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2010 Minerals Yearbook

AUSTRALIA

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

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The Mineral Industry of Australia

By Pui-Kwan Tse

In 2010, Australia's economy grew moderately during the first half of the year; however, the growth was significantly affected by the extreme flooding across the States of Queensland, Victoria and part of New South Wales, Tasmania, and Western Australia during the second half of the year. The extreme weather conditions caused disruptions to regional economic activities and damage to infrastructure and property. As a result, the gross domestic product (GDP) increased by only 0.7% in the fourth quarter of the year. Overall, Australia's economy grew at a rate of 2.7% during 2010. Australia was one of the world's leading mineral-producing countries and ranked among the top 10 countries in the world in the production of bauxite, coal, cobalt, copper, gem and near-gem diamond, gold, iron ore, lithium, manganese ore, tantalum, and uranium. After falling considerably in late 2008 and early 2009, prices for many energy and mineral products recovered slowly in late 2009 and 2010 (Reserve Bank of Australia, 2011, p. 29).

The mining sector had grown to become an important factor in the country's economic development. Mineral export revenue accounted for about one-half of the country's export income. The mining sector employed a relatively small proportion of the workforce directly; however, the demand for services to support the mining sector increased rapidly during the past decade. Owing to the strength of economic growth in China and other emerging economies, the demand for energy and mineral commodities was expected to increase in the next several years. As the world economy slowly recovered, the metal and mineral sector became a target of increasing investment. According to a Chamber of Minerals and Energy of Western Australia report, the State of Western Australia was expected to face shortages of skilled workers in the energy and mineral sectors during the next 10 years (Chamber of Minerals and Energy of Western Australia, 2011, p. 34–50).

The continuing improvement of economic conditions in the world and increasing demand for minerals in 2010 led Australian companies to increase their exploration spending significantly. Australia's total mineral exploration spending in Australia in 2010 was estimated to be US$5.7 billion (A$6.0 billion), which was an increase of about 5% from that of 2009. Spending on exploration minerals other than petroleum increased to US$2.3 billion (A$2.4 billion). The increase in exploration spending was the result of increased spending for coal and copper in Queensland and gold, iron ore, petroleum, and uranium in Western Australia. About 60% of the country's total exploration expenditure was spent on known deposits, and the remaining 40% was spent on new exploration. The increase in uranium exploration spending reflected the Government of Western Australia's removal of a ban on uranium mining in the State (Australian Bureau of Statistics, 2010a–c; 2011b).

As a result of the spending on exploration, significant mineral resources were discovered. These included the Blackbush uranium project in Whyalla, South Australia; the Davidson Creek iron ore project near Newman, Western Australia; the Hawsons iron project near Broken Hill, New South Wales; the Homeville nickel-cobalt project near Cobar, New South Wales; the Mount Carlton gold project near Collinsville, Queensland; the Mount Dorothy copper project near Mary Kathleen, Queensland; the Mount Elvire iron project north of Southern Cross, Western Australia; the Nymagee copper project in New South Wales; and the Quantum rare-earth project in Northern Territory (Geoscience Australia, 2011).

Minerals in the National Economy

Australia's mining sector contributed more than $115 billion, or 8.8%, to the country's GDP in 2010. The mining sector employed 135,000 people, of which Western Australia employed 56,000 followed by Queensland, 37,000; and New South Wales, 24,000. Expectations of sustained levels of global demand for minerals led to increased production of minerals and metals in Australia, and the mineral industry was expected to continue to be a major contributor to the Australian economy in the next several years (Australian Bureau of Statistics, 2011c).

Government Policies and Programs

The powers of Australia's Commonwealth Government are defined in the Australian Constitution; powers not defined in the Constitution belong to the States and Territories. Except for the Australian Capital Territory (that is, the capital city Canberra and its environs), all Australian States and Territories have identified mineral resources and established mineral industries. Each state has a mining act and mining regulations that regulate the ownership of minerals and the operation of mining activities in that State. The States have other laws that deal with occupational health and safety, environment, and planning. All minerals in the land are reserved to the Crown; however, a very small percentage of minerals in Australia are owned by those who were granted titles to the land before enactment of relevant State legislation that excludes mineral ownership. Companies or miners may obtain rights to conduct mining activities on unreserved Crown land where the permission of the landowner has been granted. Royalties on minerals are charged by State and Territory governments. In most cases, royalties are payable on a percentage of value or a flat rate per unit basis. Each State sets its own rate. Northern Territory's royalties are based on profit where the net value of a mine's production is used to calculate the applicable royalty. The royalty paid by a company is allowed to be deducted from reported income for income tax purposes. The amount of royalty paid can be reduced by deducting the costs incurred in the transportation of the mineral ore, concentrate, or metal.

The Federal Government drafted a tax proposal to scrap State royalty taxes on mining projects and replace them with a

uniform national resource rent tax or a resource super profits tax (RSPT) beginning on July 1, 2012. The RSPT would be up to 40% on coal, copper, iron ore, zinc, and other minerals mined in all existing and future mining projects. The intention of the proposed tax was to target project profits rather than project production and to shift the tax burden from low profitability projects to more profitable projects. The RSPT was calculated as assessable revenue less deductible expenses, including an allowance for capital expenditure. All existing projects that were subject to State-based royalties would be taxed under the RSPT. State royalties would be continued but would be creditable under the RSPT. Existing projects that were subject to the petroleum resource rent tax (PRRT) would not automatically be subject to the RSPT; rather, a company would instead be able to elect to have the RSPT apply. Facing objections from the mining sector, the Government modified the new taxation scheme for the resources sector. In 2010, the Government decided to change the RSPT scheme to a mineral resource rent tax (MRRT), which would apply only to coal and iron ore, and established a policy transition group to advise on the technical issues of the MRRT and the PRRT. After consultation with mining companies in 2010, the policy transition group submitted 94 recommendations regarding the MRRT and the PRRT to the Government. Companies that had the MRRT profits of less than A$50 million would be excluded from the new regime. The Government accepted all recommendations submitted by the policy transition group. The new MRRT would apply only to coal and iron ore mined in Australia. The current PRRT would be extended to all Australian onshore and offshore oil and gas projects, including the North West Shelf (Ministry of Treasury, 2010, p. 5–28; 2011).

The Parliament of the State of South Australia passed the Mining (Miscellaneous) Amendment Bill 2010 to the Mining Act 1971 in November 2010. The new bill repeals or amends legislative requirements for mining companies conducting operations in the State and encourages companies to supply more information on proposed and current mining operations in order to improve notification protocols for landholders and the community. The new bill is intended to ensure that the State government regulates mining operations effectively. The State government also released a draft Mining Regulations 2011 to the public for comment (Primary Industries and Resources South Australia, 2010, p. 4–10).

Production

Australia continued to be one of the world's leading producers of such commodities as bauxite, coal, cobalt, copper, gem and near-gem diamond, gold, iron ore, lithium, manganese ore, tantalum, and uranium. The country's refined metal production capacity was moderate in the Asia and the Pacific region compared with that of China and Japan. Because of its large mineral resources, Australia was virtually self-sufficient in most mineral commodities. Petroleum production, however, supported only about 70% of the country's consumption. Australia was one of the world's leading exporting countries for alumina, coal, iron ore, and uranium. In general, mineral and metal production were about the same in 2010 as in 2009. Commodities for which production decreased significantly in 2010 were cobalt, refined lead, refined nickel, refined silver, tantalum, and uranium. Commodities for which reported production increased included mined gold, iron and steel, iron ore, mined lead, manganese, intermediate nickel, salt, mined silver, titanium concentrates, mined zinc, and zircon. An increase of intermediate nickel output was a result of increased production at BHP Billiton Ltd.'s Kalgoorlie refinery. Increased manganese production was from BHP Billiton's Groote Eylandt and Bermuda-based OM Holding Ltd.'s Bootu Creek operations. The redevelopment of United States-based Newmont Mining Corp.'s Boddington Mine and increased output from Newcrest Mining Ltd. of Australia's's Cadia Hill and Telfer operation led to increased output of gold in Australia. As a result of strong demand from China, companies from the Pilbara region in Western Australia increased their iron ore production in 2010 (table 1).

Structure of the Mineral Industry

The Australian mineral industry is characterized by free enterprise in which private companies are involved in exploration, mine development, mineral production, mineral processing, and marketing. A number of Australian mineral companies were affiliates or subsidiaries of European and U.S. companies, which controlled a large part of the mining, smelting, and refining sectors and a significant portion of the mineral fuels sector (table 2).

Each State and Territory government administers the mineral industries within its own borders, which includes registering land titles; issuing exploration and development permits; conducting inspections and assuring compliance with health, safety, and environmental regulations; and levying royalties and taxes. Because the Commonwealth Government may restrict mineral exports for the good of the country, however, it effectively has control over most mineral production.

Mineral Trade

Australia continued to rely heavily on exports of the majority of its mineral production to sustain the country's mineral industry development. In 2010, the value of Australia's total foreign trade of goods was $425.4 billion (A$446.7 billion), of which the value of exports was $224.5 billion (A$236.3 billion) and the value of imports was $200.9 billion (A$210.4 billion). As a result of higher energy and mineral commodity prices and an increase in export volume, Australia's export revenue increased by about 25% to $157 billion. Mineral and metal exports accounted for about 78% of the total value of exports. Export volumes that were higher than in 2009 included bauxite, coking coal, diamond, iron ore, manganese ore, and zinc. The value of iron ore exports accounted for 30% of the total value of mineral and metal exports followed by coal, 25%; gold, 8%; oil, 7%; and liquefied natural gas, 6%. Australia's mineral and metal exports went mostly to Asian countries. Australia remained one of the world's leading exporters of alumina, coal, diamond (gem, near-gem, and natural industrial), ilmenite, iron ore, mined lead, rutile, and zircon. Crude petroleum and its refined products remained Australia's leading imported fuel and mineral

commodity, followed by gold, iron and steel, potassium fertilizer, and silver (Australian Bureau of Statistics, 2011a, p. 27).

Commodity Review

Metals

Aluminum.—Australia was the leading bauxite-producing country in the world. Bauxite was mined at the Gove Mine in the Northern Territory; the Weipa Mine in the northern part of Queensland; and the Huntly, the Willowdale, and the Worsley Mines in Western Australia. Australia was also the leading alumina-producing country in the world. All Australia's alumina refineries were located in close proximity to their bauxite mines and shipping facilities. In 2010, Western Australia was the leading bauxite-producing State and accounted for about 62% of the country's total output of bauxite followed by Queensland, 28%, and Northern Territory, 10%. In 2010, Australia exported 8.0 million metric tons (Mt) of bauxite compared with 6.4 Mt in 2009. Western Australia was the leading alumina-producing State in Australia and accounted for about 60% of the country's alumina output. The country exported 16.7 Mt of alumina. China, which received about 23% of the total exported volume, was the leading destination for exported Australian alumina followed by the United Arab Emirates, 22%; South Africa, 12%; and other countries, less than 10% each. The consumption of domestic aluminum smelters was less than 20% of the country's total alumina output, and the remainder was exported. In 2010, Australia exported 1.7 Mt of aluminum. The Republic of Korea was the leading destination for Australian aluminum exports and accounted for 38% of the total, followed by Japan, 25%; Taiwan, 12%; and Thailand, 8%; the remainder went to other countries in the world (Australian Bureau of Agricultural and Resource Economics, 2011, p. 20; Department of Mines and Petroleum, 2011, p. 9).

Owing to increasing demand for alumina in China in recent years, Australian producers expanded their bauxite mines' and refineries' output capacities. Bauxite Resources Ltd. continued to explore in the North Darling Range area, including Bindoon, New Norcia, and Toodyay, and in the South Darling Range area around Brunswick Junction in Western Australia. The company received approval from the local council to mine 2 million metric tons per year (Mt/yr) of bauxite from 10 properties located north of Bindoon in the Darling Range. Bauxite Resources shipped a total of about 130,000 metric tons (t) of run-of-mine gibbsite ore from North Bindoon to various refineries in China for test purposes in 2009 and 2010. Testing results indicated that it took about 2.6 t of bauxite to produce 1 t of alumina. Bauxite Resources was to sign an agreement with China's Yankuang Group Corp. to jointly build an alumina refinery in Western Australia. The partners would undertake studies to obtain a bankable feasibility study for the development of a 1.1-Mt/yr alumina refinery. The construction of the refinery would commence within 5 years, subject to a bankable feasibility study, site selection, and environmental and regulatory approvals. Yankuang would pay 91% of the refinery construction costs and receive 70% of the alumina output. Yankuang agreed to offtake 50% of Bauxite Resources' 30% share of the alumina output for the first 10 years. Yankuang would pay 70% of the past and future bauxite exploration costs on the Darling Range tenements. Any direct shipping of bauxite or calcined bauxite that commenced within the next 3 years would be shared between Bauxite Resources, 51%, and Yankuang, 49%. Bauxite Resources and its partner Shandong No. 1 Institute of Geology and Minerals Exploration of China commenced their exploration program in 2010 on the Darling Range. This exploration program was excluded from the agreement with Yankuang. Shandong No. 1 would pay all exploration and the bankable feasibility study costs to earn a 60% share upon the completion of a bankable feasibility study. Most of the company's bauxite output would be destined for China, mainly Shandong Province (Bauxite Resources Ltd., 2011, p. 1–12).

Rio Tinto Alcan was conducting a feasibility study to develop the bauxite resource in an area south of Embley River and the existing Weipa Mine. The new operation would progressively replace depleted resources at the Andoom and East Weipa mining areas in Weipa. The new development would increase output capacity to 50 Mt/yr from the current capacity of 21 Mt/yr in the region south of the Weipa Peninsula. Rio Tinto Alcan would prepare an environmental impact statement in 2011. Construction of a bauxite mine was scheduled to begin in 2012, depending on regulatory and internal approvals. The Weipa expansion could be completed within 3 years of environmental approval. First shipments were expected to be in 2016. In 2009, because of the weak demand for alumina in the world market, Rio Tinto Alcan decided to slow the construction of the Yarwun alumina refinery expansion in Gladstone and to reduce the output of bauxite at the Weipa Mine. In 2010, however, bauxite production at the Weipa Mine increased by 9% to meet the demand from China, and the company decided to accelerate the construction of the Yarwun refinery expansion, which was rescheduled to be put into operation in the first half of 2012 (Rio Tinto Alcan, 2010; Rio Tinto plc, 2011, p. 430).

Cape Alumina Ltd. continued exploring in 2,400 square kilometers (km^2) of leased land outside of Rio Tinto Alcan's Weipa deposit. The company proposed to produce 7 Mt/yr of bauxite at Pisolite Hills, which was located 50 kilometers (km) northeast of Weipa and between 2.8 and 15 km from the Wenlock River on the western part of Cape York Peninsula. The Pisolite Hills had estimated bauxite resources of about 130 Mt at an average washed grade of 53.1% Al_2O_3, 12.3% SiO_2, and 6.8% Fe_2O_3. The company completed a feasibility study and prepared a bankable feasibility study and an environmental impact statement for the Pisolite Hills project. Cape Alumina also completed a review of the effect of the declaration of the Wenlock River Basin as a wild river area under the Queensland's Wild Rivers Act (2005). The review indicated that about 45% of the bauxite resources were within the 500-meter-wide high-preservation area. The company planned to discuss with officials of the government of Queensland and the Federal Government about the high-preservation area. In 2010, Cape Alumina discovered new bauxite resources at the Bauxite Hills prospect, which is located about 95 km north of Weipa (Cape Alumina Ltd., 2011, p. 29).

