



# EXPANSION AT OLYMPIC DAM

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**SUMMARY** The Olympic Dam orebody is the 6th largest copper and the single largest uranium orebody in the world. Mine production commenced in June 1988, at an annual production rate of around 45,000 tonnes of copper and 1,000 tonnes of uranium. WMC announced in 1996 a proposed \$1.25 billion expansion of the Olympic Dam operation to raise the annual production capacity of the mine to 200,000 tonnes of copper, approximately 3,700 tonnes of uranium, 75,000 ounces of gold and 950,000 ounces of silver by 2001. Further optimisation work has identified a faster track expansion route, with an increase in the capital cost to \$1.487 billion but improved investment outcome, a new target completion date of end 1999, and a new uranium output of 4,600 tonnes per annum from that date.

## 1. INTRODUCTION

WMC is the owner and operator of the Olympic Dam copper uranium and precious metals mine and processing plant in South Australia.

The orebody was discovered by WMC in 1975 following a series of theoretical studies into the formation of copper deposits in the Olympic Dam area of the Stuart Shelf in South Australia. The location was selected on the basis of coincident gravity and magnetic abnormalities, and the presence of favourable tectonic lineaments. The first drill hole intersected 38 metres of 1% copper at a depth of about 350 metres below the surface.

Olympic Dam is situated 560 kilometres north, north west of Adelaide in semi-arid conditions. The deposit occurs within Mid-Proterozoic age granitic rocks which are about 1600 million years old. It is overlain by a 260 - 350 metre thickness of sedimentary rocks. Underground mining is conducted by long hole open stopping. Latest reserve figures show that the resource contains Proved and Probable Reserves of 569 million tonnes of copper, uranium oxide, gold and silver mineralisation, with an average copper grade of 2.0% and uranium oxide grade of 0.6 kg/tonne. This equates to around 340,000 tonnes U3O8 in reserves, enough to ensure production for over 200 years at current output levels. The Olympic Dam orebody is the 6th largest copper and the single largest uranium orebody in the world.

In 1979 a joint venture was formed between WMC (51%) and British Petroleum (49%) to develop the Olympic Dam resource. After government approvals had been obtained, construction of the project took place between 1986 and 1988. Mine production commenced in June 1988, at an annual production rate of around 45,000 tonnes of copper and 1,000 tonnes of uranium. The project was officially opened in November 1988.

Two optimisation expansions were undertaken (in June 1992 and June 1995). Optimisation I. raised annual production to 66,000 tonnes of copper and 1,400 tonnes of uranium. Optimisation II. raised annual production to current levels of 85,000 tonnes of refined copper and 1,500 tonnes of uranium.

In April 1993, WMC acquired BP's 49% interest in the project. Later that year preliminary work and scoping studies began to determine the next level of production.

On 15 July 1996, the Directors of WMC announced a proposed \$1.25 billion expansion of the Olympic Dam operation to raise the annual production capacity of the mine to 200,000 tonnes of copper, approximately 3,700 tonnes of uranium, 75,000 ounces of gold and 950,000 ounces of silver by 2001.

Further optimisation work has identified a faster track expansion route, which enabled us to announce on 12 February 1997 a new target completion date of end 1999 and a new uranium output of 4,600 tonnes per annum from that date. The advanced schedule increases the capital cost to \$1.487 billion but offers a considerably improved NPV for the investment. Cumulative production to date has been over 500,000 tonnes of copper and 11,000 tonnes U3O8.

## 2. MARKETS

### 2.1 Why expand?

The answer to this question lies not only in the expected markets, but also in the cost reductions we aim to achieve. The result will be higher earnings and a substantial improvement in our ROI.

### 2.2 Copper

Copper sales generate about 70% of Olympic Dam's annual revenue.

The principal uses for copper are in the construction, transport and communication industries. World wide consumption of refined copper is around 12.2 million tonnes per annum growing at about 3 to 4 per cent per annum. Growth rates in Asia are much higher at around 8 to 10% per annum.

In 1996, mine production of copper was 10.9 million tonnes and is forecast to grow at about 4% per annum.

