

ANNEXURE A

Olympic Dam Expansion NT Transport Option

Extract from Notice of Intent dated 8 June 2008¹

1 INTRODUCTION

1.1 Background

BHP Billiton Olympic Dam Corporation Pty Ltd is proposing to expand its existing mining and minerals processing operation at Olympic Dam, located about 570 km by road north-north-west of Adelaide in South Australia (see Figure 1.1). A Draft Environmental Impact Statement (Draft EIS) that presents the findings of the potential impacts and benefits of the proposed expansion is currently being prepared by Arup Pty Ltd and ENSR Australia Pty Ltd (ENSR) on behalf of BHP Billiton.

The proposed expansion is seeking government approval to increase the production rate from the current 2000,000 tonnes per annum (tpa) of refined copper up to a total for the operation of 750,000 tpa of refined copper equivalent plus associated products. The associated products being uranium oxide (increasing from 4,000 tpa to about 19,000 tpa), gold (increasing from 80,000 ounces per annum to about 800,000 ounces/a) and silver (increasing from 800,000 ounces/a to about 2,900,000 ounces/a). The 750,000 tpa of refined copper equivalent would comprise:

- about 350,000 tpa of refined copper, extracted and processed at Olympic Dam from 800,000 tpa of copper concentrate
- about 1.6 Mtpa (dry) of copper concentrate (i.e. about 1.8 Mtpa wet), which based on the Olympic Dam processing efficiencies is equivalent to 400,000 tpa of refined copper, some of which may be exported via the Port of Darwin.

The Draft EIS is being prepared in accordance with EIS Guidelines published in January 2006 to satisfy the requirements of both the Australian and South Australian governments. In studying the proposed expansion of the Olympic Dam operation, BHP Billiton has been assessing, and continues to assess, a number of options for transport and shipment of product. One option, to export some copper concentrate, as well as uranium oxide, via the Port of Darwin, was developed after the joint government guidelines were published. The purpose of this Notice of Intent is to satisfy the first step in the Northern Territory Government's environmental assessment process, and thereby provide sufficient information about the proposal to enable the Northern Territory Government to identify an appropriate level of assessment if required, should BHP Billiton wish to progress the proposal.

It is noted that no formal agreement between BHP Billiton and the Northern Territory Government for the proposal described in the Notice of Intent is in place. If and when required, BHP Billiton would undertake commercial discussions with the Northern Territory Government and other relevant parties to establish suitable agreements to locate the proposed facilities at the Port of Darwin.

¹ Minor changes have been made to update information contained in original dated 8 June 2008.

The Notice of Intent has been developed in accordance with the 'Guide to Environmental Impact Assessment Process in the Northern Territory' (Northern Territory Department of Natural Resources, Environment and The Arts 1996). The Notice of Intent addresses the two components of the proposed expansion relevant to the Port of Darwin, being the possible export of an increased volume of uranium oxide and the transport, storage and handling of copper concentrate. BHP Billiton is confident that the information provided within the Notice of Intent is sufficient to demonstrate that the transport, storage, handling and export of an increased volume of uranium oxide and the new product of copper concentrate would not have the potential for significant environmental impact.

FIGURE 1.1



1.2 The proponent

The proponent is BHP Billiton Olympic Dam Corporation Pty Ltd (BHP Billiton), a member of the BHP Billiton Group. The BHP Billiton Group is the world's largest diversified resource company, with more than 39,000 employees working at more than 100 sites in over 25 countries. It is the world's largest producer of export thermal coal, the world's third-largest supplier of copper, nickel and seaborne iron ore and the fourth-largest producer of uranium. It also has significant interests in stainless steel materials, oil, gas, zinc, diamonds, silver and aluminium. The global headquarters for the BHP Billiton Group are in Melbourne, Australia.