Antimony.—Compared with China, Australia was a relatively small antimony producer in the world. Australia's antimony

was produced from Mandalay Resources Ltd.'s Costerfield Mine in Victoria and Straits Resources Ltd.'s Hillgrove Mine in New South Wales. In 2007, Straits Resources decided to redevelop the historic Hillgrove Mine, and the construction of a demonstration processing plant was completed in the first half of 2008. The designed output capacity was for 10,000 metric tons per year (t/yr) of antimony, 30 t/yr of tungsten, and 622 kilograms per year (kg/yr) (20,000 troy ounces per year) of gold. The mine contained recoverable resources of 40,000 t of antimony, 100 t of tungsten, and 6.9 t (222,000 troy ounces) of gold. In 2008, the company produced 222 t of antimony. Production, however, was hampered by a number of technical problems, including process water treatment management and the interface between the leaching and electrowinning sections of the plant. As a result, the operation was unable to meet its production target. The company suspended plant operations in August 2009 to resolve technical issues at the plant. The technical issues were resolved in 2010; however, Straits Resources planned either to list Hillgrove Mine as an independent antimony producer or to sell it to another investor. The Hillgrove Mine was placed on care-and-maintenance status (Straits Resources Ltd., 2011, p. 4).

Mandalay Resources Corp. of Canada purchased the Costerfield antimony and gold deposit from AGD Mining Pty Ltd. in 2009. The Costerfield deposit, which is located 50 km east of the city of Bendigo in the State of Victoria, had been mined extensively during the late 18th and early19th centuries. Extensive exploration was conducted in the late 1990s; as a result, the development of the Augusta underground mine was put into operation in 2006. The company's Brunswick concentrator produced at a rate of 500 to 600 metric tons per month (t/mo) of antimony-gold concentrate that contained about 52% antimony and 60 grams per metric ton (g/t) gold. The company signed a concentrate offtake agreement with Zhongnan Antimony and Tungsten Trading Co. of China for all antimony-gold concentrate produced at Costerfield. The company also recovered gold from the historic tailings through cyanide leaching and carbon recovery. In 2010, the company produced 1,106 t of antimony and 71 kg of gold in concentrates from Costerfield. The company planned to produce more than 2,000 t of antimony and 500 kg of gold in 2011 (Mandalay Resources Corp., 2010).

Cobalt and Nickel.—Australia's main nickel ores were primary sulfides of nickel, which occur as lodes within mafic and ultramafic (iron- and magnesium-rich) igneous rocks that have a volcanic and subvolcanic origin. Western Australia's mined nickel output accounted for more than 90% of the country's total output. The top five nickel producers accounted for 80% of the total sales. BHP Billiton's Nickel West project was Australia's leading nickel operation. Nickel West included the Leinster and the Mount Keith Mines. A number of smaller sulfide nickel operations were operated by Mincor Resources NL and Xstrata Nickel Australia Pty Ltd. [a subsidiary of Xstrata plc (Xstrata)]. As a result of a rapid decline in world nickel prices in 2008 and 2009, a number of Australian nickel producers reduced their output or placed their mines on care-and-maintenance status. Most cuts in production took place at smaller operations that produced less than 6,000 t/yr of nickel in ore and concentrates. A total of about 100,000 t/yr of Australia's mine capacity was shut down in late 2008 and early 2009. As a result, mined nickel production was lower in 2009 and 2010 compared with that of 2008. The production decrease from these mines had been partially offset by increased production from mines owned by BHP Billiton and Xstrata. Australia's mined nickel output was expected to recover slowly with the redevelopment of the Ravensthorpe Mine and the restart of OJSC MMC Norilsk Nickel of Russia's Australian operation in 2011. In 2010, Australia's mined nickel output was solely from Western Australia; Australia exported a combined 214,000 t of nickel in concentrates, intermediate products, and metal (Australian Bureau of Agricultural and Resource Economics, 2011, p. 26).

More than 25 nickel occurrences had been identified at Western Areas NL's Forrestania nickel project, which is located 400 km east of Perth, Western Australia. The first developed mine of the Forrestania project was the Flying Fox underground nickel mine, which was put into operation in 2009. The mine is located about 108 km south of Marvel Loch. The total mineral resource at Flying Fox was about 1.5 Mt at an average grade of 6.0% nickel. The Forrestania nickel project's Spotted Quoll deposit, which is located 114 km south of Marvel Loch, was being developed in two phases—the Tim King open pit mine in phase 1 and the Spotted Quoll underground mine in phase 2. Development of the Tim King open pit mine began in 2009, and the mine was opened in 2010. The feasibility study for the Spotted Quoll underground mine was started in 2010. The Tim King open pit mine had a mineral resource of 2.1 Mt at an average grade of 4.3% nickel and the Spotted Quoll underground deposit had a mineral resource of 1.7 Mt at an average grade of 4.0% nickel. Ores from the Flying Fox and the Spotted Quoll Mines were carted to Western Areas' Cosmic Boy concentrator, which began operating in 2009. Western Areas planned to upgrade the capacity of the Cosmic Boy concentrator to 550,000 t/yr in 2010 from 300,000 t/yr. Nickel concentrates from the mill were shipped either to BHP Billiton's Kalgoorlie nickel smelter and to Minara Resources Ltd.'s nickel refinery for smelting or sold to Jinchuan Nonferrous Metals Corp. of China. Western Areas produced a total of 26,281 t of nickel in concentrates in 2010. The company planned continued its exploration program at Forrestania (Western Areas NL, 2010, p. 8–10; 2011, p. 2).

Minara Resources's Murrin Murrin Mine was a nickel/cobalt hydrometallurgical project. The mine began nickel production in 2007. In 2008, the company expanded the heap-leaching output capacity to about 34,000 t/yr of nickel. At yearend 2010, the mine had mineral resources of 268 Mt at average grades of 1.01% nickel and 0.074% cobalt. The company produced 28,378 t of nickel and 1,976 t of cobalt t in 2010, which were lower than the 32,977 t of nickel and 2,350 t of cobalt that were produced in 2009. In 2011, the company planned to process 3.1 Mt of high-grade ore containing 1.30% nickel (Minara Resources Ltd., 2011, p. 8).

In 2009, BHP Billiton placed the Ravensthorpe Mine on care-and-maintenance status because of the decrease in the price and demand for nickel on the world markets after the mine officially opened in mid-2008. In December 2009, BHP Billiton

decided to sell the Ravensthorpe Mine to First Quantum Minerals Australia (a subsidiary of First Quantum Minerals Ltd. of Canada) for $340 million; the sale was completed in 2010. First Quantum Minerals planned to invest $190 million to modify the hydrometallurgical processing plant, which was scheduled to be completed in mid-2011. After completion, the average annual nickel production would be 39,000 t/yr for the first 5 years and 28,000 t/yr during the 32-year life of the mine (First Quantum Minerals Ltd., 2011, p. 5).

Copper.—Australia's copper resources occur largely at Olympic Dam in South Australia and at Mount Isa in Queensland. Other important copper resources are located at the CSA and the Northparkes deposits in New South Wales; the Ernest Henry, the Mammoth, and the Osborne deposits in Queensland; and the Golden Grove and the Nifty deposits in Western Australia. Australia's mined copper output ranked the country among the top five producers in the world. In 2010, Australia's copper mine production was at about the same level as that of 2009. The mechanical failure in the main haulage shaft of the Olympic Dam was offset by higher production from the Ernest Henry and the Northparkes Mines. Australia's mined copper production was expected to increase during the next several years. The expansion of the Northparkes operation was completed in 2010, and several copper mines that were placed on care-and-maintenance status in 2008 were expected to restart in 2011. The decrease in refined copper production reflected the decreased production from the Olympic Dam. Queensland continued to be the leading State for mined copper production, largely from the Mount Isa region, which accounted for 31% of the country's output. South Australia's output contributed 29% of the country's total output in 2010, and Western Australia's mined copper increased to 20% of the total in 2010 from 17% in 2009. New South Wales's output accounted for 19%. Tasmania's mined copper output was mainly from Mount Lyell. In 2010, Australia exported a total of 1.9 Mt of copper concentrates compared with 1.8 Mt in 2009. India replaced China as the leading Australian copper concentrates destination and received 33% of the total exported; China, 30%; Japan, 16%; and the Republic of Korea, 14%. Australia exported 315,000 t of refined copper to China, which received 40% of the total exported; Malaysia, 18%; Taiwan, 17%; and Vietnam, 8% (Australian Bureau of Agricultural and Resource Economics, 2011, p. 23).

Owing to the lower price of copper, financial difficulties, and heavy rainfall in December 2008 that had a significant effect on production, CopperCo decided to suspend the Lady Annie Mine's operations. After the company was unable to retire its debt, CopperCo was placed in administration in late 2008. In 2009, CopperCo sold the Lady Annie operation to Cape Lambert Resources Ltd. (formerly Cape Lambert Iron Ore Ltd.). The Lady Annie copper deposit is located 100 km north-northwest of Mount Isa, Queensland. The copper oxide ore was located near the surface and had copper resources of about 11.3 Mt at an average grade of 1.0% copper. The ore was processed through a solvent extraction and electrowinning (SX-EW) process onsite. Full copper production of 19,000 t/yr of copper cathode was achieved in early 2008, and the expansion of the output capacity to 30,000 t/yr began in 2008. In 2010, Cape Lambert decided to sell the operation to CST Mining Group Ltd. (formerly China Sci-Tech Holding Ltd.), which was incorporated in the Cayman Islands [United Kingdom] and listed on the Hong Kong Stock Exchange, for $135 million. The mine remained on care-and-maintenance status during 2009 and the first three quarters of 2010. CST restarted the Lady Annie operation in the fourth quarter of 2010 and planned to produce 28,000 t of copper cathode in 2011. The company planned to invest $27 million to expand the heap-leaching capacity to 30,0000 t/yr in 2012. CST discovered a total of 116 Mt of copper resources at the Anthill, the Flying Horse, the McLeod Hill, the Mount Clarke, and the Swagman deposits in 2010 and would continue to explore copper resources near the Lady Annie's prospects in 2011 (CST Mining Group Ltd., 2011).

Matrix Metal Ltd. decided to commence mining operations at Leichhardt, Queensland, which was located 100 km northeast of Mount Isa, in 2006. The Leichhardt operation included the Mount Watson copper mine and the Leichhardt copper cathode plant. The 5,500-t heap-leaching, SX-EW plant produced the first copper cathode in 2007. Matrix Metal decided to upgrade the copper cathode output capacity to 9,000 t/yr in 2008. Matrix Metal entered voluntary administration in late 2008. Cape Lambert acquired the Leichhardt operation from Matrix Metal for $6.41 million (A$6.75 million) in August 2010. The Leichhardt operation was placed on care-and-maintenance status during this period. The Mount Watson had measured mineral resources of about 2.6 billion metric tons (Gt) at an average grade of 0.9% copper. Cape Lambert planned to conduct diamond drilling at the Mount Watson west pit in 2011 (Cape Lambert Resources Ltd., 2011).

OZ Minerals completed the construction of its Prominent Hill copper-gold operation in 2008 and put it into operation in February 2009. The Prominent Hill project was located about 900 meters (m) west of the Malu open pit mine. The Malu open pit mine was designed to produce between 85,000 t/yr and 100,000 t/yr of contained copper and between 1.87 t/yr (60,000 troy ounces per year) and 2.18 t/yr (70,000 troy ounces per year) of gold in concentrates. In 2010, the mine produced 112,171 t of copper in concentrates and 6.1 t (196,400 troy ounces) of gold, which was more than the designed capacity and the company's production target because of higher metal content of the ore. The company expected that the copper and gold output at the Malu open pit would continue at this level for the remaining life of the open pit. The company continued its drilling program at the Malu deposit and in the Ankata deposit in the area known as the Munda and Kalaya zones. The Ankata deposit was part of the Prominent Hill project. OZ Minerals completed a feasibility study to develop the Ankata underground mine and commenced the construction of the mine in 2010; the company was scheduled to start mining in the first half of 2012. The production costs were estimated to be less than $1.25 per pound of copper. The underground deposit had mineral resources of 4.9 Mt at an average grade of 2.52% copper, 3.68 g/t silver, and 0.48 g/t gold. The Prominent Hill project had estimated mineral resources of 200.3 Mt at average grades of 1.23% copper, 3.0 g/t silver, and 0.5 g/t gold (OZ Minerals Ltd., 2010, p. 2).

In late 2009, the board of Xstrata approved $542 million for the development of the Ernest Henry underground

expansion project near Cloncurry in Queensland. The activities of the expansion project were suspended when the Australian Government announced the RSPT in 2010. The company decided to resume the full project activities when the Government decided to replace the RSPT with MRRT in mid-2010, however. The underground project would extend the life of the Ernest Henry operation to 2024 and would enable the Ernest Henry operation to increase its output capacity to 50,000 t/yr of copper and 2.2 t/yr (70,000 troy ounces) of gold. Estimated resources at the underground area were 72 Mt of ore at grades of 1% copper, 0.5 g/t gold, and 22% magnetite. Xstrata planned to have the magnetite plant completed in early 2011 and to produce 1.2 Mt/yr of magnetite concentrate for the Asia market. The transformation of open pit mining operations to a major underground mining was scheduled to begin in 2013 (Xstrata Copper, 2009, 2010).

Sandfire Resources NL discovered a high-grade DeGrussa volcanogenic copper-gold deposit in the northeastern part of its Doolgunna tenement area, which is located 900 km northeast of Perth, in 2009. Exploration work continued in 2010. The prefeasibility study indicated that the deposit contained indicated and inferred mineral resources of 10.67 Mt of ore at average grades of 5.6% copper, 15 g/t silver, and 1.9 g/t gold. The board of Sandfire Resources conditionally approved the development of an open pit and underground mine with a 1.5-Mt/yr concentrator on the site. The company planned to have two-stage open pit mining in operation in 2 years to mine high-grade direct-shipment ore of 143,000 t at average grades of 25.6% copper and 2.5 g/t gold and 298,000 t of sulfide material at average grades of 6.0% copper and 2.4 g/t gold. The nondirect shipment ore would be processed together with underground ore to produce copper concentrate at an average grade of 27% copper for exporting to international customers. The company planned to produce between 60,000 and 70,000 t/yr of copper and about 1.3 t/yr of gold for about 7 years. In 2010, the Department of Mines & Petroleum of Western Australian granted a mining lease to Sandfire Resources. The company expected to complete a feasibility study in the second quarter of 2011 and to commence mine construction in the third quarter of 2011 (Sandfire Resources NL, 2010, p. 11; 2011).

