THE MINERAL INDUSTRY OF

AUSTRALIA

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Australia was estimated to be the third largest producer of minerals and metals (excluding coal and petroleum) in the world in 1995, and its minerals industry was a leading catalyst in promoting growth of the country. In 1995, Australia was the world's leading producer of alumina, bauxite, diamond, ilmenite, lead, monazite, opal, rutile, sapphire, and zircon. It was the third largest producer of gold and zinc, and the fourth largest producer of cobalt, iron ore, and uranium. Australia was the fifth largest producer of coal and nickel in the world. It was the premier exporter of alumina, coal, ilmenite, iron ore, refined lead, monazite, rutile, and zircon. The country's mineral wealth was so extraordinary that it was virtually self-sufficient in most mineral commodities. The only significant mineral resource in which Australia was not self-sufficient was petroleum. Nevertheless, Australia still produced about 75% of its crude oil requirements domestically. However, the country was endowed with abundant resources of other mineral fuels including coal, natural gas, liquefied petroleum gas, and uranium and continued to be one of the few market economy countries that was a net exporter of mineral fuels.

Although the Australian mineral industry dates back to coal and copper mining shortly after the first European settlements in 1788, the country's mining industry did not come into its own until the gold rushes of the 1850's in New South Wales (NSW), Queensland (QLD), Victoria (VIC), and Western Australia (WA); the lead-silver-zinc discoveries at Broken Hill, NSW, in 1883; and the Mount Isa, QLD, lead-silver-zinc and copper finds 50 years later. Further discoveries followed, and, since the mid-1960's, Australia has become a major world producer of a number of minerals.

The minerals industry, the largest primary sector of the economy, remained heavily export-oriented, with about 80% of the value of its mineral production destined for international markets. Mineral exports were heavily concentrated into just four commodity groups: alumina, aluminum, and bauxite; coal; gold; and iron ore.

Government Policies and Programs

In March, Australia's High Court rejected the Government of WA's Land Titles and Traditional Usage Act that challenged the Federal Government's Native Title Act (NTA) of 1993. The NTA had established that the native Aboriginal people still retained, in some circumstances, ownership of land, whereas WA's legislation offered, in place of native ownership, much weaker rights of traditional usage, such as use for ceremonial purposes. With the rejection, the High Court reaffirmed its two previous decisions of 1988 and 1992 that explicitly invalidated the notion that Australia was *terra nullius*—belonging to no one—at the time of European settlement.[1]

The Commonwealth Scientific and Industrial Research Organization was developing a new mineral exploration technique known as spaceborne technology that would be used to create mineral maps to aid the Australian mining industry in discovering new mineral deposits.[2]

The Commonwealth Government in February abandoned its proposals for the introduction of a carbon tax as part of a greenhouse gas package following widespread industry and State Government opposition. The proposal for a levy of $0.94 per metric ton (t) on industry was expected to raise about $750 million over 3 years. Instead, the Government was looking to the corporate sector to deliver on commitments that greenhouse gases such as carbon dioxide, chlorofluorocarbons, and methane can be reduced through greater energy efficiency and other cooperative measures.[3]

Environmental Issues

Australia's Federal Government initiated in October a "Greenhouse Challenge," a joint Government-industry program designed to assist Australian industry in the reduction of greenhouse gas emissions. The program was part of the Government's National Greenhouse Response Strategy.[4]

Production

The value of minerals produced in Australia in fiscal year (FY) 1995[5] was estimated to have increased 5%, to $22.3 billion,[6] over the $21.2 billion of 1994. Metallic mineral production contributed an estimated 40% of the total, followed by petroleum (crude oil, natural gas, and natural gas liquids) production, 30%; coal production, 25%; and industrial minerals production, including clays, construction materials, dimension stone, peat, and salt, 5%. The value of downstream production, including smelting and refining, was estimated also to have increased 5% in FY 1995 over that of FY 1994.

Australia remained the world's leading producer of alumina, bauxite, diamond, ilmenite, monazite, opal, rutile, sapphire, and zircon in calendar year 1995. The country also continued to rank among the world's top producers of aluminum, antimony, coal, cobalt, copper, gold, iron ore, lead, manganese, mined and refined nickel, salt, silver, tin, uranium, and mined zinc. *(See table 1.)*

Trade

Australia continued to rely heavily on the export of the majority of its mineral production to bolster economic growth. The value of its mineral exports in FY 1995 increased about 7.5%, to $22.4 billion, from the $20.8 billion set in FY 1994, and the minerals industry remained Australia's largest export earner, accounting for about 60% of commodity export earnings. An estimated 80% of Australia's mineral production was exported. Australia remained the premier exporter of alumina, coal, ilmenite, iron ore, refined lead, monazite, rutile, and zircon. While using its plentiful resources of energy minerals (coal, liquefied natural gas, and uranium), Australia also continued to be a net exporter of mineral fuels, thus enabling the country to retain a favorable trade balance in energy products.

Coal remained Australia's largest mineral export earner in 1995, followed by gold, iron ore, and bauxite, respectively. Annually, Australia exports about 70% of its coal production, accounting for about 30% of world coal trade; more than 90% of the gold it produces; about 90% of its iron ore production, also representing about 30% of world trade; and 80% of its aluminum production, composing more than 10% of world trade. The richness and diversity of the Australian minerals sector provided a significant portion of the gross domestic product, contributing an estimated 50% of the country's export earnings in FY 1995.

Structure of the Mineral Industry

The Australian minerals industry covers nearly the whole spectrum of minerals, from major industrial minerals (ilmenite, rutile, and zircon), base metals (copper, lead, and zinc), ferrous metals (iron ore, manganese, and nickel), nonferrous metals (aluminum and tin), precious metals (gold and silver), fuel minerals (coal and uranium), to gemstones (diamond, opal, and sapphire). Australia was one of the world's principal producers and suppliers of ores, concentrates, and refined metals. Australia was estimated to rank third in the world in the value of nonfuel mineral production. The value of mineral production, including fuels, was estimated to rank eighth in the world.

The Australian mining industry was based on a system of free enterprise, with private companies involved in exploration, mine development, production, mineral processing, and marketing. A number of foreign companies in mineral ventures in Australia were affiliates or subsidiaries of U.S. companies. Foreign companies controlled a majority of the mining, smelting, and refining sectors and a significant portion of the petroleum and natural gas sectors.

Many of Australia's mineral industries were fully integrated, producing ores, concentrates and other intermediate products (e.g., alumina), and refined metal or other end products (e.g., cut-and-polished gem diamond) within the country. In 1995, there were six alumina refineries and aluminum smelters each; three principal copper smelters and refineries each; one principal gold refinery; four principal lead-zinc smelters and/or refineries; one manganese ferroalloys plant; one nickel smelter and two nickel refineries; three principal crude steel plants; one primary tin smelter and refinery each and two secondary tin refineries; and two silver refineries. Australia had eight principal petroleum refineries.

Ownership of mineral rights in Australia was divided between State ownership in State onshore areas and Commonwealth, or Federal, ownership in Territories and in offshore areas beyond the territorial limit. However, the Commonwealth's responsibility for minerals in the Northern Territory (NT), except for uranium, has been transferred to the government of the NT. Thus, the individual States and Territories administered the minerals industries within their own borders, including registering of land titles; issuing exploration and development permits; overseeing mining operations, including administration of inspections; assuring compliance with health, safety, and environmental regulations; and levying royalties and taxes.

The Federal Government may restrict mineral exports for the good of the country and therefore had de facto control over most mineral production. *(See table 2.)*

Commodity Review

Metals

Bauxite, Alumina, and Aluminum.—Australia again was the unchallenged world leader in bauxite production for the 25th consecutive year, producing almost 45% of the production of market economy countries. All mining continued to be from the opencut operations at Weipa on the western flank of the Cape York Peninsula in the far north of QLD; the Gove operation across the Gulf of Carpentaria in northeastern Arnhem Land, NT; and from the mines south of Perth in the Darling Ranges, WA. Although substantial bauxite deposits also were known to occur bordering Admiralty Gulf at Cape Bougainville and in the nearby Mitchell Plateau area of the Kimberley region of northern WA, their remoteness from energy supplies and infrastructure continues to impede development.

Australia also was dominate in the world alumina market, producing from six refineries more than one-third of world production. The NT and QLD each had one refinery; the remaining four were in WA.

Australia was a significant supplier of aluminum as well. Aluminum was produced at six smelters, two each operating in NSW and VIC, and one each operating in QLD and Tasmania (TAS).

Comalco Ltd. began in midyear construction of a third potline at its majority-owned Boyne Island Smelter south of Gladstone in QLD. The 229,000-metric-ton-per-year (t/yr) potline, scheduled for completion in October 1997, would expand the capacity of the facility from 260,000 t/yr to 479,000 t/yr, making it one of the largest aluminum plants in the world. The plant was to reach full capacity by April 1998.[7]

Comalco achieved an agreement in November with the Tasmanian Government and the Hydro Electric Commission of Tasmania covering a power supply contract for its Bell Bay, TAS, smelter that effectively would extend the smelter's life until at least the year 2014. Although further issues still were to be negotiated prior to the formal signing of the contract in 1996, the agreement paved the way for Comalco to commit to upgrading the environmental performance, safety, process performance, and competitiveness of the smelter by 2002.[8] Under the new contract, a further 19 megawatts (MW) of power was to be provided, taking the total available to 256 MW, and enabling production capacity from the existing potlines to be increased by more than 15%, to 140,000 t/yr. Comalco planned to install dry-scrubbing technology as part of its environmental improvement program.[9]

Capral Aluminium Ltd., formerly Alcan Australia Ltd., purchased at the end of November the rolling, extruding, and distributing businesses of Comalco, making Capral by far the largest downstream manufacturer and distributor of aluminum products in the country. Capral produced about one-half of Australia's estimated 50,000-t/yr extrusion output from its own 155,000-t/yr smelter at Kurri Kurri in NSW. The divestiture of Comalco's downstream processing facilities enabled it to concentrate its efforts to improve its position as a world-class producer of bauxite, alumina, and primary aluminum at its upstream processing facilities.[10]

Chromium.—Dragon Mining NL began early in the year a feasibility study for mining high-iron chromite from Australia's largest known chromium deposit, the lateritic ore body containing an estimated 500,000 t of chromite ore, at Range Well in WA.[11] Dragon Mining, in joint venture with the major engineering firm Clough Mining Services, was planning to develop a plant to manufacture chrome grinding balls for use in both the mining and processing industries.[12]

Cobalt.—Australia was the fourth largest producer of cobalt in the world, with output produced as a byproduct of nickel mining and processing. Australia's sole cobalt processor was QNI Ltd., processing laterite nickel-cobalt ores at its Yabulu nickel refinery near Townsville, QLD, for the production of cobalt sulfide. The refinery's feedstock was ore imported from Gebe Island, Indonesia, and La Grande Terre, the main island of New Caledonia, that was blended with domestically produced ores mined at QNI's Brolga Mine and from stockpiled ore from the Greenvale Mine, both in QLD. The Greenvale Mine, 225 kilometers (km) west of Townsville at Marlborough, was depleted in 1992.

QNI awarded in October a contract for the construction of a cobalt plant at its Yabulu Refinery to manufacture pure cobalt oxide hydroxide. The plant was due to be completed in November 1996.[13] The refinery was producing about 1.36 million kilograms per year (kg/yr) of cobalt metal in sulfides as a byproduct, all of which was sold to Kokkola of Finland under long-term contract, but this was to end with the startup early in January 1997 of the facility when QNI stopped producing cobalt sulfides.[14]

Western Mining Corp. Holdings Ltd. (WMC) and Finland's Outokumpu Oy mined byproduct cobalt from their nickel sulfide mines in WA.

MIM Holdings Ltd., in joint venture with Savage Resources Ltd., was assessing the feasibility of producing cobalt associated with copper from the partnership's Ernest Henry copper-gold project in northwestern QLD. The Ernest Henry Mine was expected to start production late in 1997. MIM Holdings also was considering equipping its base metal mine at Mount Isa, QLD, to separate cobalt from copper.[15]

Copper.—Mine production of copper in Australia continued to be from operations that produced other metals, either as the primary product or as a coproduct. The most notable copper-producing operations were at Mount Isa (Hilton copper-lead-zinc mine), QLD, and Roxby Downs Station (Olympic Dam copper-gold-uranium mine), South Australia (SA).

