estimated to be 30 and 15 years, respectively (Mining Review Africa, 2009b).

Nkwe Platinum Ltd. planned to make a decision on the development of its Genorah Farms project in May 2010. The Genorah Farms project contained the Garatau and the Tubatse deposits, which had total contained PGM resources of nearly 1,350 t. Nkwe hoped to increase resources to about 3,100 t of PGM. Depending on favorable results of its feasibility study, Nkwe and joint-venture partner Xstrata could start development in the third quarter of 2010 and production in early 2012. By early 2010, PGM production could reach 15,600 kg/yr. Capital costs of the project were estimated to be \$800 million. The life of the project was expected to be about 50 years (Alexander, 2009).

In October 2009, Platinum Group Metals Ltd. of Canada announced the results of its updated feasibility study on the Western Bushveld project. The company and its joint-venture partner Wesizwe Platinum Ltd. planned to produce nearly 8,600 kg/yr of PGM at a new mine; first concentrate sales were expected to be in the first quarter of 2013. The life of the mine was estimated to be 22 years; capital costs were likely to be nearly \$600 million. In November, Wesizwe put its plans to start its new mine at the Frischgewaagd-Ledig deposit on hold because of a lack of funding. Wesizwe had planned to begin preliminary construction on the mine in late 2009 and to start production in 2014 (Platinum Group Metals Ltd., 2009).

**Silicon.**—Grupo Ferroatlantica produced about 51,800 t of silicon metal at Polokwane in 2008; the company planned to cut its production by 25% in 2009. Ferrosilicon was produced by Grupo Ferroatlantica and Silicon Technology (Pty) Ltd.

**Titanium and Zirconium.**—RBM (BHP Billiton Ltd. and Rio Tinto plc, 37% each; Blue Horizon Investments, 24%; and RBM permanent employees, 2%) of the United Kingdom, was South Africa's leading producer of ilmenite, rutile, and zircon. In fiscal year 2009, titanium slag production increased to

980,000 t from 960,000 t, and rutile, to 88,000 t from 86,000 t. Zircon production remained unchanged at 240,000 t (BHP Billiton Ltd., 2009a, p. 52).

Exxaro Resources Ltd. mined ilmenite, rutile, and zircon at its Namakwa Sands project on South Africa's western coast. Ilmenite production at Namakwa Sands decreased to 244,000 t in 2009 from 315,000 t in 2008; rutile, to 26,000 t from 27,000 t; and zircon, to 116,000 t from 130,000 t. Exxaro also operated the KZN Sands Mine in KwaZulu Natal Province. In 2009, ilmenite production at KZN increased to 368,000 t from 229,000 t; rutile, to 20,000 t from 19,000 t; and zircon, to 20,000 t from 19,000 t. The KZN Sands Mine was expected to shut down by 2014. In 2009, Exxaro decided not to proceed with the development of the Fairbreeze Mine, which was planned to replace production from KZN (Exxaro Resources Ltd., 2010, p. 8, 15).

**Vanadium.**—Evraz Group S.A. produced vanadium from titaniferous magnetite at the Mapochs and the Krokodilkraal Mines, which were operated by Highveld and Vametco Minerals Corp., respectively. In 2009, production of vanadium in ferrovandium, vanadium pentoxide ( $V_2O_5$ ), vanadium slag, and vanadium chemicals at Krokodilkraal and Mapochs decreased to 6,653 t from 10,872 t in 2008 (Evraz Group S.A., 2010).

Xstrata produced  $V_2O_5$  at the Rhovan Mine in Brits; output decreased to 5,212 t of  $V_2O_5$  in 2009 from 7,530 t in 2008. Ferrovandium production at Rhovan decreased to 2,284 t in 2009 from 3,622 t in 2008. Reduced production was attributable to the shutdown for maintenance in the third quarter of 2009 (Xstrata plc, 2010, p. 57, 93).

### *Industrial Minerals*

**Cement.**—South Africa had four cement producers with a total capacity of 14.8 Mt/yr. Pretoria Portland Cement Co. (Pty) Ltd. (PPC) was South Africa's leading cement producer. Domestic sales of cementitious products decreased to 11.8 Mt from 13.5 Mt in 2008 because of the downturn in the residential construction sector.

Sephaku Cement (Pty) Ltd. planned to build a new cement plant in North West Province with a capacity of 2.2 Mt/yr. The plant was expected to be completed in the first quarter of 2012; Sephaku delayed the opening of the plant from 2011 because of uncertainty in financial markets and decreased domestic cement demand. The life of Sephaku's limestone quarry was estimated to be more than 50 years (Resource Stocks, 2010).

**Diamond.**—De Beers Group accounted for most of South Africa's rough diamond production. In 2009, the company's output decreased to 4.8 million carats from 12 million carats in 2008. At Venetia, production decreased to 2.2 million carats from 7.5 million carats; at Finsch, to 1.43 million carats from 2.32 million carats; and at the Kimberley surface mining operations, to 397,000 carats from 913,000 carats. Production at the Voorspoed Mine increased to 532,000 carats from 128,000 carats (De Beers Group, 2010, p. 25).

In 2009, diamond production at the Cullinan Mine by Petra Diamonds Ltd. amounted to 906,404 carats; the Helam, the Sedibeng, and the Star Mines, 75,391 carats; and the Koffiefontein Mine, 46,358 carats. Petra planned to ramp up

production at Cullinan to 1.31 million carats in fiscal year 2013, 1.8 million carats in fiscal year 2016, and 2.6 million carats in fiscal year 2019. Estimated capital expenditures of the expansion project were nearly \$350 million (Petra Diamonds Ltd., 2010a, p. 7-9; 2010b, p. 24)

Petra planned to increase production at Helam, Sedibeng, and Star to 138,000 carats in fiscal year 2011 and to 165,000 carats per year starting in fiscal year 2015. Output at Koffiefontein was expected to increase to 80,000 carats per year in fiscal year 2011 and 114,000 carats per year in fiscal year 2017. Petra also planned to restart the Kimberley Mine underground operations; production was likely to be 217,000 carats in fiscal year 2011 and 181,000 carats per year from fiscal year 2014 to fiscal year 2018 (Petra Diamonds Ltd., 2010b, p. 24).

**Fluorspar.**—National fluorspar production decreased in 2009 because of declining demand for acid-grade fluorspar resulting from the worldwide economic crisis. Sallies Ltd. shut down the Witkop Mine in June 2009 after closing the Buffalo Mine in October 2008. Metorex Ltd. reduced production at its Vergenoeg Mine in 2009. In September, Minerale Y Productos Derivados SA (Minersa) of Spain increased its share in the Vergenoeg Mine to 85% from 30% by purchasing Metorex's interest.

Minersa was also engaged in a feasibility study on a new aluminum fluoride ( $AlF_3$ ) plant. Depending on favorable results of the study, the company and its joint-venture partners planned to produce 60,000 t/yr of  $AlF_3$  from fluorspar mined at Vergenoeg (Roberts, 2010).

Sephaku Holdings planned to develop the Nokeng Fluorspar project. The company planned to build a new mine adjacent to the Vergenoeg Mine that would produce 130,000 t/yr of acid-grade fluorspar starting in 2012. Sephaku also completed a prefeasibility study on a downstream processing plant in 2009. Depending on favorable results of a subsequent feasibility study, the plant could consume 108,000 t/yr of fluorspar in the production of 60,000 t/yr of  $AlF_3$ . Sephaku planned to sell its  $AlF_3$  output to domestic and foreign aluminum producers. Small amounts of hydrogen fluoride produced at Nokeng were expected to be consumed domestically in uranium enrichment (Sephaku Holdings Ltd., 2010).

**Kyanite and Related Materials.**—South Africa was the world's leading producer of andalusite. Imerys Group of France produced at the rate of about 195,000 t/yr at the Annesley, the Havercroft, the Krugerspost, and the Thabazimbi (Rhino) Mines in late 2009. By 2014, the company planned to increase production to 250,000 t/yr through a debottlenecking program at Krugerspost and Thabazimbi and opening the Segorong Mine. Andalusite Resources (Pty) Ltd. produced at the rate of about 50,000 t/yr in late 2009. The company planned to increase production at its Maroeloesfontein Mine to between 80,000 t/yr and 100,000 t/yr by 2012 (Feytis, 2009a).

**Rare-Earth Elements.**—The Steenkampskraal Mine in Western Cape Province produced rare-earth elements during the 1950s and 1960s. In January 2009, Rare Earth Extraction Company Ltd. (Rareco) negotiated an agreement with Great Western Minerals Group Ltd. of Canada to reopen the mine. Rareco planned to update its feasibility study and mining rights for Steenkampskraal (Africa Mining Intelligence, 2009).



**Wollastonite.**—Namaqua Wollastonite (Pty) Ltd., which was South Africa's last remaining producer of wollastonite, shut down its mining operations in 1999. The company planned to restart mining as early as the end of 2009. Initial production was expected to be 3,600 t/yr for domestic consumption; output was expected to increase to 12,000 t/yr and to be exported to Europe and the United States (Feytis, 2009b).

### ***Mineral Fuels and Related Materials***

**Coal.**—South Africa's coal production amounted to 250.6 Mt in 2009, of which 248.9 Mt was bituminous (table 1). Domestic coal consumption was estimated to be 184.7 Mt, and exports, 60.5 Mt. In 2009, electric power generation accounted for 64% of South Africa's coal consumption (Chamber of Mines of South Africa, 2010, p. 19).

