

## Copper

Australia ranks as the tenth largest producer of copper but accounts for only 3% of world mine production. Nevertheless, copper is an important export-earning mineral for Australia, the world's ninth largest exporter.

Copper mining began in 1842, at Kapunda in South Australia. In the second half of the 19th century Australia was a leading world producer, exporting copper ore from rich fields now worked out or uneconomic such as Moonta and Burra (S.A.), and **Cloncurry** and **Mount Morgan** (Qld). In the early 1900s copper production declined until the high grade copper ore bodies were discovered at **Mount Isa** in 1923. Though worked for emergency purposes during the Second World War full scale production did not begin here until 1953. Mount Isa now produces about two-thirds of Australia's annual output of around 250 000 t of contained copper—see Table 7.

Other significant producers of copper ores and concentrates are **Cobar** and **Woodlawn** (N.S.W.), **Mount Lyell** (Tas.), and **Warrego** near Tennant Creek (N.T.). Low prices for copper in the late 1970s, reflecting increased penetration of the metal's traditional markets by aluminium, steel and plastic, led to the closure of marginal operations, among them **Kanmantoo** (S.A.) and **Gunpowder** (Qld). The mines at **Mount Gunson** (S.A.) and **Teutonic Bore** (W.A.) ceased operations in 1986 when reserves of copper ore were exhausted.

A major new mine with an initial annual output of 30 000 t of contained copper is being developed at **Olympic Dam** (S.A.). The mine should be in production by mid 1988 and by its fourth year of operation output of copper is expected to increase to 55 000 t annually. Evaluation of a large copper deposit with a potential annual output of 35 000 to 50 000 t of contained copper and significant amounts of precious metals is now well advanced at **Goonumbla** near **Parkes** (N.S.W.). Both open cut and underground mining are proposed.

Copper is also an important by-product of some other mining operations, notably lead and zinc mining at **Broken Hill** (N.S.W.) and **Rosebery** and **Que River** (Tas.), and nickel mining in the **Kambalda** area of Western Australia.

Much of the mine output is converted into copper metal in Aust-

ralia; nearly 80% of the concentrates are processed to blister copper (97–98% copper), so called because of its blistered appearance as it cools, and refined copper (99.9% copper). In 1986 production of primary refined copper amounted to almost 164 000 t—see Table 7.

Copper concentrates produced at **Mount Isa** are smelted on site then railed to the **Townsville** refinery, Australia's largest, which has an annual capacity of 165 000 t. About half of the copper produced at Townsville is exported.