WMC's copper output grew by almost 20,000 t/yr following the completion in midyear of the optimization program at its Olympic Dam polymetallic mine and refinery at Roxby Downs Station. The program involved the construction of a new shaft, the Robinson, and associated underground loading equipment; a new fully autogenous grinding mill, the largest in Australia; and additional thickening and leaching equipment, adding additional flotation capacity. The $55-million production optimization program was started in 1993 and increased copper output from 66,000 t/yr to 84,000 t/yr.[16]

Placer Pacific Ltd. diversified into the copper sector when the company began on August 1 its first commercial production of copper concentrate from the Osborne Mine, 160 km south of Cloncurry, in northern QLD. Previously, Placer Pacific produced only gold and byproduct silver through its holdings in such operations as the Kidston Mine, QLD; the Granny Smith Mine, WA; and the Misima and Porgera Mines in Papua New Guinea. All of the copper concentrate production was to be exported, with about one-half going to Japanese smelters.[17] In November, Placer Pacific committed itself to expand the Osborne Mine's capacity by developing via a decline from the initial open pit a 1-million-ton-per-year (Mt/yr) underground operation, which was to increase the mine's life to a minimum of 11 years, producing annually 29,000 t of copper-in-concentrate and almost 1,200 kilograms (kg) of gold.

Development of the Mount Lyell copper-gold mine on the west coast of TAS near Queenstown progressed as planned during the year, and Gold Mines of Australia Ltd. (GMA) was able to restart mining and commence concentrate production in November. The mine was officially reopened on December 15, producing more than 3,000 t of copper-gold concentrate by yearend. GMA had been awarded the leases for the 101-year-old mine by the Tasmanian Government following Renison Goldfield Consolidated Ltd.'s (RGC) withdrawal at yearend 1994. Production at Mount Lyell was to increase from its initial 1995 rate of about 1.5 Mt/yr of ore to 3.5 Mt/yr over a 3-year period, taking copper-in-concentrate production from 16,200 t/yr to 39,000 t/yr by 1998.[18] GMA secured in August a 10-year agreement to supply copper concentrate to Swiss-based commodity trading house Glencore International AG (formerly Marc Rich).[19]

Cloncurry Mining NL reopened in November the Great Australia Mine in Cloncurry, QLD, after being closed for 70 years. The mine originally was discovered in 1867, with Cloncurry acquiring the exploration tenement containing the mine in 1991. Cloncurry was planning to mine and stack

110,000 t of ore prior to starting heap-leach operations in February 1996. The operation was expected to produce 5,500 t/yr of copper cathode over an expected mine life of 8 years.[20]

MIM Holdings and partner Savage Resources announced in November that it would proceed with development of the Ernest Henry copper-gold mine in northwestern QLD following the granting of key mining leases by the State government. The mine was expected to be in production late in 1997. Plans were for a 15-year mine life with production averaging 95,000 t/yr copper.[21] It was expected that all of the output would be treated at the smelter at Mount Isa and the refinery in Townsville, but the partners had not finalized their plans by yearend and some of the concentrate may be exported.[22]

Gold.—Gold was mined in all States and Territories except the Australian Capital Territory (ACT). In 1995, WA remained the premier gold producer, producing more than 75% of the country's production, followed by QLD and the NT, respectively.

Gold Corp. of Australia, an agency of the State of WA, closed at the end of January its Kalgoorlie Refinery and centralized its refining operations at its Newburn Refinery in Perth. The primary reason for the closure was the shift in global demand from the 99.5%-pure gold produced at Kalgoorlie towards gold of 99.99% purity, which Kalgoorlie was unable to produce. Another reason for the plant's closure was the 40% reduction in refining fees per ounce of gold at Kalgoorlie since 1990.[23]

Following the granting of mining leases by the QLD government, joint-venture partners MIM Holdings and Savage Resources decided in November to proceed with development of the Ernest Henry copper-gold mine in the northwestern part of the State. The mine was expected to average 3,700 kg/yr of coproduct gold over the 15-year life of the mine.

GMA restarted in November mining and milling operations at its Mount Lyell copper-gold mine near Queenstown, TAS. The mine, officially reopened on December 15, produced more than 3,000 t of copper-gold concentrate by yearend. GMA took possession of the mining leases following RGC's withdrawal from the operation at yearend 1994. Production at Mount Lyell was to increase from its initial 1995 rate of about 1.5 Mt/yr of ore to 3.5 Mt/yr over a 3-year period, taking gold production from less than 400 kg/yr to about 900 kg/yr at full production.[24]

Eagle Mining Corp. NL had its inaugural gold pour at the end of December at its Nimary Mine, near Wiluna in WA. Construction and Development of the mine had taken just 5 months, with low-grade ore being fed to the recovery plant in mid-December. At full capacity, planned to be achieved early in 1996, Nimary was expected to produce more than 3,100 kg/yr of gold over the project's life of 5-plus years.[25]

Iron Ore and Steel.—Australia remained the world's leading iron ore exporter in 1995 for the fifth consecutive year. As a world producer, Australia ranked fourth behind China, Brazil, and the former Soviet Union. Australian iron ore production continued to be heavily concentrated in the Hamersley Range of the Pilbara District, WA, which accounted for more than 96% of the country's production. Iron ore also was produced by BHP Steel Pty. Ltd. at its Iron Duke and Iron Knob Mines in the South Middleback Ranges near Whyalla, SA, and at the Savage River Mine in northwestern TAS.

BHP Steel began in June a $70-million upgrade of its Port Kembla, NSW, steelworks, to increase output of slabs by 400,000 t/yr, to 5 Mt/yr. The upgrade also was supporting BHP Steel's growth plans in the production of hot-rolled strip, plate, and feed for its packaging products plant, also undergoing an upgrade and expansion program, while maximizing the potential of the No. 6 blast furnace scheduled for commissioning in March 1996.[26]

The South Australia Steel and Energy joint-venture led by Meekatharra Minerals Ltd., with Ausmelt Ltd. and the government of SA, was in the initial stages at yearend of planning the development of a 4-Mt/yr iron ore mine and the subsequent development of a 2.5-Mt/yr pig iron plant, both in SA. Exports of the iron ore were initially to be from ports in SA, although it was being planned that the iron ore would be transported north by train for shipment out of Darwin in the NT. Startup of the iron works was to be in late 1998 or early 1999 using coal from Meekatharra's mines.[27]

BHP Steel was the only integrated steel producer in Australia during the year. BHP Steel's contribution to total world steel output, however, was relatively small, having just three steelworks that produced less than 1% of world production. BHP Steel's plants were at Newcastle and Port Kembla in NSW and Whyalla in SA.

BHP Minerals Pty. Ltd. began construction in midyear of its 2-Mt/yr direct-reduced iron (DRI)—hot-briqueted iron (HBI) processing plant at Port Hedland, WA. The plant was to incorporate direct reduction technology using the FINMET process developed by Venezuela's Siderurgica Venezolana and Austria's Voest-Alpine Industrieanlagenbai in which iron ore fines are directly reduced using hot, reformed natural gas under pressure in multistage fluidized bed reactors.[28]

Following a favorable feasibility study, privately owned Brisbane-based Minerals Ltd. announced at midyear it would proceed with development of its Fortescue iron ore project in the Dampier-Karratha area of the Hamersley Basin, WA. The Fortescue project, expected to begin production late in 1998 or early 1999, initially was to produce 4 Mt/yr of DRI and 6 Mt/yr of pellets at a processing plant near the coast supplied by a low-grade, magnetite-rich banded iron formation (BIF) mine about 80 km inland in the western end of the Pilbara District. DRI production eventually was to increase to 20 Mt/yr. The BIF ore was to be transported by slurry pipeline from the mine to the plant, then shipped in the form of HBI. Customers mainly would be electric-arc furnace steelmakers in China and Southeast Asia. In addition to the mine and plant, the project also included construction of a power station and port facilities.[29]

Lead and Zinc.—Most lead and zinc mined in Australia was from operations that produced both because the two metals commonly occur in the same deposits. Zinc was the main product in almost all of Australia's lead-zinc mining operations.

Australia ranked first in the production of lead concentrates and third in the production of zinc concentrates, producing, respectively, about 16% and 13% of the world's total in 1995. In refined production, Australia ranked eighth in lead and seventh in zinc in 1995.[30]

MIM Holdings' 70%-owned world-class-size McArthur River underground lead-zinc-silver project started mining ore in February 1995 and began milling operations in June. The McArthur River Mine is 120 km inland from the Gulf of Carpentaria in eastern NT and 230 km west of the QLD border, approximately midway between NT's capital at Darwin and MIM Holdings' Mount Isa Mine in northern QLD. The mine, operated by McArthur River Mining Pty. Ltd., was on schedule to reach its full mining capacity of 1.5 Mt/yr of ore by mid-1996. The mine's design capacity was 350,000 t/yr of high-grade bulk concentrate containing 45,000 t of lead, 160,000 t of zinc, and 50,000 kg of silver. The concentrate was to be transported 120 km by road to Bing Bong on the Gulf of Carpentaria coast and barged to ships moored 30 km offshore for export to overseas smelters. Up to one-half of the mine's output was slated to be sent to MIM Holdings' European smelters, Britannia Zinc Ltd. in Avonmouth, England, and MIM Huttenwerke in Duisburg, Germany. Of the remaining output, two Japanese smelters were to purchase about one-half, and the rest was scheduled to go to Pasminco Ltd.'s Cockle Creek Smelter near Newcastle, NSW, and two other European plants, Metaleurop in France and Enirisorse in Sardinia.[31]

CRA Ltd. formally committed itself in December to develop its Century lead-zinc deposit, 250 km northwest of Mount Isa, QLD. Development was subject to final agreement of the local Aboriginal communities, whose environmental, welfare, and cultural concerns were outstanding issues under negotiation for several months during the year. The Century Mine was to be operated by Century Zinc Ltd., a wholly owned subsidiary of CRA. A timely settlement with the local communities was essential so that CRA could meet an early 1998 contract deadline to provide the necessary low-iron concentrates to Pasminco's 205,000-t/yr Budel Zink smelter in the Netherlands, without which the Budel facility would be forced to close under Dutch law because of environmental infringements—Budel had to halt its disposal of jarosite waste generated during the smelting process.[32] Planned annual production at the Century Mine was to be 450,000 t/yr zinc-in-concentrate and 40,200 t/yr lead-in-concentrate beginning early in 1998. Production was to be transported in slurry form through a pipeline to storage and loading facilities at Karumba on the Gulf of Carpentaria, 300 km distant. From Karumba, it was to be barged to vessels anchored offshore for shipment overseas.[33]

Pasminco received in November approval from the NSW Government to upgrade its Cockle Creek zinc smelter at Boolaroo, near Newcastle in the Hunter Valley region of the State. The refurbishing was to include immediate improvements in environmental aspects of the smelting process that also would reduce costs, and a later increase in smelting capacity, scheduled to be done when the furnace undergoes a major maintenance program in 1997. The expansion would increase production from 80,000 t/yr to 110,000 t/yr.[34]

The Republic of Korea's Korea Zinc Co. Ltd. announced at yearend that it would proceed with construction of a zinc smelting plant at Townsville, QLD. The 2-phase project was to commence in midyear 1996 with construction of a 170,000-t/yr capacity smelter scheduled to come on-stream in 1999. The second phase of the project, beginning about 2004, was to double the capacity of the plant.[35]

Manganese.—Groote Eylandt Mining Co. Pty. Ltd.'s (GEMCO) opencut manganese mine on the northwest portion of Groote Eylandt, off the far north coast of Australia in the west of the Gulf of Carpentaria, was the second biggest mining operation in the NT, after the Gove bauxite mine, and was the world's third largest manganese producer, representing about 10% of production. GEMCO ships annually about one-quarter of its approximate 2 million metric tons (Mt) of concentrate to the ferromanganese plant operated by Tasmanian Electro Metallurgical Co. Pty. Ltd. (TEMCO) at Bell Bay, TAS. Both GEMCO and TEMCO were wholly owned subsidiaries of BHP Minerals. Smaller quantities were used in Australian Manganese Co. Pty. Ltd.'s electrolytic manganese dioxide (EMD) plant at Newcastle, NSW, for the production of high-grade material used in long-life batteries. Australian Manganese also was a wholly owned subsidiary of BHP Minerals.

In April, Portman Mining Ltd. reopened its Woodie Woodie operation, near Nullagine in the Pilbara region of WA, following the successful negotiation of sales contracts to supply 200,000 t of metallurgical-grade manganese to the Japanese market during the Japanese FY 1995.[36] Portman Mining had placed the operation on care-and-maintenance in 1994 because of low ore prices.

Valiant Consolidated Ltd. was Australia's only other manganese miner, producing about 80,000 t of high-grade ore from its Mike Mine at Pearana Rock Hole, also in the Pilbara region.

Formal opening was conducted in April of an expansion that raised annual EMD capacity at Australian Manganese's Newcastle plant to more than 22,000 t.

