

THE MINERAL INDUSTRY OF SOUTH AFRICA

By George J. Coakley

Mining and downstream minerals processing remained keystones of the economy of the Republic of South Africa in 1999. With a population of 43.4 million, South Africa had a gross domestic product (GDP) per capita of \$6,900 based on purchasing power parity estimates for 1998.¹ Of total exports of all goods, which were valued at \$28 billion, gold exports accounted for 14.1%, and other minerals and metals exports, for about an additional 28%. According to the Minerals Bureau of South Africa, the primary mining sector contributed \$7.7 billion, or 6.5%, to the GDP. Adding the multiplier effects of services and goods supplied by industries that support the mining sector would increase the contribution to GDP by another 14%. The contribution to the GDP would also be significantly higher if the value-added mineral-processing industries (aluminum, ferroalloys, and steel), which are counted under the manufacturing sector of the GDP accounts, were added. The mining and minerals processing through semimanufactured products accounted for more than 500,000 jobs. Employment in the primary mining sector, however, declined to 437,000 in 1999 from 466,700 in 1998 and from more than 778,000 in 1990 (Minerals Bureau, February 2001, Role in the national economy—South Africa's minerals industry—1999-2000, accessed March 10, 2001, at URL <http://www.dme.gov.za/minerals/default.htm>).

The most important mineral commodities produced in South Africa, in terms of value, were gold, coal, platinum-group metals (PGM), ferroalloys (ferrochromium, ferromanganese, and ferrosilicon), aluminum, steel, diamond, iron ore, copper, and nickel. Additionally, significant output of metallic commodities included antimony, chromite, cobalt, lead, manganese, nickel, silver, titanium, uranium, vanadium, zinc, and zirconium. Important output of industrial minerals included andalusite (aluminum silicate), aggregate and sand, asbestos, dimension stone, fluorspar, limestone and lime, phosphate rock, sulfur, and vermiculite. South Africa was a major producer and the world's third largest exporter of coal and was also the largest producer of synthetic liquid fuels and petrochemicals derived from coal. South Africa's well-developed railway and port infrastructure served the domestic minerals industry and those in neighboring countries. South Africa produced more than 55 different mineral commodities from about 723 mines and quarries, which included about 60 coal mines and 55 diamond and 49 gold operations. During 1999 and early 2000, corporate unbundling, asset sales, mergers, and changes in ownership continued to reshape the structure of the minerals industry. The major changes in the structure of the minerals industry are listed in table 2. The country continued to attract new investment in mining and mineral processing projects;

¹Where necessary, values have been converted from South African rands (R) to U.S. dollars at the rate of R6.12=US\$1.00 for 1999, and R5.53=US\$1.00 for 1998.

more than \$3.3 billion was committed for new projects in 2000, chiefly in gold and PGM, and an additional \$4.9 billion was under consideration for future investment.

Production

In 1999, South Africa was one of the largest and most diverse minerals producers in the world. As listed in table 1, changes in output levels were mixed. Gold production decreased a further 3% between 1998 and 1999 as the industry continued to rationalize production to reduce operating costs in response to the continued depressed gold price. Production of most of the other major metals was up from 1% to 10% compared with that of 1998. Output of iron ore, lead, steel, and vanadium declined. Within the industrial minerals sector, most production levels increased; declines were seen in andalusite, asbestos (which is being phased out as a result of environmental concerns), diamond, fluorspar, talc, and vermiculite. On a value basis, about 24% of primary mined products and 18% of processed mineral materials were consumed domestically. About 93 million metric tons (Mt) (42%) of coal production went for internal power generation, and 47 Mt (21%), for value-added synthetic fuel and petrochemicals production. By using South Africa's natural comparative advantage in possessing these resources, coal, iron ore, chromite, manganese, nickel, and vanadium also were converted to value-added ferroalloy and steel products for world markets.

Trade

In 1999, the total value of sales of primary minerals, as reported by the Minerals Bureau, was \$12.5 billion, of which \$9.53 billion was exported. The total value of all processed mineral materials was \$2.98 billion, of which \$2.44 billion was exported. The major exports by value in 1999 were gold at \$4.08 billion; PGM, \$2.89 billion; coal, \$2.43 billion, ferroalloys, \$1.13 billion; aluminum, \$894 million; steel, \$802 million; iron ore, \$360 million; copper, \$227 million; and nickel, chromite, manganese, and vanadium, each between \$149 million and \$190 million. Other significant exports for which individual value data were not provided included diamond, titanium, and zirconium (South Africa Minerals Bureau, 2000, p. 24, 38).

The majority, by value, of primary mineral exports, which included precious minerals went to European markets, followed by the Pacific Rim countries, the Middle East and the Near East, and North America and Central America, with less than 10% each. Exports within Africa accounted for less than 1% of the South African mineral export trade.

Although South Africa was self-sufficient in the vast majority of its mineral needs, some mineral commodities were imported.

Significant mineral imports included alumina, coking coal, rough and cut diamonds, certain ferroalloys, magnesite, magnesia, petroleum and petroleum products, precious metals, and sulfur.

Commodity Review

Coal.—More than 93% of the 223.5 Mt of salable coal was produced by the following companies: Ingwe Coal Corp. Ltd., 37%; Amcoal Colliery and Industrial Operations Ltd., 22%; Sasol Mining (Pty.) Ltd., 17%; Iscor Mining Ltd., 10%; and Duiker Mining Ltd., 7%. The majority of the 66 Mt of coal exported was shipped through the Richards Bay Coal Terminal (RBCT). During 1999, the RBCT completed its expansion to 66.5 million metric tons per year (Mt/yr) and was evaluating a further expansion to 72 Mt/yr (Financial Mail, April 7, 1999, Now you see them—now you don't, accessed December 20, 2000, at URL <http://netassets.inet.co.za/netassets/sitewide/content/direct/1,1187,294612-5435-0,00.html>). Of the 154.5 Mt of coal sold in domestic markets, 93.3 Mt was used for power generation, and 46.6 Mt, for the manufacture of synthetic fuels.

Diamond.—De Beers Consolidated Mines Ltd. planned to add a new diamond recovery treatment plant at its Kimberly Mines that would extend its operating life by 10 years and was conducting a feasibility study to examine the potential of developing new diamond resources below the existing Premier Mine that would be designed to extend its life of from 11 to 28 years.

Gold.—Anglo American plc completed its acquisition of Minorco SA and relisted as a United Kingdom corporation (Anglo American plc, 1999). Gold Fields Ltd. completed its \$230 million acquisition and merger with Dreifontein Consolidated Ltd. The new Gold Fields will be the third largest gold producer in the world with an annual production of about 124,000 kilograms (kg) (4 million troy ounces) and total reserves of 3,000 metric tons (96 million troy ounces) of gold (Gold Fields Ltd., February 8, 1999, Announcement, accessed February 19, 1999, at URL <http://www.gfl.co.za/press/990218.html>). With total investments of more than \$1.6 billion, development work continued on four new gold mines—AngloGold Ltd.'s Moab Khotsong and Western Deep Levels Mines; the South Deep Mine, which was a joint venture between Western Areas Ltd. and Placer Dome Inc. of Canada; and Avgold Ltd.'s Target Mine. The four mines will add more than 53,000 kg of gold to South Africa's gold mine capacity by 2003.