Copper is a commodity and therefore experiences price cycles. In the last 10 years the London Metal Exchange (LME) price has been as low as 70 cents a pound (US) and as high as \$1.40 a pound (US).

Olympic Dam produces high quality LME Grade "A" refined copper cathode and will find ready markets in Australia, Asia and Europe for all expanded production.

### **2.3 Uranium**

This is the area which will interest the nuclear industry. Some well known facts follow:

More than 17 per cent of the world's electricity is generated by nuclear energy. Many developed countries generate more than 30 per cent of electricity through nuclear power.

Current worldwide primary uranium production is about 39,000 tonnes U3O8.

Current reactor requirements are about 85% above this level at around 75,000 tonnes U3O8 per annum. Reactor requirements are forecast to increase steadily.

New and existing uranium mines together with supplies from the dilution of military material for use in civil reactors are expected to fill some of the supply void.

Demand has outstripped mine production and civil stockpiles of uranium in industrialised countries have been steadily diminishing.

In the context of the above, WMC is confident that it will be able to secure new uranium supply contracts to absorb its expanded output.

### **2.4 Gold / Silver**

Gold and silver would continue to be sold into local bullion markets.

### **2.5 Costs**

Under the expansion, WMC will achieve economies of scale and lower average costs of production which will help to soften the risk of volatile commodity prices and propel Olympic Dam towards the lowest cost quartile on

the copper cost curve.

## **3. KEY ELEMENTS OF THE EXPANSION**

The Olympic Dam expansion entails:

- \* An increase in mine production from approximately 3 million tonnes per annum to approximately 8.5 million tonnes per annum.
- \* The installation of a new 38 ft diameter autogenous mill.
- \* A new direct to blister Outokumpu smelter.
- \* An expanded tankhouse.
- \* Substantial infrastructure and ancillary services.

Currently the mine is producing approximately 10,000 tonnes per day of ore. Once the expansion plan is completed the production level will be increased to 25,000 tonnes per day. At this level of operation the mine will be one of the largest of its type in the world.

Key components of the mine expansion program include:

- \* A new 7 metre diameter shaft, 865 metres deep and equipped to hoist +9 million tonnes of ore to surface. This will complement the two existing shafts.
- \* A new underground gyratory crusher.
- \* An underground automated electrical rail haulage system to collect and move the broken ore to the main underground crusher.
- \* 5 new 4.5 metre diameter exhaust air raises and 3 new 4.5 metre diameter fresh air raises.
- \* Expanded mine services including electrical distribution, mine pumping, saline water supply, maintenance facilities and mine monitoring and control systems.
- \* An expanded fleet of mine development and production equipment.

Infrastructure associated with the expansion includes:

- \* A new 265 km (275 kV) power line from Port Augusta to Olympic Dam.
- \* A new construction village and caravan park.
- \* More than 100 new houses in Roxby Downs.

- \* A new health and medical centre in Roxby Downs to be built by the South Australian Government.
- \* Site services which will require:
  - 6 km of potable water supply pipelines
  - 10 km of process water supply pipelines
  - 15 km of sewer gravity and pressure mains
  - 3 km of stormwater draining pipes
  - 22 km of communication conduits

Once completed, the expansion will have involved:

- \* Project Management Hours - 1,200,000
- \* Engineering Hours - 840,000
- \* Off-site Fabrication Hours - 2,500,000
- \* Construction Hours
  - Direct - 3,500,000
  - Indirect - 700,000

Materials and facilities to be installed include:

- Concrete - 70
- Structural Steel and Plate work - 20,000 tonnes
- Electrical Cables - 500 km
- Piping - 350 km
- Underground tunnelling - 74 km
- Earthworks - 13,000,000 m<sup>3</sup>
- 275 kV Powerline - 265 km
- 600 mm diameter waterline - 135 km

### 3.1 Jobs and Population

Currently:

- 1,000 jobs on-site; and
- 3,000 jobs created off-site (using accepted multipliers for the mining industry).

As result of expansion:

- An additional 1,000 jobs on-site during the 3 year construction program.

Using accepted industry multipliers, up to 3,000 additional jobs will be created off-site in areas such as manufacturing, transport and in general labor market.

Up to 200 new permanent full-time jobs at completion of the expansion.