Mineral Sands.—Australia's mineral sands industry included the mining and processing of high concentrations of the heavy minerals ilmenite, leucoxene, monazite, rutile, and zircon. Australia was the world's leading producer and exporter of mineral sands. Australia's mineral sands industry produced about 40% of the ilmenite, 35% of the rutile, 50% of the zircon, and a substantial portion of the world's monazite.

Westralian Sands Ltd. announced in March that it would proceed with the construction of a synthetic rutile plant at North Capel that would double to 230,000 t the annual production capacity. Westralian Sands previously had secured the necessary approvals for the expansion, keeping the project on hold until more suitable market conditions were evident. The new plant was to feature innovative energy savings measures, including using heat from an ilmenite reduction kiln to generate 6 MW of electricity—most of the power requirement for production of synthetic rutile at North Capel.[37]

RZM Pty. Ltd. was forced to close in August its Tomago, NSW, mineral sands milling operations. The closure was precipitated by delays in obtaining from the National Parks and Wildlife Service (NPWS) extended mining permits on environmental grounds for the Tomago area operations that supply the dry processing plant. RZM declared *force majeure* (inevitable accident or Act of God) for the first time in its 32-year operating history at the end of October when its stocks of heavy-mineral concentrates became exhausted because of the mining interruption. It was expected at yearend that milling would recommence late in the first quarter 1996, following a decision by the NPWS on the mining leases. The annual crude output from the Tomago mill prior to closure was 30,000 t of rutile and 30,000 t of zircon.[38]

In November, the WA State government approved Tiwest Joint Venture's planned expansion of its TiO_2 plant at Kwinana, near Perth in WA. The project was to increase capacity from 64,000 t/yr to 80,000 t/yr. Tiwest was a 50-50 joint venture of Ticor Resources Pty. Ltd. and Kerr-McGee Chemical Corp. Western Australia Pty. Ltd., a subsidiary of Kerr-McGee Chemical Corp. of the United States. Tiwest began Australia's first minerals-to-pigment project in 1988.[39]

Nickel.—The Australian nickel mining industry in 1995 consisted of several mines operating near the communities of Forrestania, Kambalda, Leinster, and Mount Keith in WA and the Brolga mining operation near Marlborough, QLD. Downstream processing occurred at the Kalgoorlie Smelter in WA and at refineries at Kwinana, WA, and Yabulu, near Townsville, QLD. Australia was the world's fifth largest producer of mined nickel, behind Russia, Canada, New Caledonia, and Indonesia. It was the world's fourth largest producer of nickel metal, trailing Russia, Japan, and Canada. WMC was the country's dominant nickel miner and main nickel metal producer from its mining and processing operations in WA.

WMC was planning to raise the annual capacity at its Mount Keith Mine from 28,000 t/yr to 42,000 t/yr in a 2-stage expansion. The Mount Keith Mine was a part of the Leinster-Mount Keith Nickel Operations, an administrative division formed during the year to combine the Leinster Nickel Operations with the Mount Keith operation that was commissioned in October 1994. Output in the first stage was to be expanded from 37,000 to 38,000 t/yr of contained metal by May and to 42,000 t/yr by yearend 1996, with ore throughput targeted to rise from 8 Mt/yr to 10 Mt/yr.[40]

Defiance Mining NL was expecting to deliver from its Carr Boyd Mine its first shipment of nickel concentrates to WMC's Kalgoorlie Smelter early in 1996 following an agreement under which WMC was to purchase all the nickel concentrate produced at the developing Carr Boyd nickel project. Defiance Mining's plans included dismantling the 250,000-t/yr plant at nearby Paringa for relocation to Carr Boyd to initially process 150,000 t/yr of ore to produce 20,000 t/yr of nickel concentrates. The Carr Boyd project is 75 km north of Kalgoorlie.[41]

Platinum-Group Metals.—No Australian mines were primary producers of platinum-group metals (PGM) in 1995, although minor production continued in WA's Eastern Goldfields at Kalgoorlie-Boulder and Kambalda as a byproduct of the nickel operations. PGM, mainly platinum and palladium, were recovered at the Port Kembla, NSW, refinery-smelter complex from byproduct copper sulfide residue produced at the Kwinana nickel refinery. PGM also were contained in nickel matte produced for export at the Kalgoorlie smelter.

Silver.—Australia was a major silver producer, ranking among the world's top five producers in 1995. Almost all of the country's production, however, was as a byproduct of copper-gold, gold, or lead-zinc mining.

MIM Holdings' 70%-owned McArthur River Mine in eastern NT began commercial production of silver in midyear. Upon reaching in mid-1996 its full capacity, the operation was scheduled to produce almost 50 t/yr of silver, about 5% of Australia's annual production.

East Coast Minerals NL was planning development of its Elizabeth Hill primary silver deposit, believed to be one of the country's richest, in the Munni Munni region of the Pilbara in WA. Archaean Gold NL announced a high-grade silver, low-grade gold discovery at Boorara, near Kalgoorlie in WA, that reportedly could produce up to 450 t/yr of silver.[42]

Tin.—RGC's Renison Bell Mine near Zeehan, TAS, was the world's largest hard-rock underground tin mine and Australia's main tin producer. Gwalia Consolidated Ltd.'s Greenbushes Mine in southwestern WA also produced tin as a coproduct of its spodumene and tantalite mining.

Norminco Ltd. began tin production in October from its reactivated tin operation in the Leichhardt Creek district of the North QLD tin fields, about 70 km west of Cairns. Production initially was to be about 600 t/yr of tin in a high-grade alluvial concentrate. All of the output was sold to Malaysia Smelting Corp. Bhd. for treatment. Norminco was considering constructing a second plant at the site that would add about 1,000 t of additional capacity to the project. A feasibility study was in progress at yearend. Ultimately, Norminco was aiming to increase production to more than 3,000 t/yr as further plants came on-stream.[43] Norminco changed its name from Mount Carrington Mines Ltd. following Mount Carrington's acquisition of Norminco Pty. Ltd.

Industrial Minerals

Cement.—Five industrial conglomerates produced almost all of the country's cement capacity from a multitude of plants around the country in which they held a large share percentage. Adelaide Brighton Ltd. held the most capacity, about 2.1 Mt/yr and 29% of total capacity; Blue Circle Southern Cement Ltd. had about 2 Mt/yr of capacity (28%); Australian Cement Holdings Ltd. operated plants with about 1.4 Mt/yr, about 20% of the country's capacity; Queensland Cement Ltd. operated plants having about 1.3 Mt/yr of capacity, or 18%; and Cockburn Cement Ltd. held 0.3 Mt, about 4% of annual capacity.[44]

Diamond.—Australia has been since 1986 the world's largest producer of natural diamond in terms of carats recovered, but only a relatively small portion of its output is of gem quality, reflecting the country's sixth ranking in terms of value of world diamond production.[45] The majority of production was derived from the AK-1 lamproite pipe and alluvial operations at the mammoth Argyle Mine in the Kimberley region of WA, which retained its position for the tenth consecutive year as the world's biggest single-mine producer of diamond with output equivalent to about 40% of world production. About 5% of production was of gem quality, including a small proportion of the highly valued intensely pink stones that generated about 50% of revenues; 40% was near-gem quality that produced about 45% of revenues; and 55% was industrial quality that contributed just 5% of revenues.[46]

Argyle Diamond Mines Pty. Ltd. (ADM) was the management company and operator of Argyle Diamond Mines Joint Venture's (ADMJV) Argyle Mine; the ADMJV itself was comprised of the newly merged RTZ Ltd.-CRA Ltd. companies, 56.8%, Ashton Mining Ltd., 38.2, and Western Australia Diamond Trust, 5%. ADMJV continued to sell most of its gem and 78% of its near-gem quality white diamonds to De Beers' Central Selling Organization (CSO) under a 5-year marketing contract that was scheduled to expire on June 30, 1996, through Argyle Diamond Sales Pty. Ltd. (ADS), a company jointly owned on the same basis as the mine by the joint-venture companies. ADMJV retained the right to sell the few handfuls of the very rare, intensely pink *Argyle Pink* diamonds unique to the Argyle Mine, as well as the more common yellow-to-brown stones, which were marketed as *Argyle Champagne* or *Argyle Cognac* diamonds, depending upon the specific color. These diamonds were cut and polished using traditional techniques and automated laser cutting machines at ADS's small facility in West Perth. Most of the remaining portion of the near-gem quality and all of the industrial-grade stones were sold on the open market through ADS's Antwerp, Belgium, office. All of ADMJV's near-gem quality material was processed in India, principally from ADS's Bombay office, prior to being sold. ADMJV, through the Indo-Argyle Diamond Council, assisted its Indian customers to market their diamond jewelry in the United States.[47]

ADM changed the AK-1 treatment plant's screen sizes in October so that lower value diamonds of less than 1.5 millimeters in size would not be recovered. The change was to allow the treatment plant capacity to be increased by about 1 Mt/yr, to 9 Mt/yr. Although the amount of carats actually recovered was to decrease by 15% per year, the annual value of production was expected to increase by 10% because of the increase in the average size of the diamonds recovered.[48]

Australia's only other commercial diamond operation was Poseidon Bow River Diamond Mine Ltd.'s Bow River Mine, 25 km northeast of the Argyle Mine. All of Bow River's output was marketed under a sales agreement with the CSO. About 20% of the Bow River production was gem quality, with a consistent percentage of the intensely pink diamonds, and 80% was industrial grade. Bow River diamonds were recovered from buried diamondiferous gravels that originated from the AK-1 lamproite pipe.

Gemstones.—Australia again was the world's leading producer of precious opal in 1995, accounting for about 90% of the world's production. About one-half of Australia's opal was produced from fields at Andamooka, Coober Pedy, and Mintabie in SA. Most was hand-mined, either from an opencut or an underground drive. Opal in NSW mostly was mined at Lightening Ridge, the world's major source of the highly prized and valuable black opal, although a small amount still was produced at White Cliffs, the site of opal discovery in 1889. A small quantity of opal also was produced in western QLD.

Australia also continued to be the world's leading producer of natural sapphire. Australia's commercial sapphire production was mined from alluvial deposits in the Inverell-Glen Innes (New England) region of northern NSW and the Rubyvale-Anakie region of central QLD. Australia was supplying up to about 70% by volume of the world's sapphire until 1987 when the Thai Government lifted restrictions on mechanized mining of Thailand's sapphire, and production was increased substantially in China and Nigeria. Consequently, Australia's share of world supply gradually has declined so that in 1995 it was producing only about 25% to 30% by volume of the world's rough sapphire output. Most of the uncut gems still were exported to Thailand, the recognized world leader for cutting and marketing.

Australia again continued to produce almost all the world's chrysoprase from the Marlborough, QLD, deposit and has the world's largest known resource of nephrite jade at Cowell, on the Eyre Peninsula in SA. In addition, Australia also produced other gemstones, including agate, amethyst, chiastolite, emerald (aquamarine), garnet, rhodonite, topaz, tourmaline, turquoise, and zircon.

Gypsum.—Dampier Salt Ltd., 64.9% owned by CRA, announced at yearend its plans to begin construction early in 1996 of a gypsum project at its Lake MacLeod salt operations near Carnarvon, WA. Dampier Salt planned to produce gypsum for the wallboard and cement industries of Asia, particularly Japan, with the first shipments expected to begin late in 1997. Initial production capacity was to be 1 Mt/yr. The gypsum deposit, which overlies a salt deposit, was to be dredged from the dry lake bed and pumped as a slurry to a heap-leach pad where salt was to be leached out. The gypsum then was to be trucked to Dampier Salt's storage and port facility at nearby Cape Cuvier.[49]

Lithium and Tantalum.—In 1995, Gwalia supplied about 60% of the world's lithium materials from spodumene ore mined at the Greenbushes Mine, 300 km south of Perth, WA. Gwalia also was the world's largest producer of tantalum concentrates from tantalite ore. Both commodities were extracted from two separate pits, spaced about 300 meters apart, within the Greenbushes pegmatite ore body, one of the largest mineralized, zoned, rare-metal pegmatites in the world.[50] Gwalia also produced tantalum from its Mount Cassiterite Mine, 100 km south of Port Hedland in WA.

Production in 1995 of lithium minerals by Gwalia, Australia's sole producer, increased almost 80% over that of the previous year. This was achieved by doubling the capacity of the lithium minerals plant to 150,000 t/yr through the addition of another ball mill to increase milling capacity and the change to a 24-hour, 3-shift operation.

To add value to its mineral products through downstream processing, Gwalia completed the construction and began commissioning in September its 5,000-t/yr, $13-million lithium carbonate plant. Lithium carbonate is a key product in the lithium chemicals industry, an industry many times larger than the lithium minerals industry that Gwalia has dominated. This plant enabled Gwalia to become an integrated producer of a range of lithium-based chemical products.