Ferrous Metals.—Saldanha Steel (Pty.) Ltd., which was owned by Iscor Ltd. (50 %) and the Industrial Development Corp. of South Africa Ltd. (50 %), reached its full capacity of 1.2 Mt/yr of hot-rolled steel coil at its new \$1.5 billion steel mill at Saldanha Bay by the end of 1999. This was the world's first steel minimill to combine Corex and Midrex technologies, thus replacing traditional blast furnace technology (Saldanha Steel (Pty.) Ltd., August 16, 1999, Saldanha Steel achieves a world first, accessed February 20, 2000, at URL <http://www.ssteel.co.za/2pr.html>). Associated Manganese

Mines of South Africa Ltd. (Assmang) commissioned an extension of its Beeshoek iron ore mine that would increase capacity to 5.5 Mt/yr of iron ore. Assmang also announced plans to invest more than \$160 million during 4 years to develop the new Dwarsrivier open pit chromite mine to support the upgrade of Ferroalloy Ltd.'s (its subsidiary) ferrochrome facility at Machadodorp to 175,000 metric tons per year (t/yr) from 150,000 t/yr of ferrochrome and to develop a new shaft to access fault-displaced ore at its Nchwaning manganese mine (Anglovaal Minerals Ltd., 2000, p. 16). ASA Metals (Pty.) Ltd. commissioned its new \$25 million 60,000-t/yr ferrochromium plant near Steelpoort, and Samancor announced plans to build a new ferrochromium smelter at its Mooioi Mine; the smelter will reach full capacity of 800,000 t/yr of ferrochromium by 2002 (Ryan's Notes, 1999).

Platinum-Group Metals.—As the world's largest producer and the holder of the world's largest resources of PGM, South Africa was well-positioned to capitalize on a sharp increase in platinum and palladium prices resulting from a dramatic cutback in Russian PGM output and exports in 1999. Anglo American Platinum Corp. Ltd. (Amplats), which produced 62,200 kg of PGM in 1999, announced plans during 1999 to increase production by 16,100 kilograms per year (kg/yr) of PGM and in May 2000 announced plans to increase production to nearly 109,000 kg/yr of PGM by 2006 (Anglo American Platinum Corp. Ltd., May 16, 2000, Amplats announces expansion plans, accessed November 20, 2000, at URL <http://www.angloplatinum.com/media/media.htm>). Announcements by other producers during 1999, highlighted expansions and new developments that will add an additional 17,300 kg/yr of PGM to South African production by 2003.

Reserves

South Africa's mineral reserves are large and varied and reflect the country's complex geology. The bulk of South Africa's mineral production is from the northern half of the country. Table 3 lists the reserve base for a number of South Africa's major minerals. Although data for many of the minerals listed are incomplete for the world, South Africa's mineral reserves rank among the top five countries and are the largest in the world for andalusite, chromite, gold, manganese, PGM, and vanadium.

Outlook

Significant labor issues within the minerals sector, such as housing for migrant workers, wage parity, worker health and safety, and job training, will likely continue for the next several years. The high incidence of HIV/AIDS in South Africa also poses a threat to the workforce and to overall economic development, as well as increasing labor costs. Additionally, the ongoing corporate restructuring in South Africa and concomitant mine closures could further stimulate job losses in the mining industry, particularly the gold sector. Wildcat strikes and other labor disturbances were ongoing in 1999.

Increased attention was expected to be given to environmental issues, which also would be factors in projects that require financing from international lending institutions. The major

mining companies will likely continue to increase their holdings and activities overseas, which would include the forming of strategic alliances with major overseas partners. The extent to which this will contribute to new investment in South African mining is uncertain, although the large high-quality resource base should remain attractive to new foreign investors, provided that the political risk climate remains stable.

During the late 1990's, South Africa expanded its value-added mineral-processing capacity, especially for ferroalloys, refined metals, and steel, with room for significantly more growth and investment in this direction. For example, in steel, the country's ready access to domestic sources of nearly all the steelmaking raw materials gave it a natural competitive advantage in this industry offset partially by its long distances to world markets. In this regard, if labor and energy costs remained low and world markets remained buoyant, then South Africa had the potential to increase greatly its market share for many mineral commodities.

For more extensive coverage of the mineral industry of South Africa, see the 1998 Minerals Yearbook, volume III, Mineral Industries of Africa and the Middle East.

References Cited

- Anglo American plc, 1999, Anglo American plc posts prospectus to shareholders: Anglo American plc press release, May 22, 3 p.
Anglovaal Mining Ltd. 2000, Annual report for 1999: Anglovaal Mining Ltd., 92 p.
Ryan's Notes, 1999, New ferrochrome plants in the works—Southern Africa problems worsen: Ryan's Notes, v. 51, no. 31, August 2, p. 1-2.
South Africa Minerals Bureau, 2000, Minerals—South Africa—Statistical tables—1980-99: South Africa Minerals Bureau Bulletin B1-2000, December, 46 p.

Major Sources of Information

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Internet: <http://www.anc.org.za/num>

Major Publications

Chamber of Mines of South Africa:

Annual Report.

Statistical Tables 1998 and 1999.

Department of Mineral and Energy Affairs, Annual Report.

Minerals Bureau:

South Africa's mineral industry, 1999-2000.

Operating mines and quarries and mineral processing plants in the Republic of South Africa: various periodic directories.

Mineral Production and Sales Statistics, monthly.

Council for Geosciences.

Wilson, M.G.C., and Anhaeusser, C.R., eds., 1998, The mineral resources of South Africa: Council for Geosciences of South Africa, Handbook 16, 740 p.

TABLE 1
SOUTH AFRICA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1995	1996	1997	1998	1999
METALS					
Aluminum metal, primary	229,000 r/	569,600	673,043	677,000 r/	689,000
Antimony concentrate: 2/					
Gross weight e/	9,550	8,860	5,888 r/	7,316 r/	9,100
Sb content	5,537	5,137	3,415 r/	4,243 r/	5,278
Chromite, gross weight:					
More than 48% chromic oxide	16	--	--	--	--
44% to 48% chromic oxide	1,792	1,862	2,123	2,329 r/	2,447 e/
Less than 44% chromic oxide	3,296	3,155	3,617	4,151	4,370 e/
Total 4/	5,104	5,017	5,740	6,480	6,817
Cobalt:					
Mine output, Co content	288	350	465 e/	435 e/	450 e/
Refinery output	190	247 r/	318	296	306
Copper:					
Mine (company output), Cu content	165,573	152,595	153,058	164,000 r/	144,263
Metal:					
Smelter	151,200	148,400	163,600	152,300 r/	160,000
Refined, primary	124,300	116,000	130,200	125,600	134,500
Gold, primary	523,809	496,846	491,680	465,100 r/	451,300
Iron and steel:					
Ore and concentrate:					
Gross weight	31,946	30,830	33,225	32,965	29,512
Fe content	19,806	19,115	20,600 e/	20,438	18,442
Metal:					
Pig iron	7,137	6,876	6,192	6,900	6,100
Direct-reduced iron	950	900	1,120 r/	1,070	1,490
Ferroalloys, electric arc furnace:					
Chromium ferroalloys	1,517 r/	1,478	1,940 r/	2,025	2,155
Ferromanganese	480	562	525 r/ e/	544 e/	535 e/
Ferrosilicon	90	118	102	108	106
Ferrovanadium e/	1	1	5 r/ e/	6 e/	6 e/
Silicomanganese e/	280	241	300 r/ e/	307 r/ e/	300 e/
Silicon metal	30	29	34	33	36
Steel:					
Crude	8,741	7,999	8,311	7,506	7,300
Stainless	257	334	439	430	800 e/
Lead:					
Concentrate, Pb content	88,449	88,613	83,114	84,128	80,191
Smelter, secondary	32,100	32,200	43,000 r/	50,000 r/	55,000
Manganese:					
Ore and concentrate, gross weight:					
Metallurgical:					
More than 48% manganese	1,708	1,845	1,809	1,734	1,876
45% to 48% manganese	106	86	84	12	12
40% to 45% manganese	191	118	116	218	235
30% to 40% manganese	1,145	1,133	1,111	1,049	970
Total 4/	3,151	3,182	3,120	3,013	3,093
Chemical, 35% to 65% manganese dioxide	48	58	33	31	29
Grand total	3,199	3,240	3,153	3,044	3,122
Metal, electrolytic e/	35	39 r/	40	40 e/	40 e/
Nickel:					
Mine output, concentrate, nickel content e/	30,700	33,861 r/ 3/	34,830 3/	36,679 r/	36,200 3/
Metal, electrolytic	29,803	33,362	33,700	29,039 r/ 3/	29,000 e/
Platinum-group metals: e/					
Platinum	102,300	105,440	115,861	116,483 3/	121,304
Palladium	51,000	52,560	55,675	56,608 3/	58,164
Rhodium	10,900	11,200	11,664	11,633 3/	12,752
Other 5/ e/	18,897	19,436	13,266	15,419	24,280
Total	183,097	188,636	196,466 3/	200,143 3/	216,500
Silver	174,279	168,689	155,100 r/	160,800 r/	152,000

