PLANNING FOR MAJOR EXPANSION OF THE OLYMPIC DAM COPPER/URANIUM RESOURCE IN SOUTH AUSTRALIA

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1. Introduction

The world’s largest known uranium resource capable of economic development is located at Olympic Dam in the Far North of South Australia. The orebody is polymetallic. It is also the world’s sixth largest copper resource. In addition it contains gold and silver.

The orebody was discovered in 1975 and production began in 1988 through underground mining. Since August 2005, when BHP Billiton took over the assets of WMC Resources, including the Olympic Dam Operation, BHP Billiton has been undertaking concept and pre-feasibility studies for a further major expansion of the operation. By the end of 2006, a BHP Billiton team of up to 250 people will be assembled in Adelaide to continue these studies, reflecting the company’s approach to ‘front-end load’ project development work of this type. BHP Billiton believes that these studies are as extensive as any of their type undertaken in the mining industry. They are required by the size and complexity of the orebody and the dimensions of the project in contemplation.

Because of the size of the operation and its isolated location, significant investment in major infrastructure, including power, water supply and township development, has been necessary in the development of Olympic Dam so far. These requirements continue to pose challenges in planning further expansion of the operation. The expansion is subject to a favourable outcome in the feasibility study (which in turn will follow concept and pre-feasibility reviews) and approval by the Australian and South Australian Governments.

2. Olympic Dam

Olympic Dam is 580 km north-west of Adelaide, South Australia’s capital city. The orebody is concealed under 350 metres of barren sedimentary rocks covered by up to 30 metres of sand. The total resource estimated as of June 2005 totalled 3,970 million tonnes at 1.1% copper and 0.4 kilograms per tonne U₃O₈.

A major expansion completed in 1999 allows mining at an annual rate of up to 10 million of tonnes of ore. This provides a nominal production capacity of 200,000 tonnes of refined copper, 4,500 tonnes of uranium, 80,000 ounces of gold and 850,000 ounces of silver.

Olympic Dam is different to most Australian resource operations in that it mines and processes the ore through to final refined products on the one site. In addition to the extensive underground mining operations, Olympic Dam has a metallurgical processing plant including a copper smelter and refinery.

The majority of the Olympic Dam workforce of about 3,000 lives in the township of Roxby Downs, 16 km south of the mine. The township was built to support the Olympic Dam operations but is now diversifying into a regional centre for other activities including tourism. The current population is about 4,500.

3. Further Expansion

The Olympic Dam resource is large enough to support a significant increase in the annual production rate. Globally, it is in the top six known copper resources and can also become a relatively large gold mine. Olympic Dam’s uranium represents about 40% of the known world uranium resources in the ground.
Subject to successful completion of the pre-feasibility study scheduled for the end of 2007, followed by a final feasibility study, BHP Billiton will commit to the further expansion of Olympic Dam operations based on an open cut mine in the undeveloped southern part of the ore body and a concentrator-leaching-smelting configuration for processing. However, as is customary in the pre-feasibility phase, we are continuing to evaluate a range of options.

If approved, construction of the Olympic Dam Expansion would commence during 2009 with commissioning and ramp-up to expanded production currently planned during the years 2013 to 2014.

A key objective of the Pre-Feasibility Study is to delineate the orebody. It remains open in a number of directions and at depth. A drilling program will continue during the remainder of the pre-feasibility study and will include up to five deep holes to a depth of 2,500 metres. The current operation is worked to a depth of almost 1,000 metres, which is also the limit of most drill-hole data. In addition to the extensive drilling being undertaken, an exploration adit is being driven from the existing underground mine in the northern area of the orebody into the southern area which is the location of the proposed open pit. This will provide bulk samples for pilot testing, and will also allow infill geological drilling from underground.

Preliminary mine planning indicates that about 800 million tonnes of overburden would need to be pre-stripped to uncover ore in a starter pit. This would allow mining 40 million tonnes per annum (some of this from a continuation of the existing underground operation for some years). An expanded operation would produce 500,000 or more tonnes of copper, 500,000 ounces of gold, 2,900,000 ounces of silver and 15,000 tonnes of uranium annually.

4. The Infrastructure challenge

The process to separate the copper, uranium, gold and silver is water intensive. The operation is located in the arid area of Australia.