Anglo American's coal production remained nearly unchanged at 59.2 Mt in 2009. The New Vaal Mine produced 17.6 Mt in 2009; the Kriel Mine, 11.2 Mt; Goedehoop, 6.91 Mt; and Isibonelo, 5.06 Mt. The Mafube Mine, which was a joint venture between Anglo American and Exxaro, reached its full capacity of 5.4 Mt/yr in the third quarter of 2009. Anglo American also completed the new Zibulo Mine (formerly the Zondagsfontein Mine) in the third quarter of 2010; production was expected to reach 6.6 Mt/yr in the fourth quarter of 2012 (Anglo American plc, 2010, p. 21, 174).

Other projects under consideration by Anglo American included the Elders opencast mine, which could reach full production of 6.4 Mt/yr of thermal coal by 2013; the New Largo Mine, 14.7 Mt/yr by 2016; the Elders underground mine, 3.2 Mt/yr by 2017; and the Heidelberg underground mine, 4.2 Mt/yr by 2017. Production at the New Largo Mine could start in 2012; and at the Elders opencast, the Elders underground, and the Heidelberg underground mines, in 2013. These projects remained unapproved by the board of directors at the end of 2009 (Anglo American plc, 2010, p. 21).

Exxaro operated the Grootegeluk and the Tshikondeni Mines in Limpopo Province, and the Arnot, the Inyanda, the Leeuwpan, the Matla, the New Clydesdale, and the North Block Complex Mines in Mpumalanga Province. Production from the company's mines amounted to about 45.3 Mt in 2009 compared with 44.8 Mt in 2008. The Grootegeluk Mine produced more than 18 Mt/yr. At the Arnot Mine, production increased to 5.21 Mt in 2009 from 4.87 Mt in 2008, and at the Inyanda Mine, to 1.84 Mt from 0.84 Mt. Output at the Matla Mine decreased to 11.3 Mt from 13.2 Mt (Exxaro Resources Ltd., 2010, p. 8).

Exxaro planned to expand the capacity of the Grootegeluk Mine by 14.6 Mt/yr. The expansion project was expected to start production in the second quarter of 2012; total production from Grootegeluk could reach more than 33 Mt/yr by 2015. Development of the project depended on the results of state-owned power company Eskom's review of its contracts with Exxaro, upgrades to the rail network, and expansion of water supplies (Exxaro Resources Ltd., 2010, p. 51; Ryan, 2010).

Exxaro also planned to complete its prefeasibility study on the development of the new Thabametsi Mine adjacent to Grootegeluk by the end of March 2010. The Thabametsi Mine could start production in 2015 and reach full production in 2017.

Exxaro planned to sell as much as 16 Mt/yr from Thabametsi to five independent power producers with a capacity of 1,000 MW each and 2.5 Mt/yr to other markets. Development of the project depended on the outcome of the prefeasibility study, enabling regulation from the Department of Energy for independent power producers, upgrades to the rail network, and expansions of water supplies (Exxaro Resources Ltd., 2010, p. 51; Ryan, 2010).

In fiscal year 2009, Sasol Ltd. of South Africa decreased its coal production to 39.1 Mt from 42.8 Mt in fiscal year 2008. At the Secunda Mining Complex, output decreased to 37.3 Mt from 41.1 Mt. Increased production from the Syferfontein Mine was more than offset by decreased production from the Bosjesspruit, the Brandspruit, the Middelbult, and the Twistdraai Mines. Sasol consumed 38.6 Mt of coal in the production of synthetic fuels. The company planned to build the new Thubelisha Mine to replace the Twistdraai Mine; production was expected to start in 2012 (Sasol Ltd., 2009, p. 45, 115).

BHP Billiton Energy Coal South Africa Ltd. produced coal at the Douglas, the Khutala, the Klipspruit, and the Middleburg Mines in Mpumalanga Province. In 2009, the company produced 29.6 Mt of coal compared with 39.1 Mt in 2008. Most of the decrease in production was attributable to the sale of the Optimum Mine to Optimum Coal Holdings Ltd. in 2008. By mid-2010, BHP Billiton planned to increase capacity at the Klipspruit Mine to 8.7 Mt/yr from 4.8 Mt/yr; the mine was expected to produce at full capacity by 2011. The cost of the expansion was estimated to be about \$450 million (BHP Billiton Ltd., 2009a, p. 47, 49; 2009b, p. 4; 2010, p. 4).

Xstrata operated coal mines at Breyten, Ermelo, and Witbank. In 2009, production at the company's mines decreased to 18.7 Mt from 20.2 Mt in 2008. Output at the Tweefontein Division decreased to 5.27 Mt from 6.18 Mt, and at the Mpumalanga Division, to 1.7 Mt from 2.43 Mt. Production at the iMpunzi Division increased to 4.01 Mt in 2009 from 3.37 Mt in 2008, and at the Goedgevonden Mine, to 3 Mt from 2.92 Mt (Xstrata plc, 2010, p. 94).

ARM and Xstrata were engaged in a joint venture to increase output at the Goedgevonden Mine to 6.7 Mt/yr. About 3.5 Mt/yr of coal was expected to be consumed domestically and about 3.2 Mt/yr would be exported. ARM and Xstrata planned to reach full capacity at Goedgevonden in fiscal year 2012. The life of the mine was expected to be 32 years. Capital costs were estimated to be about \$410 million. Xstrata also completed a prefeasibility study on the Tweefontein Optimisation project in November 2009 and started a feasibility study. Depending on the results of the study, production at Tweefontein could increase to 9 Mt/yr starting in 2013 (African Rainbow Minerals Ltd., 2009, p. 9, 54; Xstrata plc, 2010, p. 65).

Shanduka Coal (Pty) Ltd. (Glencore International AG of Switzerland, 70%, and Shanduka Resources (Pty) Ltd., 30%) operated the Bankfontein, the Graspan, the Lakeside, the Leeuwfontein, and the Townlands Mines, which produced 11 Mt/yr of coal. Shanduka Resources also held a 30% interest in Kangra Group (Pty) Ltd., which produced 3 Mt/yr of coal at the Savmore and the Welgedacht Mines. About 2 Mt/yr of Kangra's production was exported (Moodley, 2010).

Optimum Coal Holdings (Pty) Ltd. operated the Optimum coal mine, which produced 11.5 Mt/yr of coal. In January 2010,

the company planned to start production at the Boshmanspoort expansion project, which was expected to increase the Optimum Mine's production by about 27%. The life of the project was estimated to be between 12 and 14 years. Optimum also planned to start production at the Vlakfontein deposit in late 2011 or early 2012. Output at Vlakfontein was expected to be 3 Mt/yr of run-of-mine coal (Cornish, 2009).

Coal of Africa Ltd. started thermal coal production at the Mooiplaats Mine in October 2008; the company was ramping up production to 2 Mt/yr. Production was likely to start at the new Makhado and Vele Mines in the first half of 2010 and the fourth quarter of 2011, respectively. The combined output at Makhado and Vele was expected to be 2 Mt/yr of metallurgical coal initially and to increase to 10 Mt/yr. In late October, Coal of Africa announced plans to purchase NuCoal Mining (Pty) Ltd., which produced 2.5 Mt/yr of coal at the Woestalleen Mine (Coal of Africa Ltd., 2010).

Continental Coal Ltd. planned to start production at the Chelmsford and the Vlakvarkfontein Mines in January 2010. At Vlakvarkfontein, Continental planned to start production at the rate of 600,000 t/yr and to reach 1.8 Mt/yr within 6 months. At Chelmsford, the company planned to start production at the rate of 600,000 t/yr and to reach 1.2 Mt/yr by mid-2011. Continental also planned to complete a feasibility study on a new mine at Project X in the first quarter of 2010. Depending on the results of the study, Project X could produce 1.8 Mt/yr (Winter, 2010).

Sekoko Coal (Pty) Ltd. planned to complete a feasibility study on the new Sekoko Mine by mid-2010. Depending on the results of the study, Sekoko could produce 6 Mt/yr of run-of-mine coal initially and ramp production up to 35 Mt/yr of run-of-mine coal. The life of the mine at full production was estimated to be more than 40 years. Resources were estimated to be 9 billion metric tons (Gt), of which 3.6 Gt was reserves. Sekoko was also considering the development of a new coal-to-liquids plant with a capacity of 50,000 barrels per day by 2016 and a new coal-fired power station with a capacity of 1,800 MW (Ruffini, 2009a).

**Uranium.**—AngloGold Ashanti mined uranium as a coproduct of gold at the Great Noligwa, the Kopanang, and the Tau Lekoa Mines. In 2009, the company's production of uranium oxide ( $U_3O_8$ ) amounted to more than 600 t. AngloGold Ashanti was considering a new uranium processing plant at the Kopanang Mine that would increase production to about 900 t/yr (Jones, 2009; AngloGold Ashanti Ltd., 2010, p. 56).

First Uranium started uranium production at the Ezulwini Mine in 2009; the company planned to produce 94 t of  $U_3O_8$  in fiscal year 2011, 140 t in fiscal year 2012, and nearly 180 t in fiscal year 2013. Production at the MWS project was expected to be 120 t of  $U_3O_8$  in fiscal year 2011 and 250 t in fiscal year 2012. Further increases in production at MWS to nearly 440 t/yr depended on additional financing (First Uranium Corp., 2010, p. 10, 18-19).

Rand Uranium (Pty) Ltd. (Pamodzi Resources Fund, 60%, and Harmony Gold, 40%) planned to start uranium production at Harmony's Cooke gold mine from underground mining operations and reprocessing tailings. The company planned to start construction on a new uranium processing plant in 2010; the plant was expected to be completed in 30 months.