See footnotes at end of table.

TABLE 1--Continued
SOUTH AFRICA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1995	1996	1997	1998	1999
METALS--Continued					
Titanium: e/					
Ilmenite concentrate thousand tons	1,680	2,100	2237.5	2,300	2,300
Rutile concentrate do.	90	115	123	130	130
Total do.	1,770	2,215	2,360 3/	2,430	2,430
Titaniferous slag 7/ do.	990	1,000	1,100	1,100	1,100
Uranium oxide	1,702	1,706	1,324	1,138	1,093
Vanadium, vanadium metal content	16,297	17,095 r/	16,103 r/	18,954 r/	17,612
Zinc:					
Concentrate:					
Gross weight e/	130,000	142,000	132,000	129,000	129,200
Zn content	70,241	76,853	71,062	69,630	69,733
Metal, smelter, primary	98,782	101,100	108,500	107,400 r/	114,000
Zirconium concentrate (baddeleyite and zircon) e/	260,000	260,000	265,000 3/	265,000 r/	350,000 e/
INDUSTRIAL MINERALS					
Aluminosilicates:					
Andalusite	206,378	233,728	251,203	236,200 r/	136,900
Sillimanite	317	--	--	65	--
Asbestos:					
Chrysotile	81,246	51,776	49,754	27,195	18,700
Crocidolite	7,396	5,344	232	--	--
Total	88,642	57,120	49,986	27,195	18,700
Barite	6,048	7,428	2,071	610	--
Calcite	10,666	13,749	2,886	2,764 r/	2,800
Cement, hydraulic thousand tons	9,071	9,000	9,500	9,500 e/	8,900 e/
Clays:					
Attapulgit	8,049	14,318	9,349	7,800 r/	7,067
Bentonite	70,927	48,076	75,500 r/	48,382	50,700
Fire clay	74,751	101,452	89,600 r/	143,500 r/	121,000
Flint clay, raw and calcined	118,688	113,645	91,700 r/	82,787	88,600
Kaolin	175,300 r/	191,900 r/	164,400 r/	138,300 r/	122,400
Brick clay, local sales thousand tons	2,909	2,919 r/	4,137 r/	3,518 r/	3,249
Diamond, natural:					
Gem e/ thousand carats	4,300	4,400	4,500	4,700	4,400
Industrial e/ do.	5,383	5,556 r/	5,586 r/	6,051 r/	5,622
Total 4/ do.	9,683	9,956 r/	10,086 r/	10,751 r/	10,022
Feldspar	47,874	53,644	68,100 r/	56,400 r/	59,300
Fluorspar:					
Acid-grade	177,000	202,018	201,000	211,100 e/ r/	203,700 e/
Ceramic-grade e/	--	--	4000	-- r/	--
Metallurgical-grade	18,794 3/	10,000 r/	2,000	14,500 e/ r/	13,800 e/
Total	195,794	202,018 r/	207,000	228,600	217,500
Gemstones, semiprecious, tiger's eye kilograms	242,607	18,650	64,300	87,200	80,000 e/
Gypsum, crude	288,178	340,688	396,900 r/	485,749	505,400
Industrial or glass sand (silica) thousand tons	2,180	2,173 r/	2,463	2,223 r/	2,170
Lime 6/ do.	1,688	1,650	1,585	1,523	1,920
Magnesite, crude	84,639	71,358	76,699	74,300 r/	74,000
Mica, scrap and ground	2,137	1,515	1,423	1,556	1,010
Nitrogen, N content of ammonia	758,500	769,800	752,400	722,800	784,800
Perlite	1,338	1,300	403	400 e/	400 e/
Phosphate rock:					
Gross weight thousand tons	2,822	2,655	2,732	2,739	2,900 e/
Phosphorus pentoxide content e/ do.	1,101	1,036	1,066	1,068	1,100 e/
Pigments, mineral, natural:					
Ochers	2,316	484	186	122	118
Oxides	2,940	159	98	64	98
Total	5,256	643	284	186	216
Salt	311,388	253,403	322,442	356,059	365,255
Sodium sulfate, natural	43,971	46,947	49,071	48,613	53,400

See footnotes at end of table.

TABLE 1--Continued
SOUTH AFRICA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1995	1996	1997	1998	1999
INDUSTRIAL MINERALS--Continued					
Stone, n.e.s.:					
Dimension:					
Granite and norite 6/	718,100 r/	708,700 r/	804,300 r/	669,363	782,000
Marble 8/	5,837	1,696 r/	-- r/	--	--
Slate 6/	23,500 r/	37,800 r/	11,000 r/	23,547	24,500
Crushed and broken:					
Limestone and dolomite	19,738	22,038	22,214	19,754 r/	19,030
Nepheline syenite	145,459	137,706	114,201	11,500 e/	--
Quartzite 6/	9,123	8,515	8,500	10,203	8,360
Shale:					
For cement	325	338	334 r/	279 r/	304
Other 6/	3,248	3,000 e/	3,000 e/	3,707 e/	2,546
Total	3,573	3,338	3,334	3,986	2,850
Aggregate and sand, n.e.s.	20,594	20,792	32,971	33,803	29,344
Sulfur:					
S content of pyrite	159	160 r/ e/	133 r/ e/	120 r/ e/	110 e/
Byproduct:					
Metallurgy e/	117	80 r/ e/	86 r/	93 e/	90 e/
Petroleum	233	195 r/ e/	230 r/ e/	223 r/ e/	209 e/
Total 4/	509	435 r/	449 r/	436 r/	409
Talc and related materials:					
Talc	9,173	9,700 r/	12,600 r/	11,300 r/	7,900
Pyrophyllite (wonderstone)	12,187 r/	8,837 r/	10,610 r/	11,500 r/	13,277
Vermiculite	221,748	196,000 r/	211,000 r/	221,300 r/	217,800
MINERAL FUELS AND RELATED MATERIALS					
Coal (saleable product):					
Anthracite	2,137	2,465	1,997	2,101	1,930
Bituminous	204,073	202,531 r/	217,272 r/	222,283	221,541
Total 4/	206,210	204,996 r/	219,269 r/	224,384 r/	223,471
Natural gas	1,980	980	1,756	1,560	2,039
Petroleum: 9/					
Crude	--	--	3,744 r/	6,549 r/	5,493
Refinery products:					
Liquefied petroleum gases	3,285	3,285	3,000 e/	3,000 e/	3,000 e/
Gasoline	73,730	66,795	67,000 e/	67,000 e/	67,000 e/
Jet fuel	8,760	10,220	10,000 e/	10,000 e/	10,000 e/
Kerosene	7,300	6,935	7,000 e/	7,000 e/	7,000 e/
Distillate fuel oil	50,005	49,275	50,000 e/	50,000 e/	50,000 e/
Residual fuel oil e/	22,995 3/	25,550	25,000	25,000	25,000
Lubricants (including greases) e/	3,000	3,000	3,000	3,000	3,000
Bitumen e/	2,000	2,000	2,000	2,000	2,000
Other e/	4,855	5,950	6,000	6,000	6,000
Total 10/	175,930	173,010	173,000 e/	173,000 e/	173,000 e/

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through December 2000.

