20 NORTHERN TERRITORY TRANSPORT OPTION

20.1 ACCIDENTAL SPILL AND EMERGENCY RESPONSE

Issue:

It was requested that the Supplementary EIS include a thorough assessment of the availability and readiness of emergency response systems to deal with spills of Olympic Dam copper concentrate containing uranium on land, freshwater and marine environments in the Northern Territory.

Submissions: 1, 3, 4, 8, 10, 35, 139, 164, 305, 317 and 338

Response:

As noted in Chapter 5 of the Draft EIS, movements of copper concentrate containing uranium by rail from an expanded Olympic Dam are not scheduled to occur for at least six years after the expansion project begins. Planning would be undertaken before these rail movements commenced and BHP Billiton would work with the Northern Territory Government and relevant agencies to develop the emergency response systems. These systems would ensure suitable emergency response plans were in place and that a coordinated response would eventuate should a rail incident occur.

Copper concentrate containing uranium is considered a radioactive material with Low Specific Activity (LSA). This means it emits low levels of radiation in relation to the mass of the material, with minimal impact to the surrounding communities and environment during transport from Olympic Dam to the Port of Darwin. In the event of an incident in which loss of containment of the concentrate occurred (e.g. in a spill situation), the spill response by Northern Territory fire and emergency services organisations would be consistent with existing Northern Territory response systems, protocols and procedures involving any dangerous or hazardous material. Such incidents are currently coordinated via the existing emergency operation centres in Darwin and Alice Springs.

Issue:

It was requested that the Supplementary EIS include more details of BHP Billiton's emergency response plans to deal with spills of Olympic Dam copper concentrate containing uranium in the Northern Territory.

Submissions: 1, 3, 4, 8, 10, 35, 139, 164, 305, 317 and 338

Response:

Before discussing emergency response plans for accidental spills of Olympic Dam concentrate, it is noted that a detailed risk assessment for the concentrate transport option to the Port of Darwin was undertaken for the Draft EIS and most risk events associated with accidental spillage of product were ranked as 'low' (refer Chapter 26 and Appendix C of the Draft EIS). There were also a number of 'medium'-level risks that mostly referred to the physical environment and water receptors. The potential aquatic impact resulting from a spill of Olympic Dam concentrate is discussed in a separate response in this section of the Supplementary EIS.

The transport of radioactive substances is governed by the 2008 edition of the Australian Radiation Protection and Safety Agency (ARPANSA) 'Code of Practice for the Safe Transport of Radioactive Material', which was published in January 2008 and is intended to be adopted into legislation by all states and territories. It adopts the IAEA Regulations for the Safe Transport of Radioactive Material 2005 Edition (No. TS-R-1). It is intended to establish uniform requirements for the transport of radioactive material in Australia. Similarly, the Australian Dangerous Goods Code 2007 (ADG 2007) is intended to establish uniform requirements Australia-wide for the carriage of all other dangerous and hazardous materials. The governing legislation for the transport of radioactive materials is the ARPANSA Code of Practice mentioned above and, irrespective of whether the latest version of the

Code of Practice had been formally incorporated into NT Government legislation or not, the requirements would be adopted for the safe carriage of BHP Billiton's radioactive materials.

BHP Billiton has prepared a Draft Radioactive Material Transport Management Plan (RMTMP) covering the transport of Olympic Dam concentrate and uranium oxide. The plan establishes a framework for operational systems and practices (i.e. day-to-day aspects) for the safe and efficient transport of radioactive product. The draft of the Radioactive Material Transport Management Plan is presented in Appendix I1 of the Supplementary EIS and would be progressively revised and refined during detailed project planning.

With regard to response plans, BHP Billiton maintains an Olympic Dam Emergency Incident Management Plan to address incidents relating to the transport of materials, including uranium oxide, currently being transported by rail to the Port of Darwin. This plan would be amended to include the transport of the copper concentrate containing uranium, and a draft framework for the revised Draft Transport of Class 7 Radioactive Material Emergency Response Plan is provided as Appendix I2 of the Supplementary EIS.

The draft framework covers the logistics chain for both Olympic Dam concentrate and uranium oxide, and includes:

- rail movement between Olympic Dam and the Port of Darwin
- storage and handling facilities at the Port of Darwin
- shipping in the Darwin Harbour area and from Darwin Harbour to international customer(s).