Production was likely to be between 1,000 and 1,100 t/yr of  $U_3O_8$ . The life of the project was estimated to be 17 years [Rand Uranium (Pty) Ltd., 2010].

South Africa's nuclear power generating capacity amounted to 1,800 MW. Eskom and the Government were considering the development of three new nuclear power stations with a capacity of 4,000 MW each. Depending on sufficient funds, construction on the first plant could start in July 2012 and be completed in 2018. The second and third plants could be completed in 2020 and 2022, respectively (ESI Africa, 2009).

## Outlook

Numerous producers planned new mines and plants and capacity expansions of existing operations for andalusite, cement, chromite, coal, fluorspar, gold, iron ore, manganese ore, nickel, PGM, uranium, and wollastonite. The power supply constraints experienced by many mining and mineral processing operations in early 2008 were inconsequential in 2009 because of the decrease in demand for power resulting from the worldwide economic crisis. In the event of economic recovery, power shortages could again constrain mining and mineral processing expansions until 2012 when Eskom planned to complete new coal-fired power stations that would have a combined capacity of 9,600 MW.

Expansions and new mines and plants before 2012 were less likely to take place in power-intensive sectors, such as ferrochromium, and depended on worldwide economic recovery. Increases in coal exports also depended upon increased capacity on the rail lines between the coalfields in Mpumalanga Province and Richards Bay and at the Richards Bay Coal Terminal. The capacity of the rail line from the coalfields to the terminal was 78 Mt/yr; increases in capacity have been delayed by disputes between coal producers and state-owned rail company Transnet Ltd. (Jones, 2009).

## References Cited

- Africa Mining Intelligence, 2009, Black partner in offing for rare earth mining: Africa Mining Intelligence, no. 195, January 21, p. 2.
- African Rainbow Minerals Ltd., 2009, Annual report 2009: Sandton, South Africa, African Rainbow Minerals Ltd., 220 p.
- Alexander, Jason, 2009, Nkwe seeks bumper Farms crop: Australia's Paydirt, v. 1, no. 166, October, p. 36.
- Anglo American Platinum Ltd., 2010, Annual report 2009: Johannesburg, South Africa, Anglo American Platinum Ltd., 276 p.
- Anglo American plc, 2010, Annual report 2009: London, United Kingdom, Anglo American plc, 188 p.
- AngloGold Ashanti Ltd., 2010, Annual financial statements 2009: Johannesburg, South Africa, AngloGold Ashanti Ltd., 362 p.
- Anooraq Resources Corp., 2010, Management discussion and analysis, for the year ended 31 December 2009: Sandton, South Africa, Anooraq Resources Corp., 42 p.
- Aquarius Platinum Ltd., 2010, Second quarter 2010—Production results to 31 December 2009: Bedfordview, South Africa, Aquarius Platinum Ltd., 28 p.
- ArcelorMittal South Africa Ltd., 2010, Annual report 2009: Vanderbijlpark, South Africa, ArcelorMittal South Africa Ltd., 222 p.
- Avery, Barry, 2009, Plataus aims to fill PGM deficit: Australia's Paydirt, v. 1, no. 166, October, p. 31.
- BHP Billiton Ltd., 2009a, Annual report 2009: Melbourne, Australia, BHP Billiton Ltd., 276 p.
- BHP Billiton Ltd., 2009b, BHP Billiton production report for the half year ended 31 December 2008: Melbourne, Australia, BHP Billiton Ltd. press release, January 21, 15 p.

- BHP Billiton Ltd., 2010, BHP Billiton production report for the half year ended 31 December 2009: Melbourne, Australia, BHP Billiton Ltd. press release, January 20, 15 p.
- Bray, E.L., 2010, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 16-17.
- Carlin, J.F., Jr., 2010, Antimony: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 18-19.
- Chadwick, Jan, 2010, New ideas in South African gold: *International Mining*, v. 6, no. 1, March, p. 45-49.
- Chamber of Mines of South Africa, 2007, Facts & figures 2006: Johannesburg, South Africa, Chamber of Mines of South Africa, 39 p.
- Chamber of Mines of South Africa, 2010, Facts & figures 2009: Johannesburg, South Africa, Chamber of Mines of South Africa, 40 p.
- Coal of Africa Ltd., 2010, Completion of NuCoal acquisition: Bryanston, South Africa, Coal of Africa Ltd., January 26, 3 p.
- Conradie, A.S., 2009, Platinum-group metals, in *South Africa's mineral industry 2008/2009*: Johannesburg, South Africa, Department of Minerals and Energy of the Republic of South Africa, p. 32-37.
- Corathers, L.A., 2010, Manganese: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 98-99.
- Cordier, D.J., 2010a, Kyanite and related materials: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 86-87.
- Cordier, D.J., 2010b, Vermiculite: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 180-181.
- Cornish, Laura, 2009, Optimum coal value: *SA Mining*, November, p. 48-51.
- De Beers Group, 2010, Operating and financial review 2009: Johannesburg, South Africa, De Beers Group, 30 p.
- DRDGold Ltd., 2010, Report to shareholders for the quarter and six months ended 31 December 2009: Parktown, South Africa, DRDGold Ltd., 8 p.
- ESI Africa, 2009, SA targets 4,000 MW nuclear plant by 2018: *ESI Africa*, v. 16, no. 2, p. 6.
- Evrz Group S.A., 2010, Evraz Group 4Q 2009 and FY 2009 operational results: Luxembourg, Luxembourg, Evraz Group S.A. press release, January 15, 5 p.
- Exxaro Resources Ltd., 2010, Annual report 2009: Pretoria, South Africa, Exxaro Resources Ltd., 276 p.
- Feytis, Alexandra, 2009a, South African andalusite expansions: *Industrial Minerals*, no. 505, October, p. 13.
- Feytis, Alexandra, 2009b, Wollastonite's pins and needles: *Industrial Minerals*, no. 506, November, p. 26-35.
- First Uranium Corp., 2010, Management's discussion and analysis of the financial results for the three and nine months ended December 31, 2009: Toronto, Ontario, Canada, First Uranium Corp., 24 p.
- Gambogi, Joseph, 2010a, Titanium mineral concentrates: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 172-173.
- Gambogi, Joseph, 2010b, Zirconium and hafnium: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 186-187.
- George, M.W., 2010, Gold: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 66-67.
- Gold Fields Ltd., 2010, Individual mine quarterly history (SA rands and metric units)—Quarter ended December 2009: Johannesburg, South Africa, Gold Fields Ltd., unpaginated.
- Harmony Gold Mining Company Ltd., 2009, Annual report 2009: Randfontein, South Africa, Harmony Gold Mining Company Ltd., 323 p.
- Holman, Jacqueline, 2009, Refinery sources 40% of business from outside SA: *Creamer Media's Mining Weekly*, v. 15, no. 6, February 20-26, p. 32-33.
- Impala Platinum Holdings Ltd., 2009, Annual report 2009: Northlands, South Africa, Impala Platinum Holdings Ltd., 240 p.
- International Resource Journal, 2010, Continuing Chinese investment in South Africa: *International Resource Journal*, v. 2, no. 12, December, p. 120-135. (Accessed January 13, 2011, at [http://www.internationalresourcejournal.com/E-MAG/Dec\\_10/IRJ.php](http://www.internationalresourcejournal.com/E-MAG/Dec_10/IRJ.php).)
- Jasinski, S.M., 2010, Phosphate rock: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 118-119.
- Jollie, David, 2010, Platinum 2010: London, United Kingdom, Johnson Matthey plc, 60 p.
- Jones, Jim, 2009, Stuttering South Africa eyes recovery: *Mining Journal*, August 7, p. 12-18.
- Jorgenson, J.D., 2010, Iron ore: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 78-79.
- Kuck, P.H., 2010, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 108-109.
- Kumba Iron Ore Ltd., 2010, Annual review 2009: Pretoria, South Africa, Kumba Iron Ore Ltd., 56 p.
- Loferski, P.J., 2010, Platinum-group metals: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 120-121.
- Lonmin plc, 2009, Annual report and accounts 2009: London, United Kingdom, Lonmin plc, 143 p.
- Miller, M.M., 2010, Fluorspar: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 56-57.
- Mining Review Africa, 2009a, Aquarius declares expansion cycle complete: *Mining Review Africa*, no. 1, p. 28-30.
- Mining Review Africa, 2009b, Boynton targets +500,000 ounces: *Mining Review Africa*, no. 1, p. 22-25.
- Moodley, Nelendhre, 2010, From the minor league to the big league: *SA Mining*, January, p. 76-78.
- O'Donovan, Barbara, 2010, South Africa's energy woes dampen delegates' enthusiasm: *Metal Bulletin*, no. 9135, February 8, p. 6.
- Papp, J.F., 2010, Chromium: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 42-43.
- Petra Diamonds Ltd., 2010a, Interim results for the six months to 31 December 2009: London, United Kingdom, Petra Diamonds Ltd., 31 p.
- Petra Diamonds Ltd., 2010b, Unique growth in a rising diamond market: Africa Mining Investment Conference, Cape Town, South Africa, February 1-4, 2010, Presentation, 25 p.
- Platinum Group Metals Ltd., 2009, Updated feasibility study on Project 1 platinum mine—Reserves & production rate increased—Capital cost decreased: Vancouver, British Columbia, Canada, Platinum Group Metals Ltd. press release, October 8, 11 p.
- Polyak, D.E., 2010, Vanadium: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 178-179.
- Rand Uranium (Pty) Ltd., 2010, Profile: Johannesburg, South Africa, Rand Uranium (Pty) Ltd., 4 p.
- Resource Stocks, 2010, Newcomer to be well equipped for market: *Resource Stocks*, January/February, p. 26-27.
- Roberts, Jessica, 2010, Fluorspar forging ahead: *Industrial Minerals*, no. 510, March, p. 41-46.
- Ruffini, Antonio, 2009a, Ambitious SA coal IPP: *ESI Africa*, v. 16, no. 2, p. 25-26.
- Ruffini, Antonio, 2009b, South Deep—A post-2050 mine: *Engineering & Mining Journal*, v. 210, no. 4, May, p. 34-36.
- Ryan, Brendan, 2008, BHP takes it on the chin in RSA: *Australia's Paydirt*, v. 1, no. 150, May, p. 71.
- Ryan, Brendan, 2009a, Du Toit and the Holy Grail: *Australia's Paydirt*, v. 1, no. 166, October, p. 11.
- Ryan, Brendan, 2009b, Pering zinc project delayed: *Miningmx*, October 21, 2 p. (Accessed April 20, 2010, at [http://www.miningmx.com/news/base\\_metals/pering-zinc-project-delayed.htm](http://www.miningmx.com/news/base_metals/pering-zinc-project-delayed.htm).)
- Ryan, Brendan, 2010, Exxaro thinks big in the Waterburg: *Australia's Paydirt*, v. 1, no. 168, December/January, p. 59-61.
- Ryan's Notes, 2009a, A pause in Chinese chrome market: *Ryan's Notes*, v. 15, no. 35, August 31, p. 2.
- Ryan's Notes, 2009b, High-carbon FeMn prices rise: *Ryan's Notes*, v. 15, no. 39, September 28, p. 2.
- Ryan's Notes, 2009c, Metmar to buy stake in Chromecorp: *Ryan's Notes*, v. 15, no. 38, September 21, p. 3.
- Ryan's Notes, 2009d, More lawsuits: *Ryan's Notes*, v. 15, no. 43, October 26, p. 4.
- Ryan's Notes, 2009e, No recovery in manganese prices: *Ryan's Notes*, v. 15, no. 24, June 15, p. 4.
- Ryan's Notes, 2009f, OMH becomes manganese giant: *Ryan's Notes*, v. 15, no. 40, October 2, p. 1-2.
- Ryan's Notes, 2009g, Samancor Chrome cuts production; continued weakness in FeCr prices: *Ryan's Notes*, v. 15, no. 46, November 16, p. 1.
- Ryan's Notes, 2009h, South Africa still magnet for FeCr production: *Ryan's Notes*, v. 15, no. 45, November 9, p. 4.
- Ryan's Notes, 2009i, Zimasco to ship FeCr to China: *Ryan's Notes*, v. 15, no. 36, September 7, p. 4.
- SA Mining, 2010, Kudos for Gold One: *SA Mining*, January, p. 42.
- Sasol Ltd., 2009, Form 20-F—2009: Rosebank, South Africa, Sasol Ltd., 473 p.
- Sephaku Holdings Ltd., 2010, Fluorspar fact sheet as of 31st January 2010: Highveld, South Africa, Sephaku Holdings Ltd., 4 p.
- Simmer and Jack Mines Ltd., 2010, Company profile 2010: Johannesburg, South Africa, Simmer and Jack Mines Ltd., 4 p.
- Smit, Petronel, 2010, Two Rivers plant improvement on track: *Creamer Media's Mining Weekly*, v. 16, no. 2, January 22-28, p. 60.