About 6,000 t of spodumene and 20,000 t of tantalite were mined from the open pits and trucked weekly to run-of-mine storage pads, where the material was separately stockpiled according to grade and mineralogical characteristics before crushing and subsequent processing. Unlike many mining-site operations, Gwalia used a single hard-rock crushing plant to process both the spodumene and tantalite ores by changing the production program once or twice each week to accommodate each ore in its own 3-stage crushing circuit.[51]

Magnesia.—The 60-40 joint-venture between Queensland Metals Corp. and Pancontinental Resources (Kunwarara) Pty. Ltd. continued to mine low-iron magnesite at its Queensland Magnesia Project (QMAG) at Kunwarara, about 60 km northwest of Rockhampton, QLD, during the year. Queensland Magnesia (Operations) Pty. Ltd., a wholly owned subsidiary of Pancontinental Resources, was the mine operator. The ore, cryptocrystalline magnesite, was mined using mechanical and hydraulic techniques, beneficiated, and transported to the plant at Parkhurst on the outskirts of Rockhampton for the production of electrofused and dead-burned magnesia.

The QMAG partners were considering near yearend to increase production from 24,000 t/yr of electrofused magnesia and 90,000 t/yr of dead-burned magnesia to 29,000 t/yr and 135,000 t/yr, respectively, within the next 3 years. Capacity of the plant has not changed since its original construction in 1991.[52]

Salt.—Dampier Salt continued to supply more than one-half of Australia's annual salt production from its solar operations at Dampier Field, on Mistaken Island near Dampier in the Pilbara area, and Lake MacLeod Field, near Carnarvon, both in WA. The Dampier Field had twice the annual production capacity, about 3 Mt, as that of the Lake MacLeod Field.

Dampier Salt also supplied more than one-half of Australia's salt exports, 70% of which went to Japan. Indonesia, the Republic of Korea, and Taiwan received the bulk of the remaining exports.

Mineral Fuels

Coal.—Australia remained the world's fifth largest producer of coal (all grades) in the world in 1995. NSW and QLD together accounted for more than 95% of the country's coal production and virtually all of its exports. Coal exports were shipped from nine terminals at seven ports along the eastern coast of the country.

The principal areas of coal production were from the Bowen Basin, QLD; Hunter Valley, Western Coalfield, and South Coast Coalfield, NSW; Leigh Creek, SA; Fingal, TAS; Latrobe Valley Coalfield, VIC; and near Bunbury, WA. The NT had no coal production during the year.

Australia retained in 1995 its position as the world's largest exporter of coal, a position it has held since 1984, shipping more than 136.7 Mt, an increase of more than 4% over the previous record high of more than 131 Mt set in 1993. Australia controlled an estimated 35% to 40% of the world's seaborne coal trade by exporting 70% of its salable coal production. Australian coal was exported to more than 30 countries around the world. The major markets were Japan and other Asian countries, which accounted for about 80% of Australia's exports in 1995. Significant amounts of coal also were exported to Europe, India, the Middle East, North Africa, and South America.[53]

The coal industry also remained in 1995 Australia's largest foreign-exchange earner, accounting for an estimated one-quarter of export revenues from the minerals sector and about 15% of the country's export earnings.

Portman Mining's Burton Coal Project, 120 km southwest of Mackay in QLD's Bowen Basin, progressed significantly during the year. The project was scheduled to be commissioned in October 1996, with the full design capability of about 2 Mt/yr expected to be reached during 1997. The exploration permit for the Burton coal deposit, approximately 20 km east of the operating Goonyella, North Goonyella, and Riverside coal mines, was acquired by Portman Mining in 1993. Portman Mining completed a feasibility study early in 1995 that confirmed the project's commercial viability. Thiess Construction Pty. Ltd. purchased a 5% interest in the project, and the remaining 95% was transferred to Portman Mining's wholly owned subsidiary Pelsoil NL. Thiess Construction and Pelsoil entered in December into their own joint-venture agreement to own, develop, and operate the Burton Coal Project; Burton

Coal Pty. Ltd., another wholly owned subsidiary of Portman Mining, was to be the mine operator.[54]

Petroleum and Natural Gas.—The merger of Caltex Australia Ltd., 75% owned by Texaco Inc. of the United States, and Ampol Ltd. was approved in May by company shareholders following sanctioning by the Trade Practices Commission (TPC), creating for the first time a leading majority Australian-owned refining and marketing company. The new company, Australian Petroleum Co. Pty. Ltd., was to become the country's largest downstream petroleum company. The Caltex brand name was to disappear; and a newly designed Ampol brand was to be used on all joint facilities, vehicles, and equipment. The TPC authorization stipulated the sale to independent operators of redundant bulk terminals and service stations, guaranteeing a supply of fuel for these retail outlets.[55] The merged company would draw petroleum products from the two refineries previously owned separately, the Kurnell Refinery in NSW and the Lytton Refinery in QLD.

Woodside Petroleum Pty. Ltd., operator of the massive North West Shelf Gas (NWS Gas) project on the Continental Shelf about 140 km offshore of Dampier, WA, successfully began production in February of natural gas and condensate from the first of 12 planned production wells at the Goodwyn A offshore drilling and production platform following a delay of 16 months. Damage caused during the driving in 1992 of piles to support the platform's substructure has cost the partners in the NWS Gas joint venture about $240 million before insurance reimbursements in remedial engineering and repair work. An accelerated drilling program was to enable production to build up to the full capacity of 25.5 million cubic meters per day of gas and 80,000 barrels per day of condensate by mid-1996.[56]

The NWS Gas project dispatched in September its 500th cargo of liquefied natural gas (LNG) aboard the vessel *Northwest Swallow*. The 57,000-t cargo was delivered to the Orita terminal of Japan's Kyushu Electric Power Co. Shipments of LNG to Japan, all from the Withnell Bay terminal on Burrup Peninsula in WA, began in July 1989.[57]

WMC was to proceed with a $90-million power generation project using natural gas to be provided from the Goldfields Gas Transmission Joint Venture (GGTJV) pipeline. WMC held a 62.664% interest in the GGTJV and was committed to the construction of several spur lines to link its nickel mines and associated facilities at Kambalda, Leinster, and Mount Keith, along with its nickel smelter at Kalgoorlie, with the main gas pipeline originating from the offshore NWS Gas fields. The project was to include installation of 40-MW gas turbines at each of the four WMC operations. Work was expected to be completed simultaneously with the startup of gas transmission in August or September 1996. Other partners in GGTJV were Normandy Poseidon Ltd., 25.493%, and BHP Minerals, 11.843%. Australia's largest gas pipeline operator, AGL Pipelines, would be the pipeline operator of the 1,480-km, $365-million “Gas to the Goldfields” pipeline.[58]

The total number of petroleum exploration and development wells drilled during 1995 (212) was 40 more than the revised number drilled during 1994 (172). The number of onshore exploration wells drilled in 1995 (92) was 10 more than that in 1994 (82). The number of offshore exploration wells drilled increased during 1995 to 56 wells compared to the previous year when 46 wells were drilled. The total number of exploration wells drilled in 1995 (148) increased almost 16% from the number drilled in 1994 (128). The total number of development wells drilled (64) was 20 more than that in 1994 (44), with 30 wells drilled onshore and 34 drilled offshore, compared to 19 (revised) and 25 wells, respectively, drilled in 1994. The total meters drilled for exploration and development wells in 1995 (475,360) was about 14% more than that drilled in 1994 (415,451, revised). In seismic survey activity during 1995, the total number of line kilometers recorded (158,351) was marginally less than the number (161,352) recorded in 1994.[59]

Uranium.—Uranium ore in Australia has been known since the 1890's. Uranium ores were mined during the 1930's for the recovery of minute amounts of radium for medical purposes at Radium Hill and Mount Painter, SA; as a result, a few hundred kilograms of uranium also was produced and used as a bright yellow pigment in glass and ceramics. Uranium ores as such were mined and treated in Australia beginning in the 1950's and mainly were intended for export to the United Kingdom and the United States for use in weapons programs of the era.[60]

The Commonwealth Government continued its policy of restricting uranium production to three sites. The two mines involved were the operational Olympic Dam Mine in SA and the Ranger Mine in the Alligator Rivers region of the NT. A third permissible site, Queensland Mines Ltd.'s Nabarlek Mine, also in the Alligator Rivers region of the NT, was closed in 1988 when reserves were depleted. Processing and exporting of its stockpiled ore was completed in 1990. Thus, the "three mines" policy was in fact a "two mines" policy because the export permit holders, Energy Resources of Australia Ltd. (ERA) and WMC, were the only ones with viable mines. The Commonwealth Government had de facto control over uranium mining in that it controlled the licenses to export uranium-bearing ores and prohibited further downstream involvement in the nuclear fuel cycle, including enrichment or other value-added processes.

ERA completed mining at its No. 1 pit at the Ranger site on schedule in December 1994 and began preproduction planning for mining the No. 3 pit, about 1.5 km to the north. Ore stockpiled from pit No. 1 was to be milled through 1999, with the transition to milling ore mined from pit No. 3 beginning in 1997. Prestripping of pit No. 3 was scheduled to start about midyear 1996.[61]

ERA was planning a $15-million mill expansion, including upgrading the level of automation to improve efficiency, giving a 50% increase in capacity by mid-1997; ERA also intended to resume year-round milling in 1996.[62]

Reserves

Australia has a significant resource base of a diverse range of minerals. It is self-sufficient in most minerals of economic importance. However, in spite of extensive exploration, the country still appears to be deficient (import reliant) in chromite, mercury, mica, platinum group metals, and sulfur. Major minerals with known reserves adequate for domestic demand and exports included bauxite, clays, coal, copper, diamond, gold, iron ore, lead, manganese, mineral sands, natural gas, nickel, salt, silver, tin, uranium, and zinc. *(See table 3.)*

Infrastructure

The communications and transportation infrastructure of Australia was well developed. There were 837,872 km of roads, including 243,750 km paved; 228,396 km gravel, crushed stone, or stabilized-soil surface; and 365,726 km unimproved earth. Inland waterways, of which there were about 8,368 km usable for mainly small, shallow-draft craft, were of little importance to the transportation industry.

The Government-owned railway system consisted of 40,478 km of track, of which 16,201 km was standard gauge. There were 1,130 km of electrified rail. A few hundred kilometers of rail was privately owned, most of which served the iron ore industry in WA. There were 308 principal airports with permanent-surface runways out of an aggregate of 480 in the country. International shipping ports included Adelaide, Brisbane, Cairns, Darwin, Devonport, Fremantle, Geelong, Hobart, Launceston, Mackay, Melbourne, Sydney, and Townsville. The merchant marine fleet included 18 petroleum, oils, and lubricant tankers; 3 chemical tankers; 6 liquefied gas tankers; 2 combination ore-oil tankers; and 30 bulk ore freighters.

Pipelines included 5,600 km for natural gas, 2,500 km for crude oil, and 500 km for refined oil products. Electric generating capacity in 1993 was 34.5 gigawatts.[63]

In remote areas where mines, mills, and smelters are usually located, an individual mining company must provide its own infrastructure, such as housing, roads, railways, port facilities, electric power and water facilities, and various community services, including schools, shopping centers, and recreation facilities.

Outlook

Because of a growing worldwide need for mineral and energy supplies, with particular demand for those mineral commodities in which Australia is abundantly endowed and for which Australia is among the world leaders in world supply—bauxite for aluminum production, coal, copper, diamond, gold, iron ore, lead, manganese, mineral sands, natural gas, and zinc—Australia should continue to be a significant world mineral supplier well into the 21st century.

However, a growing awareness of the importance of environmental protection and conservation by Australians has led to higher production costs as the Australian mining industry employs and continues to develop costly techniques for rehabilitation of mined lands and preservation of clean air and water. Since Australia became a major world producer for a number of minerals in the mid-1960's, mining has been in the more remote areas of the country, involving lands that would otherwise have been little utilized; however, this may not always be the case, and the minerals industry probably should remain vigilant toward the environment.

Access to land also has become an important issue to the Australian minerals industry. Entry to lands for exploration either already has been prohibited or has been made difficult over about 30% of the country's land mass owing to restrictions in certain areas, such as national parks and Aboriginal reserves. The percentage of lands made difficult to access is estimated to increase as land claims continue under the NTA of 1993.

Restricted access for exploration because of environmental reasons, land rights issues, or any other reason may result in decreased expenditures on exploration and capital investment. This eventually may have a very significant effect on the development of large greenfields projects that would be needed to maintain the impetus of the mining and processing sectors.