2/ Data are for the year ending June 30 of that stated.

3/ Reported figure.

4/ Data may not add to totals shown because of independent rounding.

5/ Difference between total production reported by Minerals Bureau and platinum, palladium, and rhodium supplies (shipments) reported in Johnson and Matthey Annual Platinum Review. Includes ruthenium and iridium production plus excess platinum, palladium, and rhodium inventory.

6/ Domestic sales plus exports.

7/ Except for about 45,000 metric tons per year slag derived from titaniferous magnetite by Highveld Steel, titaniferous slag is all from the smelting of ilmenite, and likely represents most of that mineral's production, for which data are unavailable.

8/ Converted from reported cubic meters using 1 cubic meter=2.7 tons.

9/ In addition, Sasol produces about 67 million barrels per year of synthetic liquid petroleum fuels from coal.

10/ Excludes refinery fuel and losses.

TABLE 2
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Billiton Aluminium South Africa (Pty.) Ltd. (Billiton plc., 100%)	Bayside smelter at Richards Bay	175.
Do.	do.	Hillside smelter at Richards Bay (planned expansion by 2003)	500+ increase to 650.
Andalusite	Rhino Minerals (Pty.) Ltd. [Mirical South Africa (Pty.) Ltd., 100%, acquired from Avmin, July 1999]	Rhino Mine near Thabazimbi and	120.
Do.		Havercroft Mine at Penge north of Steelpoort	60.
Do.	Samrec Pty. Ltd. of France (private, 100%)	Annesley Mine at Penge, 50 kilometers north of Steelpoort	75.
Do.	do.	Andalusite Refractories Mine at Groot Marico, 60 kilometers west of Rustenburg	12.
Do.	do.	Krugerspost Mine near Lydenburg	50.
Do.	Hoogenoeg Andalusite (Pty.) Ltd.	Hoogenoeg Mine, 60 kilometers northeast of Potgietersrus	15.
Antimony	Consolidated Murchison Ltd. [Metorex Pty. Ltd., 34.3%, Crew Development Corp. (Canada), 3.3%]	50 kilometers west of Phalaborwa	7 Sb concentrate. 1,000 kg gold byproduct.
Asbestos	Kaapsehoop Asbestos Pty. Ltd.	New Amianthus Mine in Mpumalanga	NA (chrysotile).
Do.	African Chrysotile Asbestos Ltd.	Msauli Mine near Barberton (closed)	NA (chrysotile).
Do.	Anglo Dutch Exploration & Mining Co. (Pty.) Ltd.	Stella Mine east of Barberton (closed)	NA (chrysotile).
Do.	Griqualand Exploration and Finance Corp.	Kuruman Mine (closed in 1998)	NA (crocidolite).
Cement	Anglo Alpha Ltd. (Holderbank; Anglovaal Industries Ltd.)	Dudfield kiln near Lichtenburg, also grinding mill at Roodepoort	1,830.
Do.	do.	Ulco kiln 60 kilometers northwest of Kimberley	1,615.
Do.	Lafarge South Africa Ltd. [Lafarge (France) [formerly Blue Circle Cement (Pty.) Ltd.]	Lichtenburg kiln, North West Province	2,400
Do.	do.	White's kiln	200.
Do.	Natal Portland Cement Co. (Pty.) Ltd. (co-owned by Anglo Alpha, Lafarge, and Pretoria Portland Cement companies)	Simumu plant, 125 kilometers southwest of Durban; also grinding mills at Durban and Newcastle	1,500.
Do.	Pretoria Portland Cement Co. Ltd. (Barlow Rand Group, 60.3%)	De Hoek, Dwaalboom, Herculese, Jupiter, Slurru, Riebeck West, and Port Elizabeth kilns	5,500 (combined), clinker.
Chromite	Samancor Ltd. (Billiton plc., 60%, Anglo American plc, 40%)	Eastern Chrome Mines in Steelpoort Valley, Mpumalanga Province, includes: Lannex, Groothoek, Jagdlust, Mooihoek, Tweefontein, and Steelpoort mines	2,200 run-of-mine ore.
Do.	do.	Western Chrome Mines in Northern Province includes Elandsdrift, Mooinooi, Ruighoek, and Waterkloof-Millsell mines	1,800 run-of-mine ore.
Do.	Chromecorp Holdings Ltd. [Xstrata Ag, nee (Sudelektra Holdings AG, (Switzerland) 100%]	Kroondal Mine east of Rustenburg	1,260 ore; 880 concentrate.
Do.	do.	Wonderkop Mine east of Rustenburg	720 ore; 400 concentrate.
Do.	do.	Chroombonne Mine near Rustenburg	576 ore; 432 concentrate.
Do.	do.	Purity Mine, near Rustenburg	360 ore; 252 concentrate.
Do.	Hernic Ferrochrome Pty. Ltd., [E.L. Haniel (Germany); Nittetsu Shoji (Japan)]	Hernic Chrome Mine near Brits, North West Province, and Mooinooi Mine near Rustenburg	NA.
Do.	Bayer Pty. Ltd.	Rustenburg Chrome Mine	NA.
Do.	Lavino South Africa (Pty.) Ltd. (Anglovaal Minerals Ltd., 51%; Middle Witwatersrand, 49%)	Grootboom Mine near Lydenburg	500 ore.
Do.	Dilokong Chrome Mine (Pty.) Ltd. (Mining Corp. Ltd., 100%)	Dilokong Mine near Lydenburg	480 ore.
Do.	Associated Manganese Mines of South Africa Ltd. (Anglovaal Minerals Ltd., 50.2%; Associated Ore & Metal Corp., 45.2%)	Dwarsrivier Mine to open 2000	1,000 run-of-mine ore.
Coal	Amcoal Colliery and Industrial Operations Ltd. (Anglo American Plc. (52%)	8 collieries: Arnot, Bank, Goedehoop, Kriel, New Denmark, New Vaal, SA Coal Estates, and Vryheid Coronation, in Mpumalanga and KwaZulu-Natal	52,000 anthracite and bituminous.

See footnotes at end of table.