Specifically, the Draft Emergency Incident Management Response Plan discusses the following:

- BHP Billiton's commitment, which is part of the BHP Billiton Charter, to maintain Crisis and Emergency Management plans in the event of an incident that may have an impact on the surrounding community in which the BHP Billiton operation resides: or the operation itself.
- The development, regular testing and updating of BHP Billiton's commitment to work closely with international, Australian, state and territory regulatory authorities and rail service providers, to ensure there is an integrated and functional Emergency Incident Management Plan. This would ensure the plan remained relevant to address any incident involving the rail transport of concentrate and uranium oxide container shipments, as well as storage, ship loading and shipment to end customers.
- Lessons learnt from a review of the Australian Transport Safety Bureau's (ATSB) various rail incident safety investigations undertaken by BHP Billiton to identify likely causes of incidents along the rail line between Olympic Dam and the Port of Darwin.
- BHP Billiton's intention to develop Mutual Aid agreements with relevant emergency service organisations such as the Northern Territory Fire and Rescue Services, other miners or similar organisations near the rail route, and other related service providers (e.g. road transport, air services and earthmoving contractors), that could be called upon and mobilised as required to ensure a rapid response to an incident and assist in a coordinated clean-up of any spilt material. This acknowledges that an incident may occur anywhere along the rail line between Olympic Dam and the Port of Darwin.
- BHP Billiton's commitment, in the lead-up to the first rail movements from the expanded operation at Olympic Dam, to work closely with emergency service organisations and rail service providers to determine resource and equipment requirements, the appropriate location of response equipment, and training needs. This would include desktop and field simulation exercises for emergency services personnel and the ongoing development of training plans to address a rail incident. It is important to note that training programs extend to train crew, mutual aid supporting organisations and other identified community organisations which may be first on the scene in the event of an incident.

The outcome of this work would be a detailed and coordinated Emergency Incident Management Response Plan, where all relevant personnel, Australian and state/territory authorities and support agencies understand and respond consistently to incidents arising during the transportation and handling of Olympic Dam's copper concentrate containing uranium and uranium oxide consignments.

Some respondents to the Draft EIS questioned why the Northern Territory Government report into road incidents involving spills of hazardous materials has not yet been publicly released. This is a matter for the NT Government.

Issue:

Further clarification was requested regarding the likelihood of Olympic Dam concentrate drying out and oxidising (i.e. self-heating) and releasing sulphur dioxide during its transfer from Olympic Dam to the Port of Darwin (or in storage shed stockpiles at the Port of Darwin), and regarding any management practices to avoid this.

Submission: 3

Response:

The short transit and storage times for the Olympic Dam concentrate mean that drying out to the point of self-combustion or significant release of sulphur dioxide is unlikely to occur.

The concentrate currently produced at Olympic Dam contains a wide range of sulphides and exhibits oxidation. It is expected that the concentrate to be exported via the Port of Darwin would have similar characteristics. Oxidation is caused by a reaction between moisture in the concentrate and oxygen from the air, generating heat that dries the concentrate even more and can make it dusty to handle. Although some sulphur dioxide may be released in this process the amount would be small.

As outlined in Appendix E of the Draft EIS, a 'closed system' has been proposed for the transport and handling of Olympic Dam concentrate. The design of this 'closed system' includes:

- enclosed rail wagons with sealed lids during rail transport between Olympic Dam and the Port of Darwin
- at the Port of Darwin:
    - rail wagons would be unloaded using a rotary tippler in an enclosed station. This would include washdown of the exterior surfaces of the wagons before the return trips to Olympic Dam
    - material would be stored in a dedicated negative pressure facility capable of holding 90,000 tonnes
    - the product would be transferred to the ship hold via a fully enclosed conveyor and ship loader.

In addition to the design aspects of the closed system, management practices would also be developed and introduced to minimise oxidisation. These may include:

- employing a ridged stockpile turnover procedure of 'first in/first out' so the oldest concentrate in storage would be the first loaded for export shipment
- measures to prevent the transfer of material outside contained areas
- continual clean-up of storage area floors, roads and access ways to prevent concentrate from being spread thinly; this material would dry out quickly and turn dusty

turning stockpiles and rehydrating concentrate retained in the storage shed for extended periods (i.e. >two months) due to delays in vessel arrivals.

A 'just in time' transport and shipping approach similar to existing practices at Olympic Dam would also be adopted, whereby vessels would depart every two weeks. This approach would minimise the time the Olympic Dam concentrate remained stockpiled within the storage shed at the Port of Darwin, so would reduce the likelihood of oxidisation and the release of sulphur dioxide.

Issue:

Details were requested regarding the amount of radioactivity in the water that would be used to wash the exterior of rail wagons at the Port of Darwin, and the impacts that may result if the washdown water entered the environment as a result of a spill during its periodic return to Olympic Dam.

Submission: 302

Response:

The washdown water would not be radioactive as defined under the Australian Radiation Protection and Nuclear Safety Agency's (ARPANSA) Code of Practice for the Safe Transport of Radioactive Materials 2009. Although a small amount of radionuclides may dissolve into the washdown water, along with other metals and salts, the radionuclides in the Olympic Dam concentrate have very low solubility. The amount of dissolved radionuclides in the washdown water would be negligible. In the main, the water would contain dissolved salts.

As discussed in the Draft EIS and detailed in Appendix E, the external surfaces of each rail wagon would be washed immediately after the unloading process had been completed at the Port of Darwin to remove any dust particles, before return trips to Olympic Dam. The washdown water would be collected, filtered and treated for reuse, and regularly (about every four to six months), some of this water would be railed back to Olympic Dam for disposal. This would ensure the washdown water at the port facility remained high-quality and that contaminated water was not released into the local environment. It is likely that a clarifier would be used to treat the water. The clarifier would use a chemical pre-treatment process to separate solids before the solids were reclaimed from sediment sumps. The reclaimed material would be returned to the stockpile for export.