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2 DESCRIPTION OF THE PROPOSAL

2.1 Uranium oxide concentrate

The current Olympic Dam operation has exported about 30% of its annual uranium oxide production via the Port of Darwin since January 2005. The uranium oxide is packed and sealed into 200 litre drums, which are then sealed inside standard ISO (or equivalent) shipping containers and transported from Olympic Dam to Adelaide by road. The uranium oxide is then railed by Freightlink to the Port of Darwin for export. The timing of rail movements is determined by shipping schedules, with the uranium oxide despatched from South Australia so as to minimise the storage time between train arrival and vessel arrival at the Port of Darwin.

Upon arrival at the Berrimah Freight Terminal, the uranium oxide is immediately transferred by road to the Tolls distribution terminal for short-term storage in a secure, dedicated and Australian Safeguards Non Proliferation Office (ASNO) approved facility. The uranium oxide is then transported by road from the Tolls terminal to the wharf for loading on the nominated export vessel. The short-term storage area at the Toll facility accommodates Olympic Dam (BHP Billiton), Heathgate Resources and Ranger (ERA) uranium oxide containers for export.

All transport by road and rail complies with relevant legislative requirements and conforms to Transport Plans approved by ASNO and the South Australian and Northern Territory governments.

The proposed Olympic Dam expansion would increase the production of uranium oxide from about 4,000 tpa to about 19,000 tpa. This equates to a total increase from about 200 to 950 containers for export per annum. The exact quantity of uranium oxide containers exported via the Port of Darwin is yet to be determined. Irrespective of the increased volume of containers, the existing ASNO approved transport and storage systems maintain a robust and secure supply chain that would be expanded, if and when required, to accommodate the uranium oxide containers to be exported via the Port of Darwin. Once the additional volumes are determined, BHP Billiton would undertake extensive investigations and discussions with relevant stakeholders and would obtain the necessary regulatory approvals for the increased transport, storage and handling of uranium oxide via the Port of Darwin.

2.2 Copper concentrate

In order to fully unlock the potential of the Olympic Dam mineral deposit, BHP Billiton is investigating the logistical requirements for the export shipment of copper concentrate. Transportation by rail of bulk copper concentrate from the Olympic Dam mine to the Port of Darwin in the Northern Territory is one option being considered. Based on the current Olympic Dam expansion project schedule, such activities could be required from about 2016.

Once the proposed Olympic Dam Expansion is fully operational, the proposed annual movement would be up to 1.6 million tonnes bulk copper concentrate with an allowance for a production variation of 20%.

For product transferred from Olympic Dam to Darwin, dedicated rail equipment on the existing Adelaide to Darwin line would be used. Storage and handling at the Port of Darwin would occur in 'closed system' facilities. The closed system would effectively manage and minimise the release of contaminants. The transfer of copper concentrate from the storage facility to the export vessel would require a dedicated BHP Billiton ship loader to be installed on the Port of Darwin's East Arm wharf facility.

The location of the proposed facilities at East Arm is dependent on the availability of land. Given the long lead time before the facilities are required (i.e. about 2016), and the Darwin Port Corporation's plans to make additional land available by reclamation close to the East Arm wharf, this Notice of Intent has been developed on the basis that a land based storage and handling solution would be available. In other words, for the purpose of the Notice of Intent, no reclamation of land would be undertaken by BHP Billiton to construct or operate the required facilities.

2.2.1 Characteristics of the copper concentrate

The current Olympic Dam operation extracts ore and trucks it to a series of primary crushers, for crushing and conveying to an ore stockpile. Ore from the stockpile is conveyed to grinding mills, where it is further crushed, with the addition of water, to form a slurry prior to progressing to the separation stage. Olympic Dam uses a conventional flotation process to separate the bulk of the copper-bearing minerals from the mined ore, producing a copper-rich concentrate and uranium-rich tailings (see Kinhill 1997 for details). This method of mining and producing concentrates would continue for the proposed expansion. Up to 1.6 Mtpa of the Olympic Dam copper-rich concentrate would be railed to the East Arm wharf for export.