Approximately 600 additional permanent residents at Roxby Downs between now and 2000.

142 additional houses at Roxby Downs.

Temporary population increase of around 1300 during the construction program.

### 3.2 Benefits to Australia

An expansion of Olympic Dam would mean a considerable boost to the Australian economy and a major increase in revenue for the South Australian Government.

The \$1.487 billion investment represents expenditure of about \$1000 for every man, woman and child in South Australia.

Based on previous experience, approximately 70 percent of the total project expenditure of \$1.487 billion will be within SA.

Royalty payments and other revenue to the State Government will rise sharply.

Subject to metals prices, revenues would rise from \$390 million at present to approximately \$750 million in 1999/2000.

## 4. GOVERNMENT & ENVIRONMENTAL ISSUES

An Indenture Agreement, in the form of the Roxby Downs (Indenture Ratification) Act 1982, between WMC and the State of South Australia covers a range of issues including:

- environmental management and protection;
- water supplies;
- provision of infrastructure such as:
  - power;
  - public health services;
  - education facilities; and other public services.

The 1982 Indenture envisaged copper production up to a level of 150,000 tonnes per annum. In late 1996, this Indenture was amended and now envisages copper production to 350,000 tonnes per annum. This amended Indenture was ratified by the South Australian Parliament in December 1996.

The entire project has recently undergone a full environmental review following its designation in 1995 under the Commonwealth Environmental Protection (Impact of Proposals) Act. This process confirmed the original EIS approvals granted in 1983. The Indenture obliges WMC to submit a new EIS to the State and Commonwealth governments seeking approvals for a production rate of up to 350,000 tonnes per annum. This approval level will provide the flexibility for future expansion. There are, however, no current plans in place to increase the annual capacity above approximately 8.5 million tonnes of ore and 200,000 tonnes of copper per annum.

A draft EIS was published for public review in May 1997, and was open for public comment for approximately 3 months. All submissions will now be addressed by WMC in a formal supplementary document and will be considered by WMC and Government. All approvals are expected within this year. The document will also be subject to internal and external review by relevant experts from WMC and the State and Commonwealth Governments.

#### **4.1 Water**

Olympic Dam is located in the driest State of the world's driest continent. Water is a particularly important resource in such an environment.

Water is extracted from two borefields in the Great Artesian Basin to the north of Olympic Dam. Borefield A has been in operation since the mid 1980s and Borefield B since September 1996.

Current licences enable Olympic Dam to draw within limits which are based on modelling of 42 megalitres per day of water from the Great Artesian Basin. Currently Olympic Dam and Roxby Downs consume approximately 15 megalitres per day. The present estimates indicate the average daily water requirement for 200,000 tonnes production will be 34 megalitres per day.

WMC is confident that the Olympic Dam water licences will enable production to increase ultimately to 350,000 tonnes.

Water requirements will be met via Borefield A on the South western shores of Lake Eyre and the southern extremities of the GAB at an abstraction rate of 6 megalitres per day; and, Borefield B on the eastern shores of Lake Eyre and more than 100 km further into the GAB, to provide the balance of water requirements.

A 1995 study of the GAB by the Australian Bureau of Agriculture Resource and Economics (ABARE) showed daily recharge of the SA section of the GAB totals 450 megalitres. Daily extraction is around 233 megalitres as follows:

- \* pastoral bores - 130 megalitres
- \* mound springs - 66 megalitres
- \* Moomba oil and gas fields - 22 megalitres
- \* Olympic Dam and Roxby Downs - 14.3 megalitres

#### **4.2 Other Environmental Issues**

The Olympic Dam tailings retention system has recently been upgraded to minimise risk of seepage. This has been done by the installation of decant towers and double lined evaporation ponds.

The area covered by the evaporation ponds will increase by about 50 per cent.

#### **5. CONCLUSIONS**

Olympic Dam is a world class orebody, without parallel in terms of size, geology and product diversity. WMC is embarking on its largest ever single capital investment in order to raise the productivity of this marvellous resource, and to demonstrate its commitment to remain a reliable and stable supplier of copper, uranium and precious metals to the world's metals and nuclear industries for many decades to come.