New investment in the minerals industry was tending toward value added, rather than the primary producing operations of the recent past, and these likely would become more vigorous in the near future.

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Major Publications

Australian Bureau of Agricultural and Resource Economics, Canberra: Quarterly Mineral Statistics, quarterly.
Australian Bureau of Statistics, Belconnen: Mineral Production, Australia, fiscal year.
Australian Bureau of Statistics, Belconnen: Production Statistics, Preliminary, monthly.

TABLE 1
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1991	1992	1993	1994	1995 e/
METALS						
Aluminum:						
Bauxite, gross weight	thousand tons	40,510	39,746	41,320	41,733	42,655
Alumina	do.	11,703	11,783	12,598	12,892	13,147
Metal, refined:						
Primary	do.	1,228	1,245	1,381	1,317	1,297 2/
Secondary		29,600	40,000	34,800 r/	55,000 r/	55,000
Antimony, Sb content of ores and concentrates e/		1,500	1,701 2/	1,700	1,700	1,700
Bismuth, mine output, Bi content e/		400	--	--	--	--
Cadmium:						
Mine output, Cd content		2,500	2,516	2,375	2,275	2,105 2/
Metal, smelter (refined)		1,076	1,001	951	910	842 2/
Cobalt: e/						
Mine output, analytic content of:						
Nickel ore		1,100	700	500	250	180
Nickel concentrate		500	500	750	950	1,250
Zinc concentrate		70	70	70	70	100
Total		1,670	1,270	1,320	1,270	1,530
Recovered cobalt, including that from imported source material e/		1,400	1,600	1,800 r/	2,200 r/	2,500
Columbium-tantalum concentrate, gross weight		703	656	495	700	900 2/
Copper:						
Mine output, Cu content	thousand tons	320	371	360	391	437 2/
Metal:						
Smelter:						
Primary	do.	195	304	323	315	327 2/
Secondary e/		10,000	10,000	10,000	10,000	10,000
Refined:						
Primary	thousand tons	244	271	285	312	310 2/
Secondary e/		35,000	32,000	24,000	24,000	26,700
Gold:						
Mine output, Au content	kilograms	234,218	243,400 e/	247,196	256,188	253,504 2/
Metal:						
Refined:						
Primary	do.	250,000 e/	250,000 e/	283,726	302,612	289,004 2/
Secondary e/	do.	20,000	8,000	8,345 2/	8,500	8,747 2/
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	117,134	112,101	120,534	128,493	142,936 2/
Fe content	do.	68,732	69,761	74,767	80,900 e/	88,653 2/
Metal:						
Pig iron	do.	5,633 r/	6,384 r/	7,414 r/	7,466	7,475 2/
Ferroalloys: e/						
Ferromanganese		45,000	55,000	75,000	100,000	100,000
Ferrosilicon		19,000	17,000	--	--	--
Silicomanganese		74,000	75,000	75,000	100,000	110,000
Total		138,000	147,000	150,000	200,000	210,000
Steel, crude	thousand tons	6,141 r/	6,803 r/	7,853 r/	8,424 r/	8,493 2/
Semimanufactures e/		3,000	3,000	1,788 2/	4,000	4,000
Lead:						
Mine output, Pb content	thousand tons	579	577 r/	519 r/	537	455 2/
Metal:						
Primary:						
Bullion, for export	do.	172	231	224	197	158 2/
Refined	do.	220	215	221	212	215 2/
Total	do.	392	446	445	409	373 2/
Secondary excluding remelt	do.	19	17	22	17	
Manganese ore (metallurgical):						
Gross weight	do.	1,412 r/	1,251 r/	2,092	1,924 r/	2,176 2/
Mn content e/	do.	664 r/	596 r/	1,043	944 r/	1,066 2/
Nickel:						
Mine output, Ni content	do.	69	58	65	79	101 2/
Metal, smelter (refined Ni and Ni content of oxide)	do.	50	57 r/	55 r/	67 r/	82 2/
Platinum-group metals: e/						
Palladium, Pd content	kilograms	400	400	400	400	400
Platinum, Pt content	do.	100	100	100	100	100
Total	do.	500	500	500	500	500
Rare-earth metals, monazite concentrate: e/						
Gross weight		7,000	6,000	3,000 r/	--	--
Monazite content		3,850	3,300	1,650 r/	--	--

See footnotes at end of table.

TABLE 1--Continued
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1991	1992	1993	1994	1995 e/
METALS--Continued						
Silver:						
Mine output, Ag content		1,180	1,218	1,092	1,045	920 2/
Metal, refined		400 e/	400 e/	345	362	346 2/
Tin:						
Mine output, Sn content 3/		5,700	6,609	8,057	7,100	8,175 2/
Metal, refined:						
Primary		268	240	222	315	570 2/
Secondary e/		300	360	250	260	300
Titanium concentrates, gross weight:						
Ilmenite	thousand tons	1,363	1,786	1,804	1,782	1,979 2/
Leucoxene		18,000	20,000	21,000	35,000	31,000 2/
Rutile		201,000	183,000 r/	186,000	233,000	200,000 2/
Tungsten, mine output, W content		237	159	23	11	10 2/
Zinc:						
Mine output, Zn content	thousand tons	1,024	1,025	1,010	995	930 2/
Metal, smelter:						
Primary	do.	322	328 r/	316	323	332 2/
Secondary e/		4,500	4,500	4,500	4,975 2/	4,500
Zirconium concentrates, gross weight	thousand tons	292	355	414	502	510 2/
INDUSTRIAL MINERALS						
Abrasives, natural: e/						
Beach pebble		2,000	2,000	2,000	2,000	2,000
Garnet		25,000	25,000	25,000	25,000	25,000
Barite e/		11,000	11,000	11,000	11,000	11,000
Cement, hydraulic	thousand tons	6,108	5,412	5,500 e/	6,500 r/	6,500
Clays: e/						
Bentonite and bentonitic clay		35,000	35,000	35,000	35,000	35,000
Brick clay and shale	thousand tons	8,000	8,000	8,000	8,000	8,000
Cement clay and shale	do.	500	500	500	500	500
Damourite clay		100	100	100	100	100
Fire clay		25,000	25,000	25,000	25,000	25,000
Fuller's earth (attapulgite)		15,000	15,000	15,000	15,000	15,000
Kaolin and ball clay		190,000	180,000	180,000	200,000 r/	210,000
Other	thousand tons	1,000	1,000	1,000	1,000	1,000
Diamond:						
Gem	thousand carats	17,978	18,078	18,844	19,485 r/	18,312 2/
Industrial	do.	17,978	22,095	23,032	23,815 r/	22,381 2/
Total	do.	35,956	40,173	41,876	43,300 r/	40,693 2/
Diatomite e/		11,000	11,000	11,000	11,000	11,000
Feldspar including nepheline syenite e/		16,000	15,000	15,000	16,000	16,000
Gemstones, other than diamond: e/						
Opal	value, thousands	$85,000	$85,000	$90,000	$100,000	$100,000
Sapphire	do.	$40,000	$40,000	$40,000	$50,000	$50,000
Other	do.	$900	$900	$1,000	$1,500	$1,500
Total	do.	$125,900	$125,900	$131,000	$151,500	$151,500
Gypsum e/	thousand tons	2,000	2,000	2,000	2,000	2,000
Kyanite e/		800	800	800	800	800
Lime e/		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Magnesite e/		100,000	262,000	260,600	285,610 2/	280,400
Nitrogen, N content of ammonia		414,100	391,900	398,000	412,600 r/	432,900 2/
Perlite, crude e/		5,000	5,000	5,000	5,000	5,000
Phosphate rock e/		2,400 r/	1,500 r/	1,700 r/	1,500 r/	1,500
Salt	thousand tons	7,791	7,693	7,737 r/	7,685 2/	8,480 2/
Sillimanite e/ 4/		100	100	100	100	100
Spodumene, concentrate		40,736	42,516	40,000 e/	45,987 r/	81,841 2/
Stone, sand and gravel: e/						
Construction sand	thousand tons	30,000	30,000	30,000	30,000	30,000
Gravel	do.	15,000	15,000	15,000	15,000	15,000
Dolomite	do.	1,000	10,000	10,000	10,000	10,000
Limestone:						
For cement	do.	6,000	6,000	6,000	6,000	6,000
For other uses	do.	6,000	6,000	6,000	6,000	6,000
Silica in the form of quartz, quartzite, glass sand	do.	2,000	2,000	2,000	2,500	2,500
Other:						
Crushed and broken stone	do.	65,000	65,000	65,000	65,000	65,000
Dimension stone	do.	100	100	100	100	100
Unspecified	do.	30,000	30,000	30,000	30,000	30,000

See footnotes at end of table.

TABLE 1--Continued
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1991	1992	1993	1994	1995 e/
INDUSTRIAL MINERALS--Continued						
Sulfur, byproduct:						
Metallurgy	do.	223	295	299	275	275
Petroleum	do.	75	75	85	115	125
Total	do.	298	370	384	390	400
Talc, chlorite, pyrophyllite, steatite e/		216,000	215,000	215,000	215,000	215,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous and subbituminous	thousand tons	206,045	223,602	226,330	227,772	239,578 2/
Lignite	do.	52,124	50,228	48,458	48,582	48,115 2/
Total	do.	258,169	273,830	274,788	276,354	287,693 2/
Coke, metallurgical e/	do.	300 r/	300 r/	300 r/	300 r/	322 2/
Fuel briquets e/	do.	750	750	750	750	750
Gas, natural, marketed	million cubic meters	21,687	23,463	24,519	28,146	30,000
Natural gas liquids	thousand 42-gallon barrels	22,261	23,411	23,050 r/	23,342 r/	24,000
Peat e/		11,000	11,000	11,000	11,000	11,000
Petroleum:						
Crude	thousand 42-gallon barrels	198,821	195,316	181,387 r/	196,539	200,000
Refinery products:						
Gasoline:						
Aviation	do.	959	1,076	1,011	955	943
Motor	do.	106,576	108,486	112,408	112,877	113,103
Jet fuel	do.	23,298	24,728	27,225	27,008	24,499
Kerosene	do.	315	688	282	514	491
Distillate fuel oil	do.	68,857	65,894	71,263	72,155	75,484
Residual fuel oil	do.	17,374	15,770	14,890	14,022	15,592
Lubricants	do.	4,226	4,384	4,261	4,903	4,881
Liquefied petroleum gas	do.	5,646	5,862	6,287	7,162	8,082
Bitumen	do.	3,288	3,561	4,252	4,129	3,818
Unspecified	do.	6,760	5,787	6,125	5,976	7,145
Refinery fuel and losses	do.	5,763	6,887	8,946 r/	6,242	8,655
Total	do.	243,062	243,123	256,950 r/	255,943	262,693
Uranium, mine output, U content		3,776	2,335	2,256	2,208 r/	3,712 2/

e/ Estimated. r/ Revised.
1/ Includes data available through Aug. 12, 1996.
2/ Reported figure.
3/ Excludes tin content of copper-tin and tin-tungsten concentrates.
4/ In addition, about 7,000 metric tons of sillimanite clay, also known as kaolinized sillimanite, is produced, containing 40% to 48% aluminum oxide.