The copper concentrate is an odourless black powder (averaging 25-40 microns), which is insoluble in water. The moisture content would be maintained between 8 and 11%, thus avoiding the potential for excessive dust generation (if too dry) or becoming a slurry (if too wet). Table 2.1 provides the composition of the copper concentrate.

Most of the uranium in the original ore will pass into the uranium-rich tailings, from which it will be extracted as UOC at Olympic Dam. However, some will remain within the copper-rich concentrate. The uranium content in the copper concentrate is expected to be between 1,000 - 2,000 ppm (compared to 990,000 ppm for the uranium concentrate). The uranium content in the copper concentrate is sufficient for it to be considered radioactive under South Australian and Northern Territory legislation. As such, it would be transported under the requirements of the Australian Radiation Protection and Nuclear Safety Agency's 'Code of Practice for the Safe Transport of Radioactive Material 2008'.

Table 2.1 Composition of the copper concentrate

Element	Abbreviation	Content
Copper (%)	Cu	31 – 36
Iron (%)	Fe	24 – 27
Lead (%)	Pb	<1
Silicon (%)	Si	2 - 3.5
Gold (ppm)	Au	7
Silver (ppm)	Ag	43
Uranium oxide (ppm)	U ₃ O ₈	1,000 – 2,000

2.2.2 Site selection, location and layout

BHP Billiton understands that the Darwin Port Corporation is revising the current East Arm Master Plan and that further facility location options may be available in the future. This Notice of Intent includes concept layouts based on the current understanding of available land. However, the ultimate location of the facilities could be anywhere within the area proposed for future development in the current East Arm Master Plan (see Figure 2.1), and would be determined with the Northern Territory Government and Darwin Port Corporation based on available land closer to the required time.

While this flexibility in site location is appropriate, it does not affect the ability to assess the environmental issues associated with the proposal because the Notice of Intent clearly defines the design controls and management measures that would be implemented to facilitate acceptable environmental outcomes.

BHP Billiton has completed an initial investigation of potential layouts for the required facilities. The currently preferred location is to base the rail, unloader and storage facilities as close as possible to the wharf. Figure 2.2 shows the concept plan for the preferred location and layout. This location provides the following advantages:

- it is within the existing area of the Darwin Port Corporation's East Arm Master Plan
- the BHP Billiton facilities would be integrated and aligned with existing infrastructure
- it locates the required infrastructure on lands that are already ecologically degraded (on the basis that the footprint areas would be reclaimed by Darwin Port Corporation and available ahead of BHP Billiton's infrastructure requirements)
- it minimises transfer distances from storage facilities to ship loader
- it segregates BHP Billiton's infrastructure from the port activities into a secure area.

Figure 2.1



Figure 2.2



To demonstrate that a land based solution is available irrespective of future reclamation, an alternative concept layout has been prepared and is shown in Figure 2.3. This location is less favourable as it is located further from the wharf.

2.2.3 Proposed infrastructure

The total footprint area required for the proposed facilities would depend on the ultimate location of the facilities. For the preferred option as shown in Figure 2.2, the area would be about 16 ha, comprising approximately:

- 12 ha for the rail loop and embankments
- 4 ha for the concentrate storage shed, ancillary infrastructure of office buildings and maintenance areas
- 0.2 ha for the rail unload and wagons wash down facility.

The footprint area would be slightly smaller if a rail spur and embankment, rather than a rail loop, was constructed. However, the rail loop provides increased operational efficiency.

Closed system

As the copper concentrate is radioactive, a closed transportation system would be implemented for its transport, storage and handling. As part of the closed system, the concentrate storage shed at the East Arm facility would be a fully enclosed building fitted with automatic doors, a negative pressure particulate filtration and building ventilation system and water recycling systems. Figure 2.4 illustrates the major components of this system and further details are provided below.

The closed system would extend from the production storage point at Olympic Dam to the ship loading activities and shipping to designated discharge ports (although the latter is outside the scope of this document).