TABLE 1  
SOUTH AFRICA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2005	2006	2007	2008	2009
<b>METALS</b>					
Aluminum metal, primary	846,213	895,000	899,000	811,000	809,000
Antimony concentrate, Sb content	5,979	4,362	3,354	3,370	2,400 <sup>e</sup>
Chromium, gross weight:					
44% to 48% chromic oxide	2,394	1,755	2,122	2,135	1,296
Less than 44% chromic oxide	5,100	5,663	7,543	7,547	5,569
Total	7,494	7,418	9,665	9,682	6,865
Cobalt:					
Mine output, Co content <sup>c</sup>	400	400	400	400	400
Refinery output	268	267	307	244	238
Copper:					
Mine, Cu content	88,600	89,700	97,000	109,000	105,000 <sup>e</sup>
Metal:					
Smelter	92,000	100,000	105,000	95,000	92,000 <sup>e</sup>
Refined, primary	99,439	104,052	113,166	92,972	89,453
Gold:					
Mine	294,671	272,128	252,598	212,571 <sup>r</sup>	197,628
Refined	451,533	427,313	400,000 <sup>e</sup>	360,000 <sup>e</sup>	330,000 <sup>e</sup>
Iron and steel:					
Ore and concentrate:					
Gross weight	39,542	41,326	42,083	48,983	55,313
Fe content (62%-65%)	24,900	26,000	26,500	30,800	34,800
Metal:					
Pig iron	6,130	6,159	5,358	5,350	4,376
Direct-reduced iron	1,781	1,754	1,736	1,190	1,386
Ferroalloys, electric arc furnace:					
Chromium ferroalloys	2,802	3,030	3,552	3,269	2,346
Ferromanganese	571	656	699	503	260 <sup>e</sup>
Ferrosilicon	127	149	140	135	110 <sup>e</sup>
Ferrovandium <sup>e</sup>	19	18	19	19	13 <sup>e</sup>
Silicomanganese <sup>e</sup>	231	247	302	233	120 <sup>e</sup>
Silicon metal	54	53	50	52	39
Total <sup>e</sup>	3,800	4,150	4,760	4,210	4,210
Steel:					
Crude	9,494	9,718	9,098	8,269 <sup>r</sup>	7,484
Stainless	658	725	657	613	390
Lead:					
Concentrate, Pb content	42,159	48,273	41,857	46,440	49,149
Refined, secondary	66,000	67,000	70,000 <sup>e</sup>	70,000 <sup>e</sup>	65,000 <sup>e</sup>
Manganese:					
Ore and concentrate, gross weight:					
Metallurgical:					
More than 48% manganese	2,467	1,452	1,742	712	--
45% to 48% manganese	454	1,812	1,755	2,897	2,121
40% to 45% manganese	935	895	961	1,192	498
30% to 40% manganese	743	1,042	1,523	1,996	1,946
Total	4,599	5,201	5,981	6,797	4,565
Chemical, 35% to 65% manganese dioxide	12	12	14	9	11
Grand total	4,611	5,213	5,995	6,806	4,576
Metal, electrolytic <sup>e</sup>	44 <sup>2</sup>	30	26	26	13
Nickel:					
Mine output, concentrate, Ni content	42,392	41,800	37,917	31,675	34,605
Metal, electrolytic	42,400 <sup>e</sup>	41,800	34,400	30,200	34,000 <sup>e</sup>

See footnotes at end of table.

TABLE 1—Continued  
SOUTH AFRICA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS—Continued						
Platinum-group metals:						
Iridium	kilograms	6,280	6,172	7,211	6,415	6,378
Platinum	do.	163,711	168,125	160,940	146,141	140,819
Palladium	do.	82,961	86,265	83,643	75,537	75,118
Rhodium	do.	20,224	19,633	21,056	19,348	20,007
Ruthenium	do.	29,805	27,333	31,182	28,236	29,071
Total	do.	302,981	307,528	304,032	275,677	271,393
Silver, mine	do.	87,874	86,951	68,919	75,199	77,780
Titanium: <sup>e</sup>						
Ilmenite concentrate	thousand metric tons	1,900	1,900	1,900	1,900	2,100
Rutile concentrate	do.	115	123	123	123	122
Total	do.	2,020	2,020	2,020	2,020	2,220
Titaniferous slag	do.	1,020	1,230	1,230	1,230	1,250
Uranium, U <sub>3</sub> O <sub>8</sub> content		795	639	619	654	629
Vanadium, vanadium metal content		22,604	23,780	23,486	20,295	14,353
Zinc:						
Concentrate, Zn content		32,112	34,444	30,859	29,002	28,159
Metal, smelter, primary		102,000	90,000	101,000	87,000	87,000
Zirconium concentrate (baddeleyite and zircon) <sup>e</sup>		376,000	398,000	398,000	398,000	387,000
INDUSTRIAL MINERALS						
Andalusite		228,265	221,209	264,645	216,667	245,000 <sup>e</sup>
Cementitious products:						
Cement, finished product, sales	thousand metric tons	11,464	12,657	13,650	13,473 <sup>r</sup>	11,784
Granulated slag, fly ash, and others, sales	do.	1,511	1,600	1,666	1,396	1,200 <sup>e</sup>
Total	do.	12,975	14,257	15,316	14,869 <sup>r</sup>	13,000 <sup>e</sup>
Clays:						
Attapulgitic		34,340	49,225	68,377	69,876	52,103
Bentonite		139,833	32,878	45,778	44,067	40,340
Fire clay		171,773	157,087	161,493	138,100	120,162
Flint clay, raw and calcined		36,607	34,413	53,974	47,290	37,227
Kaolin		59,356	51,602	50,839	39,197 <sup>r</sup>	31,048
Brick clay, local sales	thousand metric tons	11,237	11,131	12,017	9,706 <sup>r</sup>	8,885
Diamond, natural:						
Gem <sup>c</sup>	thousand carats	6,400	6,100	6,100	5,200	2,500
Industrial <sup>c</sup>	do.	9,400	9,050	9,150	7,700	3,600
Total	do.	15,776	15,153	15,250	12,895 <sup>r</sup>	6,119
Feldspar		57,534	76,722	90,185	105,815	101,394
Fluorspar:						
Acid-grade <sup>c</sup>		250,000	240,000	268,000	282,000	130,000
Metallurgical-grade <sup>c</sup>		16,000	16,000	17,000	17,000	10,000
Total		266,000	256,000	285,000	299,000	140,000
Gypsum, crude		547,581	554,020	627,377	571,343	597,571
Industrial or glass sand (silica)	thousand metric tons	2,671	3,234	3,385	3,342 <sup>r</sup>	2,306
Lime	do.	1,417	1,583	1,599	1,563	1,375
Magnesite, crude		54,800	73,300	80,700	83,900	78,000 <sup>e</sup>
Mica, scrap and ground		924	828	437	426 <sup>r</sup>	299
Nitrogen, N content of ammonia <sup>c</sup>		460,000	460,000	460,000	460,000	460,000
Perlite <sup>c</sup>		400	400	400	400	400

See footnotes at end of table.

