THE HELLYER PROJECT

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Introduction

The Hellyer deposit is one of the biggest mineral discoveries in Tasmania this century. The deposit is situated approximately 70 km south of Burnie and 3 km north of the Que River Mine in a relatively unexplored northern portion of the Cambrian Mt Read Volcanics.

Aberfoyle has a 90% interest in the Hellyer deposit, with Paringa Mining and Exploration Company PLC holding the balance.

Exploration History

Aberfoyle secured exploration rights over the area in 1970 and conducted regional geological mapping, stream sediment surveys, airborne electromagnetics and a comprehensive literature review to delineate targets for ground electromagnetics and soil geochemical surveys.

These methods, and subsequent drilling led to the discovery of the Que River deposit in 1974. A diluted indicated mineable ore reserve of 3.6 million tonnes of 0.35% Cu, 6.97% Pb, 12.51% Zn, 171 g/t Ag and 3.36 g/t Au was established.

At Que River the available ground electromagnetic systems failed to identify the main ore lens due to its poor conductivity. A good response to induced polarisation led to extensive use of this method over the area for several years in conjunction with geological mapping, stream and soil geochemistry, and drilling. However, by 1982 it was concluded that no substantial massive sulphide deposits existed less than 50 metres below surface and during 1983 a substantial part of the prospective volcanics were surveyed using UTEM. This method, a large-loop, broadband time-domain electromagnetic system, had demonstrated that the main ore lens at Que River was moderately conductive, during orientation surveys over the mine, but the response was too weak for earlier systems which were unable to detect poor conductors at depth.

A UTEM survey to the north of the Que River Mine was conducted to determine the response of some disseminated sulphides encountered in 1982 when drilling an IP/geochemical anomaly. The UTEM survey revealed part of a deep linear conductor to the north of the drill hole, with a detectable strike extent of 400 metres.

By the end of 1984, 94 diamond drill holes totalling 27,368 metres were completed. Continuity of mineralisation was defined over 600 metres of strike and ore body limits were established everywhere except the northern end. Indicated in-situ resources are considered to be 20 million tonnes averaging approximately 0.4% Cu, 7% Pb, 13% Zn, 160 g/t Ag and 2.3 g/t Au.

Geology

The Hellyer copper-lead-zinc-silver-gold ore body was emplaced penecontemporaneously with a prominent north-south fault within the Cambrian Mt Read Volcanics. A diagrammatic plan and cross sections are detailed in the accompanying figures. A stringer zone has pervasively intruded and altered porphyritic dacite ridges in an Andesitic Lapilli Tuff Sequence and have provided a locus for fold development around the base metal core. A Feldspar Phyric Sequence overlies these rocks and underlies volcaniclastics which host the mineralisation. Stratigraphically overlying the volcaniclastics are andesites, pillow lavas, black shale and an epiclastic sequence containing rhyolitic tuffs and shale.

The geological environment in the Que River-Hellyer area is considered to be similar to the Kuroko deposits of Japan in which ore bodies tend to occur in clusters.

Mining

The ore body is accessed via 1.3 km adit from the floor of the Southwell River Valley. The ore body was intercepted at about mid-height and up to 5 km of incline and decline ramps will be used to access its full vertical extent (which is over 500 m).

The majority of ore will be obtained by open stoping, followed by mass firing of pillars and extraction under caving conditions. Mining will commence in large primary stopes with arched roofs to provide stability. When the primary stoping is complete in an area, the surrounding pillars will be mass-blasted into them. At this stage the openings will be so large that surrounding waste rock will subsequently cave. The ore from the pillars will be extracted from below the caved material.

The mine will have an underground workforce of 40 miners, working on a three shift, five-day week roster. Some of the mechanised equipment employed is the largest used underground in Australia.

Mineral Processing

Initially, production totalled 250,000 tonnes per year, with the ore being treated at the converted Cleveland (tin) concentrator during commissioning of a new mill which was opened in April, 1989. The Hellyer concentrator has a capacity of 1 million tonnes of ore per annum. It produces four types of base metal concentrates: zinc, copper, silver and bulk concentrates.