Rail operations

If all copper concentrate produced at Olympic Dam were transported to Darwin, there would be a daily train to the East Arm facility. The rail configuration would comply with both the governing legislative regulations, safety procedures as stipulated by the South Australian/Northern Territory governments and the rail track owners operating guidelines and standards (rail track owners being the Australian Rail Track Corporation (ARTC) and Australian Pacific Transport (APT)).

It is anticipated that the train would be 1–1.5 km long and carry about 5,000 tonnes. The train operating speed would be 80 km per hour, and dedicated wagon rolling stock rated at 23 tonne per axle would be used. All wagon rolling stock would have clearly displayed signs advising that it is conveying radioactive material. Rail wagons would be effectively sealed with suitable covers, fitted in such a manner that there would be no escape of the copper concentrate under routine conditions of transport.

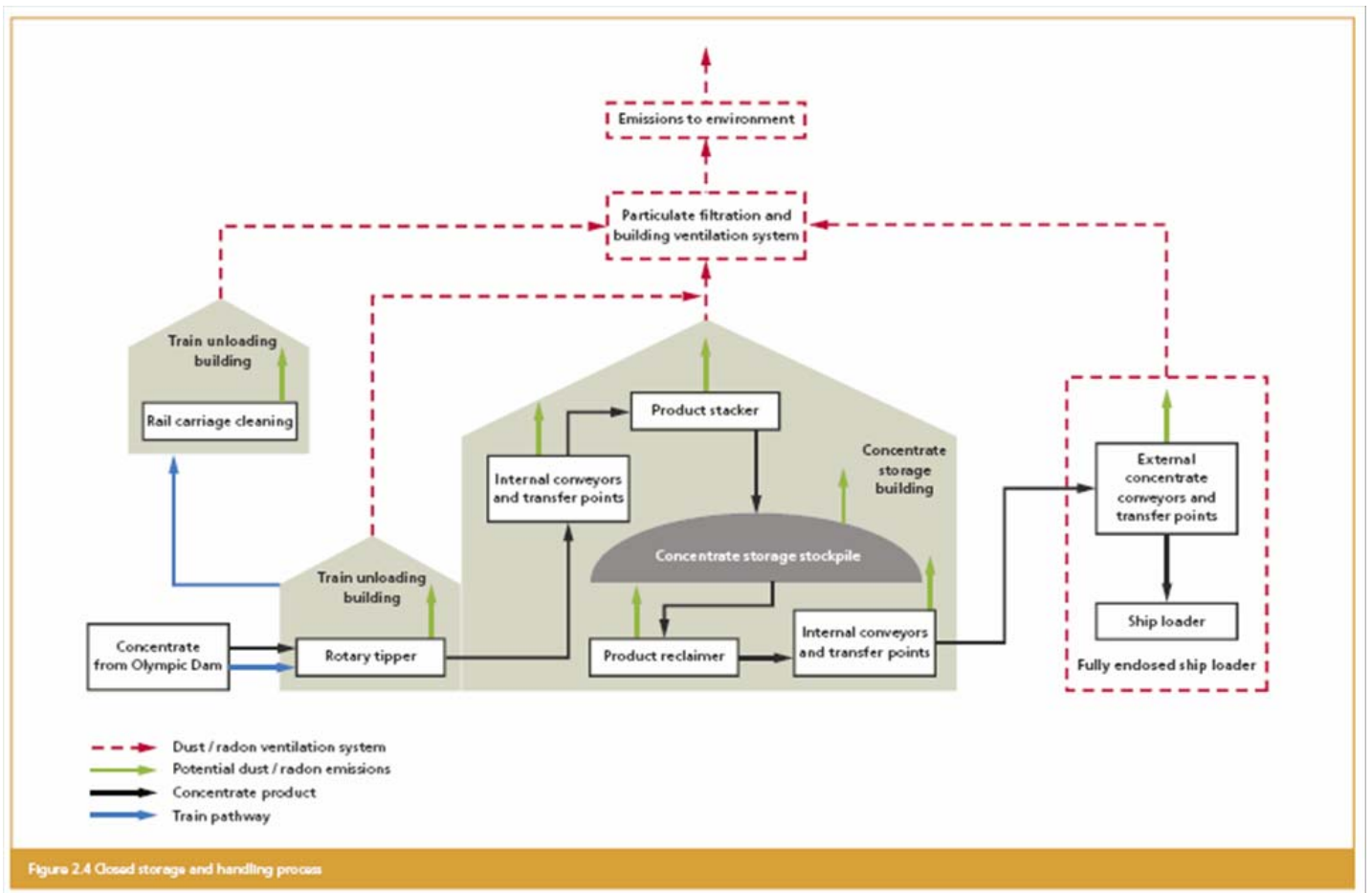
Upon arrival at the BHP Billiton East Arm facilities, the locomotives would be disconnected and diverted outside the rail unloading facility. Rail wagons would be moved through the unloading facility using a wagon indexer, with the covers removed and replaced after the concentrate was discharged.