TABLE 2--Continued
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Coal--Continued	Ingwe Coal Corp. Ltd. (Billiton Plc., 100%)	10 collieries in Mpumalanga and KwaZulu-Natal Provinces	59,000 anthracite and bituminous.	
Do.	Duiker Mining Ltd., (Glencore International AG, 100%)	Duiker and Tavistock collieries (6 mines, includes Tweefontein and Spitzkop collieries)	20,000.	
Do.	Duvha Opencast Services (Pty.) Ltd. (Rand Mines Ltd., 71%)	Duvha Colliery, 18 kilometers southeast of Witbank	11,000 bituminous.	
Do.	Kangra Group Pty. Ltd.	Savamore, Springlake, Taaboschpruit, and Welgedacht collieries	4,300 bituminous and steam.	
Coal	Sasol Mining (Pty.) Ltd. (Sasol, 100%)	Sigma Colliery, 2 mines, 75 kilometers south of Johannesburg (closing end 1999)	5,500 bituminous.	
Do.	do.	Secunda Collieries, 6 mines, 75 kilometers south of Witbank	43,000 bituminous.	
Do.	Iscor Mining Ltd. (Iscor Ltd., 100%)	Grootegeeluk Mine, 120 kilometers north of Thabazimbi	12,000 steam coal. 2,000 coking coal, 450 metallurgical coal.	
Do.	do.	Leeuwpan Colliery in Mpumalanga Province	1,250 steam coal.	
Do.	do.	Durnacol Mine at Dannhauser, 40 kilometers south of Newcastle	530 coking coal.	
Do.	do.	Tshikondeni Mine in Venda, about 100 kilometers southeast of Messina	410 coking coal.	
Do.	Anglovaal Minerals Ltd. (100%)	Dortfontein Colliery	700.	
Do.	do.	Forzando Colliery	1,350.	
Do.	Newcoal (Eyesizwe Coal (Pty.) Ltd., 80%; Anglo Coal, 11%; Ingwe Coal Corp. Ltd., 9%)	Matla, Arnot underground, Glisa, and, New Clydesdale collieries	18,000.	
Do.	Kuyasa Mining (Pty.) Ltd.	Ikhewezi mine, near Delmas	350.	
Do.	Gold Fields Coal Ltd.	Greenside and New Clydesdale Collieries	3,000.	
Do.	Anker Holdings B.V. (Netherlands)	Elandsfontein, Golfview, Van Oudshoornstrom, and Woestalleen collieries	5,000 e/.	
Do.	Wakefield Coal Division, [Metorex Pty. Ltd., 40.07% (Canada)]	Leeuwfontein and Side collieries in Witbank Coalfield	1,300 steam.	
Copper	Palabora Mining Co. Ltd. (Rio Tinto Ltd., 46.4%, Anglo American plc /De Beers, 29%)	Palabora open pit mine and plant at Phalaborwa	130 metal in ore.	
Do.	do.	(Switch to underground mining in 2002)	(Reduce to 75 metal in ore.)	
Do.	do.	Smelter at Phalaborwa	140 anodes.	
Do.	do.	Refinery at Phalaborwa	125 cathodes.	
Do.	O'okiep Copper Co. Ltd. [Metorex (Pty.) Limited 89%]	Nigramoep copper mine, near Nababeep, Northern Cape Province	15 Cu in concentrates.	
Do.	do.	O'okiep smelter at Nababeep	42 blister.	
Do.	Black Mountain Mineral Development Co. (Pty.) Ltd. (Anglo American plc., 100%)	Black Mountain Mine near Aggeneys, 100 kilometers northeast of O'okiep	5 Cu in concentrate.	
Do.	Maranda Mining Co. [Metorex (Pty.) Limited, 29.1%]	Maranda zinc-copper mine in Murchison Range in Northern Province	1.6 Cu metal.	
Diamond thousand carats	De Beers Consolidated Mines Ltd., (Anglo American plc, 29%)	Finsch Mine, 100 kilometers west of Kimberley	2,500. e/	
Do.	do.	Kimberley Mines, Kimberley	800. e/	
Do.	do.	Koffiefontein Mine, 70 kilometers south of Kimberley	200. e/	
Do.	do.	Namaqualand Mines, 50 kilometers north of Port Nolloth	800. e/	
Do.	do.	Premier Mine, 70 kilometers east of Pretoria	1,700. e/	
Do.	do.	Venetia Mine, 150 kilometers north of Potgietersrus	5,000. e/	
Do.	do.	SouthernEra Resources Ltd. (Canada), (In joint venture with De Beers or Randgold Resources on some operations)	Klipspringer project, includes 10 kimberlite fissures and pipes near Potgietersrus in Northern Province	1,000.
Do.	do.	Benguela Concessions Ltd.	Several marine operations along Namqualand coast; Moonstone mining ship	40.

See footnotes at end of table.

TABLE 2--Continued
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Diamond--Continued thousand carats	Trans Hex Group Ltd.		Baken deposit on Orange River; So Ver, Reuning, Komagass, and Hondklip Bay mines, and 3 marine operations off Northern Province	200.
Do.	do.	Trivalence Mining Corp. of Canada, (100%)	Palmietgat kimberlite mine	50.
Fluorspar	Vergenoeg Mining Corp. (Pty.) Ltd. [Metorex Pty. Ltd., 70%; Minerale y Productos Derivados SA (Spain), 30%]		Vergenoeg Mine, 90 kilometers east of Pretoria	100 acid-grade fluorspar. 10 metallurgical grade fluorspar.
Do.	South Africa Land & Exploration Co. (Sallies), [Athlone International (Australia), 100%]		Witkop Mine, 130 kilometers west of Johannesburg	120 acid-grade fluorspar (plan to double capacity).
Do.	Van den Heever Fluorspar Works		Van Den Heever Mine, 120 kilometers west of Johannesburg	50 e/ metallurgical-grade fluorspar.
Gold	tons	AngloGold Ltd.	Vaal River Operations: includes Great Noligwa (ex Vaal Reefs Shaft 8), Kopanang (Vaal Reefs #9), and Tau Lekoa (Vaal Reefs #10) underground mines; Vaal River surface operations; and Moab Khotsong development	60 Au.
Do.	do.	do.	Ergo Operations: Slimes dam reprocessing	11 Au.
Do.	tons	AngloGold Ltd.	Free State Operations: includes Bambanani (Freegold #1), Tshepong (Freegold #2), Matjhabeng (ex-Western Holdings), and Joel, underground mines and Free State surface operations	48 Au.
Do.	do.	do.	West Wits Operations: includes Tau Tona (ex-Western Deeps-East), Savuka (ex-Tau Tona (ex-Western Deeps-East), Savuka (ex-Western Deeps-West), Mponeng (ex-Western Deeps-South) underground mines plus Western Ultra Deep Levels project	42 Au. 12 Au by 2003.
Do.	do.	Gold Fields Ltd.	Beatrix, Driefontein, Kloof, Oryx, St.Helena, and Target mines; west and southwest of Johannesburg	125 Au, South African operations only.
Do.	do.	Harmony Gold Mining Co. Ltd.	Free State Operations--shafts include: Harmony 2 and 4; Merriespruit 1, 7, and 3; Virginia, Unisel, Masimong 4 and 5; Brand 2, 3, and 5; Central, Saaiplaas, and Virginia metallurgical plants; and Central refinery	26.5 Au.
Do.	do.	do.	Deelkraal and Elandsrand mines	20 Au.
Do.	do.	do.	Evander Operations---includes six shafts and Kinross, Leslie, and Winkelhaak metallurgical plants	12.5 Au.
Do.	do.	do.	Randfontein Operations---Includes Cooke 1, 2, and 3, No. 4, and Doornkop shafts, and No. 4 and Doornkop metallurgical plants; and Doornkop South Reef development	24.9 Au.
Do.	do.	do.	Lindum open pit operations	Included in Randfontein.
Do.	do.	do.	Kalgold open pit, heap leach and carbon-in-leach operation at Mafikeng, Northwest Province	3.2 Au.
Do.	do.	Avgold Ltd. (Anglovaal Mining Ltd., 60.1%)	Eastern Transvaal Consolidated Div. (Fairview, New Consort, and Sheba Mines), near Klersdorp	2.8 Au.
Do.	do.	do.	Target mine development	10.9 Au by 2002.
Do.	do.	Durban Roodeport Deep Ltd.	Blyvoornuitzicht and Doornfontein Section	6.3 Au.
Do.	do.	do.	Buffelsfontein Section	5.5 Au.
Do.	do.	do.	Hartebeestfontein Section	15.5 Au.
Do.	do.	do.	Crown Section - tailings retreatment	4.1 Au.
Do.	do.	do.	Argonaut Deep project on hold (60-million-troy-ounce gold resource)	
Do.	do.	Western Areas Ltd. (JCI Gold, 50%, and Placer Dome Inc., 50%)	Western Areas	6 Au.
Do.	do.	do.	South Deep project	11.7 Au by 2002.
Do.	do.	Rand Refinery Ltd.	Germiston, Gauteng Province	1,200 refined Au.