TABLE 2
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities 2/	Annual capacity e/
Alumina	Queensland Alumina Ltd., operator. [Comalco Ltd., 30.3%; Kaiser Aluminum and Chemical Corp. (Australia) Ltd., 28.3%; Alcan Australia Ltd., 21.4%; and Pechiney Australia Pty. Ltd., 20%]	Gladstone Refinery, QLD	3,300
Do.	Nabalco Pty. Ltd., operator. (Swiss Aluminium Australia Ltd., 70%; and Gove Aluminium Ltd., 30%)	Gove Refinery, NT	1,600
Do.	Alcoa of Australia Ltd., operator. Alcoa International Holdings, Co., 60.0%; Western Mining Corp. Ltd., 39.25%; QBE Securities Pty. Ltd., 0.5%; and QBE Nominees Pty. Ltd., 0.25%	Kwinana Refinery, WA	1,700
Do.	do.	Pinjarra Refinery, WA	3,000
Do.	do.	Wagerup Refinery, WA	1,700
Do.	Worsley Alumina Pty. Ltd., operator. [Reynolds Australia Alumina Ltd., 56%; The Shell Co. of Australia Ltd., 31.5%; Kobe Alumina Associates (Australia) Pty. Ltd., 10%; and Nissho Iwai Alumina, 2.5%]	Worsley Refinery, WA	1,600
Aluminum	Comalco Aluminium (Bell Bay) Ltd., 100%	Bell Bay Smelter, TAS	120
Do.	Boyne Island Smelters Ltd., operator. (Comalco Ltd., 59.25%; Marubeni Corp., Sumitomo Corp., and Light Metal Industries, 17% collectively; Mitsubishi Corp. and Mitsubishi Materials Corp., 14.25% jointly; and Yoshida Kogyo KK, 9.5%)	Boyne Island Smelter, QLD	260
Do.	Capral Aluminium Ltd., 100%	Kurri Kurri Smelter, NSW	155
Do.	Alcoa of Australia Ltd., operator. Alcoa International Holdings, Co., 60.0%; Western Mining Corp. Ltd., 39.25%; QBE Securities Pty. Ltd., 0.5%; and QBE Nominees Pty. Ltd., 0.25%	Point Henry Smelter, VIC	182
Do.	Alcoa of Australia Ltd., 45% and manager; ALUVIC (State of VIC agency), 25%; First National Resources Trust, 10%; China International Trust Investment Co., 10%; and Marubeni, 10%	Portland Island Smelter, VIC	327
Do.	Tomago Aluminium Co. Pty. Ltd., operator. (Gove Aluminium Finance Ltd., 35%; Pechiney Australia Pty. Ltd., 35%; Australian Mutual Provident Society, 15%; VAW Australia Pty. Ltd., 12%; and Hunter Douglas Ltd., 3%)	Tomago Smelter, NSW	380
Antimony	Hillgrove Gold Ltd., 100%	Garibaldi-Eleanora (Hillgrove) Mine, NSW	3
Bauxite	Nabalco Pty. Ltd., operator. (Swiss Aluminium Australia Ltd., 70%; and Gove Aluminium Ltd., 30%)	Gove Mine, NT	7,000
Do.	Alcoa of Australia Ltd., operator. Alcoa International Holdings, Co., 60.0%; Western Mining Corp. Ltd., 39.25%; QBE Securities Pty. Ltd., 0.5%; and QBE Nominees Pty. Ltd., 0.25%	Huntly, Jarrahdale, and Willowdale Mines, WA	23,500
Do.	Worsley Alumina Pty. Ltd., operator. [Reynolds Australia Alumina Ltd., 56%; The Shell Co. of Australia Ltd., 37.5%; Kobe Alumina Associates (Australia) Pty. Ltd., 10%; and Nissho Iwai Alumina, 2.5%]	Mount Saddleback (Worsley) Mine, WA	7,000
Do.	Comalco Aluminium Ltd., 100%	Weipa operations, QLD	11,100
Cement	Blue Circle Southern Cement Ltd., operator. Boral Ltd., 100%	Berrima Plant, NSW	1,200
Do.	Adelaide Brighton Cement Ltd., 49% and operator, and Adelaide Brighten Ltd., 51%	Birkenhead Plant, SA	1,000
Do.	Queensland Cement Ltd., operator. Holderbank (Switzerland), 100%	Darra Plant, QLD	700
Do.	Adelaide Brighton Cement Ltd., 49% and operator, and Adelaide Brighten Ltd., 51%	Geelong Plant, VIC	800
Do.	Goliath Cement Ltd., operator. Australian Cement Holdings Ltd., 100%	Railton Plant, TAS	1,000
Do.	Cockburn Cement Ltd., operator. Rugby Group (United Kingdom), 100%	South Coogee Plant, WA	1,000
Coal, black	Powercoal Pty. Ltd., 100%	Angus Place underground mine, NSW	1,500
Do.	BHP Steel Collieries Division, 100%	Appin underground mine, NSW	2,400
Do.	Powercoal Pty. Ltd., 100%	Awaba State underground mine, NSW	1,000
Do.	Coalex Pty. Ltd., 95% and manager; and Sumitomo Coal Mining Co. Ltd., 5%	Baal Bone underground mine, NSW	3,000
Do.	Central Queensland Coal Associates, 100%. (BHP Australia Coal Ltd., 44.72% and operator; QCT Resources, 27.78%; Mitsubishi Development Pty. Ltd., 13.33%; AMP society, 8.61%; and Pancontinental Mining Ltd., 5.56%)	Blackwater opencut, QLD	5,000
Do.	Pacific Coal Pty. Ltd., 57.19%, operator; ARCO Coal Australia Inc., 31.42%; Electric Power Development Co., 7.97%; and Joint Coal Development Co. Ltd., 3.42%	Blair Athol opencut, QLD	8,500
Do.	Clutha Coal Pty. Ltd., 100%	Brimstone No. 1 underground mine, NSW	2,400
Do.	Camberwell Coal Pty. Ltd., operator. (Navidale Pty. Ltd., 50%; Toyota Tsusho Corp., 40%; and Dia Coal Ltd., 10%)	Camberwell opencut, NSW	2,400
Do.	Coalex Pty. Ltd., 80% and manager; Kyodo Oil Aust. Pty. Ltd. (Japan), 10%; and Yukong Ltd. (Republic of Korea), 10%	Clarence underground mine, NSW mine, NSW	1,900

See footnotes at end of table.

TABLE 2--Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995 1/

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities 2/	Annual capacity e/
Coal, black--Continued:	Powercoal Pty. Ltd., 100%	Cooranbong underground mine, NSW	1,200
Do.	BHP Steel Collieries Division, 100%	Cordeaux underground mine, NSW	2,800
Do.	Curragh Queensland Mining Ltd., operator. [ARCO Coal Australia Inc., 60%; R.W. Miller Ltd., 30%; and Mitsui Coal Development (Australia) Ltd., 10%]	Curragh opencut, QLD	6,600
Do.	The Shell Co. of Australia Ltd., 82%; Showa Denko KK, 3%; and Marubeni Corp., 15%	Dartbrook underground mine, NSW	4,000
Do.	Capricorn Coal Management Pty. Ltd., manager. (The Shell Co. of Australia Ltd., 46.75%; Minproc Energy Pty. Ltd., 26.06%; British Coal Corp., 14.81%; and Ruhrkohle Australia Pty. Ltd., 12.38%)	German Creek opencut and underground mine, QLD	6,000
Do.	Central Queensland Coal Associates, 100%. (BHP Australia Coal Ltd., 44.72% and operator; QCT Resources, 27.78%; Mitsubishi Development Pty. Ltd., 13.33%; AMP society, 8.61%; and Pancontinental Mining Ltd., 5.56%)	Goonyella-Riverside opencuts, QLD	9,250
Do.	Arco Coal Australia Inc., 80% and manager; Mitsui and Co. Ltd., 15%; and MLC Coal Investments Pty. Ltd., 5%	Gordonstone underground mine, QLD	4,200
Do.	Oakbridge Ltd., 100%	Gretley underground mine, NSW	1,300
Do.	Coal and Allied Industries Ltd., 100%	Hunter Valley No. 1 and No. 2 opencuts, NSW	7,500
Do.	Electricity Trust of SA, 100%	Leigh Creek opencut mine, SA	3,000
Do.	Coal and Allied Industries Ltd., 80% and manager; and Pohang Iron and Steel Co. Ltd., 20%	Mount Thorley opencut, NSW	6,500
Do.	Powercoal Pty. Ltd., 100%	Munmorah State underground mine, NSW	1,200
Do.	do.	Myuna underground mine, NSW	1,500
Do.	MIM Holdings Ltd., 75%; and Agip Coal Australia Pty. Ltd., 25%	Newlands opencut, QLD	4,000
Do.	Powercoal Pty. Ltd., 100%	Newstan State underground mine, NSW	2,500
Do.	Central Queensland Coal Associates, 100%. (BHP Australia Coal Ltd., 44.72% and operator; QCT Resources, 27.78%; Mitsubishi Development Pty. Ltd., 13.33%; AMP society, 8.61%; and Pancontinental Mining Ltd., 5.56%)	Norwich Park opencut, QLD	4,500
Do.	do.	Peak Downs opencut, QLD	5,500
Do.	Oakbridge Ltd., 100%	Pelton-Ellalong underground mine, NSW	2,000
Do.	Central Queensland Coal Associates, 100%. (BHP Australia Coal Ltd., 44.72% and operator; QCT Resources, 27.78%; Mitsubishi Development Pty. Ltd., 13.33%; AMP society, 8.61%; and Pancontinental Mining Ltd., 5.56%)	Saraji opencut, QLD	4,700
Do.	Shell Australia Ltd., 100%	South Bulli underground mine, NSW	3,000
Do.	Kembla Coal and Coke Pty. Ltd., 100%	Tahmoor underground mine, NSW	4,100
Do.	FAI Mining Ltd., 70% and manager; Marubeni Coal Pty. Ltd., 14%; Taiheiyo Australia Pty. Ltd., 10%; Chelsea Coal Pty. Ltd., 3%; and Kokan Kogyo (Australia) Pty. Ltd., 3%	Teralba underground mine, NSW	1,700
Do.	BHP Steel Collieries Division, 100%	Tower underground mine, NSW	1,600
Do.	Ulan Coal Mines Ltd., manager. (Mitsubishi Development Pty. Ltd., 49%; Exxon Coal Authorities Australia Ltd., 36%; and the State Superannuation Board of NSW, 15%)	Ulan No. 2 underground and Ulan opencut mines, NSW	5,500
Do.	Wambo Mining Corp. Pty. Ltd., 100%	Wambo underground and opencut mines, NSW	4,000
Do.	Kembla Coal and Coke Pty. Ltd., 100%	West Cliff underground mine, NSW	3,000
Do.	FAI Mining Ltd., 70% and manager; Marubeni Coal Pty. Ltd., 14%; Taiheiyo Australia Pty. Ltd., 10%; Chelsea Coal Pty. Ltd., 3%; and Kokan Kogyo (Australia) Pty. Ltd., 3%	West Wallsend underground mine, NSW	2,400
Do.	Powercoal Pty. Ltd., 100%	Wyee State underground mine, NSW	1,800
Coal, brown	Generation Victoria (formerly State Electricity Commission of VIC), 100%	Latrobe Valley opencut mines (Loy Yang, Morwell, and Yallourn), VIC	48,000
Copper	Denehurst Ltd., 50% and manager; and Macquarie Resources Ltd., 50%	Benambra Mine, VIC	18
Do.	Poseidon Gold Ltd., manager, 40%; Billiton Australia Gold Pty. Ltd., 30%; Newcrest Mining Ltd., 20%; and Kobe Alumina Associates (Australia) Pty. Ltd., 10%	Boddington Mine, WA	10
Do.	GSM Metals Pty. Ltd., operator. (Golden Shamrock Mines Ltd., 70%; and private interests, 30%)	Cobar (CSA) Mine, NSW	35
Do.	Ernest Henry Mining Pty. Ltd., operator. (MIM Holdings Ltd., 51%; and Savage Resources Ltd., 49%)	Ernest Henry Mine, QLD	95
Do.	Poseidon Gold Ltd., 100%	Gecko Mine, NT	17
Do.	Nord Pacific Ltd., operator. [Straits Engineers Pte. Ltd. (Singapore), 60%; and Nord Pacific Ltd., 40%]	Girilambone Mine, NSW	15
Do.	Murchison Zinc Co. Pty. Ltd., operator. (Normandy Poseidon Ltd., 45%; Esso Australia Resources Ltd., 35%; and Aztec Mining Co. Ltd., 20%)	Golden Grove Project (includes Gossan Hill and Scuddles Mines), WA	4
Do.	Gunpowder Copper Ltd., operator. (Adelaide Brighton Cement Holdings Ltd., 100%)	Gunpowder Mine, QLD	9

See footnotes at end of table.

