



**RIO
TINTO**

Copper

The use of copper and its principal alloys, bronze and brass, encompasses human progress since the Stone Age 60 centuries ago. One of the greatest copper deposits ever found, at Rio Tinto in Spain, supplied the Roman Empire and gave its name to this company.

Copper has always been on the forefront of technology, a role continuing today with consumption of more than 15 million tonnes of the metal each year.

With world population and development on the increase, demand for copper is expected to continue to build well beyond current annual consumption to supply wire and cable for power and voice transmission, to build automobiles and homes, home appliances and computers.

Rio Tinto produces six per cent of world copper, ranking it fourth in the world. The metal accounts for a third of the Group's operating assets and nearly a quarter of annual revenue. Gold is a significant co-product, making Rio Tinto the seventh largest producer in the world. The copper portfolio on four continents includes outright ownership or a major stake in three of the world's largest copper mines, each with a producing life of more than 20 years. Projections show that in about 15 years' time Rio Tinto could be producing more copper from underground mines than from open pit mines. This is made possible by the development of a mining technique called block caving, already in use at three mines.

Block caving entails undercutting the ore zone to allow rock stresses and gravity to fragment the ore so that it falls naturally through cone shaped funnels to be collected at drawpoints for hoisting to surface. Rio Tinto is building technology and expertise in the planning and building of block cave mines.

Copper is an essential raw material. Wiring and plumbing have been the two top markets for copper in recent years. Both have benefited from an increasing intensity of use (more electrical loads for computers and more bathrooms in new homes). Other major uses are in fire suppressant sprinkler systems, architectural applications such as sheet copper roofing and copper flashing and trim, and in automotive applications such as radiators.

Rio Tinto Copper group interests:

*Kennecott Utah Copper
(100 per cent)*

*Grasberg joint venture, Indonesia
(40 per cent)*

*Escondida, Chile
(30 per cent)*

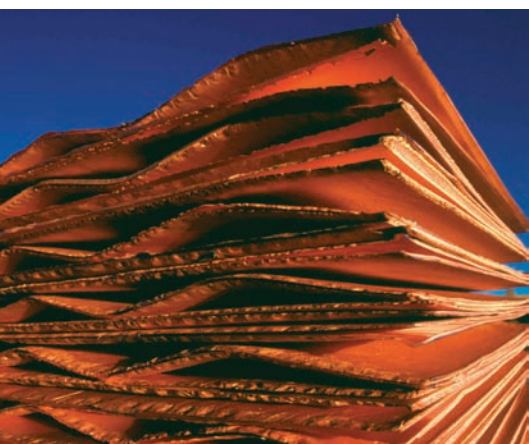
*Palabora, South Africa
(49.2 per cent)*

*Northparkes, Australia
(80 per cent)*

*Kennecott Minerals
(100 per cent)*

*Resolution project
(55 per cent)*

Front cover: Close up of surface of 99.999 per cent purity copper cathode after removal from tank house at Escondida, Chile.



Stacked sheets of newly produced copper cathode at Escondida, Chile.



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Kennecott Utah Copper, US

Rio Tinto owns 100 per cent of Kennecott Utah Copper (KUC), which operates the Bingham Canyon mine, Copperton concentrator and Garfield smelter complex near Salt Lake City, Utah, US. KUC, which celebrated its centenary in 2003, supplies more than 10 per cent of annual US copper requirements. Its Bingham Canyon mine has produced more copper than any mine in the world – over 16 million tonnes. A project to enlarge the open pit was approved in 2005 which will extend the life of the mine to 2017.

The concentrator and US \$1.1 billion smelter complex completed in 1995 allows all mine output to be processed on site. The Garfield smelter is a state of the art smelting/refining facility recognised as best in class for environmental protection. Substantial amounts of gold, silver and molybdenum are produced as by-products. The company is one of the largest private employers in Utah with about 1,400 people.

Ore from Bingham Canyon is processed by flotation to produce copper and molybdenum concentrates. The concentrates are treated in the smelting and refining process to produce copper metal and molybdenum, gold and silver by-products. The copper is sold under short term contracts to fabricators in the US.

KUC as the owner of 53 per cent of undeveloped land in the Salt Lake Valley, formed Kennecott Land to develop about 16,000 hectares of the 37,200 hectares owned. The initial 1,800 hectare Daybreak project site lies in the path of expanding residential areas. Kennecott Land has the right to build roads, make utility connections and prepare the land for sale to builders who will construct houses for 30,000 people. Rio Tinto is initially investing US\$50 million with the first revenues received in 2004.

Flotation bubbles capture copper and other mineral particles in the separation process, Kennecott Utah Copper, US.

Grasberg's remaining life expectancy is expected to be at least 25 years.

Grasberg, Indonesia

Grasberg in Indonesia on the island of New Guinea is one of the world's largest copper and gold mines in terms of reserves and production. It is operated by PT Freeport Indonesia (PTFI), the principal and 91 per cent owned operating subsidiary of US based Freeport McMoRan Copper & Gold Inc. (FCX). Rio Tinto acquired an initial interest in the mine in 1995 through acquisition of shares in FCX. This ownership interest was sold in 2004. Rio Tinto retains a joint venture agreement with FCX which entitles Rio Tinto to 40 per cent of additional material mined due to expansions.

A US\$1 billion expansion of mining and milling capacity was completed in early 1998 followed by commencement of underground development of the DOZ (Deep Ore Zone). Production from DOZ achieved design capacity of 25,000 tonnes per day in 2002 and further capacity increases have been achieved to over 40,000 tonnes per day.

Substantially all of PTFI's concentrate is sold under long term contracts to smelters in Asia, Europe and North America. Rio Tinto's share of Grasberg's future production is expected to be more than 7.5 million tonnes of copper and over 20 million ounces of gold. Grasberg's remaining life is expected to be at least 25 years.