See footnotes at end of table.

TABLE 2--Continued
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel:			
Iron ore	Iscor Ltd.	Sishen Mine at Sishen	27,000 ore to 32,000 by 2002.
Do.	do.	Thabazimbi Mine at Thabazimbi	2,900 ore.
Do.	Highveld Steel and Vanadium Corp. Ltd. (Anglo American plc, 74%)	Mapochs Mine at Roossenekal, 60 kilometers west of Lydenburg	3,000 titaniferous and vanadiferous magnetite ore.
Do.	Associated Manganese Mines of South Africa Ltd., (Anglovaal Minerals Ltd., 50.2%)	Beeshoek Mine near Postmasburg	4,500 ore.
Ferroalloys 2/	Samancor Chrome Division, (Billiton plc., 60%; Anglo American plc, 40%)	Ferrometals plant at Witbank, (6 furnaces, 2 with 110,000 capacity closed in 1999); F1 and F2 20 megawatt furnaces (80,000 metric tons per year) closed August 2000	450 ferrochromium.
Do.	do.	Tubatse Ferrochrome plant at Steelpoort (6 furnaces)	340 ferrochromium.
Do.	do.	Middelburg Ferrochrome plant 35 kilometers east of Witbank (3 furnaces)	235 ferrochromium.
Do.	do.	Palmiet Ferrochrome plant at Krugersdorp, 30 kilometers west of Johannesburg (3 furnaces)	120 ferrochromium.
Do.	do.	Bathlako Ferrochrome plant at Ruighoek, northwest of Rustenburg	20 ferrochromium.
Do.	Chromecorp Holdings Ltd., [Xstrata AG, nee Sudelektra Holding AG (Switzerland), 100%]	Rustenburg (6 furnaces)	400 ferrochromium.
Do.	do.	Lydenburg (4 furnaces)	350 ferrochromium.
Do.	do.	Wonderkop (4 furnaces)	320 ferrochromium.
Do.	do.	Rustenburg slag retreatment plant	25 ferrochromium.
Do.	do.	Wonderkop slag retreatment plant	20 ferrochromium.
Do.	do.	Silicon Technology plant at Ballengeich, KZN	55 ferrosilicon.
Do.	Samancor and Xstrata Joint Venture (Billiton plc., 50%; Xstrata AG, 50%)	Wonderkop furnace (mid-2001 start up)	180 ferrochromium.
Do.	Hernic Ferrochrome Pty. Ltd., [ELG Haniel (Germany); Nittetsu Shoji (Japan)]	Plant near Brits (2 furnaces)	260 ferrochromium.
Do.	Feralloys Ltd. (Associated Manganese Mines of South Africa Ltd., 100%)	Machadadorp plant (3 furnaces), 80 kilometers east of Middelburg	150 ferrochromium, 175 by 2000.
Do.	Cato Ridge Alloys Ltd. (Associated Manganese Mines of South Africa Ltd., 50%, Mizushima Ferroalloy Co. Ltd., 40%, Sumitomo Corp., 10%)	Cato Ridge, 75 kilometers west of Durban	245 ferromanganese.
Do.	Samancor Manganese Division, (Billiton plc., 54.6%; Anglo American plc, 28.9%, other private, 16.5%)	Metalloys Ltd. plant at Meyerton (9 furnaces), 50 kilometers south of Johannesburg; can switch between FeMn and SiMn	530 high-carbon ferromanganese, 200 silicomanganese.
Do.	Advalloy (Pty.) Ltd., (Billiton/Samancor, 50%; Japan Metals & Chemicals Co., 35%; Mitsui & Co. Ltd., 15%)	Furnace at Samancor's Meyerton Plant	75 low-carbon and high-carbon ferromanganese.
Do.	Manganese Metal Co. (Pty.) Ltd. (Samancor Ltd.)	Plants at Krugersdorp and Nelspruit	44 electrolytic manganese.
Do.	Transalloys Division (Highveld Steel and Vanadium Corp. Ltd., 100%)	Witbank	50 medium-carbon ferromanganese.
Do.	do.	do.	175 silicomanganese.
Do.	tons ASA Metals (Pty.) Ltd. (Eastern Asia Metal Investment Co. Ltd., 60%; Northern Province Development Corp., 40%)	Plant near Pietersburg, Northern Province (associated with Dilokong Chrome)	50 ferrochrome.
Do.	Rand Carbide Division, Highveld Steel and Vanadium Corp. Ltd., (100%)	Plant at Witbank, Mpumalanga Province	58 ferrosilicon.
Do.	tons Vametco Minerals Corp. (Strategic Minerals Corp., USA, 100%)	Smelter near Brits	5,250 ferrovanadium.
Steel	Iscor Ltd.	Vanderbijlpark Works	3,200 flat products.
Do.	do.	Newcastle Works	2,000 profile products.
Do.	do.	Vereeniging Works	450 e/ specialty steels.
Do.	Highveld Steel and Vanadium Corp. Ltd. (Anglo American plc, 74%)	Witbank	1,000 cast billets, blocks, and slabs.
Do.	Saldanha Steel (Pty.) Ltd. (Iscor Ltd., 50%; Industrial Development Corp., 50%)	Hot-rolled steel coil plant at Saldanha Bay	1,200.
Do.	Columbus Stainless (Samancor, 33.3%; Highveld Steel and Vanadium Corp. Ltd., 33.3%; Industrial Development Corp., 33.3%)	Stainless steel plant at Middelburg	500.

See footnotes at end of table.