Figure 2.3



Figure 2.3 Concept layout - current land-based option

Figure 2.4



The unloading of wagons would occur inside an enclosed facility utilising a tippler operation with the copper concentrate being discharged into an underground bin/conveyor for movement to the storage facility. Automatic doors at either end of the unloading facility would rise and lower between each rail car.

The outside of each rail wagon would be washed immediately after the unloading operation to remove dust particles from the external surfaces. The water used to wash the rail wagons would be collected and treated to recover concentrate particles that may have attached to the wagon during unloading (i.e. tipping). The treated water would be contained in onsite storage tanks for reuse in subsequent wash cycles, while any collected solids would be placed on the copper concentrate stockpile for export, resulting in a zero discharge decontamination system.

From time to time (preliminary estimates suggest about every four to six months), a proportion of the wash down water would be removed from the system and the system would be 'topped up' with replacement water. The removed water would be discharged into a holding tank or similar unit and the unit would be railed back to Olympic Dam for disposal within the established BHP Billiton on site systems.

Preliminary estimates suggest that up to 0.6 mega-litres (ML) would be required to wash the external surfaces of the train wagons. Depending on the method used to treat the wash down water (and thus the retention time to allow solids to separate), and the frequency of topping up the wash down water system, an annual water demand may be up to 2.5 ML.

Unloading station

The unloading station would be a cast in-situ reinforced concrete structure with the internal design incorporating lifting equipment, monorails and lift wells, as required. It would also provide sufficient space for maintenance and the performance of house keeping functions.

Below ground, the uploading station would include the following equipment:

- hopper
- belt feeder
- transfer to conveyor
- dust extraction bag house/ventilation system
- access stairs
- collection sump
- sump pump (slurry).

Above ground, the unloading station would be enclosed in a steel framed building to ensure the operation is contained and protected from the weather.

Conveying and materials handling

Safety and quality control underpin the BHP Billiton operating philosophy, and this is particularly important for conveying and materials handling. All conveyor transfer points would contain fully enclosed spoon chutes, with dust curtains at entry and exit points. Dust suppression mist sprays would be located within the skirts after the loading point and would cover the full width of the conveyed material.

The following steps are proposed to minimise and manage potential spillage:

- elevated conveyor galleries would be enclosed and have sealed floors
- floor drains would be provided as required for wash down of the gallery floors
- conveyor filling ratio and belt speed would be selected to reduce the risk of spillage
- wash down water/slurry would be recycled on-site providing a zero discharge rail wagon decontamination system.

The alignment of the conveyor from the storage shed to the wharf would depend on the ultimate site layout of the storage facility. Irrespective of the location, the conveyor would be enclosed and elevated.