The current operation and the township of Roxby Downs consume about 34 megalitres of water daily. This is pumped from the Great Artesian Basin (which takes in parts of Queensland, New South Wales and the Northern Territory as well as South Australia) at distances of up to 200 kilometres from the mine, using borefield and pipeline infrastructure installed at a cost of more than $100 million. The water is desalinated at Olympic Dam for potable and some operational requirements.

An initial borefield was established in 1983. A second was commissioned in 1996. The cost of this water has provided a significant incentive to improve the efficiency of water use at Olympic Dam. Since production began in 1988, savings of around 40% per tonne of ore milled have been achieved.

As well as cost, other sustainability considerations are also very important in planning for Olympic Dam’s water supplies because ecologically significant mound spring systems are located on the rim of the Great Artesian Basin in South Australia and without efficient water management practices in the Basin, naturally occurring water flows at these springs may be depleted.

Until relatively recently, pastoralists in the South Australian portion of the Basin used about 130 megalitres daily, about four times the volume used by Olympic Dam operations. Typically, water for pastoral purposes had been reticulated along open boredrains, often many kilometres long, where up to 90% was lost due to seepage and evaporation in some instances. With financial support from Olympic Dam, pastoralists in the vicinity of our second borefield have closed these drains and replaced them with networks of closed pipes, valves and troughs. As a result of the success of the initial phase of this program, government provided further funds to extend it. The financial contribution from Olympic Dam has resulted in saving of about 37 mega litres per day.
essentially the same volume as is currently consumed by the Olympic Dam Operation and the Roxby Downs township. As a result of this excellent program, the net impact of Olympic Dam on the water resources of the Great Artesian Basin has been neutral.

To support an expanded operation, the daily water supply requirement is projected to increase by up to 100 mega litres. Exploration has been undertaken in the Great Artesian Basin to assess the potential for establishing a third borefield. Other options have also been considered, including groundwater aquifers closer to Olympic Dam unconnected to the Great Artesian Basin. Another option being considered in the pre-feasibility study is to establish a coastal desalination plant in the Whyalla region on Spencer Gulf. This would require a 320 km pipeline to Olympic Dam. As well as providing an additional sustainable supply for Olympic Dam, there would be another advantage from a coastal desalination plant. The northern region of South Australia is currently supplied with water from the River Murray. The Federal and State governments have recognised the need to reduce overall consumption from the River Murray to address salinity and other concerns. Accordingly, a coastal desalination plant which supplies Olympic Dam could also be sized to supply the northern region of South Australia with significant environmental benefit to the River Murray. Early in 2006, BHP Billiton and the South Australian Government signed a Memorandum of Understanding to assess the viability of such a project. The outcomes should be known by the end of the year.

Olympic Dam’s current power requirement is 130 megawatts at 90% utilisation. This represents about 10% of South Australia’s total base load. To support the last expansion of the operation, a 275 kV powerline was constructed from Port Augusta to Olympic Dam. This covered 265 km with 514 towers ranging in height from 32 to 50 metres.

BHP Billiton is considering a range of options for the additional power supply that would be necessary for the expansion. Olympic Dam’s total power requirement at the expanded capacity will amount to more than 400 megawatts. Gas fired power generation at Olympic Dam has been given detailed assessment but is not currently viable. An alternative plan is to build a new transmission line to Olympic Dam to take power from the national grid.

The freight logistics support required for Olympic Dam is already substantial. It amounts to 1 million tonnes annually of supplies in and product out, requiring 12,000 truck movements between Olympic Dam and Adelaide. The mining operation is about 90 km from the national rail network and a rail spur is being considered. This would give the operation more flexibility in moving product, allowing use of the Port of Darwin via the Adelaide to Darwin railway, as well as continuing the use of Port Adelaide. Also, heavy vehicle movements on public highways would be reduced.

BHP Billiton’s preference is for its workforce to work as close as possible to its operations. Accordingly, we are planning for a large increase in the population of the township of Roxby Downs. By the end of the next decade, the population may more than double to between 9,000 and 10,000. Recruiting a workforce to an isolated part of arid Australia is a continuing challenge, even more so taking into account the skills shortage facing the resources sector. We are already working with the South Australian Government on the additional public infrastructure that will be necessary to ensure that Roxby Downs remains what it is today – a regional town with high standards of community facilities.