Gold.—Gold mine output in Australia ranked the country among the world's top four producers, together with China, South Africa, and the United States. In 2010, Australia's mined gold output increased by more than 10% from that of 2009; however, output of refined gold decreased by about 7%. Western Australia remained the leading gold-producing State, with a 69.4% share, followed by New South Wales, 11.5%; Queensland, 6.1%; and Northern Territory, 4.1%; South Australia, Victoria, and Tasmania accounted for the remaining 8.9% The country's gold resources occur and are mined in all States, as well as in the Northern Territory, and much of the gold was produced from large open pit mines. Owing to higher prices of gold in the world markets, gold operators could afford to reduce the grade of ore fed into their processing plants in order to extend the mine life. Australia's gold production was expected to be higher during the next several years because a number of new projects—Crocodile Gold Corp.'s Northern Territory project, Navigator Resources Ltd.'s Leonora project, and YTC Resources Ltd.'s Hera project—were expected to increase production as they approached their full production potential, which was expected to offset the projected production declines at numerous mines that were nearing the end of their estimated mine life. In 2010, Australia exported 332 t (compared with 362 t in 2009) of refined gold produced from imports of gold dore and scrap that were shipped from overseas, refined into gold bullion, and then reexported. Weaker global demand for gold bullion coins and bars had contributed to the decrease of refined gold exports. India, the United Kingdom, and Thailand accounted for 88% of Australia's total gold exports. India was the leading gold consuming country in the world. Because London was a gold market trading center, many of Australia's gold transactions were conducted in London (Australian Bureau of Agricultural and Resource Economics, 2011, p. 25).

In 2010, Newmont had four gold mines—Boddington, Jundee, and Kalgoorlie in Western Australia and Tanami in Northern Territory. Newmont completed the redevelopment of the Boddington Mine in late 2009. The Boddington operation was expected to produce an average of 35,000 t/yr of copper and 31 t/yr (1 million troy ounces per year) of gold for the first full 5 years of operation; the projected mine life was 20 years. In 2010, the Boddington Mine produced 22.6 t (728,000 troy ounces) of gold. The Jundee Mine was an open pit and underground operation. The Jundee operation produced gold from a number of very thin high-grade ore veins below the surface. About 10.4 t (335,000 troy ounces) was produced in 2010. At yearend 2010, the mine had proven and probable reserves of about 25 t (0.8 million troy ounces) of gold. The Kalgoorlie operation was a joint partnership between Newmont and Barrick Gold Australia Ltd. The Kalgoorlie operation comprised the Fimiston open pit (commonly referred to as the Supper pit) and the Mount Charlotte underground mine. The Supper pit was one of the largest gold mines, in terms of production, in Australia. During 2010, the Kalgoorlie operation produced 23.4 t (754,000 troy ounces) of gold. At yearend 2010, the mine had proven and probable reserves of about 118 t (3.8 million troy ounces) of gold. The Tanami operation was located about 40 km west of the Granites. Mining began in the early 1990s, and in 2010, gold was produced from the Callie underground mine at Dead Bullock Soak. In 2010, the Tanami operation produced 7.8 t (250,000 troy ounces) of gold. Exploration results indicated that there was a potential gold resource beyond the current operating depth. The company decided to postpone until 2011 its decision on whether to explore and to study the feasibility of extending the mine life at Callie beyond 2017 (Newmont Mining Corp., 2011, p. 26–27).

Crocodile Gold Corp. of Canada held a 2,700-km^2 land tenement in the Northern Territory. Crocodile's Burnside project, which is located about 150 km south of Darwin, consisted of several gold deposits, including the Brocks Creek, the Cosmo, and the Howley deposits. Many companies had carried out extensive drilling in the area in the 1990s, and the former owner of the Burnside project. CBS Gold International Inc., had planned to develop the Cosmo and the Howley deposits. CBS Gold was placed in administration in 2007, however, and Crocodile Gold acquired the Burnside project.

In 2009, Crocodile Gold commenced its mining operations at Brocks Creek Mine (underground) and Howley Mine (open pit), which was known as "Chinese operation." Ores were transported to its Union Reefs mill for processing. The Union Reefs mill had a processing capacity of 8,000 metric tons per day of ore. The company completed the feasibility study at the Princess Louise open pit mine and planned to develop the Cosmo underground mine. Both mines were scheduled to start production in 2011. As of yearend, Brocks Creek had probable resources of 34,000 t at an average grade of 8.6 g/t gold; Cosmo Deeps, 3.1 Mt at an average grade of 4.2 g/t gold; Howley, 340,000 t at an average grade of 1.6 g/t gold; and Princess Louise, 200,000 t at an average grade of 1.5 g/t gold. Crocodile Gold planned to produce a total of more than 6.2 t (200,000 troy ounces) of gold in 2012 (Crocodile Gold Corp., 2011a, b).

Renison Consolidated Mines NL commenced the feasibility study on its Agate Creek gold project, which is located about 50 km west of Kidston and 50 km south of Forsayth in Queensland. The Agate Creek was a joint venture between Barrick Gold Corp. of Canada and Renison. In 2010, Barrick decided to withdraw from the joint venture and assigned its interest to Renison. Under the agreement, Barrick was entitled to have a 1% net smelter royalty. The Agate Creek deposit had a combined indicated and inferred mineral resources of 14.8 Mt at an average grade of 1.0 g/t gold. The company planned to process between 1 and 1.5 Mt/yr of ore to produce 3.1 t/yr (100,000 troy ounces per year) of gold (Renison Consolidated Mines NL, 2010).

The boards of AngloGold Ashanti Ltd. of South Africa and Independence Group NL approved the development of the Tropicana Gold project, which is located 330 km east northeast of Kalgoorlie, Western Australia. The project was a joint venture of AngloGold Ashanti (70%) and Independence Group (30%). The Tropicana deposit was discovered in 2005, and the Havana deposit, which was located south of Tropicana, was discovered in 2006. The bankable feasibility study was based on the open pit mining of the Havana and the Tropicana deposits. The construction costs were estimated to be $760 million, and construction was scheduled to begin in the second quarter of 2011 and to be completed by yearend 2013. The company planned to process 5.8 Mt of ore to produce between 14.6 and 15.2 t (470,000 and 490,000 troy ounces) of gold during the first 3 years. The Tropicana gold project had proved and probable reserves of 48 Mt at an average grade of 2.2 g/t gold. The company expected that more gold would be discovered in the area (AngloGold Ashanti Ltd., 2010).

Iron and Steel.—Australia was among the top three iron ore producers (in terms of iron content) in the world, along with Brazil and China. Australia's most significant iron ore mines were located in the Pilbara region of Western Australia, which accounted for 96.8% of the country's total iron ore production followed by South Australia, 2.0%; and the Northern Territory and Tasmania, 0.6% each. Owing to its limited domestic demand and production capacity for iron and steel, Australia exported more than 90% of its iron ore output to such Asian countries as China, Japan, the Republic of Korea, and Taiwan. In 2010, Australia's iron ore and pellet exports increased to 402 Mt from 363 Mt in 2009. Australia's iron ore exports to China decreased to 274 Mt in 2010 from 276 Mt in 2009. Owing to the economic recovery, Japan's iron ore imports from Australia increased to 76 Mt from 59 Mt; the Republic of Korea, to 40 Mt from 28 Mt; and Taiwan, to 12 Mt from 8 Mt. Increased demand for iron ore in Asian countries, especially China, stimulated substantial investment in new iron ore projects in Australia and other iron-ore-rich countries. Mines operated by BHP Billiton, Fortescue, and Rio Tinto dominated the Pilbara area's output. China's iron and steel industry was expected to continue to grow during the next several years. Because China had only a limited domestic supply of high-grade iron ore, China's iron and steel producers increasingly relied on imported iron ore to meet their demand. Australia's iron ore production was expected to increase to more than 600 Mt in 2016. The country was expected to continue to be an iron ore supplier to the North Asian countries (Australian Bureau of Agricultural and Resource Economics, 2011, p. 26).

Fortescue was the third ranked iron ore producer in Australia. The board of the company approved an $8.4 billion plan to expand its production capacity to 155 Mt/yr from 55 Mt/yr in November 2010. The development plan included the expansion of the existing railway system and port; the expansion of mine production at Chichester Hub to 90 Mt/yr; and development of a mine and related infrastructure at its Solomon Hub. The expansion of the Chichester Hub operation included the extension of the company's railway line from Cloudbreak to Christmas Creek. Iron ore production from Cloudbreak would remain at its current level of 35 Mt/yr. The company planned to expand the mining operation at Christmas Creek to 55 Mt/yr by the construction of an ore processing facility there. Construction of the ore processing facility at Christmas Creek was scheduled to begin in March 2011 and to be completed by yearend 2012. The Solomon Hub included the Firetail and the Kings deposits. The measured resource of these deposits totaled 1.7 Gt at average grades of 56.4% iron, 7.2% silicon oxide, 3.1% aluminum oxide, and 0.07% phosphorus. The development of the Solomon Hub would be processed in two stages. Construction of the Firetail Mine was scheduled to begin in the second quarter of 2011; direct-shipment ore would be exported in the third quarter of 2012 and fine products would be delivered to overseas customers in the third quarter of 2013. Fortescue intended to export a total of 155 Mt/yr from two areas in June 2014. The company obtained a 120-Mt/yr priority shipment agreement with the Port Hedland Port Authority at its port facilities at Port Hedland. The company sold most of its iron ore products to iron and steel producers in China (Fortescue Metals Group Ltd., 2010, 2011).

Mount Gibson Iron Ltd. operated two iron ore mines—Koolan Island and Tallering Peak—in Western Australia. The two mines had a combined output capacity of 7 Mt/yr. Most of the iron ore was exported to customers in China under offtake agreements. The price of iron ore to China from Mount Gibson was based on the benchmark price at Rio Tinto's Hamersley iron ore operations. In 2010, no annual price index agreements by the major iron ore producers were in place with iron and steel producers in Asia. Mount Gibson negotiated with its customers to establish price mechanisms similar to those of major iron ore producers except that the price was based on the freight

on board price rather than on a landed price in China. Mount Gibson restarted the development of its Extension Hill iron ore project, which was located 85 km east of Perenjori, Western Australia. The definitive feasibility study of the project was completed in 2007. The Extension Hill hematite deposit had probable reserves of 12.8 Mt and resources of 19.5 Mt. The first ore shipment was expected to begin in September 2011; mine and rail infrastructure would not be completed until December 2011. The Extension Hill iron ore mine was designed to produce 3 Mt/yr (Mount Gibson Iron Ltd., 2010, p. 8; 2011, p. 10).

The Karara iron ore mine, which was a joint venture of Gindalbie Metals Ltd. (50%) and Angang Group Investment (Australia) Pty Ltd. (50%) (a subsidiary of Anshan Iron and Steel Group Corp. of China), was under construction in 2010. The Karara deposit, which is located 220 km east of Geraldton, Western Australia, had probable ore reserves of 977 Mt at average grades of 36.5% iron, 42.7% silicon oxide, 0.8% aluminum oxide, and 0.09% phosphorus. The bankable feasibility study on the magnetite phase of Karara was completed in 2007. In 2011, in the first stage of development, the company planned to produce up to 2 Mt/yr of high-grade hematite ore. Development of the magnetite ore mine was scheduled to start in 2012, and the concentrator was designed to produce 8 Mt/yr of 68% iron in concentrates by yearend 2012. Iron ore would be transported by railway from Karara to Geraldton Port for shipping. The construction of an 85-km railway from Karara to Tilley Siding, near Morawis, would be completed in 2011. The total investment was estimated to be $2.6 billion. Gindalbie Metals signed a life-of-mine offtake agreement with Anshan to support its new steel plant, Bayuquan, at Yingkou in China (Gindalbie Metals Ltd., 2011, p. 7).

Australia-based CITIC Pacific Mining Management Pty Ltd. (a subsidiary of a Hong Kong-based CITIC Pacific Ltd., which was, in turn, a member of China state-owned CITIC Group) had invested about $5 billion to develop its Sino iron ore project at Cape Preston, which is located 100 km southwest of Karratha in Western Australia. CITIC Pacific Mining had rights to mine 2 Gt of magnetite ore in the Cape Preston area in 2009. The company planned to produce about 24 Mt/yr of 67% iron in concentrates. In 2006, the Foreign Investment Review Board approved CITIC Pacific Mining's request to purchase the mining rights for 6 Gt of iron ore from Mineralogy Pty Ltd. in the Balmoral tenement where 4 Gt of magnetite resource had been delineated. Mineralogy would receive a royalty from CITIC Pacific Mining of A$0.3 per metric ton of mined ore and an additional 6% to 10% revenue-based royalty on the tonnage exported. After further exploration in the area, the company reported that ore resources, including measured, indicated, and inferred, increased to 5.1 Gt at an average grade of 31.8% iron. The area had the mineral potential to host between 60 and 100 Gt of iron ore. Concentrates would be moved by conveyor belt to barges and then to offshore vessels at Cape Preston and shipped to China. The first shipment of concentrates was scheduled to be made in the second half of 2011 (Australia Resources Ltd., 2006; CITIC Pacific Ltd., 2011, p. 22–31).

Lead, Silver, and Zinc.—Australia's lead, silver, and zinc mines were predominantly based on ore bodies with zinc as the major component and lead and silver as byproducts. An exception was BHP Billiton's Cannington underground mine in the State of Queensland where lead and silver were major components and zinc was a minor component. In 2010, Australian zinc mine production was higher than in 2009. The increased zinc production came from the resumed production of the Century Mine in Queensland and the Golden Grove Mine in Western Australia. The output of zinc was expected to increase during the next 2 years because CBH Resources Ltd. and Xstrata planned to increase zinc output from the Endeavor Mine and the Mount Isa Mine, respectively, and because of the commencement of CBH Resources's Rasp Mine. The State of Queensland remained the leading lead- and zinc-producing State in Australia. In 2010, Australia exported 525,000 t of lead concentrates. China was the leading destination for Australian lead concentrate exports and accounted for 57% of the total, followed by the Republic of Korea, 16%; the European Union, 13%; and Japan, 10%; the remaining 4% went to other countries in the world. Australia also exported 163,000 t of refined lead, for which India was the leading destination followed by Taiwan, the Republic of Korea, Malaysia, and Thailand. In 2010, Australia exported 2.3 Mt of zinc concentrates, which was an increase of 9.5% from that of 2009. Zinc concentrates went mainly to such East Asian countries as China, 46%; and Japan and the Republic of Korea, 12% each. Zinc metal exports decreased by about 13% to 397,000 t and went to such destinations as, in descending order of volume exported, Taiwan, China, Hong Kong, the United States, Malaysia, and Indonesia (Australian Bureau of Agricultural and Resource Economics, 2011, p. 27, 40).