Tests conducted on the flotation concentrate slurry at Olympic Dam show that only minor amounts of the radionuclides dissolve into the water. These results show that even when the water is in constant contact with ore and copper concentrate, the amount of dissolved uranium (and other radionuclide levels) is less than one-twentieth of the minimum amount which would be required for the material to be defined as 'radioactive' under the Australian Radiation Protection and Nuclear Safety Code of Practice for the Safe Transport of Radioactive Materials 2009.

Issue:

A detailed environmental risk assessment of the possible impact of Olympic Dam concentrate entering the environment and causing environmental harm was requested.

Submission: 4

Response:

A risk assessment of the possible fault mechanisms leading to such an event was undertaken and outlined in Chapter 26 and Appendix C of the Draft EIS. The details of the predicted likelihood and consequence ranking, leading to the risk event rating of low for some mechanisms and medium for others, were provided in Appendix U of Arup 2008 – Technical Supplement to the Olympic Dam Development Study – Risk Assessment (Amended) (ARUP 2008).

The activities that may lead to possible risk events or situations that were considered in the risk assessment were:

- accidents at level crossings
- track failures
- mechanical failures of equipment
- shunting incidents
- train collisions
- malicious acts involving derailment and non-derailment
- loss of wagon covers and loss of wagon integrity.

The likelihood and consequences for each risk event were assessed having regard to the following factors:

- occupational health and safety
- social consequences
- flora
- fauna
- physical environment
- water.

In most of these events, the likelihood was categorised as low, owing largely to the ability of the proposed closed system to significantly reduce the chance of an event leading to the breach of the sealed containers. In particular, the rail wagons used to transport the concentrate would be of a conventional, robust construction of fabricated steel with a suitable epoxy lining and protective coating, or stainless steel lining, to maximise corrosion protection. The wagons would also have large-radius internal corners to minimise the build-up of concentrate product, and would be fitted with purpose-built secure lids that would be removed during loading/unloading operations. The design, construction and operation of the wagons would comply with the relevant Rail Industry Safety and Standards Board (RISSB) industry standards, rules and codes of practice for rolling stock that operates on the Australian rail network.

The following section provides information about the potential aquatic impact in the event that the concentrate reached this environment.

20.1.1 POTENTIAL AQUATIC IMPACT OF OLYMPIC DAM CONCENTRATE

Some stakeholders have expressed concern that spills of copper concentrate could have an impact on the aquatic environment. This concern is based on the observation that 'copper is an algaecide'. However, this fear is unfounded for the Olympic Dam copper concentrate, as it is not water-soluble and unlikely to be absorbed by organisms.

Copper sulphate ($CuSO_4^{-2}$) is registered for use as an algaecide in Australia and is used to control algae and cyanobacteria in drinking water reservoirs, farm dams, tanks and irrigation supplies (House and Burch 2002).

Copper concentrate consists of copper sulphides (CuS and Cu_2S). Copper sulphides are insoluble in water and are not bioavailable. The insolubility of copper sulphides is illustrated by the following comparisons:

- a saturated solution of copper sulphide has less than 1/10,000,000 the normal concentration of copper in sea water
- a saturated solution of copper sulphide has less than 1/100,000,000 the maximum allowable concentration of copper allowed by the Australia/New Zealand or the US EPA Water Quality Guidelines.

Therefore, if a spill were to occur it would be unlikely to be toxic to organisms. The potential impact would more likely be a result of the material contributing slightly to elevated turbidity or to creating a blanket on the seabed in the immediate area of the spill. Should this occur, then in consultation with relevant authorities every practicable effort would be made to recover the spilt material to limit its impact. As part of the incident response planning, plans and arrangements would be developed for suitable and appropriate recovery of spilt material.

The SA Environment Protection (Water Quality) Policy prescribed limit of 0.01 mg Cu/L is based on total copper (Environment Protection Authority (SA) 2003). Total copper includes both dissolved (ionic) and insoluble copper. However, the toxicity of copper in aquatic systems depends on the concentration of dissolved, free cupric (Cu^{+2}) ions. Copper in its ionic form can be taken up by organisms, that is, it is bioavailable. Copper sulphate is highly soluble, in that more than 200 g will dissolve in one litre of water (International Occupational Safety and Health Information Centre 2001), and is therefore highly bioavailable.

For a detailed explanation of Olympic Dam copper sulphide solubility see the technical paper presented in Appendix I3 of the Supplementary EIS.

20.2 PORT OF DARWIN INFRASTRUCTURE AND FACILITIES

Issue:
The Northern Territory Government requested ongoing cooperation to ensure integration of the proposed BHP Billiton facilities with the East Arm Master Plan.

Submission: 3

Response:

BHP Billiton has made a commitment to the Northern Territory Government of ongoing cooperation and consultation to facilitate a mutually beneficial integration of the proposed BHP Billiton facilities and the East Arm Master Plan.

During the development of the Draft EIS, BHP Billiton contributed to discussions about the new master plan with the consultants who were preparing it on behalf of the Darwin Port Authority.