5. The Indenture Agreement

Operations at Olympic Dam are regulated by the Roxby Downs Indenture ratified by the State Parliament in 1982 following an agreement for the initial development between WMC, as the then owner of Olympic Dam, and the South Australian Government.

This Indenture also deals with the provision of major infrastructure, including power, water, transport and township development. The Indenture continues to provide the important
commercial and legal security necessary to make a considerable investment in Olympic Dam over a long period. It provides the State Government with the regulatory framework tailored for the operations.

The implementation of the Indenture requires close and continuous liaison between BHP Billiton and State Government Departments and Agencies.

BHP Billiton believes this is of significant benefit to both parties. It enables BHP Billiton to foreshadow to government, early, issues with existing operations and plans for the future. At the same time, it provides Government Departments and Agencies with a precise framework within which to address regulatory and other issues.

These arrangements operate on a one-window approach. The Government has a designated officer who is contacted by BHP Billiton on all issues requiring Government consideration. In turn, that officer brings other Departments and Agencies into the discussions as required. This facilitates efficient liaison and co-ordination between us. An additional benefit of the Indenture for the State is the royalty arrangement detailed in the Indenture. In recent years, annual royalty payments have been in excess of $30 million.

The Indenture agreement will require amendment to facilitate a further major expansion. This will include Parliamentary ratification. This Parliamentary ratification process has resulted in bi-partisan support from the major parties for the Olympic Dam Operation. BHP Billiton values this bi-partisan support highly, and is a feature of Olympic Dam we continue to emphasize in dialogue with our international customers.

While 70% of revenue generated by Olympic Dam is on account of the production of refined copper, our uranium sales are essential to the viability of the operation. As uranium mining continues to be debated by the community, the bi-partisan support Olympic Dam has received provides BHP Billiton with an important level of certainty about its ability to continue to plan long term for Olympic Dam including the commitment to a major capital expansion.

Arrangements are also in place to ensure continuing dialogue with the Federal Government about the operations at Olympic Dam and the proposed expansion, recognising that uranium mining and export require Federal approvals.

Each six months the Olympic Dam Environment Consultative Committee meets. This Committee comprises representatives of the Federal and State Government Departments and BHP Billiton. Each meeting reviews environmental and other issues associated with Olympic Dam to enhance liaison between both levels of Government and BHP Billiton.

During the major expansion between 1997 and 1999, when all Government and Parliamentary approvals were in place and construction had begun, there was a monthly meeting between Olympic Dam and Government representatives to report progress on construction and to identify issues where Government action or decisions were required to maintain the construction schedule.

The effectiveness of this process was reflected in the fact that completion of the major expansion was achieved within schedule of about 24 months.

6. Community Issues

Olympic Dam is on land in which a number of Aboriginal groups claim an interest. BHP Billiton is negotiating with the groups on a life-of-mine land access agreement that would address native title and heritage issues and also provide the groups and the wider Aboriginal community in northern South Australia with financial support for a range of capacity building activities including education, training and employment programs.
BHP Billiton recognises the community interest in ensuring that the products of our operations are handled in a safe and environmentally responsible manner. We have been developing product stewardship programs since 1999. In relation to uranium, our focus is on those phases of the nuclear cycle for which BHP Billiton has a direct responsibility. In doing so, we are engaging with a range of stakeholders to contribute to ongoing research, and participating in industry forums in Australia and overseas.

7. Conclusion

The polymetallic orebody at Olympic Dam contains the world’s largest known economic uranium resource, in addition to the significant copper reserve, and a major mine and ore processing expansion is being considered, currently in pre-feasibility phase. The expanded operations would require investment in a large open pit mine with significant pre-strip tonnage to achieve a sustainable ore supply, processing facilities including a flotation concentrator, leaching, solvent extraction, smelting and refining plants, and extensive and efficient infrastructure.

Principal products of the Expansion would be cathode copper, refined gold and uranium oxide concentrate. Olympic Dam would become the world’s largest uranium mine in terms of annual output.

Pre-feasibility work in 2006 and 2007 includes ore resource delineation, mine planning to determine reserves, ore processing flowsheet alternatives evaluated on both technical and economic grounds, infrastructure assessments and augmentation plans, community and land access negotiations, environmental impact assessment and management plans, and government agreements and permitting. High levels of front-end loading and risk assessment are being undertaken to ensure that plans and well developed and well understood before final approvals to proceed with the Expansion are sought.