Escondida, Chile

Rio Tinto owns 30 per cent of the low cost Escondida open pit copper mine operated by BHP-Billiton, one of the largest copper mines in the world, with a mine life expected to exceed 50 years at current rates of production. It is situated 3,000 metres above sea level in the Atacama desert in the Andes mountains of northern Chile.

The orebody was discovered in 1981 and in 1985 Rio Tinto acquired its interest for US\$55 million. Project construction commenced in 1988 at an initial capital cost of US\$824 million and the first copper was produced in 1990. Escondida employs more than 2,400 people. The mine and processing facilities have been expanded in stages at additional capital costs exceeding US\$1 billion to the current plant capacity of 225,000 tonnes of ore per day for concentrate production and a separate solvent-extraction and electrowinning (SX-EW) plant.

This is based on leaching copper oxide ores and produced its first cathode copper in 1998. Approval was given in 2003 for the US\$400 million Escondida Norte project which will maintain capacity at Escondida above 1.2 million tonnes of copper per annum to the end of 2008 as existing Escondida mine grades decline. First production from Norte is expected in the fourth quarter of 2005. Rio Tinto's share of the project cost is US\$120 million. A US\$850 million sulphide leach project was approved in 2004 which is expected to produce an additional 180,000 tonnes (Rio Tinto share 54,000 tonnes) of copper cathode metal per annum for more than 25 years from 2006.

The tankhouse at Escondida, Chile, where several thousand tonnes of 99.999 per cent purity copper cathode are produced every week.



Palabora, South Africa

Palabora Mining Company (Palabora) is a listed South African company in which Rio Tinto owns a 49.2 per cent interest. Palabora operates a large copper mine, smelter and refinery managed by Rio Tinto in the Limpopo Province of South Africa. It is one of Africa's largest copper mine by output.

The copper deposit was identified in the early 1950s and a company was formed in 1956 to develop the mine, which started operations in 1964. The deposit was initially mined by open pit methods supplying most of South Africa's copper needs with the balance exported offshore. Mining of the open pit ceased in 2002.

Palabora has developed a US\$465 million underground mine. This involved sinking production and service shafts to a depth of 1,270 metres below surface and mining by the cost effective block caving mining method.

The underground mine has a target rate of production of 30,000 tonnes per day of ore. About 1.6 million tonnes of copper are expected to be produced over the 20 year life of the underground mine.

The Palabora refinery produces continuous cast rod for the domestic market and cathodes for export.

Useful by product metals and minerals include uranium oxide, magnetite and nickel sulphate as well as small quantities of gold, silver and platinum. Palabora also owns a nearby vermiculite deposit which is mined and processed for sale worldwide. Vermiculite is a versatile industrial mineral with hundreds of uses.

Northparkes, Australia

Rio Tinto's 80 per cent interest in the Northparkes copper-gold mine in New South Wales, Australia, resulted from the acquisition of North Ltd in 2000. Mining commenced in 1994 with an open pit operation.

Underground mining using the block caving method has been undertaken since 1997. Northparkes was the first mine in Australia to utilise this technique. Northparkes has the capacity to mine and process about five million tonnes of ore per year to produce around 160,000 tonnes of concentrate containing about 60,000 tonnes of copper and 50,000 ounces of gold. A second block cave section started production in 2004. With the development of another orebody planned, Northparkes is expected to be in production until at least 2015. The mine employs about 160 people. The copper concentrate produced is shipped under long term contracts to smelters in Japan (67 per cent), Australia (14 per cent) and other countries (19 per cent).

Kennecott Minerals, US

Rio Tinto owns 100 per cent of Kennecott Minerals (KM) which produces gold, silver, zinc, copper and other base metals from wholly owned and joint venture operations in the US. It also manages closed mine sites and a nickel project in Michigan.

KM's interests include the Greens Creek polymetallic mine in Alaska which it manages, and Rio Tinto's 40 per cent interest in the Cortez-Pipeline gold mine in Nevada which is operated by Placer Dome.

Greens Creek is an underground mine producing zinc and lead enriched with gold and silver, on Admiralty Island off Juneau, Alaska. The mine and mill consistently exceed design capacity due to ongoing productivity improvements. Greens Creek is capable of annually producing in concentrates eight million ounces of silver, 57,000 tonnes of zinc, 60,000 ounces of gold and 21,000 tonnes of lead.

Cortez-Pipeline in northern Nevada is one of the lowest cost gold mines in North America, producing about 1 million ounces per year of which Rio Tinto's share is 40 per cent. It has many years ahead of it, especially with the discovery in 2003 of a new satellite orebody.

KM employs about 300 people.



Above: Pressure cleaning drills in a maintenance bay at Palabora's underground mine in South Africa.



Right: Blasting at Bingham Canyon, US.



Haul truck transporting ore from Bingham Canyon mine to the Copperton concentrator.

Resolution project

The Resolution project is situated in Arizona, US, in the area of the depleted Magma copper mine. In 2001, an agreement was signed with BHP-Billiton Base Metals which allowed Rio Tinto to earn a 55 per cent interest in the project by spending US\$25 million over six years. The earn in was completed in April 2004.

In 2003, five deep exploration drillholes intersected significant copper mineralisation, indicating a large deposit at depth, 2,000 metres below surface. The project is undergoing further evaluation. If the project proceeds to development, production will not start before 2014.



Geologist studies drill core at the Resolution project, US, and (right) the drill rig.

Arizona sunset, Resolution Copper project, US.



Fact sheets in this series comprise:

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Currency: All \$ values refer to US dollars unless stated otherwise.

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Ownership: Where Rio Tinto is not the sole owner of a company, the percentage interest is shown.

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