In those discussions, BHP Billiton outlined its emerging requirements for the proposed transport solution at the East Arm facility. The Darwin Port Authority will ultimately be responsible for the master plan, along with giving the necessary approvals and permits to develop the overall port capabilities to meet cargo demand.

In June 2009, the NT Department of Planning and Infrastructure released a Notice of Intent covering proposed expansion works at the wharf and hardstand, and reclamation and infrastructure developments such as rail loops and supply bases.

BHP Billiton would continue to maintain a close working relationship with the Darwin Port Authority to integrate detailed planning for the expanded facilities.

It is noted, however, that no commercial discussions have been undertaken to date between BHP Billiton and the Darwin Port Authority regarding ownership, access and contractual arrangements in relation to the proposed export of Olympic Dam copper concentrate via East Arm. Such discussions would be held as necessary at the appropriate time.

Issue:

Further information was requested regarding the type of response measures or response capacities proposed in the event of a security breach or potential terrorist action involving the Northern Territory transport solution.

Submissions: 10 and 35

Response:

Appendix U of Arup 2008 – Technical Supplement to the Olympic Dam Development Study – Risk Assessment (Amended) (ARUP 2008) reviewed the possibility of malicious action or sabotage leading to a loss of containment, and identified most risk levels for copper concentrate containing uranium as low. Appendix E of the Draft EIS provided an overview of the security approach and arrangements that would be implemented for operations at the East Arm facilities in collaboration with the Darwin Port Corporation and other relevant authorities and agencies along the rail line from Olympic Dam to the Port of Darwin. The types of measures that normally apply include but are not limited to:

- installing, monitoring and maintaining security measures (which may include mesh fencing with razor wire, closed-circuit television with sensor alarms, movement detectors and 24-hour security patrols) around the proposed unloading, storage, office and maintenance areas to prevent unauthorised access
- locking access points to the conveyor systems and transfer towers at all times and fitting them with alarm systems and remote sensors connected to the overall security control system
- requiring all construction and operation employees to possess and carry a Maritime Security Identification Card, as required by the Australian Government's maritime ports security program
- strictly controlling visitor access in line with BHP Billiton and Port of Darwin requirements.

During rail transport from Olympic Dam to the Port of Darwin standard measures would include:

- direct rail services, with trains stopping only for necessary operational requirements (i.e. passing other trains en route)
- lids being securely fitted to all wagons throughout the journey
- train drivers following established communication protocols throughout the journey, including reporting:
    - whereabouts/status
    - any incidents or delays that adversely affected the journey.

Additionally, the Australian Safeguards and Non-Proliferation Office (ASNO) manages and monitors international nuclear safeguards processes across the whole supply chain, reinforcing these export permissions through bilateral safeguards and other administrative arrangements with foreign state nuclear regulatory authorities (NRC, CNSC, EURATOM, CNNC) which have obligations to track all Australian-obligated nuclear materials (AONM) back to ASNO. See Chapter 27 of the Supplementary EIS for further discussion.

It is also noted that the proposed rail transport and facilities are not scheduled for operation until six years after the expansion project begins. In that time, more detailed and extensive security assessments would be undertaken to develop a specific security plan covering each aspect of the NT transport option. The security assessments covering all credible risks and threats would be made in conjunction with Australian Government organisations such as the Australian Safeguards and Non-Proliferation Office (ASNO) and the Australian Security Intelligence Organisation (ASIO), along with Northern Territory Government agencies such as Northern Territory Police and other related parties such as the Darwin Port Authority and nominated rail service providers.

The Australian Government through the Attorney-General's Department and ASIO provide Risk Context Statements to the various Critical Infrastructure industry groups and Chemicals of Security Concern. Security assessments would be assessed and appropriate security arrangements implemented by BHP Billiton, or the contractor acting on its behalf, before larger volumes of uranium oxide and Olympic Dam copper concentrate containing uranium were transported via East Arm to international customers.

Given the sensitive nature of these assessments, including proposed response arrangements in the event of a security breach, this information would remain restricted and confidential to the party (parties) involved.

A discussion on nuclear security is presented in Section 27.8 of the Supplementary EIS.

Issue:

Further information was requested regarding the risk assessment of the East Arm port facilities in light of extreme weather events.

Submission: 35

Response:

The Draft EIS and the accompanying risk assessment appendix (Appendix C) identified the potential risk of damage at the East Arm port facilities caused by extreme weather conditions as a medium-risk event. The baseline assessment in Appendix U of Arup 2008 – Technical Supplement to the Olympic Dam Development Study – Risk Assessment (Amended) (ARUP 2008) identified a high likelihood of physical damage occurring to the proposed facilities from an extreme weather event such as a cyclonic rain storm in Darwin leading to the loss of containment of the Olympic Dam copper concentrate, which would nonetheless have a 'medium' consequence for the surrounding environment. As discussed in Chapter 26 of the Draft EIS, a medium-risk rating is defined as tolerable in accordance with Australian risk standards, but a rating incorporating further mitigation and controls through BHP Billiton's management systems would be applied.