TABLE 1—Continued  
SOUTH AFRICA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2005	2006	2007	2008	2009	
<b>INDUSTRIAL MINERALS—Continued</b>						
Phosphate rock:						
Gross weight	thousand metric tons	2,577	2,629	2,556	2,287	2,237
Phosphorus pentoxide content	do.	966 <sup>r</sup>	986 <sup>r</sup>	959 <sup>r</sup>	858 <sup>r</sup>	839
Pigments, mineral, natural:						
Ochers		382	372	20	39	--
Oxides		128	218	212	--	183
Total		510	590	232	39	183
Salt		399,087	464,909	411,511	429,888 <sup>r</sup>	408,422
Sodium sulfate, natural		55,184	43,303	50,000	38,717	43,835
Stone, n.e.s. <sup>3</sup>						
Dimension:						
Granite and norite		607,500	497,600	564,100	457,965 <sup>r</sup>	335,871
Slate		52,312	33,154	22,876	25,538 <sup>r</sup>	30,473
Crushed and broken:						
Limestone and dolomite	thousand metric tons	24,813	27,366	23,941	23,481	22,789
Shale:						
For cement	do.	501	533	498	418	462
Other	do.	1,106	1,010	1,031	814 <sup>r</sup>	976
Total	do.	1,607	1,543	1,529	1,232 <sup>r</sup>	1,438
Aggregate and sand, n.e.s. <sup>3</sup>	do.	49,970	58,519	63,873	58,608 <sup>r</sup>	52,157
Sulfur:						
S content of pyrite	do.	133	68	71	61	60
Byproduct:						
Metallurgy	do.	220	231	236	187	176 <sup>e</sup>
Petroleum	do.	422	343	335	323	300 <sup>e</sup>
Total	do.	776	643	642	571	536
Talc and related materials:						
Talc		8,469	10,966	14,281	5,145	4,718
Pyrophyllite (wonderstone)		60,267	74,886	123,573	80,704	114,889
Vermiculite		209,801	197,765	198,526	199,764	193,334
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal (salable product):						
Anthracite	thousand metric tons	1,640	1,584	2,349	2,207	1,658
Bituminous	do.	243,300	243,198	245,317	250,492 <sup>r</sup>	248,924
Total	do.	244,940	244,782	247,666	252,699 <sup>r</sup>	250,582
Natural gas	million cubic meters	2,060	1,795	1,900 <sup>r, e</sup>	2,111 <sup>r</sup>	2,000 <sup>e</sup>
Petroleum: <sup>4</sup>						
Crude	thousand 42-gallon barrels	7,277	4,441	2,559	1,976	1,070
Refinery products:						
Liquefied petroleum gases	do.	3,445	3,793	3,399	3,283 <sup>r</sup>	3,200 <sup>e</sup>
Gasoline	do.	67,029	67,711	67,182	69,741 <sup>r</sup>	68,000 <sup>e</sup>
Jet fuel	do.	14,751	15,300	13,386	14,028 <sup>r</sup>	13,500 <sup>e</sup>
Kerosene	do.	4,777	4,824	4,715	4,800 <sup>r</sup>	4,700 <sup>e</sup>
Distillate fuel oil	do.	68,639	73,653	46,394	50,459 <sup>r</sup>	49,000 <sup>e</sup>
Residual fuel oil	do.	33,566	32,674	27,426	28,751 <sup>r</sup>	28,000 <sup>e</sup>
Other, includes lubricants and greases <sup>e</sup>	do.	17,000	17,000	14,000 <sup>r</sup>	15,000 <sup>r</sup>	14,500
Total <sup>e, 5</sup>	do.	209,000	215,000	177,000 <sup>r</sup>	186,000 <sup>r</sup>	181,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant figures; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through January 21, 2011.

<sup>2</sup>Reported figure.

<sup>3</sup>Not elsewhere specified.

<sup>4</sup>In addition, Sasol Ltd. produced about 67 million barrels per year of synthetic liquid petroleum fuels from coal.

<sup>5</sup>Excludes refinery fuel and losses.

Source: Mineral Economics Directorate, South Africa Department of Minerals and Energy.

TABLE 2  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	BHP Billiton Ltd.	Hillside smelter at Richards Bay	700.
Do.	do.	Bayside smelter at Richards Bay	180.
Andalusite	Imerys Group	Thabazimbi Mine near Thabazimbi	120.
Do.	do.	Annesley Mine at Penge	75.
Do.	do.	Havercroft Mine at Penge	60.
Do.	do.	Krugerspost Mine, near Lydenburg	50.
Do.	Andalusite Resources (Pty) Ltd. [African Mineral Trading and Exploration (Pty) Ltd.]	Maroeloesfontein, near Thabazimbi, Northern Province	50.
Antimony	metric tons Consolidated Murchison Ltd. (Metorex Pty. Ltd., 100%)	Consolidated Murchison Mine near Gravelotte	7,000 antimony in concentrate.
Cement	Pretoria Portland Cement Co. (Pty) Ltd. (Barloworld Trust Co. Ltd., 68%)	De Hoek, Dwaalboom, Hercules, Jupiter, Port Elizabeth, Riebeeck, and Slurry plants	6,800.
Do.	Alpha Ltd. [AfriSam Consortium (Pty) Ltd., 48.5%]	Dudfield and Ulco plants	3,700.
Do.	Lafarge South Africa Ltd. (Lafarge S.A.)	Lichtenburg plant in North West Province	2,700.
Do.	Natal Portland Cement Co. (Pty) Ltd. (Cimentos de Portugal SGPS, S.A., 98%)	Simumu plant	1,640.
Chromite	Xstrata plc, 79.5%, and Merafe Resources Ltd., 20.5%	Boshoek Mine at Boshoek <sup>2</sup>	1,344.
Do.	do.	Kroondal Mine at Rustenburg	1,320.
Do.	do.	Thorncliffe Mine at Steelpoort	1,320.
Do.	do.	Helena Mine at Steelpoort	960.
Do.	do.	Waterval Mine <sup>2</sup>	480.
Do.	do.	Horizon Mine at Pilansberg	144.
Do.	Samancor Chrome Ltd. (Kermas Group Ltd., 100%)	Eastern Chrome Mines in Steelpoort Valley, Mpumalanga Province	2,000.
Do.	do.	Western Chrome Mines in Northern Province <sup>2</sup>	1,500.
Do.	International Ferro Metals Ltd.	Buffelsfontein Mine	1,320.
Do.	Nkomati Joint Venture (African Rainbow Minerals Ltd., 50%, and OJSC MMC Norilsk Nickel, 50%)	Nkomati Chrome Mine in Mpumalanga Province	1,000.
Do.	Assmang Ltd. (African Rainbow Minerals Ltd., 50%, and Assore Ltd., 50%)	Dwarsrivier Mine in Mpumalanga Province	880. <sup>e</sup>
Do.	Bayer (Pty) Ltd.	Rustenburg Chrome Mine	450.
Do.	Dilokong Chrome Mine (Pty) Ltd. [ASA Metals (Pty) Ltd., 100%]	Dilokong Mine, near Burgersfort in Mpumalanga Province	360. <sup>e</sup>
Do.	National Manganese Mines (Pty) Ltd.	Buffelsfontein Mine at Mooinooi	180.
Coal	Anglo Coal Ltd. (Anglo American plc, 100%)	Goedehoop, Greenside, Isibonelo, Kleinkopje, Kriel, Landau, Mafube, New Denmark, New Vaal and Nooitgedacht Mines	60,000. <sup>e</sup>
Do.	Exxaro Resources Ltd. (BEE Holdco, 52.3%)	Grootegeeluk Mine in Limpopo Province	18,600.
Do.	do.	Matla Mine in Mpumalanga Province	14,000.
Do.	do.	Arnot Mine in Mpumalanga Province	5,000.
Do.	do.	North Block Mine in Mpumalanga Province	3,000.
Do.	do.	Leeuwpan Mine in Mpumalanga Province	2,500.
Do.	do.	Inyanda Mine	2,000. <sup>e</sup>
Do.	do.	New Clydesdale Mine in Mpumalanga Province	1,400.
Do.	do.	Tshikondeni Mine in Limpopo Province	414.
Do.	Anglo American plc, 50%, and Exxaro Resources Ltd., 50%	Mafube Mine	5,000.
Do.	Sasol Ltd.	Syferfontein Mine	9,200.
Do.	do.	Brandspruit Mine	8,400.
Do.	do.	Middelbult Mine	8,300.
Do.	do.	Bosjesspruit Mine	8,100.
Do.	do.	Twistdraai Mine	7,300.

See footnotes at end of table.

TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Coal—Continued	Sasol Ltd.		Mooikraal Mine	2,000.
Do.	BHP Billiton Energy Coal South Africa Ltd., 84%, and Xstrata plc, 16%		Middelburg Mine	17,000 bituminous.
Do.	BHP Billiton Energy Coal South Africa Ltd.		Khutala underground mine	15,100 bituminous.
Do.	BHP Billiton Energy Coal South Africa Ltd., 84%, and Xstrata plc, 16%		Douglas Mine	8,500 bituminous.
Do.	BHP Billiton Energy Coal South Africa Ltd.		Klipspruit Mine	4,800 bituminous.
Do.	Xstrata plc, 74%		Goedgevonden Mine at Witbank	6,000.
Do.	Xstrata plc, 79.8%		Twefontein Division (Boschmans, South Witbank, Waterpan, and Witcons Mines) at Witbank	5,200.
Do.	do.		iMpunzi Division (Phoenix and Tavistock Mines) at Witbank	5,400.
Do.	do.		Southstock Division at Witbank	5,700.
Do.	do.		Mpumalanga Division (Spitzkop and Tselentis Mines) at Breyten and Ermelo	2,800.
Do.	Optimum Coal Holdings (Pty) Ltd		Optimum Mine	13,500 bituminous.
Do.	do.		Koornfontein Mines	5,200 bituminous.
Do.	Shanduka Coal (Pty) Ltd. (Glencore International AG, 70%, and Shanduka Resources (Pty) Ltd., 30%)		Bankfontein, Graspan, Lakeside, Leeuwfontein, and Townlands Mines	13,000.
Do.	Coal of Africa Ltd.		Mooiplaats Mine	6,000.
Do.	Kangra Group Pty. Ltd. [Shanduka Resources (Pty) Ltd., 30%]		Savmore and Welgedacht Mines	3,000. <sup>e</sup>
Do.	Stuart Coal Group		Stuart Colliery	3,000. <sup>e</sup>
Do.	NuCoal Mining (Pty) Ltd.		Woestalleen Mine	2,500.
Do.	Total Coal SA (Pty) Ltd.		Forzando North and Forzando South Mines	1,800. <sup>e</sup>
Do.	do.		Dorsfontein Mine	700. <sup>e</sup>
Copper	Palabora Mining Co. Ltd. (Rio Tinto Ltd., 57%, and Anglo American plc, 29%)		Palabora Mines at Phalaborwa	80 copper in concentrate.
Do.	do.		Smelter at Phalaborwa	130 anodes.
Do.	do.		Refinery at Phalaborwa	130 cathodes.
Do.	Anglo American Platinum Corp. Ltd. (Anglo American plc, 74.1%)		Amandebult, Rustenburg, and Union sections; and Bafokeng Rasimone, Lebowa, Modikwa, Potgietersrust, and Western Limb Mines	13 <sup>e</sup> mine.
Do.	do.		Rustenburg Base Metal Refiners	12 <sup>e</sup> refined.
Do.	Black Mountain Mineral Development Co. (Pty) Ltd. (Anglo American plc, 74%)		Black Mountain Mine near Aggeneys in Northern Cape Province	6 copper in concentrate.
Diamond	thousand carats	De Beers Consolidated Mines Ltd. (Anglo American plc, 29%)	Venetia Mine in Northern Province	7,500.
Do.	do.	do.	Finsch Mine, 100 kilometers west of Kimberley	2,800.
Do.	do.	do.	Kimberley surface mines, Kimberley	1,500.
Do.	do.	do.	Namaqualand Mine near Kleinsee	1,200.
Do.	do.	do.	Voorspoed Mine	900.
Do.	do.	do.	South Africa Sea Areas	240.
Do.	do.	Petra Diamonds Ltd.	Cullinan Mine	1,800.
Do.	do.	do.	Helam, Sedibeng, and Star Mines	175.
Do.	do.	do.	Koffiefontein Mine in Free State Province	120.
Do.	do.	do.	Kimberley underground mines, Kimberley <sup>2</sup>	100.
Do.	do.	Trans Hex Group Ltd.	Baken, Bloeddrif, Reuning, and Saxendrift Mines	140. <sup>e</sup>
Fluorspar	Witkop Fluorspar Mine (Pty) Ltd. (subsidiary of Sallies Ltd.)		Witkop Mine at Zeerust <sup>2</sup>	180.
Do.	do.		Buffalo Mine at Mookgoong <sup>2</sup>	60.
Do.	Vergenoeg Mining Corp. (Pty) Ltd. [Minerales Y Productos Derivados SA (Minersa), 85%]		Vergenoeg Mine at Rust de Winter	120.

See footnotes at end of table.



TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Gold:				
Mine		AngloGold Ashanti Ltd. (Anglo American plc, 41.8%)	Vaal River operations: Kopanang Mine	5,000 ore.
Do.	kilograms	do.	do.	34,000 gold.
Do.		do.	Great Nologwa Mine	2,700 ore.
Do.	kilograms	do.	do.	15,000 gold.
Do.		do.	Tau Lekoa Mine	5,000 ore.
Do.	kilograms	do.	do.	17,000 gold.
Do.		do.	Moab Khotsong Mine	1,200 ore.
Do.	kilograms	do.	do.	11,000 gold.
Do.		do.	West Wits operations: Tau Tona Mine	2,160 ore.
Do.	kilograms	do.	do.	16,000 gold.
Do.		do.	Savuka Mine	2,160 ore.
Do.	kilograms	do.	do.	12,000 gold.
Do.		do.	Mponeng Mine	1,920 ore.
Do.	kilograms	do.	do.	17,000 gold.
Do.		Gold Fields Ltd.	Kloof Mine	3,960 ore.
Do.	kilograms	do.	do.	24,000 gold.
Do.		do.	Driefontein Mine	6,660 ore.
Do.	kilograms	do.	do.	28,000 gold.
Do.		do.	Beatrix Mine	4,920 ore.
Do.	kilograms	do.	do.	20,000 gold.
Do.		do.	South Deep Mine	2,640 ore.
Do.	kilograms	do.	do.	12,000 gold.
Do.		Harmony Gold Mining Co. Ltd.	Bambanani, Masimong, Phakisa, and Tshepong Mines	5,040 ore.
Do.	kilograms	do.	do.	17,100 gold.
Do.		do.	Evander operations	2,400 ore.
Do.	kilograms	do.	do.	13,100 gold.
Do.		do.	Elandsrand Mines	2,220 ore.
Do.	kilograms	do.	do.	11,900 gold.
Do.		do.	Virginia Mine	2,500 <sup>c</sup> ore.
Do.	kilograms	do.	do.	8,000 <sup>c</sup> gold.
Do.		do.	Target Mine	1,260 ore.
Do.	kilograms	do.	do.	3,300 gold.
Do.		do.	Kalgold Mine	1,800 ore.
Do.	kilograms	do.	do.	2,400 gold.
Do.		do.	Doornkop Mine	2,640 ore.
Do.	kilograms	do.	do.	2,100 gold.
Do.		DRDGold Ltd.	Blyvooruitzicht Mine	4,800 ore.
Do.	kilograms	do.	do.	4,800 gold.
Do.		do.	Crown Mine	11,760 ore.
Do.	kilograms	do.	do.	4,500 gold.
Do.		do.	East Rand Proprietary Mine	2,700 gold.
Do.	kilograms	do.	Ergo Mine	1,100 <sup>c</sup> gold.
Do.	do.	First Uranium Corp.	Ezulwini Mine	4,400 gold.
Do.	do.	do.	Mine Waste Solutions Project (MWS)	1,700 gold.
Do.	do.	Gold One International Ltd.	Modder East Mine	5,600 gold.
Do.	do.	Simmer and Jack Mines Ltd.	Buffelsfontein Mine	3,800 gold.
Do.	do.	do.	Transvaal Gold Mining Estate (TGME)	NA.
Do.	do.	Barberton Mines Ltd. [Metorex Ltd., 54%, and Shanduka Resources (Pty) Ltd., 26%]	Eastern Transvaal Consolidated Division (Fairview, New Consort, and Sheba Mines)	3,200. <sup>c</sup>
Do.	do.	Central Rand Gold Ltd.	Central Rand Goldfield near Johannesburg	1,200 gold.

See footnotes at end of table.

TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
<b>Gold—Continued:</b>				
Refined	metric tons	Rand Refinery Ltd. (AngloGold Ashanti Ltd., 53%, and Gold Fields Ltd., 33%)	Germiston, Gauteng Province	1,200.
<b>Iron and steel:</b>				
Iron ore		Kumba Iron Ore Ltd.	Sishen Mine at Sishen	41,000.
Do.		do.	Thabazimbi Mine at Thabazimbi	2,700.
Do.		Assmang Ltd.	Khumani Mine	10,000.
Do.		do.	Beeshoek Mine near Postmasburg	6,000.
Do.		Highveld Steel and Vanadium Corp. Ltd. (Ervaz Group S.A., 79%)	Mapochs Mine at Roossenekal	2,450.
Do.		Xstrata plc	Rhovan Mine at Brits	400.
Do.		Vametco Minerals Corp. (Ervaz Group S.A., 81%)	Krokodilkraal Mine and plant near Brits	180.
Ferroalloys		Xstrata plc, 79.5%, and Merafe Resources Ltd., 20.5%	Wonderkop	553 ferrochromium.
Do.		do.	Rustenburg	430 ferrochromium.
Do.		Xstrata plc, 69.6%, and Merafe Resources Ltd., 30.4%	Lydenburg	396 ferrochromium.
Do.		Xstrata plc, 79.5%, and Merafe Resources Ltd., 20.5%	Lion plant at Steelpoort	360 ferrochromium.
Do.		do.	Boshoek	240 ferrochromium.
Do.		Samancor Chrome Division (Kermas Group Ltd., 100%)	Plants at Middelburg, Steelpoort, and Witbank	1,300 ferrochromium.
Do.		Hernic Ferrochrome (Pty) Ltd. (Mitsubishi Corp., 51%)	Plant at Brits	420 ferrochromium.
Do.		ASA Metals (Pty) Ltd. (Sinosteel, 60%, and Limpopo Economic Development Enterprise, 40%)	Plant near Pietersburg, Northern Province	400 ferrochromium.
Do.		Assmang Ltd.	Machadodorp plant in Mpumalanga Province	290 ferrochromium.
Do.		International Ferro Metals Ltd.	Plant in North West Province	267 ferrochromium.
Do.		Tata Steel Ltd.	Richards Bay	150 ferrochromium.
Do.		Samancor Manganese (Pty) Ltd. (BHP Billiton Ltd., 60%, and Anglo American plc, 40%)	Plant at Meyerton	370 ferromanganese; 120 silicomanganese.
Do.		Assmang Ltd.	Cato Ridge plant in KwaZulu Natal Province	300 ferromanganese.
Do.		Advalloy (Pty) Ltd. [Samancor Manganese (Pty) Ltd., 100%]	Furnace at Samancor's Meyerton plant	82 ferromanganese.
Do.		Renova Group	Plant at Witbank	48 ferromanganese.
Do.		do.	do.	170 silicomanganese.
Do.		Silicon Technology Pty Ltd.	NA	55 ferrosilicon.
Do.		Grupo Ferroatlantica	Rand Carbide plant	55 ferrosilicon.
Do.	metric tons	Vanchem Vanadium Products (Pty) Ltd.	Plant at Witbank	12,500 ferrovanadium.
Do.	do.	Xstrata plc	Rhovan plant at Brits	6,000 ferrovanadium.
Do.	do.	Vametco Minerals Corp.	Smelter near Brits	4,800 ferrovanadium.
Do.		Ruukki Group Oyj	Mogale plant	110 ferroalloys.
Steel		ArcelorMittal South Africa Ltd.	Vanderbijlpark plant	4,600 crude steel.
Do.		do.	Newcastle plant	1,900 crude steel.
Do.		do.	Saldanha plant	1,300 crude steel.
Do.		do.	Vereeniging plant	400 crude steel.
Do.		Highveld Steel and Vanadium Corp. Ltd.	Witbank	1,000 iron; 1,000 crude steel.
Do.		Columbus Stainless (Pty) Ltd. (Acerinox SA, 76%)	Stainless steel plant at Middelburg	750 crude steel.
Do.		Scaw Metals Group (Anglo American plc)	Germiston plant, Johannesburg	600 crude steel.
Do.		Davsteel Division (Cape Gate Pty. Ltd.)	Vanderbijlpark plant, Gauteng	480 crude steel; 480 billet.

See footnotes at end of table.

TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
<b>Iron and steel—Continued:</b>				
Steel—Continued	Cape Town Iron & Steel Works (Pty) Ltd.	Kuilsrivier plant, Cape Town	250 crude steel; 250 billet.	
Do.	Duferco Steel Processing Ltd.	Cold-rolled slab steel plant at Saldanha Bay	240 rolled steel.	
Lead	Black Mountain Mineral Development Co. (Pty) Ltd.	Black Mountain Mine near Aggeneys in Northern Cape Province	54 lead in concentrate.	
Lime	PPC Lime Ltd (subsidiary of Pretoria Portland Cement Company Ltd.)	Plant at Lime Acres	1,200.	
Do.	Idwala Lime (Idwala Industrial Holdings)	Plant at Daniëlskuil	1,000.	
Do.	Inca Lime (Pty) Ltd. [subsidiary of Inca Mining (Pty) Ltd.]	Plant at Immerpan, Limpopo Province	100.	
Manganese	Assmang Ltd.	Nchwaning Mine near Black Rock	3,000 ore.	
Do.	do.	Gloria Mine near Black Rock	600 ore.	
Do.	Samancor Manganese (Pty) Ltd.	Mamatwan and Wessels Mines near Hotazel in Northern Cape Province	3,400 ore.	
Do.	Renova Group	Kalahari Mine	NA.	
Do.	Metmin (Metorex Pty. Ltd., 100%)	Open pit mine in North West Province	24 manganese dioxide.	
Do.	Manganese Metal Co. Pty. Ltd. [Samancor Manganese (Pty) Ltd., 51%]	Electrolytic plant at Nelspruit	27 manganese metal.	
Nickel	Anglo American Platinum Corp. Ltd.	Amandebult, Rustenburg, and Union sections; and Bafokeng Rasimone, Lebowa, Modikwa, Potgietersrust, and Western Limb Mines	24 mine. <sup>c</sup>	
Do.	do.	Rustenburg Base Metal Refiners	22 refined. <sup>c</sup>	
Do.	Impala Platinum Ltd.	Impala Mines	8 mine. <sup>c</sup>	
Do.	do.	Impala Refining Services	10 refined. <sup>c</sup>	
Do.	do.	Base Metals Refinery	14 refined. <sup>c</sup>	
Do.	Lonmin plc	Marikana Mines (Eastern Platinum, Karee, and Western Platinum) near Rustenburg and Limpopo Mine	5 mine. <sup>c</sup>	
Do.	do.	Base Metals Refinery	5 refined. <sup>c</sup>	
Do.	Nkomati Joint Venture	Nkomati Mine in Mpumalanga Province	5 mine.	
Nitrogen, ammonia	Sasol Ltd.	Plants at Sasolburg and Secunda	660.	
<b>Petroleum:</b>				
Crude	thousand 42-gallon barrels	Petroleum Oil and Gas Corporation of South Africa, 55%, and Pioneer Natural Resources Co., 45%	Pioneer offshore field	21,900.
Do.	do.	Petroleum Oil and Gas Corporation of South Africa	Oribi field, 140 kilometers southwest offshore from Mossel Bay	9,100.
Do.	do.	do.	Oryx field	4,400.
Refined	do.	Shell and BP Refineries Pty. Ltd. (Shell SA Energy, 50%, and BP Southern Africa, 50%)	Sapref refinery in Durban	65,700.
Do.	do.	Engen Ltd. (62%)	Engen refinery in Durban	45,600.
Do.	do.	National Petroleum Refiners of South Africa Pty. Ltd. (Sasol Ltd., 63.6%)	Natref refinery in Sasolburg	33,600.
Do.	do.	Caltex Oil SA Pty. Ltd. (private, 100%)	Calref refinery in Cape Town	40,300.
Phosphate rock		Phosphate Development Corp. Ltd. (Foskor Ltd.) (Industrial Development Corp., 100%)	Foskor Mine and plant at Phalaborwa	2,500 phosphate rock. <sup>3</sup>
Do.		Fer-Min-Ore Ltd.	Plant at Germiston	30.
Do.		do.	Plant at Isithebe	12.
Phosphoric acid		Sasol Ltd.	Plant at Phalaborwa	325.
Platinum-group metals		Anglo American Platinum Corp. Ltd.	Bathopele, Khomanani, Khuseleka, Siphumelele and Thembelani Mines	12,000 ore.
Do.	kilograms	do.	do.	24,000 platinum; 13,000 palladium; 3,300 rhodium.

See footnotes at end of table.

TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Platinum-group metals—Continued	Anglo American Platinum Corp. Ltd.		Dishaba and Tumela Mines at Northam	7,000 ore.
Do.	kilograms	do.	do.	18,000 platinum; 8,700 palladium; 2,300 rhodium.
Do.	Anglo American Platinum Corp. Ltd., 85%		Union Mine at Swartklip	6,000 ore.
Do.	kilograms	do.	do.	10,000 platinum; 4,800 palladium; 1,700 rhodium.
Do.	Bafokeng Rasimone Platinum Mine (Royal Bafokeng Nation, 67%, and Anglo American Platinum Corp. Ltd., 33%)		Bafokeng Rasimone Platinum Mine at Rasimone	2,400 ore.
Do.	kilograms	do.	do.	6,100 platinum; 2,500 palladium; 420 rhodium.
Do.	do.	Kroondal Platinum Mines (Anglo American Platinum Corp. Ltd., 50%, and Aquarius Platinum Ltd., 50%)	Kroondal Mine	7,900 platinum; 3,800 palladium; 1,400 rhodium.
Do.	Modikwa Platinum Mine (Anglo American Platinum Corp. Ltd., 50%, and African Rainbow Minerals, 50%)		Modikwa Mine at Makgemeng	2,400 ore.
Do.	kilograms	do.	do.	4,300 platinum; 4,200 palladium; 870 rhodium.
Do.	Anglo American Platinum Corp. Ltd.		Mogalakwena Mine at Ga-Masenya	5,000 ore.
Do.	kilograms	do.	do.	6,000 platinum; 6,200 palladium; 430 rhodium.
Do.	do.		Mototolo Mine at Steelpoort	2,400 ore.
Do.	kilograms	do.	do.	3,500 platinum; 2,000 palladium; 570 rhodium.
Do.	do.		Polokwane smelter at Polokwane	650 concentrate.
Do.	do.		Mortimer smelter at Swartklip	180 concentrate.
Do.	do.		Waternal smelter	650 concentrate.
Do.	kilograms	do.	Mortimer, Polokwane, and Waternal smelters	85,000 platinum; 48,000 palladium; 12,000 rhodium.
Do.	do.	do.	Precious Metals Refinery	81,000 platinum metal; 44,000 palladium metal; 11,000 rhodium metal.
Do.	Impala Platinum Ltd. (Impala Platinum Holdings Ltd., 100%)		Impala Mines, near Phokeng in North West Province	17,000 ore.
Do.	kilograms	do.	do.	34,000 platinum; 15,000 palladium; 3,300 rhodium.
Do.	Impala Platinum Ltd.		Marula Mine at Bothashoek	2,200 ore.
Do.	kilograms	do.	do.	3,900 platinum; 4,000 palladium; 820 rhodium.
Do.	do.	do.	Smelter near Phokeng	87,000 platinum.
Do.	do.	do.	Smelter near Springs	71,500 platinum; 33,400 palladium; 8,300 rhodium.
Do.	do.	do.	Refinery near Phokeng	87,000 platinum.