CBH Resources operated the Endeavor Mine at Cobar and a concentrate shiploading facility at Newcastle for mines in New South Wales. The company received State government approval for the development of the Rasp underground mine, which is located within Broken Hill City in New South Wales. The mine area had been mined in the 1880s and had substantial tonnage of unmined resources at the mine site. The company planned to focus on underground development in the Main Lode ore body. Drilling results indicated that the ore body contained total indicated and inferred resources of 16.5 Mt at average grades of 6.6% zinc, 5.1% lead, and 89 g/t silver. The company would start the construction of the mine and a 750,000-t/yr processing plant in 2011. Toho Zinc Co. Ltd. of Japan took over all of CBH Resources' shares in September 2010. CBH Resources became a subsidiary of Toho Zinc (CBH Resources Ltd., 2007, p. 6–7; 2011).

Xstrata's subsidiary, Xstrata Zinc, operated several lead and zinc mines and a processing plant in Mount Isa, Queensland. The company planned to expand its Black Star open pit mine and George Fisher underground mine output capacities. In 2010, the executive committee of Xstrata approved a total expenditure of $362 million for these two mines. After completion in 2013, the output of the George Fisher underground mine would increase to 4.5 Mt/yr from 3.5 Mt/yr. The company planned to mine ore at a depth of 400 meters (m) below the surface, or 100 m below the current design of the Black Star open pit mine, and the life of the mine at the current rate of 4.6 Mt/yr would be extended to 2016. Xstrata also planned to develop the Lady Loretta lead-silver-zinc deposit in northwestern Queensland.

The deposit, which was located 140 km northwest of the Mount Isa operation, had mineral resources of 13.7 Mt grading 17% zinc and 6% lead. The construction of the mine would start in 2011 and was scheduled to be completed in 2013. Lady Loretta was designed to produce 1 Mt/yr of ore for 10 years. Ore from these mines would be processed at the Mount Isa concentrator (Xstrata plc, 2011, p. 90; Xstrata Zinc Australia, 2010a, b; 2011).

Tantalum.—In August 2007, Talison Minerals Pty Ltd. of Canada acquired the Greenbushes and the Wodgina Mines in Western Australia from Sons of Gwalia Ltd. In 2009, Talison Minerals placed its lithium and tantalum operations into two separate companies—Talison Lithium Ltd. and Talison Tantalum Ltd. Talison Minerals suspended its Wodgina tantalum operation in December 2008. Lower priced tantalum from central Africa, particularly from the Democratic Republic of the Congo [Congo (Kinshasa)], supplied a significant amount of tantalum to the world market. The Greenbushes tantalum underground operation remained on care-and-maintenance status in 2009. In 2010, Tailson Tantalum Ltd. was renamed Global Advanced Metals Pty Ltd. Global Advanced Metals planned to reopen its Greenbushes and Wodgina operations in 2011, depending on market conditions (Global Advanced Metals Pty Ltd., 2010).

Tin.—Compared with other tin-producing countries in the Asia and the Pacific region, Australia was not a significant tin producer. Australia's tin was mined mainly in the State of Tasmania, and to a lesser extent, in the State of Western Australia. Metals X Ltd., which was the leading tin-producing company in Australia, had operations at Zeehan and north of Renison in Tasmania. Ores from both mines were shipped to the company's concentrator in Renison, which had an output capacity of 8,500 t/yr of tin in concentrates. Another of Metals X's tin operations, Collingwood, which was located in Queensland, had been on care-and-maintenance status since 2008. In 2010, Metals X sold 50% of its interest in its Tasmanian tin assets to Yunnan Tin Group of China. Yunnan Tin Group had two wholly owned subsidiaries—Yunnan Tin Australia Investment Holding Pty Ltd. and Yunnan Tin Australia TDK Resources Pty Ltd.—in Australia. The two parties established a joint-venture company, Bluestone Mines Tasmania Joint Venture Pty Ltd., to manage the assets. Metals X started to develop the South Renison Decline in 2009. It planned to mine ore from both the North Renison and the South Renison Declines at a rate of about 60,000 t/mo to replace the depleted Mount Bischoff ore, which was scheduled to cease operations at yearend 2010. The joint venture estimated that the Renison underground mine had mineral resources of 7.25 Mt grading 1.77% tin. The joint venture planned to reprocess and recover tin from an estimated 18.95 Mt of tailings at the historic Rension site. The tailings contained average grades of 0.44% tin and 0.21% copper. The company planned to process 2 Mt/yr of tailings to produce 5,300 t/yr of tin and 2,000 t/yr of copper. The beneficiated material contained 10% tin and could be smelted to produce a 68% tin fume product (Metals X Ltd., 2010, p. 14–20; 2011, p. 4–5).

Consolidated Tin Mines Ltd. continued its tin exploration near Cairns in northern Queensland. Its Mount Garnet project had identified measured, indicated, and inferred resources of 7.4 Mt at an average grade of 0.6% tin. The company sent 80 t of sample from the Gallian site to its pilot plant at Greenbushes in Western Australia for testing in late 2010. The company planned to prepare a feasibility study for this project if the test results were positive (Consolidated Tin Mines Ltd., 2011, p. 3).

Industrial Minerals

Cement.—Australia has three major integrated cement companies (Adelaide Brighton Cement Pty Ltd., Blue Circle Southern Cement Ltd., and Cement Australia Pty Ltd.) and a number of small independent companies. The three major cement companies accounted for all integrated production of clinker and cement in Australia. Domestic clinker capacity was about 8 Mt/yr and cement capacity was about 10 Mt/yr. The highly efficient dry precalciner technology accounted for 85% of Australia's cement production. During the past several years, the three integrated cement producers produced about 9 Mt/yr for the domestic market. Small independent producers used imported clinker from Asian countries to produce cement and accounted for about 15% of the domestic supply of cement. The Government planned to implement a carbon tax in 2011 that would affect the cement sector in Australia. Carbon dioxide is emitted as a product of the chemical reaction during clinker production. To reduce carbon dioxide emission, some Australian cement plants were required to technically upgrade their production plants. Should the tax on carbon emissions go into effect, some cement producers would have difficulty recovering all their investment costs and as a result some plants would likely be closed. Companies might relocate their operations overseas. Imports of clinker to Australia were expected to increase in the future. Cement Australia planned to shut down its cement plant at Kandos, New South Wales, in 2011 (Cement Australia Pty Ltd., 2011a, b).

Lithium.—Talison Lithium was listed on both the Australian Stock Exchange and the Toronto Stock Exchange. The lithium resource at Greenbushes was increased to 31.4 Mt at an average grade of 3.1% lithium oxide in early 2011 from 9.6 Mt at an average grade of 3.9% lithium oxide in March 2010. The estimated life of the mine was increased to 22 years. The two ore treatment plants had a total output capacity of 600,000 t/yr to produce about 260,000 t/yr of lithium concentrates that contained about 15% lithium carbonate equivalent. The technical-grade plant produced low-iron lithium concentrates that would be used in the manufacture of ceramics, glass, and heat-proof cookware. The chemical-grade plant produced higher levels of iron lithium concentrates, which would be used to produce lithium chemicals for the manufacture of lithium-ion batteries, mobile phones, and electric bicycles and automobiles. In 2010, the company completed the stage 1 expansion to increase its output capacity at the Greenbushes operation to about 315,000 t/yr of lithium concentrate (about 47,000 t/yr of lithium carbonate). In recent years, demand for chemical-grade and technical-grade lithium concentrates had increased, especially from customers in China. Talison Lithium planned to invest $65 million to double the output capacity to 740,000 t/yr of lithium concentrate (about 110,000 t/yr lithium carbonate). The commencement of stage 2 expansion was scheduled to begin 2011 and to be completed in 2012 (Talison Lithium Ltd., 2011a, b).

Rare Earths.—Globally, the production and resources of rare earths were dominated by China. In 2009, there was no recorded production of rare earths in Australia. During the year, however, Lynas Corp. Ltd. completed a feasibility study and received Government approval to develop the Mount Weld rare-earth project. The feasibility study indicated that the Mount Weld deposit contained 17.5 Mt of resources (measured, indicated, and inferred) at an average grade of 8.1% rare-earth oxide (REO) at a cutoff grade of 2.5% REO. Lynas started construction of an open pit mine and a concentration plant at the Mount Weld deposit in 2007; the deposit was located 35 km south of Laverton, Western Australia. The company started mining at the Central Lanthanide pit in 2010. The concentration plant was completed at yearend 2010 and would be put into operation in 2011 to produce at a target grade of 36% REO concentrates; the recovery rate was expected to be 68.7%. Rare-earth concentrates were shipped to Lynas' advanced materials plant in Kuantan, Malaysia. Local residents in Malaysia had opposed construction of the advanced materials plant because a solution to the problem of long-term storage of the radioactive thorium waste was not yet resolved. The Malaysian Ministry of International Trade and Industry was to appoint an independent panel of international experts to conduct a review of the health, safety, and environmental aspects of the plant. In 2010, Lynas and Sojitz Corp. of Japan formed a strategic alliance and signed on offtake, distribution, and financing agreement to enable Lynas to accelerate the development of the phase 2 operation. Under the agreement, Sojitz was allocated a minimum of 8,500 t/yr of rare-earth products for the Japanese market for 10 years. Sojitz would provide a financial package of $325 million to Lynas (Lynas Corp. Ltd., 2010; 2011, p. 2–3).

Alkane Resources Ltd.'s Dubbo zirconia project, which was located 30 km south of Dubbo in New South Wales, had developed a flow sheet to recover such metals as hafnium, niobium, rare earths, and zirconium. The company had a demonstration pilot plant at the Australian Nuclear Science and Technology Organization in Sydney that used sulfuric acid leaching and then solvent extraction to recover the metals. Laboratory-scale testing for the recovery of high-purity light rare-earth oxides was successful; however, the recovery rate of heavy rare-earth products was only about 50%. The company would continue to optimize the plant's operating conditions in 2011. The Dubbo deposit had mineral resources (measured and inferred) of 73.2 Mt at average grades of 1.96% zirconium oxide, 0.75% rare earth oxide, 0.46% niobium oxide, 0.14% yttrium oxide, and 0.04% hafnium oxide. The company signed a nonbinding memorandum of understanding with Mintech Chemical Industries Pty Ltd. to form a joint venture to produce between 10,000 and 12,000 t/yr of zirconium oxychloride. The feasibility study of the Dubbo zirconia project was expected to be completed in mid-2011 (Alkane Resources Ltd., 2011, p. 7).

Talc.—In 2001, Rio Tinto (through its subsidiary Luzenac Australia Pty Ltd.) acquired the Three Springs talc operation, which was located in Western Australia, from WMC Resources Ltd. The mine had an output capacity of 200,000 t/yr of talc. In 2010, Rio Tinto invested $11 million to replace the Three Springs' beneficiation plant. The new facility was equipped with a more-sophisticated sampling system to ensure an all-around improvement in product efficiency and quality. The new plant had the capacity to produce up to 150,000 t/yr of high-specification products. Owing to the global financial crisis, Rio Tinto put its borate and talc business up for sale and received a binding offer from a France-based company, Imerys SA, for its talc business. The transaction required the European Commission's approval. The sale transaction was expected to be completed in 2011 (Rio Tinto plc., 2010).

Mineral Fuels and Related Materials

Coal.—Australia ranked behind China and India in the Asia and the Pacific region in coal output; the country, however, was the world's leading exporter of coal. Queensland and New South Wales were Australia's leading coal-producing States and accounted for more than 95% of the country's total output. In 2010, Australia mined 449 Mt of raw black (bituminous and anthracite) coal, of which 355 Mt was salable coal. Underground coal mines accounted for about 75% of the total output. Queensland's coal output accounted for 53.9% of the country's total output and was mainly from the Bowen Basin, which extends south from Collinsville to Blackwater and Moura, and from mines at Blair Athol, Newlands, and near Brisbane. New South Wales' coal output accounted for 43.3% of the country's total output and was mined near the eastern and western edges of the large Sydney Gunnedah Basin. Heavy rainfall, which flooded open pit mines and washed out rail lines in the State of Queensland, affected coal production and transportation in the fourth quarter of 2010. In 2010, Australia exported more than 300.3 Mt of coal (metallurgical coal, 159.0 Mt, and thermal coal, 141.3 Mt) compared with 274.2 Mt in 2009. Japan was the leading destination for Australian metallurgical coal, 30.2%; followed by India, 20.4%; China, 8.2%; the Republic of Korea, 5.1%; and others, 36.1%. Japan was also the leading destination for Australian thermal coal, 49.4%, followed by the Republic of Korea, 18.8%; Taiwan, 14.5%; and others, 17.3%. Domestic coal consumption was less than 70 Mt, of which the power sector accounted for about 85%, followed by steel, 6.7%; cement, 1.3%; and other, 7%. Several new coal mines were scheduled to come onstream during the next couple of years, and the Australian Government projected that Australian production of salable coal would increase to 404 Mt and that exports would increase to 325 Mt in 2014 (Australian Bureau of Agricultural and Resource Economics, 2011, p. 21).

Uranium.—Australia was the third ranked uranium producer in the world after Kazakhstan and Canada. Australia's uranium production was mainly from three mines—the Beverley, the Olympic Dam, and the Ranger. A number of undeveloped deposits also occur in the Northern Territory, Queensland, South Australia, and Western Australia. The Australian Government permits uranium mining, provided that all the relevant environmental safeguards and health requirements are met. Regulation of Australia's uranium mines is mainly a State and Territorial government responsibility. Among the States and Territories, only the governments of Northern Territory and South Australia permitted uranium mining before 2008. Western Australia lifted the ban on uranium mining in the State in 2008.

Australia's uranium production was expected to increase during the next several years. The Honeymoon project, which was a joint venture of Uranium One Inc. of Canada (51%) and Mitsui & Co. Ltd. of Japan (49%), was located 75 km northwest of Broken Hill, South Australia, and was scheduled to be put into operation in mid-2011. The Honeymoon deposit had indicated resources of 1.2 Mt at an average grade of 0.24% uranium oxide. The company planned to produce 400 t/yr (880,000 pounds per year) of uranium oxide for 6 years. Other new projects, which were under feasibility study, included Mega Uranium Ltd.'s Lake Maitland in Western Australia and Marathon Resources Ltd.'s Mount Gee in South Australia (Uranium One Inc., 2011, p. 14).

Outlook

Australia is a natural-resource-rich country with significant resources of metallic, nonmetallic, and fuel minerals. Mineral and energy commodity exports are an important part of the country's economy. Reflecting strong world demand for mineral resources, especially in the Asia and the Pacific region, the Australian economy is expected to continue to benefit from higher commodity export earnings. Expenditures on mineral and energy exploration in Australia are expected to increase owing to higher costs of labor and equipment and global demand for natural resources in the future. Production of such mineral commodities as bauxite, copper, iron ore, natural gas, nickel, and zinc was expected to continue to increase during the next several years. Major projects, such as the Yarwun alumina refinery project; BHP Billiton's RGP iron ore project; Hamersley Iron's Yandicoogina iron ore expansion; Fortescue Metals' iron ore project; Rio Tinto's Brockman 4, Hope Downs, and Mesa A iron ore projects and Clermont and Kestrel coal projects; and Xstrata's Mangoola coal project, are expected to come onstream within this decade. Western Australia is Australia's leading State for metallic mineral exports and New South Wales and Queensland are its major coal exporting States; however, to sustain export growth, the country's infrastructure would require significant expansion and upgrading so that minerals for export could be transported from inland to port terminals. A carbon tax and mineral resource rent tax would not affect Australian mineral investment significantly. Australia is expected to remain a major mineral and fuel exporting country.