The base residual risk levels remained unchanged for an extreme weather event such as a cyclonic rain storm in Darwin leading to the loss of containment of the Olympic Dam copper concentrate (ARUP 2008). However, it was noted that the following matters were taken into consideration when undertaking the risk assessment for the Draft EIS:

After research into the damage caused to Darwin from Cyclone Tracy in 1974, extensive changes were made to the building codes to ensure buildings in Australian cyclone risk areas such as Darwin were better constructed to withstand extreme weather events. Research conducted by the Cyclone Testing Station at James Cook University in Townsville confirmed there had been a significant reduction in building damage following Tropical Cyclone Ingrid in 2005, attributed largely to such changes to building codes (James Cook University Cyclone Testing Station <http://www.jcu.edu.au/cts/idc/groups/public/documents/newsletter/jcuprd_045827.pdf>, viewed 16 March 2010). Recommendations made by the testing station as a result of this research included:

- specifying and using appropriate materials suitable for the site exposure conditions
- undertaking regular inspection and maintenance of housing, especially the structural components
- ensuring strength upgrades were completed on all structural components of the wind load resistance system, including the batten-to-truss/rafter connection
- using water-resilient internal linings, if practicable
- reviewing (and upgrading strength if required) storm resistance of automatic weather stations.

- During the detailed designing of the proposed facilities, BHP Billiton would rely on expert advice, Northern Territory building codes and BHP Billiton safety-in-design procedures to reduce the risk of damage to the proposed facilities. Some design initiatives that would normally be employed for the construction of the proposed facilities include:
  - use of the Building Code of Australia (BCA) and Northern Territory provisions and design standards
  - diligent construction practices, and correct application of materials and components in accordance with manufacturer's instructions
  - appropriate inspection and certification at the time of construction
  - securing and effectively tying down all roofs to withstand appropriate uplift forces from cyclonic winds
  - designing verandahs and pergolas around buildings so they are not attached to the main roof
  - ensuring doors, entry points and windows can be effectively sealed and can withstand expected cyclone pressure and the effects of debris. This may include the use of metal wire screens or shutter protection
  - ongoing inspections and maintenance of all buildings to reduce the likelihood of corrosion damaging the structural integrity of all buildings.

- Supporting this design work, and in line with the Northern Territory Government guidelines, BHP Billiton would also develop appropriate site-based procedures relating to extreme weather events such as cyclones. It is anticipated that the procedure would cover the key periods associated with such extreme weather events, namely the:
    - cyclone watch period
    - cyclone expected warning
    - cyclone imminent warning
    - post-impact and pre-commencement of normal operations.

These procedures would also extend to transport activities. Depending on the event, location and circumstances, contingency plans would be implemented to delay, terminate en route, or cancel planned rail services.

Issue:

It was suggested that emissions from the proposed concentrate storage and handling shed should not exceed the National Environment Protection (Ambient Air Quality) Measure (NEPM) for particulates at the site boundary.

Submissions: 3 and 10

Response:

The 'as low as reasonably achievable' (ALARA) principle has been applied to the design of the proposed infrastructure for receiving, handling and transferring concentrate at East Arm, which includes a 'closed system' that would be monitored routinely to ensure optimal performance. The proposed 'closed system' was outlined in a response above and is further discussed in the next response.

As discussed in the Draft EIS, BHP Billiton modelling suggests that the operation of the proposed facilities at the Port of Darwin would not exceed the ground level air quality criteria as outlined in Chapter 13 (Air Quality) of the Draft EIS. BHP Billiton would work with the NT Government during the design stage to establish suitable air quality criteria specific to the proposed Port of Darwin facilities to monitor emission concentrations at the site boundaries.

Issue:

Information was requested about the detailed design of several aspects of the proposed facilities at the Port of Darwin (e.g. ventilation systems, wastewater treatment systems, vessel loading systems, dust management during construction and earthworks to avoid mosquito breeding areas).

Submission: 3

Response:

As discussed in Appendix E of the Draft EIS, BHP Billiton has completed preliminary design work for the proposed infrastructure required to receive, store, transfer and load Olympic Dam copper concentrate at the Port of Darwin. As operations at these facilities are not scheduled until six years after the expansion project begins, the detailed design of the specific facilities has not yet commenced. The exact location of the facilities at the Port of Darwin has not yet been determined as the site would be chosen in collaboration with the Northern Territory Government to comply with the Darwin Port Authority's East Arm Master Plan, as noted above. Once a location had been established, BHP Billiton would undertake detailed planning and would develop suitable plans to support submissions required for NT Government construction permits and licences.

The Draft EIS presented conservative (i.e. worst-case) assessments of the facilities and identified environmental and social performance outcomes to be achieved during the construction, operation and decommissioning of the facilities.

Some of the key elements detailed in the Draft EIS are provided below.

Construction activities

The construction phase involves 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 and unloaders, rail loaders and unloaders, conveyors and associated equipment.