TABLE 2--Continued
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Iron and steel--Continued:				
Steel--Continued	Scaw Metals Division, Anglo Operations Ltd.		Germiston plant, Johannesburg	500 speciality castings and rolled products.
Do.	Duferco Steel Processing Ltd.		Cold-rolled slab steel at Saldanha Bay	400.
Do.	Davsteel Division, Cape Gate Pty. Ltd.		Vanderbijlpark plant, Gauteng	400 rebar, wire rod, and other shapes.
Do.	Cape Town Iron & Steel Works (Pty) Ltd. (CISCO)		Kuilsrivier plant, Cape Town	180 rebar.
Manganese	Associated Manganese Mines of South Africa Ltd. (Avmin Ltd., 50.2%)		Gloria and N'Chwaning Mines near Black Rock, 70 kilometers north of Sishen	1,500 ore.
Do.	Samancor Ltd. (Billiton plc., 60%, Anglo American plc, 40%)		Mamatwan open pit mine and Mamatwan ore sintering plant, near Hotazel	2,200 ore, of which, 1,100 sintered ore.
Do.	do		Wessels underground mine, near Hotazel	1,200 ore.
Do.	Manganese Metal Co. Pty. Ltd. (Samancor Ltd., 100%).		Electrolytic plant, Nelspruit, Mpumalanga	26 manganese metal.
Do.	do.		Electrolytic plant, Krugersdorp, Gauteng	18 manganese metal.
Do.	Metmin (Metorex Pty. Ltd., 100%)		Open pit mine in Northwest Province (used as catalyst for extracting uranium from gold)	24 manganese dioxide.
Nickel	Nkomati Joint Venture (Anglovaal Mining Ltd., 75%; Anglo American plc, 25%)		Nkomati Mine in Mpumalanga Province	15 nickel in concentrate.
Petroleum, crude million 42-gallon barrels	Soeker (Government, 100%)		Oribi field 140 kilometers southwest offshore from Mossel Bay	9.1.
Do.	do.	do.	Oryx field	1.8 e/.
Do.	do.	Mossgas, (Government, 100%, through Central Energy Fund)	9 wells in Mossel Bay	3.5.
Do.	do.	Shell and BP Refineries Pty. Ltd. (Shell South Africa, 50%; BP, 50%)	Sanref refinery in Durban	60 crude.
Do.	do.	Caltex Oil SA Pty. Ltd. (private, 100%)	Refinery in Cape Town	41 crude.
Do.	do.	National Petroleum Refiners of South Africa Pty. Ltd. (SASOL, Total SA)	Natref Refinery in Secunda, 100 kilometers southeast of Johannesburg	32 crude.
Do.	do.	Engen Ltd. (62%)	Gencor Refinery in Durban	38 crude.
Phosphate	Phosphate Development Corp. Ltd. (Foskor Ltd.) (IDC, 100%)		Foskor mine and plant at Phalaborwa	2,900 phosphate rock 3/.
Platinum-group metals kilograms	Anglo American Platinum Corp. Ltd., (Anglo American Plc., 100%). (Anglo Platinum)		Rustenburg Section near Rustenburg, Rustenburg underground and open pit mines (New Waterval UG2 mine by 2002) Adding 12,285 kilograms per year platinum capacity by 2002	24,000 platinum metal. 10,260 palladium metal. 1,650 rhodium metal.
Do.	do.	do.	Rustenburg mill	9,000,000 tons per year ore.
Do.	do.	do.	Union Section, 50 kilometers south of Thabazimbi	9,850 platinum metal. 4,540 palladium metal. 1,470 rhodium metal.
Do.	do.	do.	Union mill	4,000,000 tons per year ore.
Do.	do.	do.	Amandelbult Section, 50 kilometers south of Thabazimbi mines	17,700 platinum metal. 8,150 palladium metal. 6,500 rhodium metal.
Do.	do.	do.	Amandelbult mill	6,000,000 tons per year ore.
Do.	do.	do.	Lebowa Platinum (Atok) Mine, 70 kilometers east of Potgietersrus	2,520 platinum metal. 1,100 palladium metal. 150 rhodium metal.
Do.	do.	do.	Lebowa Platinum Mill	1,000,000 tons per year ore.
Do.	do.	do.	Potgietersrust Platinums Mine (30 million metric tons per year low grade ore mined, most of which is stockpiled for future use)	5,160 platinum metal. 5,500 palladium metal. 350 rhodium metal.
Do.	do.	do.	Potgietersrust Platinum mill	3,100,000 tons per year ore.
Do.	do.	do.	Bafokeng Rasimone mine in Northern Province opening in 2000, full capacity by 2002	7,776 PGM.
Do.	do.	do.	Bafokeng Rasimone mill	2,400,000 tons per year ore.
Do.	do.	do.	Waterval Mine	12,285 PGM.
Do.	do.	do.	Total Amplats mill capacity	23,800,000 tons per year ore.
Do.	do.	do.	Waterval Mill	4,800,000 tons per year ore.

See footnotes at end of table.

TABLE 2--Continued
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
			Waterval smelter	50 converter matte.
Platinum-group metals-- Continued kilograms				
Do.	do.	Anglo American Platinum Corp. Ltd., (Anglo American Plc., 100%). (Anglo Platinum)	Rustenburg Base Metals Refiners Refinery	25 nickel plus refined copper and cobalt, and precious metals concentrates.
Do.	do.	do.	Precious Metals Refinery - Total Amplats capacity	70,000 platinum metal, 34,000 palladium metal, 6,500 rhodium metal.
Do.	do.	Anglo Platinum and African Rainbow Minerals	Maandagshoek Mine (full capacity by 2003)	5,000 platinum metal.
Do.	do.	do.	Maandagshoek mill (to treat UG2 ore)	2,400,000 tons per year ore.
Do.	do.	Impala Platinum Ltd. (Impala Platinum Holdings Ltd., 100%) (Implats)	13 mine shafts and concentrator near Rustenburg, Northwest Province	15,000,000 tons per year ore.
Do.	do.	do.	Smelter	
Do.	do.	do.	Enhanced Precious Metals Refinery near Springs, Gauteng Province	62,200 platinum, 18,000 palladium, 4,600 rhodium.
Do.	do.	do.	Reopening Crocodile River Mine in 2001	1,555 platinum plus 930 other PGM.
Do.	do.	do.	Platexco properties, including Winnaarshoek Deposit adjacent to Implats Clapham, Forrest Hill and Dreikop properties. Plus Platexco Mokopane and Septre properties	6,220 PGM.
Do.	do.	Lonmin Platinum (Lonmin Plc., 73%; Impala Platinum Holdings Ltd., 27%)	3 mines (Eastern Platinum, Karee, and Western Platinum) near Rustenburg	37,324 PGM (in concentrates), 10,000,000 tons per year ore.
Do.	do.	do	Smelter	Matte, 6,000 grams per ton PGM.
Do.	do.	do.	Base Metals Refinery	Copper and nickel sulfate, and PGM concentrates.
Do.	do.	do.	Precious Metals Refinery, at Western Platinum, 20 kilometers east of Rustenburg	20,600 platinum, 9,330 palladium, 2,800 rhodium.
Do.	do.	Northam Platinum Ltd. (Mvelaphanda Platinum, 22.5%; Anglo Platinum, 20%)	Northam Mine 20 kilometers south of Thabazimbi	13,000 platinum.
Do.	do.	do.	Northam mill (treats Merensky ore)	1,800,000 tons per year ore.
Do.	do.	do.	New mill in 2001 (to treat UG2 ore)	900 ore.
Do.	do.	do.	Northam Refinery	5,910 platinum.
Do.	do.	Kroondal Platinum Mines, [Aquarius Platinum Ltd., (Australia), 45%, and Implats, 15%]	Kroondal Minel, 10 kilometers east of Rustenburg; opening in 2000	3,110 platinum, 1,555 palladium, 467 rhodium.
Do.	do.	do.	Kroondal mill	1,200,000 tons per year ore.
Do.	do.	Aquarius Platinum Ltd. (Australia), (Implats, 25%)	Marikana Mine, 20 kilometers SE of Rustenburg (feasibility study in 2000)	4.665 platinum planned.
Do.	do.	do.	Marikana mill	1,540,000 tons per year ore.
Do.	do.	do.	Everest South deposit feasibility study in 2001	5,440 PGM planned.
Do.	do.	Messina Holdings Ltd. (SouthernEra Resources Ltd., 70.4%) (Purchased from Implats in 1999)	Messina platinum deposit, near Klipspringer diamond mine, Northern Province, 2003 startup	2,176 platinum, 1681 palladium, 247 rhodium.
Pyrophyllite		Alpha Ltd.	Idwala Industrial Minerals plant, and Witpoort Quarry	NA.
		Wonderstone Ltd., (The Associated Ore & Metals Corp. Ltd.)	Pyrophyllite (wonderstone) mine in Northwest Province	NA.
Do.		G&W Base and Industrial Minerals Pty. Ltd.	Masala Mine, Mpumalanga	NA.
Silicon		Silicon smelters (Pechiney, 77%, Samancor, 23%)	Near Pietersburg, Northern Province (3 submerged arc furnaces)	40 silicon.
Synthetic fuels million 42-gallon barrels		Sasol, (Government, 100%)	Coal to oil plant at Secunda and a coal to petrochemical plant at Sasolburg	54.8.
Do.	do.	Mossgas (Government, 100% through Central Energy Fund)	Natural gas to petroleum products plant at Mossel Bay	16.4.