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TABLE 1
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless othewise specified)

Commodity		2006	2007	2008	2009	2010
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	61,780	62,398	64,038	65,231	68,414
Alumina	do.	18,312	18,844	19,446	19,948	19,956
Metal, refined:						
Primary	do.	1,932	1,957	1,974	1,943	1,928
Secondary[e]		130,000	130,000	130,000	130,000	130,000
Antimony, Sb content of ores and concentrates[e]		1,600	1,010	1,500	1,000	1,100
Cadmium:[e]						
Mine output, Cd content		700	700	700	650	600
Metal, smelter, refined		330	350	350 *	370 *	350 *
Chromium, chromite, gross weight		258,087	253,400	224,809	119,314 [r, 2]	120,000 [e]
Chromite content[e]		103,000	103,000	90,000	45,000 [r]	45,000
Cobalt:						
Co content in laterite ore, Ni concentrate, and Zn concentrate[e]		5,130 [r]	4,730 [r]	4,780 [r]	4,345 [r, 2]	3,850
Metal, refined		3,700	3,680	3,620	4,050	4,120
Copper:						
Mine output, Cu content	thousand metric tons	879	870	885	859	849
Metal:						
Smelter, primary and secondary	do.	377	399	447	422	402
Refined, primary	do.	429	442	503	446	417
Gold:						
Mine output, Au content		246	247	215	224 [r]	261
Metal, refined:						
Primary		266	259	244	256	280
Secondary		112	116	117	123	71
Iron and steel:						
Iron ore:[e]						
Gross weight	thousand metric tons	275,000	299,000	342,000	394,000	433,000
Fe content	do.	171,000	186,000	208,000	228,000	271,000
Metal:						
Pig iron	do.	6,433	6,351	6,409	4,370 [r]	6,000 [e]
Ferroalloys:[e]						
Ferromanganese		125,000	115,000 [r]	147,000 [r]	87,000 [r]	100,000
Silicomanganese		120,000 [r]	110,000 [r]	125,000 [r]	74,000 [r]	90,000
Total		245,000 [r]	225,000 [r]	272,000 [r]	161,000 [r]	190,000
Steel, crude	thousand metric tons	7,937	8,047	7,724	5,135	7,140
Semimanufactured products[e]		5,780 [r]	7,130 [r]	10,200 [r]	7,530 [r]	8,000
Lead:						
Mine output, Pb content	thousand metric tons	686	641	645	566	625
Metal:						
Bullion	do.	118	125	167	150	142
Refined:						
Primary	do.	233	202	220	204	178
Secondary, excluding remelt	do.	27	27	24	25	26
Manganese ore, metallurgical:						
Gross weight	do.	4,549	5,265	4,812	4,451	6,465
Mn content	do.	2,190	2,540	2,310	2,140	3,100
Nickel:						
Mine output, Ni content	do.	175	160	188	165	170
Matte	do.	39	42	31	28	54
Metal, smelter, refined Ni and Ni content of oxide	do.	119	114	103	131	108
Platinum-group metals:[e]						
Palladium, Pd content	kilograms	750	600	580	800 [r]	650
Platinum, Pt content	do.	209	142	120	230 [r]	130
Total	do.	959	742	700	1,030 [r]	780
Silver:						
Mine output, Ag content		1,727	1,879	1,926	1,633 [r]	1,864
Metal, refined		634	625	644	664 [r]	735
Tantalum, tantalite, Ta_2O_5 equivalent		584	538	680	105	--

See footnotes at end of table.

TABLE 1—Continued
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2006	2007	2008	2009	2010
METALS—Continued						
Tin:						
Mine output, Sn content		1,478	2,071	1,783	5,630 r	7,000 e
Metal, refined:						
Primary		572	118	170 r	7,637 r	3,000 e
Secondary[e]		400	400	400	400	400
Titanium concentrates, gross weight:						
Ilmenite	thousand metric tons	2,377	2,340	2,082	1,449	1,492
Leucoxene[e]		131,000	163,000	148,000	162,000	159,000
Rutile		232,000	312,000	325,000	281,000	380,000
Tungsten, mine output, W content		15	7	28	33	16
Zinc:						
Mine output, Zn content	thousand metric tons	1,362	1,514	1,519	1,290	1,479
Metal, smelter:						
Primary	do.	463	502	499	525	499
Secondary[e]		6,000	6,000	6,000	6,100	6,000
Zirconium concentrates, gross weight	thousand metric tons	491	601	550	474	518
INDUSTRIAL MINERALS						
Abrasives, natural:						
Beach pebble[e]		2,000	2,000	2,000	2,000	2,000
Garnet		278,233	294,007	298,290	275,560	196,839
Barite[e]		21,000	21,000	21,000	21,000	22,000
Cement, hydraulic[e]	thousand metric tons	9,000	9,200	9,400	9,200	9,000
Clays:[e]						
Bentonite and bentonitic clay		220,000	220,000	220,000	220,000	230,000
Brick clay and shale	thousand metric 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	22,000	22,000	22,000	22,000
Fuller's earth, attapulgite		10,000	10,000	10,000	10,000	10,000
Kaolin and ball clay		250,000	230,000	230,000	230,000	240,000
Other	thousand metric tons	2,000	2,000	2,000	2,000	2,000
Diamond:						
Gem	thousand carats	7,305	231	273	220	100
Industrial	do.	21,915	18,960	15,397	10,575	9,900
Total	do.	29,220	19,191	15,670	10,795	10,000
Diatomite[e]		20,000	20,000	20,000	20,000	20,000
Feldspar, including nepheline syenite[e]		50,000	50,000	50,000	50,000	50,000
Gemstones, opal	value, $million	50	40	41	20 e	20 e
Gypsum	thousand metric tons	4,265	3,896	3,734 r	3,500 e	3,500 e
Kyanite[e]		1,000	1,000	1,000	1,000	1,000
Lime[e]		1,600,000	1,600,000	2,200,000 r	2,000,000 r	2,000,000
Lithium, spodumene		222,101	192,277	239,528	197,482	295,000
Magnesite		446,000	447,000	126,000	344,000 r	300,000 e
Nitrogen, N content of ammonia		1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Perlite, crude[e]		6,500	6,500	6,500	6,500	7,000
Phosphate rock:[e]						
Gross weight		2,140,000	2,850,000	2,950,000	2,500,000	2,600,000
P_2O_5 content		493,000	655,000	678,000	575,000	600,000
Salt[3]	thousand metric tons	11,424	10,855	11,160	10,316	11,968
Soda ash[e]	do.	310	310	310	310	310
Stone and sand and gravel:						
Construction sand	do.	30,540	35,530	37,000 r	34,000 e	35,000 e
Crushed and broken stone[e]	do.	81,000	95,000	110,000 r	115,000 r	120,000
Dimension stone	do.	200	190	230 e	230 e	230 e
Gravel[e]	do.	13,500	13,600	12,000	12,000	12,000
Dolomite[e]	do.	10,000	10,000	10,000	10,000	10,000
Limestone[e]	do.	18,300	19,100	18,400	18,000	19,000
Silica in the form of quartz, quartzite, glass sand[e]	do.	4,300 r	5,300 r	5,500 r	5,600 r	5,600

See footnotes at end of table.

TABLE 1—Continued

AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2006	2007	2008	2009	2010
INDUSTRIAL MINERALS—Continued						
Sulfur, byproduct:[e]						
Metallurgy	thousand metric tons	880	880	880	870	800
Petroleum	do.	58	58	60	60	60
Total	do.	938	938	940	930	860
Talc, chlorite, pyrophyllite, steatite[e]		130,000	125,000	120,000	120,000	120,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, salable:						
Bituminous and subbituminous	thousand metric tons	309,000	320,000	332,000	348,000	449,000
Lignite[e]	do.	71,000	71,000	71,000	71,000	50,000
Total[e]	do.	380,000	391,000	403,000	419,000	499,000
Gas, natural, marketed	million cubic meters	44,100	39,960	38,256	42,345	44,986
Petroleum:						
Crude, includes condensate	thousand 42-gallon barrels	163,900	170,470	168,123	169,211	169,985
Refinery products	do.	229,748	252,443	246,717	241,233	235,971
Uranium, mine output, U_3O_8 content		8,970	10,145	9,989	7,942	7,440

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 1, 2011.

[2]Reported figure.

[3]Does not include production from the Northern Territory and the State of Victoria.

*Correction posted on November 7, 2012.

TABLE 2
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Aluminum:			
Bauxite	Gove open pit bauxite mine (Rio Tinto Alcan, 100%)	15 km southeast of Nhulunbuy, NT	8,000
Do.	Huntly open pit bauxite mine (Alcoa World Alumina Australia, 100%)	80 km south of Perth, WA	20,000
Do.	Weipa-Andoom open pit bauxite mine [Comalco Ltd., operator (Rio Tinto Alcan, 100%)]	Weipa, QLD	21,000
Do.	Willowdale open pit bauxite mine (Alcoa World Alumina Australia, 100%)	130 km south of Perth, WA	8,600
Do.	Boddington-Worsley open pit bauxite mine {Worsley Alumina Pty. Ltd., manager [BHP Billiton Ltd., 86%; Japan Alumina Associates (Australia) Pty. Ltd., 10%; Sojitz Alumina Pty. Ltd., 4%]}	14 km south of Boddington, WA	13,200
Alumina, refinery	Gladstone alumina refinery [Queensland Alumina Ltd., operator (Rio Tinto Alcan, 80%, and United Company RUSAL 20%)]	Gladstone, QLD	3,850
Do.	Gove alumina refinery [Alcan Gove Pty Ltd. (Rio Tinto Alcan, 100%)]	Nhulunbuy, Gove, NT	3,800
Do.	Kwinana alumina refinery (Alcoa World Alumina Australia, 100%)	Kwinana, WA	2,100
Do.	Pinjarra alumina refinery (Alcoa World Alumina Australia, 100%)	Pinjarra, WA	4,200
Do.	Wagerup alumina refinery (Alcoa World Alumina Australia, 60%, and Western Mining Corp., 40%)	Waroona, WA	2,600
Do.	Worsley alumina refinery {Worsley Alumina Pty. Ltd., manager [BHP Billiton Ltd., 86%, and Japan Alumina Associates (Australia) Pty Ltd., 10%]}	20 km northwest of Collie, WA	3,500
Do.	Yarwun alumina refinery (Rio Tinto Alcan, 100%)	Gladstone, QLD	1,400
Metal smelter	Bell Bay aluminum smelter (Rio Tinto Alcan, 100%)	Bell Bay, TAS	160
Do.	Kurri Kurri aluminum smelter (Hydro Aluminium Kurri Kurri Pty. Ltd., 100%)	Kurri Kurri, near Newcastle, NSW	165
Do.	Boyne Island aluminum smelter [Boyne Smelters Ltd., operator (Rio Tinto Alcan, 64%; Sumitomo Light Metal Industries Ltd., 17%; Ryowa Development Pty. Ltd., 12%; Kobe Steel Ltd., 5%; Sumitomo Chemical Co. Ltd., 2%)]	Boyne Island, QLD	550
Do.	Point Henry aluminum smelter (Alcoa of Australia, 100%)	Point Henry, VIC	185
Do.	Portland aluminum smelter [Alcoa of Australia, 55%, manager; China International Trust Investment Co. (China state-owned company), 22.5%; Marubeni Australia Pty. Ltd., 22.5%]	Portland, VIC	345
Do.	Tomago aluminum smelter [Tomago Aluminium Co. Pty. Ltd., operator (Gove Aluminium Finance Ltd., 36.05%; Rio Tinto Alcan, 51.55%; Hydro Aluminium, 12.40%)]	Tomago, NSW	525
Antimony	Augusta underground antimony-gold mine [AGD Mining operator (Cambrian Mining Plc, 100%)]	50 km east and southeast of Bendigo, VIC[3]	5
Do.	Hillgrove Mine (Straits Resources Ltd., 100%)	25 km east of Armidale, NSW	10
Bentonite	Arumpo open pit bentonite mine (Arumpo Bentonite Pty. Ltd., 100%)	95 km northeast of Mildura, NSW	10
Do.	Cedars open pit bentonite mine (PCP Douglass Pty. Ltd., 100%)	10 km southwest of Yarraman, QLD	20
Do.	Cressfield open pit bentonite mine (Unimin Australia Ltd., 100%)	20 km north of Scone, NSW	12
Do.	Mantuan Downs (Pacific Enviromin Ltd., 100%)	West of Springsure, QLD	100
Do.	Miles open pit bentonite mine (Unimin Australia Ltd., 100%)	350 km west of Brisbane, QLD	100
Cement, plant	Adelaide Brighton Cement Pty Ltd., 100%	Angaston, SA	250
Do.	do.	Birkenhead, SA	1,200
Do.	do.	Geelong, VIC	800
Do.	do.	Munster, SA	590
Do.	Blue Circle Southern Cement Ltd., 100%	Berrima, NSW	1,200
Do.	do.	Maldon, NSW	700
Do.	do.	Waurn Ponds, VIC	250
Do.	Cement Australia Pty Ltd. (Hanson Ltd. and Holcim Australia Pty Ltd.)	Brisbane, QLD	1,200
Do.	do.	Gladstone, QLD	1,600
Do.	do.	Kandos, NSW	450
Do.	do.	Railton, TAS	1,000
Do.	Cockburn Cement Ltd., 100%	Munster, 30 km south of Perth, WA	700
Chromite	Coobina open pit chromite mine (Palmary Enterprises Ltd., 100%)	80 km southeast of Newman, WA	250