BHP Billiton would work closely with the appointed construction contractor to ensure the adoption of suitable mitigation strategies such as dust control and compliance with the Northern Territory Government Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites (Department of Health and Families, NT Government 2005). The management plan for mosquitoes implemented during civil works would comply with the Northern Territory Coastal Management Committee (1998) report, 'Construction practice near tidal areas in the Northern Territory Guidelines to prevent mosquito breeding, Report to Department of Health and Community Services, Darwin, Northern Territory'.

The closed system

The storage and materials handling areas in the closed system would be designed to separate those activities that interact with the Olympic Dam copper concentrate containing uranium into 'supervised' and 'non-supervised' areas to prevent the transfer of material outside contained areas. These zones would be clearly signposted, and clear rules and protocols would be established to control transfers between the areas. Washdown facilities would be provided for machinery and mobile equipment, and radiation clearances would be required before equipment could be moved from a designated 'supervised' area. Similarly, all personnel in supervised areas would be required to remove their personal protective equipment (PPE) and wash/shower before changing into non-work clothes and entering non-supervised areas of the site facilities. All PPE would be retained on-site and laundered.

Similarly, the conveyor system connecting the storage facilities and wharf gantry with the ship loader would adopt a closed-system approach. Access to this infrastructure would be via a 'supervised' area where the same procedures for washdown, radiation clearance and security for personnel would apply. The ship loader would be fitted with appropriate spillage, washdown and control devices. The washdown water would most likely be discharged into the vessel hold before the hatch was closed.

Infrastructure would be fitted with suitable control devices to monitor equipment performance and allow emergency shutdown procedures to be activated. These emergencies would include instances such as loss of mains power, equipment failure, spills and excessive increases in heat and dust levels in the enclosed conveyor systems.

Water and wastewater management

A site-wide water management strategy would be developed to maximise water self-sufficiency for the site, including the separation of stormwater collected from 'supervised' and 'non-supervised' areas. Stormwater collected from the 'supervised' area would be treated in a similar manner to the wagon washdown water, and stormwater from 'non-supervised' areas would be held for reuse on-site or temporarily in on-site detention basins before being released in a controlled manner into the drainage system of the East Arm precinct.

The process beyond the EIS

After an EIS had been approved, but before ground disturbance works commenced, numerous permits and licences as well as detailed design drawings, construction and operational management plans would also be required. The relevant regulatory agencies would be allowed further opportunity to ensure compliance with stated performance outcomes. Such plans would address erosion and sediment control, dust management and pest management (especially targeting mosquitoes).

Issue:

It was questioned whether the existing water supply infrastructure to the Port of Darwin has sufficient capacity to support the 2.5 ML per annum required by BHP Billiton.

Submission: 4

Response:

A key component of the detailed planning as the project progresses before export shipments begin is the development of a site-wide Water Management Strategy to maximise water self-sufficiency.

The existing East Arm port facility is already connected to mains supply for potable water as well as water pressure and hydrant flows for firefighting requirements that comply with relevant NT legislative requirements. The Darwin Port Authority has advised for planning purposes that the existing port water systems can, on average, provide approximately 100 KL/h across the port, but have the capacity to deliver more water if required.

The preliminary estimate of the annual water required for BHP Billiton's proposed concentrate-handling infrastructure at the East Arm is 2.5 ML. The estimate contained in Appendix E of the Draft EIS included estimates for:

- rail wagon washdown facilities
- potable water requirements
- a safety shower and eyewash water supply system across the site
- fire protection systems.

As part of the site-wide Water Management Strategy to maximise water self-sufficiency, various water saving initiatives would be reviewed and may include:

- reducing the dependency on off-site water sources (i.e. mains water)
- maximising the containment and treatment of the water used for washdown of rail wagons
- maximising the harvesting and retention of stormwater run-off
- maximising the recycling of water used to launder employees' clothing and of other site water requirements.
- disposing of waste material from workshops and the drainage sediment generated from the water treatment activities in accordance with NT Government/BHP Billiton procedures.

Sanitary wastewater would be connected to the existing East Arm mains infrastructure.

Issue:

Further detail was requested regarding the exact location of the proposed concentrate storage and handling facilities.

Submission: 4

Response:

With the proposed facilities at East Arm not required until six years after commencement of the expansion project, BHP Billiton would continue to work closely with the Darwin Port Authority and the NT Government to determine the preferred location of the required facilities.

BHP Billiton proposes construction facilities at East Arm to:

- receive trains loaded with Olympic Dam concentrate
- dispatch the concentrate from the rail wagons and wash the exterior of the wagons before the return trip to Olympic Dam
- store the concentrate in a dedicated storage facility with a 90,000-tonne capacity
- transfer the product via conveyor and ship loader to the nominated export vessel for shipment to international customers.

Appendix E of the Draft EIS presented the outcomes of detailed environmental investigations for BHP Billiton's preferred location option, and a land-based location option in the overall East Arm and Darwin Business Park precinct. The exact location of these facilities cannot be determined at this stage. The assessments presented in the Draft EIS demonstrated that both locations can adequately cater for the required infrastructure with minimal impacts on the surrounding environment.