See footnotes at end of table.

TABLE 2--Continued
SOUTH AFRICA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Titanium:				
Titanium concentrates	Richards Bay Minerals trading for Tisands (Pty.) Ltd. and Richards Bay Iron and Titanium (Pty.) Ltd. (Rio Tinto Plc., 50%; Billiton Plc., 50%)	Opencast operations near Richards Bay	1,280 ilmenite concentrate. e/ 125 rutile concentrate. e/	
Do.	Namakwa Sands Ltd. (Anglo Operations Ltd, a subsidiary of Anglo American plc, 100%)	Opencast mine near Brand-se-Baai and mineral separation plant at Koekenaap, 300 kilometers northwest of Cape Town	540 ilmenite concentrate, 42 rutile concentrate.	
Titanium slag	Richards Bay Iron and Titanium (Pty.) Ltd./ Richards Bay Minerals (Rio Tinto Plc.)	Smelter at Richards Bay	1,000 titania slag.	
Do.	Namakwa Sands Ltd. (Anglo Operations Ltd, a subsidiary of Anglo American plc, 100%)	Smelter at Vredenberg, Saldanha Bay area	230 titania slag (by 2000), 120 pig iron.	
Do.	Highveld Steel and Vanadium Corp. Ltd.	Steel plant at Witbank	48 titania slag. e/	
Uranium	tons	AngloGold Ltd. (Anglo American plc., 60%; De Beers, 40%)	Vaal Reefs Mine and plant near Klerksdorp	2,000 uranium oxide e/ (900 @ 1998-99 output).
Do.	do.	Avgold Ltd. (Anglovaal Minerals Ltd, 100%)	Hartebeestfontein Mine and plant, 5 kilometers southeast of Klerksdorp	400 uranium oxide. e/ (<200 @ 1998-99 output).
Do.	do.	Palabora Mining Co. Ltd.	Palabora Mine and plant at Phalaborwa	160 uranium oxide. e/
Vanadium	do.	Highveld Vanadium and Chemicals (Anglo American plc through Highveld Steel and Vanadium Corp. Ltd.)	Mapochs Mine near Lydenburg	25,000 vanadium pentoxide. e/
Do.	do.	do.	Highveld steel plant in Witbank	17,000 vanadium pentoxide.
Do.	do.	do.	Highveld Vantra plant in Witbank	8,000 vanadium pentoxide.
Do.	do.	Vametco Minerals Corp. (Strategic Minerals Copr., USA, 100%)	Krokodilkraal Mine and plant near Brits	5,000 vanadium pentoxide. e/
Do.	do.	Transvaal Alloys Pty. Ltd. (Highveld Steel and Vanadium Corp., 100%)	Wapadskloof Mine and plant, 60 kilometers northeast of Middelburg	2,250 vanadium pentoxide. e/
Do.	do.	Vanadium Technology Ltd., [Xstrata AG, nee Sudelektra Holding AG (Switzerland), 100%]	Kennedy's Vale (ex-Vansa Vanadium) Mine and plant, near Lydenburg	5,900 vanadium pentoxide, 1,500 ferrovandium.
Do.	do.	Rhombus Vanadium Holdings Ltd. [Xstrata AG, nee Sudelektra Holding AG (Switzerland), 100%]	Ba-Mogopa Mine and Usko plant	13,500 vanadium.
Vermiculite	Palabora Mining Co. Ltd.	Palabora mine and plant at Phalaborwa	230 concentrate. e/	
Do.	Natkruit Vermiculite Mine Pty. Ltd. (Verimex Trading Pty. Ltd.)	Mine near Soutpansberg, Northern Province	22 concentrate, (closed March 1999).	
Zinc	Zinc Corp. of South Africa Ltd. ("Zincor") (Isacor Ltd., 100%)	Struisbult Springszinc refinery at Springs, southeast of Johannesburg	120 Zn.	
Do.	Black Mountain Mineral Development Co. (Pty.) Ltd. (Anglo American plc., 100%)	Black Mountain Mine near Aggeneys, 100 kilometers northeast of Okiep	26 Zn (in concentrate).	
Do.	Maranda Mining Co. [Metorex (Pty.) Limited, 29.1%]	Maranda zinc-copper mine in Murchison Range in Northern Province	15 Zn metal in concentrates.	
Do.	Pering Mine (Pty.) Ltd. (Billiton plc., 100%)	Pering Mine in Northern Cape Province (phased closure begun in 1999)	27 Zn in concentrate, 6 Pb in concentrate.	
Zirconium	Tisand (Pty.) Ltd./Richards Bay Minerals	Opencast mines near Richards Bay	300 zircon concentrate.	
Do.	Namakwa Sands Ltd. (Anglo Operations Ltd, a subsidiary of Anglo American plc, 100%)	Opencast mine near Brand-se-Baai and mineral separation plant at Koekenaap	140 zircon concentrate.	
Do.	Palabora Mining Co. Ltd.	Palabora Mine and plant at Phalaborwa	14 baddeleyite. e/	
Do.	do.	Zirconium basic sulphate plant at Phalaborwa	8 Zr basic sulphate (by1999).	
Do.	Phosphate Development Corp. Ltd. (Foskor Ltd.) (IDC, 100%)	Plant at Phalaborwa	3 baddeleyite. e/	
Do.	do.	Fused zirconia plant	6 synthetic zirconia.	

e/ Estimated. NA Not available.

1/ Based on information available as of September 2000.

2/ Depending on markets furnace capacity can switch between ferrochromium and ferromanganese.

3/ 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 1999 1/

(Million metric tons unless otherwise specified)

Commodity	Reserve base
Andalusite 2/	50.8
Antimony	thousand tons 250
Chromium, ore	3,100
Coal, recoverable	34,980
Cobalt 3/	thousand tons 15
Copper	13
Diamond 4/	million carats 1,120
Fluorspar	36
Gold	thousand tons 35.9
Iron ore, Fe content	1,500
Lead	3
Manganese	4,000
Natural gas	billion cubic meters 22
Nickel 3/	11.8
Petroleum	million barrels 29.4
Phosphate rock, concentrates	2,500
Platinum-group metals	thousand tons 62.8
Silver	do. 10
Titanium	146
Uranium 5/	thousand tons 218.3
Vanadium	12
Vermiculite	80
Zinc	15
Zirconium	14.3

1/ Metallic minerals are contained metal.

2/ Includes the aluminosilicate, sillimanite.

3/ Minerals Bureau estimates as of December 31, 1997.

4/ De Beers reserves and resource data only.

5/ Recoverable at a cost of less than \$80 per kilogram.

Sources: Chamber of Mines Online Statistical Tables 1999, accessible at URL <http://bullion.org.za/bulza/publications/Stats/MinRes.pdf>. Minerals Bureau estimates as of December 31, 1999. U.S. Energy Information Administration, United States-South Africa, International energy data exchange, 1998, accessible at URL <http://www.eia.doe.gov/emeu/international/safricadata.htm>. Petroleum and natural gas estimates as of January 1, 1999.