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Coal	Angus Place longwall coal mine (Centennial Coal Co. Ltd., 50%, and SK Corp., 50%)	16 km northwest of Lithgow, NSW	3,000
Do.	Appin longwall coal mine [Illawarra Coal Holdings Pty Ltd., operator (BHP Billiton Ltd., 100%)]	40 northwest of Wollongong, NSW	8,800
Do.	Ashton open pit/underground coal mine (Felix Resources Ltd., 60%; Chu Corp., 10%; private, 30%)	14 km northwest of Singleton, NSW	4,000
Do.	Awaba underground coal mine [Powercoal Pty. Ltd., operator (Centennial Coal Co. Ltd., 100%)]	30 km southwest of Newcastle, NSW	2,000
Do.	Baal Bone coal mine [Oakbridge Pty. Ltd., 74.1% (Xstrata plc, 100%); Sumitomo Corp., 5%; Toyota Tsusho Mining (Australia) Pty Ltd. 4.75%; private, 14.44%]	24 km northwest of Lithgow, NSW	2,500
Do.	Bengalla open pit coal mine [Coal and Allied Industries Ltd., 40%, manager; Wesfarmers Bengalla Ltd., 40%; MCDA Bengalla Investment Pty. Ltd., 10%; Taipower Bengalla Pty. Ltd., 10%]	5 km west of Muswellbrook, NSW	6,600
Do.	Blackwater open pit coal mine (includes South Blackwater) [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	195 km west of Rockhampton, QLD	14,000
Do.	Blair Athol open pit coal mine [Rio Tinto Ltd., 57.2%, manager; J-Power (Australia) Pty Ltd., 8%; private, 34.8%]	25 km northwest of Clermont, QLD	13,000
Do.	Broadmeadow open pit/underground coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	30 km north of Moranbah, QLD[3]	3,000
Do.	Bulga open pit coal mine [Oakbridge Pty Ltd., manager (Xstrata plc, 68.25%; Nippon Steel Australia Pty. Ltd., 12.5%; Toyota Tsusho Mining (Australia) Pty Ltd., 4.38%; private, 13.3%]	16 km southwest of Singleton, NSW	10,000
Do.	Burton open pit coal mine (Peabody Energy Corp., 95%, and Thiess Pty. Ltd., 5%)	150 km southwest of Mackay, QLD	5,800
Do.	Callide coal mine (Anglo Coal Pty Ltd., 100%)	120 km southwest of the Port of Gladstone, QLD	10,700
Do.	Camberwell open pit coal mine [Camberwell Coal Pty. Ltd., manager [Toyota Tsusho Mining (Australia) Pty. Ltd., 90%, and Dia Coal Mining (Australia) Pty Ltd., 10%]	10 km northwest of Singleton, NSW	4,000
Do.	Clarence underground coal mine [Centennial Coal Co. Ltd., 85%, (manager) and SK Australia Pty. Ltd., 15%]	10 km east of Lithgow, NSW	2,500
Do.	Commodore open pit coal mine Roche Mining Pty. Ltd., operator [Intergen (Australia) Pty Ltd., 100%]	80 km southwest of Toowoomba, QLD	3,600
Do.	Coppabella open pit coal mine (Macarthur Coal Ltd., 73.3%, and others, 26.7%)	140 km southwest of Mackay, QLD	4,000
Do.	Cumnock No. 1 open pit coal mine (Cumnock Coal Ltd., 100%)	28 km northwest of Singleton, NSW	3,000
Do.	Curragh open pit coal mine (Wesfarmers Ltd., 100%)	70 km east of Emerald, QLD	9,000
Do.	Dartbrook coal mine (Anglo Coal Holdings Australia Ltd., 77.3%)	70 km north of Singleton, NSW[3]	3,750
Do.	Dawson coal complex (includes Moura, Theodore, and Taroom) [Anglo American plc, 51%, and Mitsui & Co. (Australia) Ltd., 49%]	230 km west of Bundaberg, QLD	7,000
Do.	Dendrobium underground coal mine (BHP Billiton Ltd., 100%)	15 km southwest of Wollongong, NSW	5,200
Do.	Donaldson open pit coal mine (Donaldson Coal Pty Ltd., 100%)	5 km southeast of Maitland, NSW	2,500
Do.	Drayton open pit coal mine [Anglo Coal Holdings Australia Ltd., 88.2%, manager; Mitsui Coal Development Australia Pty. Ltd., 3.8%; Mitsui Mining (Australia) Pty. Ltd., 3%; others, 5%]	35 km northwest of Singleton, NSW	5,000
Do.	Duralie open pit coal mine (Gloucester Coal Ltd., 100%)	110 km of Newcastle, NSW	2,000
Do.	Elouera underground coal mine (Gujarat NRE Resources NL, 100%)	15 km southwest of Wollongong, NSW	2,000
Do.	Ensham-Yongala open pit coal mine [Idemitsu Kosan Co. Ltd., 85%; J-Power (Australia) Pty. Ltd., 10%; LG International (Australia) Pty Ltd., 5%]	40 km northeast of Emerald, QLD	9,000
Do.	Ewington II open pit coal mine (Griffin Coal Mining Co. Pty. Ltd., 100%)	8 km east of Collie, WA	1,000
Do.	Foxleigh open pit coal mine (Foxleigh Mining Pty Ltd., 100%)	Bowen Basin, QLD	3,600
Do.	German Creek and German Creek East open pit/underground coal mines [Anglo American plc, 70%, and Mitsui & Co. (Australia) Ltd., 30%]	275 km west-northwest of Rockhampton, QLD	6,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Coal—Continued	Glennies Creek longwall coal mine (CVRD Inco Ltd., 85%; Nippon Steel Australia Pty Ltd., 5%; POSCO Australia Pty Ltd., 5%; private, 5%)	12 km north of Singleton, NSW	2,800
Do.	Goonyella-Riverside-Broadmeadow open pit coal mines (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)	140 km southwest of Mackay, QLD	16,000
Do.	Gregory Crinum open pit/underground coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	60 km north of Emerald, QLD	5,500
Do.	Hunter Valley Operations (includes Carrington Chestnut, Howick, Hunter Valley No. 1, Lemington, Riverview open pit coal mines) (Coal and Allied Industries Ltd., 100%)	10 km west and 25 km north of Singleton, NSW	15,000
Do.	Hail Creek open pit coal mine (Rio Tinto Ltd., 82%; Nippon Steel Australia Pty Ltd., 8%; Marubeni Coal Pty. Ltd., 6.66%)	100 km west of Mackay, QLD	8,000
Do.	Hazelwood open pit coal mine (International Power Hazelwood, 100%)	150 km southeast of Melbourne, VIC	20,000
Do.	Jellinbah East open pit coal mine (Queensland Coal Mine Management Pty. Ltd., 70%; Marubeni Coal Pty. Ltd., 15%; Sojitz Australia Ltd., 15%)	90 km east of Emerald, QLD	4,000
Do.	Kestrel underground coal mine [Rio Tinto Ltd., 80%, and Mitsui & Co. (Australia) Ltd., 20%]	40 km north-northeast of Emerald, QLD	5,500
Do.	Liddell open pit coal mine (Xstrata Coal Australia Pty. Ltd., 67.5%, and Mitsui Matushima Australia Pty. Ltd., 32.5%)	25 km northwest of Singleton, NSW	4,000
Do.	Loy Yang open pit coal mine (Loy Yang Power Ltd., 100%)	165 km east of Melbourne, VIC	30,000
Do.	Mondalong underground coal mine (Centennial Coal Co. Ltd., 100%)	35 km southwest of Newcastle, NSW	4,500
Do.	Moorvale open pit coal mine (Macarthur Coal Ltd., 73.3%; CITIC Resources Australia Pty Ltd., 7%; Sojtz Australia Ltd., 7%; Nippon Steel Australia Pty Ltd., 2%)	10 km south of Coppabella, QLD	3,400
Do.	Moranbah North longwall coal mine (Anglo American plc., 88%, and Nippon Steel Australia Pty. Ltd., 5%)	150 km southwest of Mackay, QLD	5,800
Do.	Mount Arthur open pit coal mine (BHP Billiton Ltd., 100%)	5 km southwest of Muswellbrook, NSW	15,000
Do.	Mount Owen open pit coal mine (Xstrata plc, 100%)	20 km northwest of Singleton, NSW	7,700
Do.	Mount Thorley open pit coal mine (Coal and Allied Industries Ltd., 80%, and POSCO Australia Pty. Ltd., 20%)	14 km southwest of Singleton, NSW	12,000
Do.	Muja open pit coal mine (The Griffin Coal Mining Co. Pty. Ltd., 100%)	18 km southeast of Collie, WA	2,000
Do.	Muswellbrook No. 2 open pit coal mine (Muswellbrook Coal Co., 100%)	4 km northeast of Muswellbrook, NSW	1,700
Do.	Myuna underground coal mine (Centennial Coal Co. Ltd., 100%)	35 km south of Newcastle, NSW	1,500
Do.	New Acland open pit coal mine (New Hope Corp. Ltd., 100%)	35 km northwest of Toowoomba, QLD	3,750
Do.	Newlands-Collinsville-Abbot Point open pit coal mine (Xstrata plc, 55%; Itochu Corp., 35%; Sumitomo Corp., 10%)	130 km west of Mackay, QLD	15,000
Do.	Newstan longwall coal mine (Centennial Coal Co. Ltd., 100%)	30 km southwest of Newcastle, NSW	4,000
Do.	North Goonyella underground coal mine (Peabody Energy Corp., 100%)	40 km north Moranbah, QLD	3,000
Do.	Norwich Park open pit coal mine (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)	85 km north-northeast of Emerald, QLD	5,000
Do.	Oaky Creek longwall and Alliance open pit coal mines (Xstrata plc, 55%; Sumitomo Coal Australia Pty. Ltd., 25%; Itocho Corp., 20%)	300 km west-northwest of Rockhampton, QLD	9,500
Do.	Peak Downs open pit coal mine (BHP Billiton Ltd., 50%, and Mitsubishi Development Pty. Ltd., 50%)	145 km north of Emerald, QLD	9,000
Do.	Premier open pit coal mine (Wesfarmers Premier Coal Ltd., 100%)	10 km southeast of Collie, WA	4,000
Do.	Ravensworth-Narama open pit coal mine (includes Ravensworth East) (Xstrata Coal Australia Pty. Ltd., 100% of Ravensworth and 50% of Narama; Iluka Resources Ltd., 50% of Narama)	20 km northwest of Singleton, NSW	3,500
Do.	Rixs Creek open pit coal mine (Bloomfield Colliers Pty. Ltd., 100%)	5 km northwest of Singleton, NSW	2,000
Do.	Rolleston open pit coal mine (Xstrata plc, 75%; Itochu Corp., 12.5%; Sumitomo Corp., 12.5%)	90 km south-southeast of Emerald, QLD	8,000
Do.	Saraji open pit coal mine (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)	125 km north of Emerald, QLD	6,500
Do.	South Walker Creek open pit/underground coal mine (BHP Mitsui Coal Pty. Ltd., 100%)	90 km southwest of Mackay, QLD	4,300
Do.	Springvale underground coal mine (Centennial Coal Co. Ltd. 50%; SK Corp., 25%; Korea Resource Corp. Australia, 25%)	16 km northwest of Lithgow, NSW	3,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Coal—Continued	Tahmoor longwall coal mine (includes Tahmoor North and Bargo) (Centennial Coal Co. Ltd., 85.79%, and private, 14.21%)	70 km southwest of Sydney, NSW	2,500
Do.	Tarong-Meandu open pit coal mine (Rio Tinto Ltd., 100%)	85 km north of Toowoomba, QLD	7,000
Do.	Ulan underground coal mine (Xstrata plc, 90%, and Mitsubishi Corp., 10%)	45 km northwest of Mudgee, NSW	5,000
Do.	United Collieries underground coal mine (Xstrata plc, 95%, and private, 5%)	15 km west of Singleton, NSW	3,000
Do.	Wambo open pit/underground coal mine (Peabody Energy Corp., 100%)	30 km from Singleton, NSW	6,000
Do.	West Cliff longwall coal mine (BHP Billiton Ltd., 100%)	43 km northwest of Wollongong, NSW	2,300
Do.	West Wallsend longwall coal mine (Xstrata plc, 70%; Marubeni Coal Pty Ltd., 17%; private, 13%)	25 km southwest of Newcastle, NSW	2,500
Do.	Yallourn open pit lignite mine (CLP Power Asia Ltd., 100%)	140 km southeast of Melbourne, VIC	18,000
Cobalt:			
Mine	Cawse open pit nickel-cobalt mine (OJSC MMC Norilsk Nickel, 100%)	50 km northwest of Kalgoorlie, WA	0.2
Do.	Murrin Murrin open pit nickel-cobalt mine (Minara Resources Ltd., 60%, and Glencore Australia Pty. Ltd., 40%)	60 km east of Leonora, WA	2.0
Do.	Radio Hill underground nickel-cobalt mine (Fox Resources Ltd., 100%)	35 km south of Karratha, WA	0.2
Do.	Ravensthorpe open pit mine (BHP Billiton Ltd., 100%)	155 km west of Esperance, WA	1.4
Refinery	Yabulu nickel-cobalt refinery (Nickel Consolidated Pty Ltd., Nickel House Pty, and Nickel Process Pty)	Townsville, QLD	3
Copper:			
Mine, Cu content	Boddington open pit/underground gold mine (Newmont Mining Corp., 100%)	130 km southeast of Perth, WA	35
Do.	Cadia Hill open pit gold-copper mine (Newcrest Mining Ltd., 100%)	21 km south-southwest of Orange, NSW	25
Do.	Cobar underground copper mine (Glencore International AG, 100%)	12 km northwest of Cobar, NSW	30
Do.	Eloise underground copper mine (FMR Investement Pty Ltd., 100%)	60 km southeast of Cloncurry, QLD	70
Do.	Ernest Henry open pit/underground copper-gold mine (Xstrata plc, 100%)	35 km northeast of Cloncurry, QLD	115
Do.	Golden Grove underground zinc-copper mine (Oxiana Ltd., 100%)	225 km east of Geraldton, WA	20
Do.	Hellyer underground zinc-lead-copper-silver mine (Bass Metals Ltd., 100%)	80 km south-southwest of Burnie, TAS	1
Do.	Lady Annie copper (solvent extraction-electrowinning) mine (CST Mining Group Ltd., 100%)	100 km north-northwest of Mount Isa, QLD	19
Do.	Leichhardt copper mine (Cape Lambert Resources Ltd., 100%)	110 km northwest of Cloncurry, QLD[3]	10
Do.	Mount Gordon open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	120 kilometers north of Mount Isa, QLD	50
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	190
Do.	Mount Lyell underground copper-gold mine [Sterlite Industries (India) Ltd., 100%]	2 km northeast of Queenstown, TAS	35
Do.	Nifty open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	200 km southeast of Marble Bar, WA	25
Do.	Northparkes open pit/underground copper-gold mine (Rio Tinto Ltd., 80%; Sumitomo Metal Mining Oceania Pty. Ltd., 13.3%; SC Mineral Resources Pty. Ltd., 6.7%)	30 km northwest of Parkes, NSW	90
Do.	Olympic Dam underground copper-silver-gold-uranium mine [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	235
Do.	Osborne underground copper-gold mine (Barrick Gold Corp., 100%)	120 km northeast of Boulia, QLD	50
Do.	Peak underground gold-zinc-lead-copper-silver underground mine (includes New Cobar, New Occidental, and Perseverance), (GoldCorp Inc., 100%)	8 km south of Cobar, NSW	3
Do.	Prominent Hill open pit copper-gold mine (OZ Minerals Ltd., 100%)	650 km northwest of Adelaide, SA	100
Do.	Ridgeway underground gold-copper mine (Newcrest Mining Ltd., 100%)	5 km south of Orange, NSW	30
Do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	2
Do.	Tritton underground mine (Straits Resources Ltd., 100%)	Nyngan, NSW	30
Smelter	Mount Isa copper smelter (Xstrata plc, 100%)	Mount Isa, QLD	250
Do.	Olympic Dam copper smelter [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	70
Do.	Port Kembla copper smelter (Furukawa Co. Ltd., 52.5%; Nittetsu Mining Co., 20%; NisshoIwai Corp., 17.5%; Itochu Corp., 10%)	Port Kambla, NSW	120