Issue:

It was suggested that background radiation levels in the wider area of the Port of Darwin should be established before operation of the Olympic Dam concentrate storage and handling facility began.

Submissions: 1 and 3

Response:

An initial study of the metals and radionuclide levels associated with the Northern Territory transport option was conducted, but the results were not available for the Draft EIS. In response to submissions received, the results are presented in the Supplementary EIS in Section 26.1.1.

20.3 RAIL TRANSPORT

Issue:

Concern was raised about the use of the Adelaide to Darwin rail line for the transport of Olympic Dam uranium oxide and copper concentrate containing uranium on the basis of traffic delays and health risks from radiation exposure.

Submissions: 10, 46, 65, 97, 145, 189, 215, 221, 256, 275 and 305

Response:

Section E4.2.3 and Table E4.18 in Section E4.10.2 of Appendix E of the Draft EIS showed that the closed rail system would result in negligible health and traffic impacts to the communities along the rail line between Olympic Dam and the Port of Darwin, including Alice Springs.

In particular, the radiation levels were assessed as negligible, with all doses significantly less than the 1 millisievert (mSv) annual dose limit to members of the public. The typical Australian natural background dose is about 2.4 mSv per year (mSv/y) (refer Appendix S1 of the Draft EIS for a discussion on radiation levels). As examples of these negligible doses, an individual would have to be:

- standing at a pedestrian rail crossing each day for a full year as a daily 1.8 km train of copper concentrate containing uranium passed to receive radiation exposure of 0.29 mSv/y above background.
- sitting in the first car at a level crossing each day for a full year as a daily 1.8 km train of copper concentrate containing uranium passed to receive radiation exposure of 0.05 mSv/y above background.

Alternatively, in order to receive the maximum public dose limit of 1 mSv/y from gamma radiation alone from a train carrying Olympic Dam concentrate (which is 0.8 uSv/h at 5 m), a bystander would have to remain within 5 m of the train for 1,250 hours a year (the equivalent of 156 eight-hour days).

With regard to traffic delays, existing rail operational procedures prevent trains stopping between Norris Bell Avenue (near the National Road Transport Hall of Fame) and the Alice Springs rail terminal in this rail section. A similar location exists north of Alice Springs. This ensures trains would not block level crossings unnecessarily and traffic delays in Alice Springs would be reduced. Section 19.5.6 of the Draft EIS calculated traffic delays at a rail/road crossing at two minutes for a train travelling along the majority of the route (when the train would travel at 80 km/h), and up to seven minutes when a train was travelling at 20 km/h through Alice Springs.

Other initiatives to minimise delays to traffic in Alice Springs and at other locations along the rail line could include where possible:

- securing train times with the rail service provider to transit through built-up areas such as Alice Springs outside peak-hour traffic periods
- securing semi-unimpeded train paths because, unlike most other users, BHP Billiton has no planned requirements to stop at the Alice Springs rail terminal. Currently all trains heading in both directions stop at the terminal for either passengers, freight and/or operational matters.

Issue:

Further justification was sought for using the rail line to the Port of Darwin rather than the rail line to Adelaide for the export of Olympic Dam concentrate.

Submission: 317

Response:

As outlined in Chapter 4 and Section E4.3.3 of Appendix E of the Draft EIS, BHP Billiton selected the Port of Darwin's East Arm Facility for the export of copper concentrate because:

- East Arm is a deep-water port that can accommodate the large Panamax-class vessels preferred for the proposed expansion and it currently handles bulk exports of iron ore, manganese ore and copper concentrate from OZ Minerals' Prominent Hill operations
- it has sufficient capacity to accommodate the handling and shipping of the proposed 1.6 Mtpa of Olympic Dam bulk concentrate
- its location avoids the potential for urban encroachment
- the export of bulk materials from the Port of Darwin is supported by the Northern Territory Government as part of the Australasian trade route major project.

As outlined in the Draft EIS, the rail line between Adelaide and the Port of Darwin carries approximately one-third of the freight volumes (by tonnage) available for general freight intermodal transport along the Adelaide to Darwin corridor. Mining cargoes (including iron ore and manganese) represent the largest single user of the line.

Port Adelaide was not selected as the preferred option because it does not currently support the preferred Panamax-class vessels in the absence of significant additional infrastructure for handling bulk copper concentrate containing uranium.

Issue:

The Northern Territory Government has asked that BHP Billiton to check whether the 12 crossings that are recorded as not conforming to sight line distance standards in Attachment E4.3 of Appendix E4 of the Draft EIS correlate with those crossings identified as non-conforming in a report commissioned by the NT Government in 2008 on rail crossing safety.

Submission: 3

Response:

The report commissioned by the Northern Territory Government could not be provided to BHP Billiton for this comparison for reasons of cabinet confidentiality. Accordingly, BHP Billiton asked the Northern Territory Department of Lands and Planning to confirm whether the 12 non-conforming level crossings in Attachment E4.3 of Appendix E4 of the Draft EIS are the same crossings identified by the Northern Territory Government in 2008. The department representatives compared the report information to the Draft EIS and found that in most instances there was a match with the BHP Billiton desktop assessment of non-conforming sight line distances.