TABLE 2--Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995 1/

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities 2/	Annual capacity e/
Do.		Aberfoyle Ltd., 100%	Hellyer Mine, TAS	4
Do.		Mount Isa Mines Ltd., operator. (MIM Holdings Ltd., 100%)	Hilton Mine at Mount Isa, QLD	180
Do.		Horseshoe Gold Mine Project, manager. (Sabminco NL, 57%; and Asian Pacific Resources Pty. Ltd., 43%)	Horseshoe Mine, WA	15
Do.		Mount Isa Mines Ltd., operator. (MIM Holdings Ltd., 100%)	Mount Isa Smelter, QLD	175
Do.		Gold Mines of Australia Ltd., 100%	Mount Lyell Mine, TAS	39 3/
Do.		Western Mining Corp. Holdings Ltd., 100%	Nifty Mine, WA	16
Do.		North Ltd., operator, 80%; Sumitomo Metal Mining Co. Ltd., 13.3%; and Sumitomo Corp., 6.7%	Northparkes Mine, NSW	65,000
Do.		Olympic Dam Operations Ltd., manager. (Western Mining Corp. Holdings Ltd., 100%)	Olympic Dam Mine, SA	84
Do.		do.	Olympic Dam Refinery, SA	50
Do.		do.	Olympic Dam Smelter, SA	70
Do.		Peak Gold Mines Pty. Ltd., operator. (CRA Ltd., 100%)	Peak Mine, NSW	3
Do.		Southern Copper Ltd., manager. (CRA Ltd., 60%; Furukawa Co. Ltd., 30%; and Nissho-Iwai Corp., 10%)	Port Kembla Refinery, NSW	80
Do.		do.	Port Kembla Smelter, NSW	80
Do.		Red Dome Pty. Ltd., operator. (Niugini Mining Ltd., 100%)	Red Dome Mine, QLD	6
Do.		Pasminco Ltd., 100%	Rosebery Mine, TAS	4
Do.		Australian Resources and Mining Co. NL, 100%	Selwyn (Starra) Mine, QLD	16
Do.		Newcrest Mining Ltd., 100%	Telfer Mine, WA	2
Do.		Pancontinental Mining Ltd., manager, 100%	Thalanga Mine, QLD	9
Do.		Copper Refineries Pty. Ltd., operator. (MIM Holdings Ltd., 100%	Townsville Refinery, QLD	175
Do.		Denehurst Ltd., 100%	Woodlawn Mine, NSW	8
Diamond	thousand carats	Argyle Diamond Mines Pty. Ltd., operator and manager. (RTZ Ltd.-CRA Ltd., 56.8%; Ashton Mining Ltd., 38.2%, and Western Australian Diamond Trust, 5%)	Argyle Mine (AK-1 lamproite pipe and alluvial deposits), WA	40,000
Do.	do.	Poseidon Bow River Diamond Mine Ltd., 100%.	Bow River Mine, WA	1,000
Gas, condensate	thousand 42-gallon barrels per day	Woodside Petroleum Pty. Ltd., manager; BP Developments Australia Ltd.; Chevron Asiatic Oil Co.; Shell Development (Australia) Pty. Ltd.; BHP Petroleum (North West Shelf) Pty. Ltd.; and Japan Australia Oil (MiMi) Pty. Ltd., 16.67% each	North West Shelf Project, 140 kilometers offshore from Dampier, WA	60
Gas, natural	million cubic meters per day	do.	North West Shelf Project, 140 kilometers offshore from Dampier, WA	20
Gold	kilograms	Poseidon Gold Ltd., 100%	Big Bell Mine, WA	5,500
Do.	do.	Poseidon Gold Ltd., manager, 40%; Billiton Australia Gold Pty. Ltd., 30%; Newcrest Mining Ltd., 20%; and Kobe Alumina Associates (Australia) Pty. Ltd., 10%	Boddington Mine, WA	11,000
Do.	do.	Poseidon Gold Ltd., operator, 62%; and Forrestania Gold NL, 38%	Bounty Mine, WA	2,500
Do.	do.	Great Central Mines NL, 100%	Bronzewing Mine, WA	6,200
Do.	do.	Territory Goldfields NL, 100%	Cosmo Howley Mine, NT	1,700
Do.	do.	Ernest Henry Mining Pty. Ltd., operator. (MIM Holdings Ltd., 51%; and Savage Resources Ltd., 49%)	Ernest Henry Mine, QLD	3,700
Do.	do.	Perilya Mines NL, 100%	Fortnum Mine, WA	1,500
Do.	do.	Poseidon Gold Ltd., 100%	Golden Crown Mine, WA	1,150
Do.	do.	North Flinders Mines Ltd., 100%	The Granites Mine, NT	4,750
Do.	do.	Golden Valley Joint Venture, manager. (Placer Pacific Ltd., 60%; and Delta Gold NL, 40%)	Granny Smith Mine, WA	4,800
Do.	do.	Alcoa of Australia Ltd., operator. Alcoa International Holdings, Co., 60.0%; Western Mining Corp. Ltd., 39.25%; QBE Securities Pty. Ltd., 0.5%; and QBE Nominees Pty. Ltd., 0.25%	Hedges Mine, WA	4,900
Do.	do.	Hampton Areas Australia Ltd., operator. (Gold Mines of Kalgoorlie Ltd., 100%)	Jubilee Mine, WA	2,300
Do.	do.	Australian Gold Refineries, operator. Gold Corp. of Australia, 100% (State of WA agency)	Kalgoorlie Refinery, WA	46,000
Do.	do.	Delta Gold NL, manager, 50%; and North Ltd., 50%	Kanowna Belle Mine, WA	5,600
Do.	do.	Kidston Gold Mines Ltd., 100%	Kidston Mine, QLD	6,500
Do.	do.	Sons of Gwalia Ltd., 100%	Leonora Mine, WA	2,800
Do.	do.	Plutonic Resources Ltd., 100%	Meekatharra area mines, WA	2,300
Do.	do.	Kalgoorlie Consolidated Gold Mines Pty. Ltd., manager. (Gold Mines of Kalgoorlie Ltd., 50%; and Homestake Gold of Australia Ltd., 50%)	Mount Charlotte Mine, WA	4,300
Do.	do.	Reynolds Australia Gold Operations Ltd., 100%	Mount Gibson Mine, WA	3,450
Do.	do.	Mount Leyshon Gold Mines Ltd., 100%	Mount Leyshon Mine, QLD	7,500
Do.	do.	Hill 50 Gold Mine NL, operator. (Western Mining Corp. Holdings Ltd., 100%)	Mount Magnet-Hill 50 Mines, WA	6,600
Do.	do.	Centaur Mining and Exploration Ltd., 100%	Mount Pleasant Mine, WA	1,750
Do.	do.	Zapopan NL, 100%	Mount Todd Mine, NT	3,100
Do.	do.	Newcrest Mining Ltd., manager, 80%; and Titan Resources NL, 20%	New Celebration Mine, WA	4,750
Do.	do.	Eagle Mining Corp. NL, 100%	Nimary Mine, WA	3,100

See footnotes at end of table.

TABLE 2--Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995 1/

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities 2/	Annual capacity e/
Gold--Continued:	kilograms	MIM Holdings Ltd., manager, 50.1%; and Haoma Mining NL, 49.9%	Nolans Mine, QLD	3,400
Do.	do.	North Ltd., operator, 80%; Sumitomo Metal Mining Co. Ltd., 13.3%; and Sumitomo Corp., 6.7%	Northparkes Mine, NSW	2,200
Do.	do.	Olympic Dam Operations Ltd., manager. (Western Mining Corp. Holdings Ltd., 100%)	Olympic Dam Mine, SA	1,500
Do.	do.	Newcrest Mining Ltd., 100%	Ora Banda Mine, WA	2,650
Do.	do.	MIM Holdings Ltd., 100%	Pacific precious metals refinery, NSW	1,900
Do.	do.	Pajingo Gold Mine Pty. Ltd., 100%	Pajingo Mine, QLD	1,900
Do.	do.	Peak Gold Mines Pty. Ltd., operator. (CRA Ltd., 100%)	Peak Mine, NSW	3,700
Do.	do.	Australian Gold Refineries, operator. Gold Corp. of Australia, 100% (State of WA agency)	Perth (Newburn) Refinery, WA	95,000
Do.	do.	Renison Goldfields Consolidated Ltd., 100%	Pine Creek Mine, NT	3,100
Do.	do.	Plutonic Resources Ltd., 100%	Plutonic Mine, WA	5,300
Do.	do.	Red Dome Pty. Ltd., operator. (Niugini Mining Ltd., 100%)	Red Dome Mine, QLD	3,600
Do.	do.	Western Mining Corp. Holdings Ltd., 100%	St. Ives Mines, WA	7,500
Do.	do.	Australian Resources Ltd., 100%	Selwyn (Starra) Mine, QLD	3,600
Do.	do.	Stawell Gold Mines Joint Venture, manager. (MPI Gold Pty. Ltd., 50%; and Pittston Mineral Ventures of Australia, 50%)	Stawell Mine, VIC	1,100
Do.	do.	Kalgoorlie Consolidated Gold Mines Pty. Ltd., manager. (Gold Mines of Kalgoorlie Ltd., 50%; and Homestake Gold of Australia Ltd., 50%)	Super Pit, WA	23,000
Do.	do.	Zapopan NL, 100%	Tanami Mine, NT	1,900
Do.	do.	do.	Telfer Mine, WA	12,000
Do.	do.	Gold Mines of Australia Ltd., 100%	Temora Mine, NSW	2,250
Do.	do.	Westgold Resources NL, 100%	Tuckabianna Mine, WA	1,700
Do.	do.	Wiluna Mines Ltd., 100%	Wiluna Mine, WA	4,230
Do.	do.	Ross Mining NL, 100%	Wirralie Mine, QLD	3,200
Do.	do.	Gold Mines of Australia Ltd., 100%	Youanmi Mine, WA	2,350
Ilmenite		Cable Sands (WA) Pty. Ltd., operator. [Nissho Iwai Corp. (Japan), 100%]	Busselton East and Waroona Mines. WA	100
Do.		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Capel Mine, WA	180
Do.		Ticor Resources Pty. Ltd., 50% and manager; and Kerr-McGee Chemical Corp. Western Australia Pty. Ltd., 50% (Tiwest Joint Venture)	Cooljarloo Mine, WA	480
Do.		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Eneabba West Mine, WA	600
Do.		Mineral Deposits Ltd., operator. (BHP Minerals Ltd., 100%)	Hawks Nest (Stockton, Viney Creek, and Viney Creek North) Mines, NSW	10
Do.		Consolidated Rutile Ltd., 100%	North Stradbroke Island (Bayside and Gordon) Mines, QLD	850
Do.		Westralian Sands Ltd., 100%	Yoganup Extended and Yoganup North Mines, WA	300
Iron ore		Hamersley Iron Pty. Ltd., 100%	Brockman No. 2 Mine, WA	4,500
Do.		Channar Management Services, manager. [Hamersley Iron Pty. Ltd., 60%; and CMIEC (Channar) Pty. Ltd., 40%, a People's Republic of China state-owned enterprise]	Channar Mine, WA	5,500
Do.		Portman Mining Ltd., 60% and operator; and Angang Australia Pty. Ltd., 40%, a People's Republic of China state-owned enterprise	Koolyanobbing Mine, WA	3,000
Do.		Hamersley Iron Pty. Ltd., 100%	Marandoo Mine, WA	10,000
Do.		do.	Mount Tom Price Mine, WA	28,000
Do.		BHP Iron Ore Ltd., 55% and manager; Pilbara Iron Pty. Ltd., 30%; Mitsui-Itochu Pty. Ltd., 10%; and CI Minerals Australia Pty. Ltd., 5%	Mount Whaleback Mine, WA	35,000
Do.		BHP Iron Ore Ltd., 55% and manager; BHP Australia Coal Pty. Ltd., 30%; CI Minerals Australia Pty. Ltd., 8%; and Mitsui Iron Ore Corp. Pty. Ltd., 7%	Nimingarra-Shay Gap-Sunrise Hill and Yarrie Mines (Mount Goldsworthy extension project, WA)	6,500
Do.		Robe River Mining Co. Pty. Ltd., manager of Robe River Iron Associates Joint Venture. (North Mining Ltd., 65%; Mitsui Iron Ore Development Pty. Ltd., 20%; Pannawonica Iron Associates, 10%; and Cape Lambert Iron Associates, 5%	Pannawonica-Deepdale (Robe River) Mine, WA	27,000
Do.		Hamersley Iron Pty. Ltd., 100%	Paraburdoo Mine, WA	15,000
Do.		Savage River Mines, operator. (Pickands Mather and Co. International, 100%)	Savage River Mine, TAS	1,500
Do.		BHP Iron Ore Ltd., 85%; CI Minerals Australia Pty. Ltd., 8%; and Mitsui Iron Ore Corp. Pty. Ltd., 7%	Yandi Mine, WA	15,000
Lead		Pasminco Ltd., 100%	Broken Hill (South) Mine, NSW	150
Do.		Western Metals NL, 80% and manager; and Padaeng Industry Co. Ltd. (Thailand), 20%	Cadjebut Mine, WA	22
Do.		Century Zinc Ltd., operator. (CRA Ltd., 100%)	Century Mine, QLD 4/	40

See footnotes at end of table.