The wharf conveyor would feed the ship loader via a travelling tripper. Once again, the conveyor would be enclosed with suitable protection over the longitudinal slot to allow the passage of the tail of the ship loader, but not to provide a conduit for dust emissions under normal operating conditions. A certified belt weigher (0.5% accuracy) would be provided on the berth conveyor after the loading skirts. A nominal design capacity of 1,200 tonnes per hour would be used for the conveyors.

Copper Concentrate storage shed

The storage shed would have a capacity of up to approximately 90,000 tonnes and would be a dry stockpile facility (with the copper concentrate maintained between 8 – 11 % moisture).

As part of the closed system, the copper concentrate storage shed at the East Arm facility would be a fully enclosed building fitted with automatic doors, dust management and water recycling systems. Ventilation equipment would include scrubbers, filtration and dust suppression. The shed would be fitted with a ventilation system to provide negative pressure and allow for the collection and filtering of copper concentrate stockpile emissions and particulate emissions produced by the reclaim equipment. The ventilation and filtering system is hereafter collectively termed the particulate filtration system.

Product would be reclaimed from the stockpiles and transferred into reclaim hoppers using front end loaders. Each hopper would have a sufficient volume to accommodate the required flow characteristics, with maintenance access provided to dust filters. A means of flow control would be provided at each hopper.

A drainage collection zone would be established around the shed. This zone would include regular travel paths for light vehicles and front end loaders (e.g. the roadways travelled to/from the maintenance workshop). The zone would be clearly sign-posted with rules and protocols established by the terminal operator to ensure staff do not enter or leave the area without following appropriate personal hygiene procedures (i.e. shower). Stormwater runoff from this area would be collected and recycled within the above described rail wagon wash down water system.

Ship wharf loader

The existing East Arm wharf infrastructure has been designed to cater for an additional ship loader. BHP Billiton would require a dedicated wharf loader for transferring the copper concentrate into the export vessel. The ship loader dimensions would be based on the following:

- a 1,200 t/h travelling ship loader with rail spacing designed to East Arm rails
- loading into a Panamax ship with 170 m hatch length
- fitted with appropriate spillage, wash down collection and control devices.

Ship calls

Based on the Panamax vessels loading approximately 60,000 – 65,000 tonnes per call and all Olympic Dam product being shipped through Darwin, it is anticipated that there would be approximately 24-27 calls per year to East Arm, or about one call every two weeks. This would result in an increase in the additional annual berth capacity at East Arm of approximately 18%.

Loading time is expected to be about 50 hours per call, subject to berth requirements, tide and weather conditions (noting that loading would not occur during periods of heavy rainfall, storms, cyclone events or the like).

Office buildings and maintenance area

Strict procedures and controls would be implemented to maintain separation between areas where copper concentrate is handled and areas not exposed to copper concentrate.

Before operating equipment could be removed from designated copper concentrate handling areas, wash down procedures would be followed before the equipment was transferred to nominated clean areas for repair or maintenance.

Utilities and services

The infrastructure requirements for copper concentrate storage and handling at East Arm are presented in Table 2.2.

Table 2.2 Utility and service requirements

Utility	Requirement
Electricity	Would be supplied from existing East Arm infrastructure
Communications	Would connect with existing East Arm infrastructure
Water	Annual demand may be up to 2.5 ML Connected to existing East Arm infrastructure and supplemented where practical with collected stormwater. 30 l/s @ 200 kPa (if fire appliances in attendance) 30 l/s @ 700 kPa (if fire appliances not in attendance) Fire storage capacity: 500,000 l water tank if mains insufficient
Waste water	Sanitary waste: Would connect with the existing East Arm infrastructure Wash down bay: Laundry area collected, treated and recycled Industrial waste from workshop, drainage sediment and wash down sediment removed from site and disposed of in accordance with NT Government / BHP Billiton procedures
Fuel, Oils	Mobile plant: 10,000 l diesel stored and banded to Australian Standards Small quantities of oils, lubricants, industrial solvents and cleaning material

Security

BHP Billiton would collaborate with the Darwin Port Corporation and relevant regulatory authorities and agencies to develop and implement a site specific security management plan. The plan would include the installation, monitoring and maintenance of appropriate security measures around the proposed unloading, storage, office and maintenance areas to prevent unauthorised access to the facilities. Measures may include secure mesh fencing with razor wire, closed-circuit television and sensor movement detectors, alarm systems and security patrols.