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Copper—Continued:				
Refinery		Olympic Dam copper refinery [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	235
Do.		Port Kembla copper refinery (Furukawa Co. Ltd., 52.5%; Nittetsu Mining Co., 20%; NisshoIwai Corp., 17.5%; Itochu Corp., 10%)	Port Kambla, NSW	120
Do.		Townsville copper refinery (Xstrata plc, 100%)	Townsville, QLD	300
Diamond	thousand carats	Argyle Mine (AK-1 lamproite pipe and alluvial diamond mines) (Rio Tinto plc, 100%)	120 km southwest of Kununurra, WA	30,000
Do.	do.	Ellendale Mine (includes pipes 4 and 9) (Gem Diamond Ltd., 100%)	130 east southeast of Derby, WA	700
Do.	do.	Ellendale 9 North Mine (Blina Diamond NL, 100%)	140 east of Derby, WA	500
Diatomite		Barraba open pit diatomite mine (Australia Diatomite Mining Pty. Ltd., 100%)	85 km north-northwest of Tamworth, NSW	25
Dolomite		Ardrossan metallurgical dolomite quarry (OneSteel Ltd., 100%)	Northern York Peninsula, SA	650
Do.		Cookes Hill Mine (includes Nickol River and Warrawoona) (Haoma Mining NL, 100%)	Near Port Hedland, WA	400
Feldspar		Broken Hill open pit feldspar mine (includes Bakers, Lady Beryl, and Spar Ridge) (Unimin Australia Ltd.., 100%)	42 km southwest of Broken Hill, NSW	15
Garnet		Port Gregory open pit industrial garnet mine (GMA Garnet Pty. Ltd., 100%)	100 km north of Geraldton, WA	250
Gas:				
Condensate	thousand 42-gallon barrels per day	North West Shelf gas operations {Woodside Petroleum Pty. Ltd., manager [BHP Petroleum Pty. Ltd., BP Australia Holdings Ltd., Chevron Asiatic Ltd., Japan Australia LNG (MIMI) Pty. Ltd., Shell Development (Australia) Pty. Ltd., and Woodside Petroleum Ltd., 16.67% each]}	130 km offshore Dampier, WA	60
Natural	million cubic meters per day	do.	do.	20
Liquefied natural	million metric tons	do.	Four-train liquefaction plant, Burrup Peninsula, WA	12
Gold:				
Mine	kilograms	Agnew open pit/underground gold mine (Gold Fields Ltd., 100%)	23 km west of Leinster, WA	5,600
Do.	do.	Boddington open pit/underground gold mine (Newmont Mining Corp., 100%)	130 km southeast of Perth, WA	31,000
Do.	do.	Bronzewing underground gold mine (includes Mount McClure, Venus, Success, Cockburn, Corboys, Mount Joel) (Audax Resources Ltd., 100%)	65 km northeast of Leinster, WA	9,000
Do.	do.	Burnside open pit mines (includes Union Reefs, Brocks Creek, North Point, Princess Louise, Rising Tide, Zapopan, Fountain Head) (Crocodile Gold Corp., 100%)	Pine Creek, NT	6,500
Do.	do.	Cadia Hill open pit gold-copper mine (Newcrest Mining Ltd., 100%)	21 km south-southeast of Orange, NSW	11,000
Do.	do.	Ernest Henry open pit copper-gold mine (Xstrata plc, 100%)	35 km northeast of Cloncurry, QLD	3,000
Do.	do.	Granny Smith open pit gold mine (includes Wallaby) (Barrick Gold Corp., 100%)	20 km south of Laverton, WA	16,000
Do.	do.	Gwalia underground gold mine (St Barbara Ltd., 100%)	3 km south of Leonora, WA	2,600
Do.	do.	Henty underground gold-silver mine (Barrick Gold Ltd., 100%)	30 km north of Queenstown, TAS	3,700
Do.	do.	Hillgrove Mine (Straits Resources Ltd., 100%)	25 km east of Armidale, NSW	650
Do.	do.	Jundee-Nimary open pit/underground gold mine (Newmont Mining Corp., 100%)	45 km northeast of Wiluna, WA	12,000
Do.	do.	Kalgoorlie open pit/underground gold mine [Kalgoorlie Consolidated Gold Mine Pty Ltd., operator (Barrick Gold Australia, 50%, and Newmont Mining Corp., 50%)]	600 km east Perth, WA	20,000
Do.	do.	Kanowna Belle underground gold mine (Barrick Gold Corp., 100%)	18 km northeast of Kalgoorlie, WA	7,000
Do.	do.	Lawlers underground gold mine (Barrick Gold Corp., 100%)	30 km southwest of Leinster, WA	3,000
Do.	do.	Mount Lyell underground copper-gold mine [Sterlite Industries (India) Ltd., 100%]	2 km northeast of Queenstown, TAS	1,000
Do.	do.	Mount Magnet open pit/underground gold mine (includes Hill 50 and Star) (Harmony Gold Mining Co. Ltd., 100%)	2 km from Mount Magnet, WA	8,500
Do.	do.	Norseman underground gold mine (Norseman Gold Plc, 100%)	Norseman, WA	3,700
Do.	do.	Northparkes open pit/underground copper-gold mine (Rio Tinto Ltd., 80%, and Sumitomo Metal Mining Oceania Pty. Ltd., 20%)	30 km north of Parkes, NSW	155,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Gold—Continued:				
Mine—Continued	kilograms	Olympic Dam underground copper-silver-gold-uranium mine [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	1,500
Do.	do.	Pajingo underground gold mine (includes Vera-Nancy) [North Queensland Metals Ltd. (operator), 60%, and Heemskirk Consolidated Ltd., 40%]	60 km south-southeast of Charters Towers, QLD	6,400
Do.	do.	Plutonic open pit/underground gold mine (Barrick Gold Corp., 100%)	180 km northeast of Meekatharra, WA	8,000
Do.	do.	Prominent Hill open pit copper-gold mine (OZ Minerals Ltd., 100%)	650 km northwest of Adelaide, SA	2,200
Do.	do.	Ravenswood open pit mine (includes Nolans, Sarsfield, and Mount Wright) (Resolute Mining Ltd., 100%)	100 km south of Townsville, QLD	3,000
Do.	do.	Ridgeway underground gold-copper mine (Newcrest Mining Ltd., 100%)	25 km south of Orange, NSW	10,800
Do.	do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	1,000
Do.	do.	Saint Ives open pit/underground gold mine (Gold Fields Ltd., 100%)	75 km south-southeast of Kalgoorlie, WA	15,000
Do.	do.	Selwyn underground copper-gold mine (Barrick Gold Corp., 100%)	160 km southeast of Mount Isa, QLD	700
Do.	do.	Stawell underground gold mine (Perseverance Corp. Ltd., 100%)	250 km west of Melbourne, VIC	3,000
Do.	do.	Sunrise Dam open pit mine gold (includes Cleo) (AngloGold Ashanti Ltd., 100%)	55 km south of Laverton, WA	15,000
Do.	do.	Super Pit open pit gold mine (includes Fimiston) [Kalgoorlie Consolidated Gold Mines Pty. Ltd., manager (Barrick Gold Corp., 50%, and Newmont Mining Corp., 50%)]	Southeast corner of the Kalgoorlie-Boulder Township, WA	25,000
Do.	do.	Tanami open pit gold mine (includes Central Desert Joint Venture) (Newmont Gold Corp., 100%)	650 km northwest of Alice Springs, NT	15,000
Do.	do.	Telfer copper and gold mine (Newcrest Mining Ltd., 100%)	400 km east southeast of Port Hedland, WA	15,000
Do.	do.	Thunderbox gold mine (Lionore Mining International Ltd., 100%)	90 km northeast of Leonora, WA	5,000
Do.	do.	Trident gold mine (Avoca Resources Ltd., 100%)	Higginsville, WA	5,000
Do.	do.	Wiluna open pit/underground gold mine (Apex Minerals NL, 100%)	7 km south of Wiluna, WA	3,300
Smelter	do.	Gidji Roaster gold smelter (Kalgoorlie Consolidated Gold Mines Pty. Ltd., 100%)	Kalgoorlie, WA	24,300
Refinery	do.	Perth Refinery [AGR Management Services Ltd. (Australian Gold Alliance Pty Ltd., 40%; Western Australian Mint, 40%; Johnson Matthey (Australian) Ltd., 20%]	Newburn, WA	300,000
Gypsum		Gypsum Resources Australia Pty. Ltd., 100%	Lake MacDonnell open pit gypsum mine, near Point Thevenard, SA	1,400
Do.		Dampier Salt Ltd., 100%	Lake MacLeod salt and gypsum solar	900
Iron and steel:				
Iron ore		Channar open pit iron ore mine [Hamersley Iron Pty. Ltd., 60% (Rio Tinto Ltd., 100%), and China Iron and Steel Industry & Trade Group Corp. (SINOSTEEL) (a China state-owned company), 40%]	70 km south of Tom Price, WA	11,000
Do.		Cockatoo Island open pit iron ore mine (BHP Billiton Ltd., 100%)	130 km north northeast of Derby, WA	1,500
Do.		Eastern Range open pit iron ore mine [Hamersley Iron Pty. Ltd., 54% (Rio Tinto Ltd., 100%), and Shanghai Baosteel Group Corp., 46%]	10 km east of Paraburdoo, WA	10,000
Do.		Extension Hill open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	85 km of Perenjori, WA	3,000
Do.		Hamersley Operations (includes Brockman No. 2, Marandoo, Mount Tom Price, Nammuldi, Paraburdoo, and Yandicoogina open pit iron ore mines) [Hamersley Iron Pty. Ltd., 100% (Rio Tinto Ltd., 100%)]	30 km to 85 km northeast, northwest, and south of Tom Price, WA	90,000
Do.		Hope Downs Mine [Hope Downs Iron Ore Pty Ltd. (Hancock Prospecting Pty Ltd. 100%), 50%, and Rio Tinto Ltd., 50%]	75 km northwest of Newman, WA	30,000
Do.		Jimblebar open pit iron ore mine {[BHP Iron Ore (Jimblebar), 85% (BHP Billiton Ltd., 100%)]; [Mitsui Itochu Iron Pty Ltd., 10% (Mitsui & Co. (Australia) Ltd. 100%)]; [CI Minerals Australia Pty Ltd., 5% (Itochu Corp., 100%)]}	40 km east of Newman, WA	8,000
Do.		Koolan Island open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	140 north of Derby, WA	4,000
Do.		Koolyanobbing Central open pit iron ore mine (Portman Ltd., 100%)	50 km north-northeast of Southern Cross, WA	6,000
Do.		Mount Goldsworthy mining associates joint venture (includes Area C, Goldsworthy, and Nimingarra) (BHP Billiton Minerals Pty Ltd. (manager), 85%; ITOCHU Minerals & Energy of Australia Pty Ltd., 8%; Mitsui Iron Ore Corp. Pty. Ltd., 7%)	180 km east of Port Hedland, WA	42,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Iron and steel—Continued:			
Iron ore—Continued	Mount Gould open pit iron ore mine (Unimin Australia Ltd., 100%)	160 km west of Meekatharra, WA	6,000
Do.	Mount Newman open pit iron ore mine (includes Mount Whaleback, Orebody 23-25, Orebody 29, and Orebody 30-35) [BHP Billiton Minerals Pty Ltd., 85% (BHP Billiton Ltd., 100%); Mitsui Itochu Iron Pty Ltd., 10% (Mitsui & Co. (Australia) Ltd., 100%); CI Minerals Australia Pty Ltd., 5% (Itochu Corp., 100%)]	Within 13 km of Newman, WA	30,000
Do.	Pannawonica (includes Mesa A and J) open pit iron ore mine [Robe River Iron Associates, manager (Rio Tinto Ltd., 53%; Mitsui & Co. (Australia) Ltd., 33%; Nippon Steel Australia Pty. Ltd., 10.5%; Sumitomo Metal Australia Pty. Ltd., 3.5%]	130 km south-southwest of Dampier, WA	32,000
Do.	Cloudbreak iron ore mine (includes Chicester Range, Christmas Creek, WhiteKnight, Mount Lewin, Mount Nicholas, and Flinders) (Fortescue Metals Group Ltd., 100%)	Chichester Ranges, East Pilbara, WA	55,000
Do.	Savage River open pit iron ore mine (Stemcor Holdings Ltd., 100%)	100 km southwest of Burnie, TAS	2,400
Do.	Tallering Peak open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	120 northeast of Geraldton, WA	3,000
Do.	Whyalla open pit iron ore mines (OneSteel Ltd., 100%)	270 km northwest of Adelaide, SA	2,600
Do.	Yandi open pit iron ore mine (BHP Billiton Minerals Pty Ltd., 85%, manager; ITOCHU Minerals & Energy of Australia Pty Ltd., 8%; Mitsui Iron Ore Corp. Pty. Ltd., 7%)	92 km north of Newman, WA	42,000
Pig iron	Hismelt pig iron plant [Hismelt Corp. Pty Ltd. (Rio Tinto Ltd., 60%; Nucor Corp., 25%; Mitsubishi Corp., 10%; and Shougang Corp., 5%]	Kwinana, WA	800
Steel	OneSteel Whyalla steelworks (OneSteel Ltd., 100%)	Whyalla, SA	1,200
Do.	Port Kembla steelworks (Blue Scope Steel Ltd., 100%)	Port Kembla, NSW	5,000
Do.	Smorgon Steel Group Ltd.	Laverton, Melbourne, VIC	700
Do.	do.	Waratch, NSW	285
Kaolin	Axedale Clays open pit kaolin mine (E Clay Pty Ltd., 100%)	18 km east of Bendigo, VIC	50
Do.	Pittong open pit kaolin mine (Imerys Minerals Australia Pty Ltd., 100%)	35 km southwest of Ballarat, VIC	110
Do.	Skardon River open pit kaolin mine (Queensland Kaolin Pty. Ltd., 96.6%, and private, 3.4%)	85 km north of Weipa, QLD	150
Lead:			
Mine, lead content	Anges zinc mine (Terramin Australia Ltd., 100%)	2 km from Strathalbyn, SA	10
Do.	Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	90
Do.	Cannington underground silver-lead-zinc mine (BHP Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	265
Do.	Century open pit zinc-silver-lead mine (Zinifex Ltd., 100%)	250 km north of Mount Isa, QLD	90
Do.	Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., 100%)	40 km northwest of Cobar, NSW	45
Do.	Hellyer underground zinc-lead-copper-silver mine (Intec Ltd., 50%, and Polymetals Mining Services Pty Ltd., 50%)	80 km south-southwest of Burnie, TAS	44
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	150
Do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	5 km north of Queenstown, TAS	25
Smelter	Mount Isa smelter (Xstrata plc, 100%)	Mount Isa, QLD	240
Do.	Port Pirie smelter (Nyrstar Corp., 100%)	5 km north of Queenstown, TAS	235
Magnesite	Kunwarara open pit magnesite mine (includes Marlborough) (private interest, 100%)	70 km northwest of Rockhampton, QLD	3,000
Manganese:			
Mine, concentrate	Bootu Creek open pit manganese mine (OM Holding Ltd., 100%)	110 km north of Tennant Creek, NT	600
Do.	Groote Eylandt open pit manganese mine [Groote Eylandt Mining Co., operator (BHP Billiton Ltd., 60%, and Anglo American Corp., 40%)]	Groote Eylandt, NT	3,100
Do.	Woodie Woodie open pit manganese mine (includes Bells and East Pilbara leases) [Pilbara Manganese Pty Ltd., operator (Consolidated Minerals Ltd., 100%)]	400 southeast of Port Hedland, WA	1,000
Alloys	Bell Bay Smelter [Tasmanian Electro Metallurgical Co. Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Bell Bay, TAS	250