See footnotes at end of table.

TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Platinum-group metals—Continued	kilograms	Impala Platinum Ltd.	Precious metals refinery, near Springs in Guateng Province	71,500 platinum metal; 33,400 palladium metal; 8,300 rhodium metal.
Do.		Lonmin plc	Marikana Mines near Maroelakop	11,000 <sup>e</sup> ore.
Do.	kilograms	do.	do.	22,000 <sup>e</sup> platinum; 10,000 <sup>e</sup> palladium; 3,000 <sup>e</sup> rhodium.
Do.	do.	do.	Precious Metals Refinery at Western Platinum	31,000 platinum metal; 14,000 palladium metal; 4,000 rhodium metal.
Do.		Northam Platinum Ltd. (Anglo American Platinum Corp. Ltd., 22.5%, and Mvelaphanda Resources Ltd., 21.9%)	Zondereinde Mine near Northam	1,800 Merensky ore; 900 UG2 ore.
Do.	kilograms	do.	do.	8,100 platinum; 3,900 palladium; 900 rhodium.
Do.		Marikana Platinum Mine (Anglo American Platinum Corp. Ltd., 50%, and Aquarius Platinum Ltd., 50%)	Marikana Mine	2,640 ore.
Do.	kilograms	do.	do.	2,800 platinum; 1,300 palladium; 550 rhodium.
Do.		Everest Platinum Mine (Aquarius Platinum Ltd., 50.5%, and Impala Platinum Holdings Ltd., 20%)	Everest Platinum Mine at Lydenburg <sup>2</sup>	6,200 platinum-group metals.
Do.		Aquarius Platinum Ltd.	Blue Ridge Mine	3,900 platinum-group metals.
Do.		Platmin Ltd.	Pilanesberg Mine	7,800 platinum-group metals.
Do.	do.	Xstrata plc, 74%	Eland Mine	7,500 platinum-group metals.
Do.		Anooraq Resources Corp., 51%; Anglo American Platinum Ltd., 49%	Bokoni Mine at Sefateng	1,860 ore.
Do.	kilograms	do.	do.	4,100 platinum; 2,700 palladium; 470 rhodium.
Do.		Two Rivers Platinum Mine (Pty) Ltd. (African Rainbow Minerals Ltd., 55%, and Impala Platinum Holdings Ltd., 45%)	Two Rivers Platinum Mine near Steelpoort	2,900 ore.
Do.	kilograms	do.	do.	4,100 platinum; 2,300 palladium; 660 rhodium.
Do.		Eastern Platinum Ltd. (Eastplats)	Crocodile River Mine at Arbourfell	4,000 <sup>e</sup> platinum-group metals.
Do.	kilograms	Platinum Australia Pty Ltd. (PLA)	Smokey Hills Mine	3,000 platinum-group metals.
Pyrophyllite		Idwala Industrial Minerals (Benoni)	Ottsdal Mine in North West Province	15.
Do.		Wonderstone Ltd. (The Associated Ore & Metals Corp. Ltd.)	Pyrophyllite (wonderstone) mine, North West Province	NA.
Do.		G&W Base and Industrial Minerals Pty. Ltd.	Piet Retief Mine	NA.
Silicon		Grupo Ferroatlantica	Polokwane plant, near Pietersburg	52 silicon metal. <sup>e</sup>
Silver	metric tons	Rand Refinery Ltd.	Germiston, Gauteng Province	200 refined silver.
Sulfur		Sasol Ltd.	Plants at Sasolburg and Secunda	205.

See footnotes at end of table.

TABLE 2—Continued  
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Synthetic fuels	thousand	Sasol Ltd.	Coal to oil plant at Secunda	54,800.
	42-gallon barrels			
Do.	do.	Petroleum Oil and Gas Corporation of South Africa	Natural gas to petroleum products plant at Mossel Bay	18,300.
Titanium:				
Titanium concentrates		Richards Bay Minerals (BHP Billiton Ltd., 37%; Rio Tinto plc, 37%; Blue Horizon Investments, 24%)	Open cast operations, near Richards Bay	1,280 ilmenite; <sup>c</sup> 125 rutile. <sup>c</sup>
Do.		Exxaro Resources Ltd.	Mine near Brand-se-Baai and mineral separation plant at Koekenaap	540 ilmenite; 25 rutile.
Do.		do.	KZN Sands Mine near Richards Bay	550 ilmenite; 20 rutile; 5 leucoxene.
Titanium slag		Richards Bay Minerals (RBM)	Smelter at Richards Bay	1,060 titanium slag; 110 rutile.
Do.		Namakwa Sands Ltd.	Smelter at Vredenberg, Saldanha Bay area	200 titanium slag.
Do.		Highveld Steel and Vanadium Corp. Ltd.	Steel plant at Witbank	48 titanium slag. <sup>c</sup>
Do.		Exxaro Resources Ltd.	Empangeni smelter near Richards Bay	250 titanium slag.
Uranium oxide	metric tons	AngloGold Ashanti Ltd.	Vaal Rivers operation, near Klerksdorp	3,000.
Do.	do.	First Uranium Corp.	Ezulwini Mine	100. <sup>c</sup>
Vanadium pentoxide	do.	Highveld Steel and Vanadium Corp. Ltd. (Ervaz Group S.A., 79%)	Mapochs Mine near Lydenburg	17,500.
Do.	do.	do.	Plant at Witbank	10,800.
Do.	do.	Xstrata plc	Rhovon Mine at Brits	10,000.
Do.	do.	Vametco Minerals Corp.	Krokodilkraal Mine and plant near Brits	3,800.
Do.	do.	Vanchem Vanadium Products Pty Ltd.	Wapadskloof Mine and plant, 60 kilometers northeast of Middelburg	2,250. <sup>c</sup>
Vermiculite		Palabora Mining Co. Ltd.	Palabora Mine and plant at Phalaborwa	223.
Zinc		Zinc Corp. of South Africa Ltd. (Exxaro Resources Ltd., 100%)	Struisbult Springszinc refinery at Springs, southeast of Johannesburg	110 refined zinc; 170 sulfuric acid.
Do.		Black Mountain Mineral Development Co. (Pty) Ltd.	Black Mountain Mine near Aggeneys in Northern Cape Province	41 zinc in concentrate.
Zirconium		Richards Bay Minerals (RBM)	Open cast mines near Richards Bay	300 zircon in concentrate.
Do.		Namakwa Sands Ltd.	Mine near Brand-se-Baai and mineral separation plant at Koekenaap	125 zircon in concentrate.
Do.		Exxaro Resources Ltd.	Hillendale Mine near Richards Bay, KwaZulu Natal Province	45 zircon in concentrate.
Do.		Palabora Mining Co. Ltd.	Palabora Mine and plant at Phalaborwa	14 baddeleyite. <sup>c</sup>
Do.		do.	Zirconium sulfate plant at Phalaborwa	8 zirconium sulfate.
Do.		Phosphate Development Corp. Ltd. (Foskor Ltd.) (Industrial Development Corp., 100%)	Plant at Phalaborwa	8 baddeleyite. <sup>c</sup>
Do.		do.	Fused zirconia plant	6 synthetic zirconia.

<sup>c</sup>Estimated. Do., do. Ditto. NA Not available.

<sup>1</sup>Based on information available as of January 2011.

<sup>2</sup>Not operating at the end of 2009.

<sup>3</sup>Most of Foskor's phosphate output is from phosphate concentrates supplied by the neighboring Palabora copper mine.

TABLE 3  
SOUTH AFRICA: RESERVE BASE OF MAJOR MINERALS IN 2009<sup>1</sup>

(Million metric tons unless otherwise specified)

Commodity	Reserve base
Andalusite <sup>2</sup>	51
Antimony	thousand metric tons 200
Chromium, ore	5,500
Coal, recoverable	30,408
Copper	13
Fluorspar	80
Gold	thousand metric tons 31
Iron ore	1,500
Lead	3
Manganese, ore	4,000
Nickel	12
Phosphate rock, concentrates	2,500
Platinum-group metals	thousand metric tons 70
Titanium minerals	244
Uranium	thousand metric tons 341
Vanadium	12
Vermiculite	80
Zinc	15
Zirconium	14

<sup>1</sup>Metallic minerals are contained metal.

<sup>2</sup>Includes the aluminosilicate and sillimanite.

Source: Mwape, P., Malebo, L., Mokwena, E., Tjatjie, T., Mnguni, M., Mashaba, P., Musi, L., Perold, W., Andreas, A., and Mudau, S., 2009, General review, *in* South Africa's Mineral Industry 2008/2009: Johannesburg, South Africa, Department of Minerals and Energy of the Republic of South Africa, p. 1-19.