TABLE 2--Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995 1/

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities 2/	Annual capacity e/
Lead--Continued		GSM Metals Pty. Ltd., operator. (Golden Shamrock Mines Ltd. 100%)	Cobar (CSA) Mine, NSW	4
Do.		Pasminco Ltd., 100%	Cockle Creek Smelter, NSW	30
Do.		Pasminco Ltd., 60%; and Korea Zinc Co. Ltd., 40%	Elura Mine, NSW	15
Do.		Aberfoyle Ltd., 100%	Hellyer Mine, TAS	45
Do.		McArthur River Mining Pty. Ltd., operator. (MIM Holdings Ltd., 70%; and ANT Minerals Pty. Ltd. holding the combined Japanese interests of Nippon Mining and Metals Co. Ltd., 15%; 15%; Mitsubishi Materials Corp., 5%; Mitsui & Co. Ltd., 5%; and Marubeni Corp., 5%)	McArthur River Mine, NT	45
Do.		Mount Isa Mines Ltd., manager. (MIM Holdings Ltd., 100%)	Mount Isa Mine, QLD	190
Do.		do.	Mount Isa Smelter, QLD	240
Do.		Peak Gold Mines Pty. Ltd., manager. (CRA Ltd., 100%)	Peak Mine, NSW	4
Do.		Pasminco Ltd., 100%	Port Pirie Refinery-Smelter, SA	220
Do.		do.	Rosebery Mine, TAS	15
Do.		Pancontinental Mining Ltd., manager, 100%	Thalanga Mine, QLD	15
Do.		Aztec Mining Co. Ltd., 100%	Woodcutters Mine, NT	10
Do.		Denehurst Ltd., 100%	Woodlawn Mine, NSW	14
Leucoxene		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Capel Mine, WA	3
Do.		Ticor Resources Pty. Ltd., 50% and manager; and Kerr-McGee Chemical Corp. Western Australia Pty. Ltd., 50% (Tiwest Joint Venture)	Cooljarloo Mine, WA	10
Do.		Westralian Sands Ltd., 100%	Yoganup Extended and Yoganup North Mines, WA	5
Magnesia		Queensland Magnesia (Operations) Pty. Ltd., operator. Queensland Metals Corp., 60%, and Pancontinental Resources, (Kunwarara) Pty. Ltd., 40%	Queensland Magnesia Project, Kunwarara, 60 kilometers northwest of Rockhampton, QLD.	114 5/
Manganese		Groote Eylandt Mining Co. Pty. Ltd., operator. (BHP Minerals Ltd., 100%)	Groote Eylandt Mine, NT	2,300
Do.		Portman Mining Ltd., 100% and manager	Woodie Woodie Mine, WA	400
Manganese alloys		Tasmanian Electro Metallurgical Co. Pty. Ltd., 100%	Bell Bay Smelter, TAS	260
Monazite		RZM Pty. Ltd., operator. [Nissho Iwai Corp. (Japan), 100%]	Tomago Mines, NSW	1
Do.		Westralian Sands Ltd., 100%	Yoganup Extended and Yoganup North Mines, WA	2
Nickel		Outokumpu Mining Australia Pty. Ltd. and Outokumpu Western Australia Pty. Ltd., 50% each and both wholly owned subsidiaries of Outokumpu Oy of Finland	Forrestania area mines, 375 kilometers southeast of Perth, WA	9
Do.		Western Mining Corp. Holdings Ltd., 100%	Kalgoorlie Smelter, WA	80
Do.		do.	Kambalda Nickel Operations (KNO), WA	35
Do.		do.	Kwinana Refinery, WA	46
Do.		do.	Leinster-Mount Keith Nickel Operations (LMKNO), WA, (administratively combined from the previously separate Leinster Nickel Operation and the Mount Keith Nickel Mine)	72
Do.		QNI Ltd., 100%	Yabulu Refinery, QLD	28
Do.		Dominion Mining Ltd., 100%	Yakabindie Mine, WA	24
Opal		Many small producers	Andamooka and Coober Pedy areas, SA; Lightning Ridge area, NSW	NA
Petroleum	thousand 42-gallon barrels per day	Petroleum Refineries (Australia) Pty. Ltd., manager. (Mobile Refining Australia Pty. Ltd., 100%)	Altona Refinery, VIC	108
Do.	do.	BP Refinery (Bulwer Island) Pty. Ltd., 100%	Bulwer Island Refinery, QLD	57
Do.	do.	Shell Refining (Australia) Pty. Ltd., 100%	Clyde Refinery, NSW	80
Do.	do.	do.	Geelong Refinery, VIC	110
Do.	do.	Australia Petroleum Co. Pty. Ltd., 100%	Kurnell Refinery, NSW	110
Do.	do.	BP Refinery (Kwinana) Pty. Ltd., 100%	Kwinana Refinery, WA	120
Do.	do.	Australia Petroleum Co. Pty. Ltd., 100%	Lytton Refinery, QLD	85
Do.	do.	Petroleum Refineries (Australia) Pty. Ltd., manager. (Mobile Refining Australia Pty. Ltd., 100%)	Port Stanvac Refinery, SA	72
Rutile		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Capel Mine, WA	40
Do.		Ticor Resources Pty. Ltd., 50% and manager; and Kerr-McGee Chemical Corp. Western Australia Pty. Ltd., 50% (Tiwest Joint Venture)	Cooljarloo Mine, WA	35
Do.		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Eneabba West Mine, WA	120
Do.		Mineral Deposits Ltd., operator. (BHP Minerals Ltd., 100%)	Hawks Nest (Stockton, Viney Creek, and Viney Creek North) Mines, NSW	35
Do.		Consolidated Rutile Ltd., 100%	North Stradbroke Island (Bayside and Gordon) Mines, QLD	80
Do.		RZM Pty. Ltd., operator. [Nissho Iwai Corp. (Japan), 100%]	Tomago Mines, NSW	35

See footnotes at end of table.

TABLE 2--Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995 1/

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities 2/	Annual capacity e/
Rutile--Continued		Westralian Sands Ltd., 100%	Yoganup Extended and Yoganup North Mines, WA	115
Salt		Dampier Salt Ltd., operator. CRA Ltd., 64.9%; the Japanese companies Itochu Corp., Marubeni Corp., and Nissho-Iwai Corp., held the remaining 35.1%	Dampier and Lake Macleod salt fields, WA	4,500
Do.		Leslie Salt Division, Cargill Australia Ltd., 100%	Leslie Salt operations, WA	2,750
Silver	kilograms	McArthur River Mining Pty. Ltd., operator. (MIM Holdings Ltd., 70%; and ANT Minerals Pty. Ltd. holding the combined Japanese interests of Nippon Mining and Metals Co. Ltd., 15%; 15%; Mitsubishi Materials Corp., 5%; Mitsui & Co. Ltd., 5%; and Marubeni Corp., 5%)	McArthur River Mine, NT	50,000
Do.	do.	Olympic Dam Operations Ltd., manager. (Western Mining Corp. Holdings Ltd., 100%)	Olympic Dam Mine, SA	12,900
Spodumene		Gwalia Consolidated. Ltd., 100%	Greenbushes Mine, WA	84
Steel		BHP Steel Ltd., 100%	Newcastle steelworks, NSW	1,800
Do.		do.	Port Kembla steelworks, NSW	4,000
Do.		do.	Sydney (Rooty Hill) minimill, NSW	250
Do.		do.	Whyalla steelworks, SA	1,200
Talc		Three Springs Talc Pty. Ltd., 100%	Three Springs Mines, WA	200
Tin		Spectrum Resources Australia Pty. Ltd., 98% and manager; and Nargun Pty. Ltd., 2%	Anchor (Blue Tier) Mine, TAS	3
Do.		Gwalia Consolidated Ltd., 100%	Greenbushes Mine, WA	1
Do.		do.	Greenbushes Smelter, WA	1
Do.		Renison Goldfields Consolidated Ltd., 100%	Renison Bell Mine, TAS	6
Uranium	metric tons uranium oxide	Olympic Dam Operations Ltd., manager. (Western Mining Corp. Holdings Ltd., 100%)	Olympic Dam Mine, SA	1,500
Do.	do.	Energy Resources of Australia Ltd., 100%	Ranger Mine, NT	4,500
Zinc		Pasminco Ltd., 100%	Beltana Mine, SA	30
Do.		do.	Broken Hill (South) Mine, NSW	210
Do.		Western Metals NL, 80% and manager; and Padaeng Industry Co. Ltd. (Thailand), 20%	Cadjebut Mine, WA	65
Do.		Century Zinc Ltd., operator. (CRA Ltd., 100%)	Century Mine, QLD 4/	450
Do.		Pasminco Ltd., 100%	Cockle Creek Refinery-Smelter, NSW	80
Do.		Pasminco Ltd., 60%; and Korea Zinc Co. Ltd., 40%	Elura Mine, NSW	90
Do.		Murchison Zinc Co. Pty. Ltd., manager. (Normandy Poseidon Ltd., 45%; Esso Australia Resources Ltd., 35%; and Aztec Mining Co. Ltd., 20%)	Golden Grove Project (includes Gossan Hill and Scuddles Mines), WA	95
Do.		Aberfoyle Ltd., 100%	Hellyer Mine, TAS	115
Do.		McArthur River Mining Pty. Ltd., operator. (MIM Holdings Ltd., 70%; and ANT Minerals Pty. Ltd. holding the combined Japanese interests of Nippon Mining and Metals Co. Ltd., 15%; Mitsubishi Materials Corp., 5%; Mitsui & Co. Ltd., 5%; and Marubeni Corp., 5%)	McArthur River Mine, NT	160
Do.		Mount Isa Mines Ltd., manager. (MIM Holdings Ltd., 100%)	Mount Isa Mine, QLD	250
Do.		Pasminco Ltd., 100%	Port Pirie Refinery-Smelter, SA	45
Do.		do.	Ridson Refinery, TAS	220
Do.		do.	Rosebery Mine, TAS	45
Do.		Pancontinental Mining Ltd., manager, 100%	Thalanga Mine, QLD	45
Do.		Aztec Mining Co. Ltd., 100%	Woodcutters Mine, NT	45
Do.		Denehurst Ltd., 100%	Woodlawn Mine, NSW	55
Zircon		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Capel Mine, WA	68
Do.		Ticor Resources Pty. Ltd., 50% and manager; and Kerr-McGee Chemical Corp. Western Australia Pty. Ltd., 50% (Tiwest Joint Venture)	Cooljarloo Mine, WA	67
Do.		RGC Mineral Sands Ltd., manager. (Renison Goldfields Consolidated Ltd., 100%)	Eneabba West Mine, WA	300
Do.		Mineral Deposits Ltd., operator. (BHP Minerals Ltd., 100%)	Hawks Nest (Stockton, Viney Creek, and Viney Creek North) Mines, NSW	25
Do.		Consolidated Rutile Ltd., 100%	North Stradbroke Island (Bayside and Gordon) Mines, QLD	65
Do.		RZM Pty. Ltd., operator. [Nissho Iwai Corp. (Japan), 100%]	Tomago Mines, NSW	30
Do.		Westralian Sands Ltd., 100%	Yoganup Extended and Yoganup North Mines, WA	30

e/ Estimated. NA Not available.
1/ Data are rounded to three significant digits.
2/ NSW New South Wales; NT Northern Territory; QLD Queensland; SA South Australia; TAS Tasmania; VIC Victoria; WA Western Australia.
3/ Full capacity planned for 1998; initial capacity in 1995 was approximately 16,000 metric tons per year of copper-in-concentrates.
4/ Mine scheduled to come on-stream in 1998.
5/ Plant produces 24,000 metric tons per year electrofused magnesia and 90,000 metric tons per year dead-burned magnesia.

TABLE 3
AUSTRALIA: RESERVES OF MAJOR MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Antimony		88.1
Bauxite	million metric tons	2,538.0
Black coal:		
In situ	billion metric tons	69.0
Recoverable	do.	49.0
Brown coal:		
In situ	do.	46.0
Recoverable	do.	41.0
Cadmium		73.4
Cobalt		52.0
Columbium		3.4
Copper	million metric tons	20.2
Diamond:		
Gem and near gem	million carats	130.0
Industrial	do.	168.0
Gold	metric tons	3,434.0
Iron ore	billion metric tons	18.0
Lead	million metric tons	19.7
Lithium		159.0
Magnesite (MgO_2)	million metric tons	246.9
Manganese ore	do.	124.0
Mineral sands:		
Ilmenite	do.	132.5
Rutile	do.	14.4
Zircon	do.	21.0
Nickel	do.	2.9
Petroleum, recoverable:		
Condensate	billion liters	133.0
Crude	do.	244.0
Liquefied petroleum gas	do.	135.0
Natural gas	billion cubic meters	1,006.0
Platinum-group metals 1/	metric tons	17.7
Rare earths 2/		1,000.0
Silver		44.7
Tantalum		6.2
Tin		159.0
Tungsten		1.0
Uranium, recoverable	metric tons	633.0
Vanadium		15.0
Zinc	million metric tons	42.6

1/ Platinum, palladium.
2/ Rare earth oxides plus yttrium oxide.

Source: Mineral Resources Branch, Bureau of Resource Sciences, Canberra, Australia.