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Mineral sands	Eneabba open pit heavy-mineral sands mine (Iluka Resources Ltd., 100%)	260 km north of Perth, WA	NA
Do.	Hawks Nest heavy-mineral sands dredge (Mineral Deposits Ltd., 100%)	50 km northeast of Newcastle, NSW	NA
Do.	Jangardup heavy-mineral sands dredge (Cable Sands (WA) Pty. Ltd., 100%)	50 km south of Nannup, WA	NA
Do.	North Capel open pit heavy-mineral sands mine (Iluka Resources Ltd., 100%)	7 km north of Capel, WA	NA
Do.	North Stradbroke Island heavy-mineral sands dredge (Stradbroke Rutile Pty. Ltd., 100%)	35 km east of Brisbane, QLD	NA
Do.	Tiwest Joint Venture heavy-mineral sands dredge (KMCC Western Australia Pty. Ltd., 50%, and Ticor Resources Pty. Ltd., 50%)	180 km north of Perth, WA	NA
Do.	Wemen heavy-mineral sands dredge (Murray Basin Titanium Pty. Ltd., 100%)	80 km southeast of Mildura, VIC	NA
Molybdenum metric tons	Wolfram Camp molybdenum-tungsten mine (Queensland Ore Ltd., 85%, and private, 15%)	85 km west of Cairns, QLD	120
Nickel:			
Mine, Ni content	Avebury nickel mine (includes Bison, North Avebury, Saxon, and West Viking) [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	Near Zeehan, TAS	7
Do.	Black Swan underground nickel mine (includes Silver Swan) (OJSC MMC Norilsk Nickel, 100%)	53 km northeast of Kalgoorlie, WA	10
Do.	Carnilya Hill open pit mine (Mincor Resources NL, 70%, and View Resources Ltd., 30%)	25 km northeast of Kambalda, WA	5
Do.	Cawse open pit nickel-cobalt mine (OJSC MMC Norilsk Nickel, 100%)	50 km northeast of Kalgoorlie, WA	9
Do.	Cosmos open pit nickel mine (Xstrata plc, 100%)	50 km north of Leinster, WA	13
Do.	Flying Fox underground mine (Western Areas NL, 100%)	108 km south of Marvel Loch, WA	15
Do.	Kambalda underground nickel mines (Palmary Enterprises Ltd., 100%)	5 km south of Kambalda, WA	35
Do.	Lake Johnson underground nickel mine (includes Maggie Hays, Maggie Hays Lake, and Emily Ann) (OJSC MMC Norilsk Nickel, 100%)	130 km west of Norseman, WA	12
Do.	Lanfranchi underground mine (includes Deacon, Schmitz, Tramway, and Winner) (Panoramic Resources Ltd., 100%)	42 km south of Kambalda, WA	10
Do.	Leinster open pit/underground nickel mines (BHP Billiton Ltd., 100%)	10 km north of Leinster, WA	44
Do.	Long underground mine (Independence Group NL, 100%)	Near Kambalda East, WA	10
Do.	Miitel underground nickel mine (includes Redross and Mariners) (Mincor Resources NL, 100%)	70 km south of Kambalda, WA	10
Do.	Mount Keith open pit nickel mine (includes Cliffs and Yakabindie) (BHP Billiton Ltd., 100%)	70 km south-southeast of Wiluna, WA	40
Do.	Murrin Murrin open pit nickel-cobalt mine (Minara Resources Ltd., 60%, and Glencore International AG, 40%)	60 km east of Leonora, WA	34
Do.	Radio Hill underground nickel-cobalt mine (Fox Resources Ltd., 100%)	35 km south of Karratha, WA	4
Do.	Ravensthorpe open pit mine (First Quantum Minerals Ltd., 100%)	155 km west of Esperance, WA[3]	39
Do.	Savannah underground mine (Panoramic Resources Ltd., 100%)	120 km north of Halls Creek, WA	8
Do.	Spotted Quoll nickel mine (includes Tim King and Willy Willy) (Western Areas NL, 100%)	114 km south of Marvel Loch, WA	10
Do.	Waterloo underground nickel mine (includes Amorac) (OJSC MMC Norilsk Nickel, 100%)	90 km north of Leonora, WA	5
Smelter	Kalgoorlie nickel smelter (BHP Billiton Ltd., 100%)	Kalgoorlie, WA	100
Refinery	Kwinana nickel refinery (BHP Billiton Ltd., 100%)	Kwinana, WA	67
Do.	Murrin Murrin nickel refinery (Minara Resources Ltd., 60%, and Glencore International AG, 40%)	Murrin Murrin, WA	45
Do.	Yabulu nickel-cobalt refinery (Nickel Consolidated Pty Ltd., Nickel House Pty, and Nickel Process Pty)	Townsville, QLD	40
Opal	Many small producers	Andamooka and Coober Pedy areas, SA; Lightning Ridge area, NSW	NA

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Petroleum	thousand 42-gallon barrels per day	Exxon Mobil Corp., 100%	Altona Refinery, VIC	120
Do.	do.	Bulwer Island Refinery [BP Amoco Refinery (Bulwer Island) Pty. Ltd., 100%]	Bulwer Island, QLD	69.3
Do.	do.	Clyde Refinery [Shell Refining (Australia) Pty. Ltd., 100%]	Clyde, NSW	85
Do.	do.	Geelong Refinery [Shell Refining (Australia) Pty. Ltd., 100%]	Geelong, VIC	110
Do.	do.	Kurnell Refinery (Caltex Australia Ltd., 100%)	Kurnell, NSW	114
Do.	do.	Kwinana Refinery [BP Amoco Refinery (Kwinana) Pty. Ltd., 100%]	Kwinana, WA	138
Do.	do.	Lytton Refinery (Caltex Australia Ltd., 100%)	Lytton, QLD	106
Do.	do.	Port Stanvac Refinery (Exxon Mobil Corp., 100%)	Port Stanvac, SA	69
Phosphate rock		Phosphate Hill-Duchess open pit phosphate mine (Incitec Pivot Ltd., 100%)	140 km northwest of Mount Isa, QLD	2,200
Salt		Dampier solar evaporation salt pans (Dampier Salt Ltd., 100%)	Near Dampier, WA	4,000
Do.		Lake MacLeod solar salt and gypsum evaporation pans (Dampier Salt Ltd., 100%)	65 km north of Carnarvon, WA	900
Do.		Port Hedland solar salt fields (Dampier Salt Ltd., 100%)	Port Hedland, WA	3,000
Silica		Itochu Corp., 50%, and Tochu Corp., 50%	Kemerton silica sands dredge, 25 km northeast of Bunbury, WA	450
Silver:				
Mine,	kilograms Ag content	Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	81,200
Do.	do.	Cannington underground silver-lead-zinc mine (BHP Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	700,000
Do.	do.	Century open pit zinc-silver-lead mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	250 km north of Mount Isa, QLD	3,000
Do.	do.	Pasminco Ltd., 100%	Cockle Creek silver smelter, NSW	85,000
Do.	do.	Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., 100%)	40 km northwest of Cobar, NSW	35,000
Do.	do.	Hellyer underground zinc-lead-copper-silver mine (Intec Ltd., 50%, and Polymetals Mining Services Pty Ltd., 50%)	80 km south-southwest of Burnie, TAS	60,000
Do.	do.	Henty underground gold-silver mine (Barrick Gold Ltd., 100%)	30 km north of Queenstown, TAS	1,100
Do.	do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	375,000
Do.	do.	Olympic Dam underground copper-silver-gold-uranium mine [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	27,000
Do.	do.	Peak underground gold-zinc-lead-copper-silver underground mine (includes New Cobar, New Occidental, and Perseverance), (GoldCorp Inc., 100%)	8 km south of Cobar, NSW	6,000
Do.	do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	5 km north of Queenstown, TAS	35,000
Smelter	do.	Port Pirie smelter (Nyrstar Corp., 100%)	do.	450,000
Refinery	do.	Perth Refinery [AGR Management Services Ltd. (Australian Gold Alliance Pty Ltd., 40%; Western Australian Mint, 40%; and Johnson Matthey (Australian) Ltd., 20%]	Newburn, WA	81,000
Spodumene		Greenbushes open pit/underground tantalite-spodumene mine (Talison Lithium Ltd., 100%)	70 km southeast of Bunbury, WA	260
Do.		Mount Cattlin spodumene mine (Galaxy Resources Ltd., 100%)	2 km north of Ravensthorpe, WA	140
Talc		Three Springs open pit talc mine (Imerys SA, 100%)	330 km north of Perth, WA	150
Tantalum, tantalite, Ta_2O_5 content	metric tons	Greenbushes open pit/underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	550
Do.	do.	Bald Hill tantalite mine (Haddington Resources Ltd., 100%)	60 km southeast of Kambalda, WA[3]	100
Do.	do.	Wodgina open pit tantalite mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA[3]	250

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Tin:				
Mine, Sn content	metric tons	Collingwood underground tin mine (Metals X Ltd., 100%)	35 km south of Cooktown, QLD	3,000
Do.	do.	Greenbushes open pit/underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA[3]	1,000
Do.	do.	Mount Bischoff open pit mine (Metals X Ltd., 50% and Yunnan Tin Group of China, 50%)	55 km southwest of Burnie, TSA	6,000
Do.	do.	Renison Bell underground tin mine (Metals X Ltd., 50% and Yunnan Tin Group of China, 50%)	136 km south of Burnie, TAS[3]	4,000
Smelter	do.	Greenbushes Smelter (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	1,000
Tungsten, W content	do.	Kara magnetite and scheelite mine (Itochu Corp., 50%, and Tasmania Mines Ltd., 50%)	30 km south of Burnie, TAS	50
Do.	do.	Wolfram Camp molybdenum-tungsten mine (Queensland Ore Ltd., 85%, and private, 15%)	85 km west of Cairns, QLD	500
Uranium, U_3O_8 content	do.	Beverley in situ leach uranium operation (Heathgate Resources Pty. Ltd., 100%)	300 km northeast of Port Augusta, SA	1,000
Do.	do.	Olympic Dam underground copper-silver-gold-uranium mine [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	4,400
Do.	do.	Ranger open pit uranium mine (Energy Resources of Australia Ltd., 100%)	230 km east of Darwin, NT	5,000
Vanadium, V_2O_5 content	do.	Windimurra open pit mine vanadium (Precious Metals Australia Ltd., 90%, and Noble Group Ltd., 10%)	100 km east-southeast of Mount Magnet, WA[3]	8
Zinc:				
Mine, Zn content		Anges zinc mine (Terramin Australia Ltd., 100%)	2 km from Strathalbyn, SA	24
Do.		Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	360
Do.		Cannington underground silver-lead-zinc mine (BHP Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	100
Do.		Century open pit zinc-silver-lead mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	250 km north of Mount Isa, QLD	500
Do.		Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., a subsidiary of Toho Zinc Co. Ltd. of Japan, 100%)	40 km northwest of Cobar, NSW	125
Do.		Golden Grove underground zinc-copper mine (OZ Minerals Ltd., 100%)	225 km east of Geraldton, WA	150
Do.		Hellyer underground zinc-lead-copper-silver mine (Intec Ltd., 50%, and Polymetals Mining Services Pty Ltd., 50%)	80 km south-southwest of Burnie, TAS	130
Do.		Jaguar underground mine (Jabiru Metals Ltd., 100%)	250 km north of Kalgoorlie, WA	420
Do.		McArthur River open pit mine [McArthur River Mining Pty Ltd., operator (Xstrata plc, 100%)]	60 km southwest of Borroloola, NT	143
Do.		Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	175
Do.		Peak underground gold-zinc-lead-copper-silver underground mine (includes New Cobar, New Occidental, and Perseverance), (GoldCorp Inc., 100%)	8 km south of Cobar, NSW	8
Do.		Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	100
Smelter		Port Pirie smelter (Nyrstar Corp., 100%)	5 km north of Queenstown, TAS	45
Do.		Hobart smelter (OZ Minerals Ltd., 100%)	Hobart, TAS	320
Refinery		Sun Metals zinc refinery [Sun Metals Corp. Pty. Ltd., operator (Korea Zinc Co., 100%)]	Townsville, QLD	170

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Abbreviations for States and Territories in this table include the following: NSW—New South Wales; NT—Northern Territory; QLD—Queensland; SA—South Australia; TAS—Tasmania; VIC—Victoria; WA—Western Australia.
[2]Abbreviation(s) used for unit(s) of measure in this table include the following: km—kilometer.
[3]On care-and-maintenance status; expansion project development decision pending.

TABLE 3
AUSTRALIA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2010

Commodity		Reserves[1]
Antinomy, Sb content	thousand metric tons	138
Bauxite	million metric tons	6,200
Cadmium, Cd content	thousand metric tons	61
Coal:		
Black:		
In situ	billion metric tons	61
Recoverable	do.	44
Brown:		
In situ	do.	41
Recoverable	do.	37
Cobalt, Co content	thousand metric tons	1,400
Copper, Cu content	million metric tons	80
Diamond:		
Gem and near gem	million carats	105
Industrial	do.	109
Gold, Au content	metric tons	7,400
Iron ore	billion metric tons	28
Lead, Pb content	million metric tons	29
Lithium, Li content	thousand metric tons	607
Magnesite ($MgCO_3$ content)	million metric tons	330
Manganese ore	do.	181
Mineral sands:		
Ilmenite	do.	200
Rutile	do.	23
Zircon	do.	40
Molybdenum, Mo content	thousand metric tons	276
Nickel, Ni content	million metric tons	24
Niobium (columbium) and tantalum:		
Niobium (columbium), Nb content	thousand metric tons	115
Tantalum, Ta content	do.	51
Petroleum, recoverable:		
Condensate	million barrels	2,750
Crude	do.	1,430
Liquefied petroleum gas	do.	1,470
Natural gas	billion cubic meters	4,650
Platinum-group metals (Pd, Pt)	metric tons	5
Rare earths (REO plus Y_2O_3)	thousand metric tons	1,650
Silver, Ag content	do.	69
Tin, Sn content	do.	176
Tungsten, W content	do.	195
Uranium, U content	do.	1,200
Vanadium	do.	2,700
Zinc, Zn content	million metric tons	56

do. Ditto.
[1]Economic demonstrated resources.

Source: Geoscience Australia, 2010, Australia's identified mineral resources 2010: Canberra, Australia, Geoscience Australia, p. 5. (Data have been rounded to no more than three significant digits.)