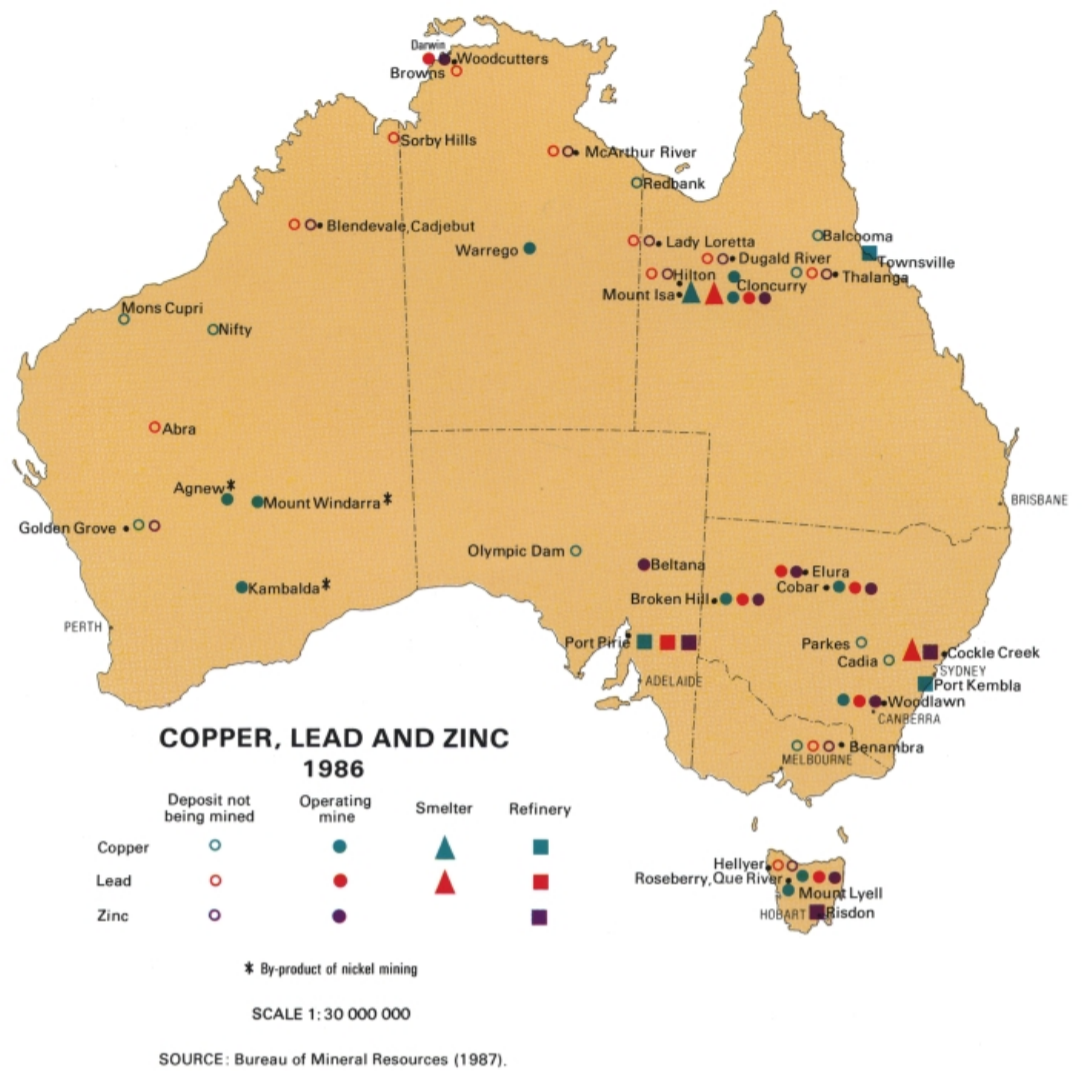
The other main centre of copper processing is the integrated smelting and refining works at **Port Kembla** (N.S.W.), originally sited there in 1907 to take advantage of abundant coal supplies and available port and industrial service facilities. Today the plant has an annual capacity of 40 000 t of refined copper and treats concentrates from **Cobar** and **Woodlawn**. The refinery is Australia's major producer of secondary refined copper—from purchased scrap, residues and drosses. Most production is sold domestically.

A small refinery with an annual capacity of 4000 t was commissioned at **Port Pirie** in 1984. It processes copper matte derived from the copper dressing of lead bullion at the nearby lead smelter/refinery.

A flash smelter formerly operated at **Warrego** but following its closure in 1981 all copper concentrates were transported by road to **Mount Morgan** for smelting. Warrego concentrates, together with concentrates from **Mount Chalmers** east of Rockhampton, were the major source of feed for the **Mount Morgan** smelter after mining ceased there in 1981. **Mount Chalmers** closed in 1982 due to exhaustion of ore reserves and copper concentrates produced at Warrego following the closure of **Mount Morgan** smelter in 1984 were exported. A low grade copper concentrate produced at Warrego is leached on site to produce a copper cement product which is sent to **Burra** (S.A.) for conversion to copper oxide for use in the manufacture of agricultural fertilisers.

Table 7. Copper production, 1984–86

	1984	1985	1986
	thousand tonnes		
Mine production of copper	236	260	250
Production of primary blister copper	180	168	170
Production of primary refined copper	171	164	164
Production of secondary refined copper	26	31	23
Exports of copper ore and concentrate	202	270	233
Exports of copper in copper ore and concentrate	59	78	66
Exports of refined copper	75	71	67



Surface operations at **Mount Isa mine** (Qld). **Mount Isa** is the world's largest single producing lead-silver mine and a major producer of copper

and zinc. All of the ore is mined underground. The former lead-zinc-silver open cut mine is to the left of the striped chimney; the copper

smelter is immediately to the right. The lead smelter is in front of the tallest chimney. The headframes for the copper and the silver-

lead-zinc mines are located close to one another, behind the two tall chimneys.