With the handling system of conveyors and transfer towers from the storage facility to ship loader being enclosed, all access points would be locked and secure at all times. Alarm systems and remote sensors would be fitted at access points and connected into the overall security control system for the facilities.

As the proposed facilities are within the Port of Darwin jurisdiction, the Australian Government maritime ports security program would also apply, with all construction and operation employees required to possess and carry a Maritime Security Identification Card. Visitor access would be strictly controlled at all times and comply with both BHP Billiton and Port of Darwin requirements.

Construction phase

The concentrate storage shed and rail spur would be constructed to withstand flooding in a 1:100 year ARI rain event, which would require the facilities to be constructed to align with the existing height levels for East Arm facilities.

Infrastructure would be constructed to the necessary building standard codes and requirements for facilities as stipulated by government regulations and the Darwin Port Corporation.

The construction phase would involve the following:

- Civil works – bulk earthworks, access roads, road and rail structures, laying of rail track, security works, utilities and stormwater drainage controls
- Buildings and structures – storage facilities, workshops, administration and support facilities and building services
- Materials handling equipment – ship loaders, rail loaders and unloaders, conveyors and associated equipment
- Procurement of major equipment – locomotives, rolling stock, front end loaders and other required mobile or fixed plant and equipment
- Integrated logistics support – maintenance arrangements, consumables, recruitment, training, administrative systems and permits and access requirements.

Rehabilitation and decommissioning

The BHP Billiton Group implements a closure standard that requires all operations to develop, review and update closure plans as required. Either the existing Olympic Dam Closure Plan would be updated to include the proposed East Arm facilities, or a site-specific plan would be developed. The BHP Billiton Closure Standard identifies the following principles for rehabilitation and closure, and these principles would be adopted for the rehabilitation and

decommissioning of the proposed East Arm facilities (see also Section 5.5 for closure objectives):

- closure planning is incorporated into the design, construction and operation phases
- progressively rehabilitate and stabilise disturbed areas as soon as possible
- seek opportunities to reuse/recycle redundant assets during operations and on closure
- infrastructure is decommissioned in accordance with environmental, health and safety objectives.

The timing of decommissioning for the proposed facilities will depend on the anticipated operating life of the Olympic Dam mine and whether other shipping options are also used for copper concentrates.

2.2.4 Workforce

Construction

It is anticipated that the workforce required to construct the copper concentrate storage and handling facilities would be up to 50 people, depending on the construction program, and that these people would be accommodated in Darwin.

Operation

It is anticipated that there would be an office building, small maintenance facility and warehouse near the concentrate storage shed. If all copper concentrate produced at Olympic Dam were transported to Darwin, staff numbers would be about 16, consisting of 10 operator/maintainers, five supervisors/office staff and one manager.

All site personnel would remove site based clothing, shower and change into non-work clothes when leaving site. All work clothes would be retained onsite and laundered.

2.3 Timing

Based on the current Olympic Dam expansion schedule, it is anticipated that increased uranium oxide concentrate and copper concentrate production would need to be transported from about 2016.

The construction phase for the copper concentrate storage and handling facilities would be about two years, including the period for the likely pile driving for foundations. This schedule assumes the necessary land at the preferred location would be available to commence construction activities, and therefore excludes any land reclamation activities.

As noted above, once operational, one Panamax vessel could be loaded at the Port of Darwin every two weeks serviced by a daily rail movement if all copper concentrate produced at Olympic Dam were transported to Darwin.