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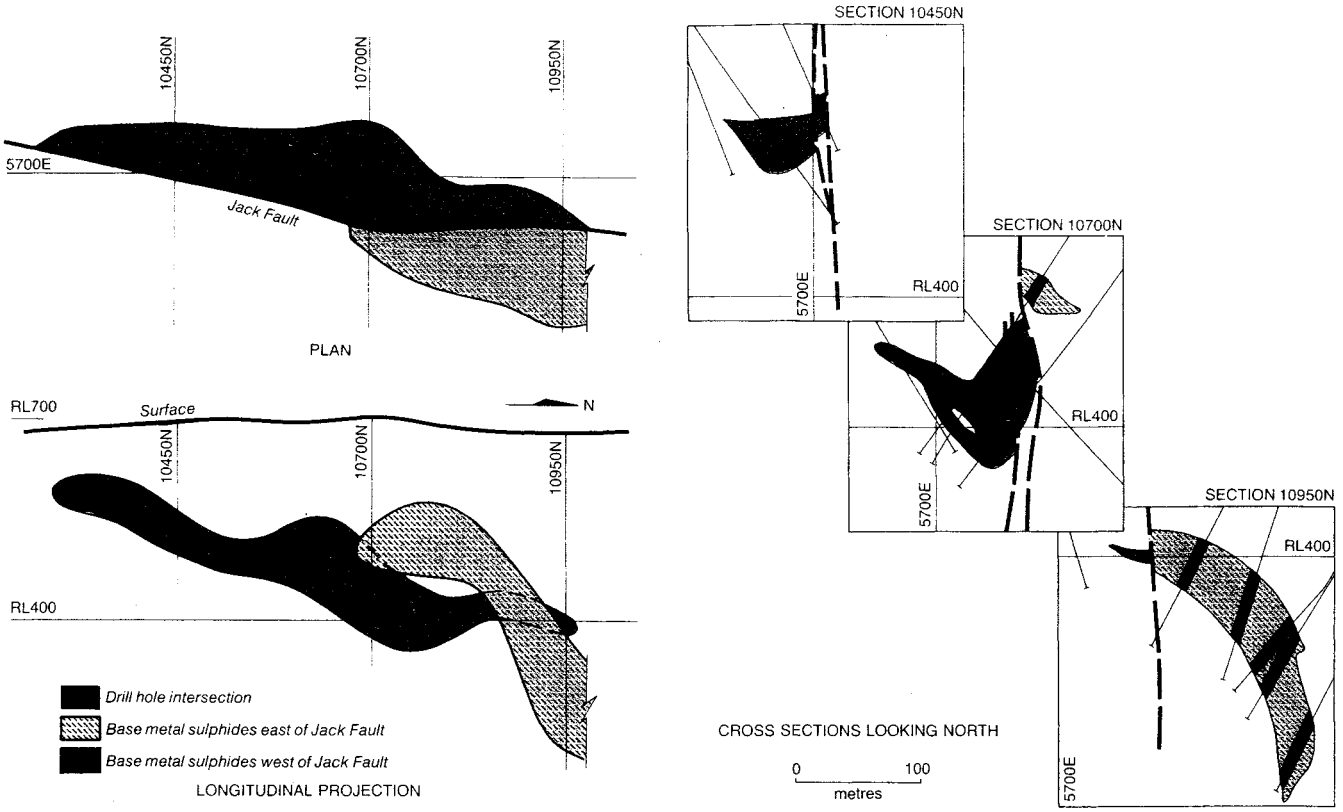

Figure 1 - Hellyer Project - plan and typical cross sections of ore body.

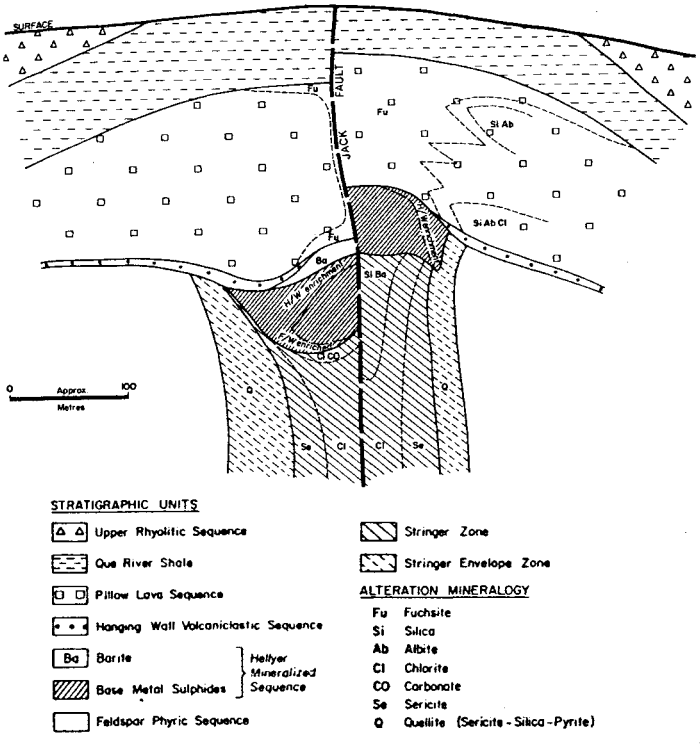

Figure 2 - Hellyer Project - schematic cross section.

The mill utilises a number of innovative features that place it on the front line of mineral processing technology in Australia, these include:

- production of four separate concentrates
- second largest flotation machines ever installed (and the World's largest for lead-zinc)
- first Tower Mills installed in Australia
- total plant design for lowest capital cost and energy efficiency
- centralised control room for overview of all sections.

Concentrates are transported from the mill to Burnie via the Emu Bay Railway. From there, a substantial tonnage of the zinc concentrate is shipped to the Electrolytic Zinc Company's Risdon plant where metallic zinc and saleable by-products are produced. Other concentrates are sent to mainland Australian smelters and to Japan, Korea and Europe.

Acknowledgement

The mining and mineral processing sections in this article have been summarised/paraphrased from Pringle-Jones (1989). This informative publication is available from the Tasmanian Chamber of Mines.

References

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