Subsequent to the NT Government-commissioned report, the Department of Lands and Planning has been progressively addressing high-risk level crossings. In particular, as part of the Australian Government's $150 million 'Boom Gates for Rail Crossings' program, $2.5 million was committed over 2008–2009 and 2009–2010 to fund the installation of boom gates and other safety measures at three of the high-risk level crossing sites in the Northern Territory, as identified by the commissioned report (those crossings are all in Alice Springs: at Larapinta Drive, Espie Street and Lovegrove Drive). In addition, the 2008–2009 and 2009–2010 NT budgets included a further $4.62 million and $2.2 million respectively for level crossing upgrades, predominately focused around Alice Springs, Darwin and Palmerston.

BHP Billiton was advised by the Department of Lands and Planning that for the 12 crossings in question, a number of actions have been implemented since the NT Government report, including:

- Ilparpa Road and Elizabeth River Boat Ramp level crossings have been identified to be upgraded with active controls (i.e. bells, lights and gates)
- a number of crossings have had minor works completed and/or are identified for additional works, such as Commonage Road, under the NT Government programs.

The Department of Lands and Planning will continue to monitor level crossing risk and propose works on a needs and priority basis.

Issue:

BHP Billiton was asked to consider constructing rail bypasses around major population centres, such as Alice Springs, Tennant Creek, Katherine and Darwin.

Submission: 317

Response:

This is a matter for the owners of the line and the Northern Territory Government to consider. Since the release of the Draft EIS, a desktop investigation by BHP Billiton suggests that such a realignment would incur significant costs because:

- there are limited route options around Alice Springs
- it would most likely entail considerable encroachment into areas of existing community use
- the Alice Springs rail station and intermodal terminal would need to be relocated so all train operations could divert on the bypass. The majority of trains passing through Alice Springs utilise the freight yards and/or passenger terminal and these activities would continue to operate through Alice Springs if these facilities were not relocated.

The construction of the standard-gauge rail line (1,435 mm) between Tarcoola and Alice Springs was covered by the *Tarcoola to Alice Springs Railway Act 1974*. This line was completed in 1980 and retained the existing alignment, which enters Alice Springs through Heavitree Gap in the south, then continues on to the established Alice Springs rail station and intermodal terminal. In 2003, construction of the Alice Springs to Darwin rail line was completed, extending rail services north of the Alice Springs rail station and intermodal terminal.

In the case of Katherine and Tennant Creek, the rail alignment has been located approximately 650 m and 550 m respectively from the nearest town receivers. In the case of Darwin, the line is located west of Palmerston North and does not enter Darwin proper.

The rail line between Darwin, Katherine, Tennant Creek and Alice Springs, which is part of, and is connected to, the national rail system that traverses Australia, was designed to carry all types of cargoes (i.e. unitised cargoes in containers and bulk cargoes) and to provide passenger services between Darwin and the southern states. The passenger rail services are operated by Great Southern Railways (GSR) and Freightlink handles all cargoes, ranging from bulk materials such as iron ore, Prominent Hill copper concentrate and bulk fuel through to containers of general and refrigerated goods. More recently, the Australian Army has moved its tanks between Darwin and Port Augusta along this rail system.

Issue:

It was noted that BHP Billiton in Western Australia is proposing a new design for kibbles, where a purpose-built tipping container with a rubber (or similar) seal and a closing lid mechanism is used. BHP Billiton was asked to consider this design for use in the rail transport to the Port of Darwin.

Submission: 3

Response:

Given the proposed volume of Olympic Dam copper concentrate to be transported from Olympic Dam, the use of kibbles was deemed to be unfavourable due to safety, operational and economic considerations.

The use of kibbles was considered by BHP Billiton during the planning phase of the expansion project but was rejected as kibbles do not suit the expanded Olympic Dam operation. Specifically, compared to the proposed solution in the Draft EIS:

- The large volume of concentrate to be transported (1.6 Mtpa) better lends itself to the bulk rail wagons. These wagons have a design capacity of 68 tonnes net of concentrate per wagon, compared to about 11.5 tonnes for a kibble; and a wagon can carry only five kibbles
- Because rail wagons with kibbles have approximately 20% less capacity than bulk rail wagons, one to two more train services per week would be required, which would result in additional capital and operating costs and traffic delays.
- Kibbles are traditionally unloaded by forklifts, which increases the risk of a loss of containment if the unit is dropped or punctured during this process.
- Compliance with 'as low as reasonably achievable' (ALARA) principles, which specify clean external surfaces, would be more difficult to achieve with kibbles as they would most likely require manual washdown systems and use more water at both Olympic Dam and the Port of Darwin.

The use of bulk rail wagons to move large quantities of bulk materials is common practice and provides an efficient means for the proposed movement of 1.6 Mtpa of concentrate. Some of the other exporters who also use rail services to the Port of Darwin to export their mineral products use similar bulk rail wagon designs. It is acknowledged that one exporter, Prominent Hill, which recently commenced rail deliveries of copper concentrate to the Port of Darwin, does use kibbles. However, that operation has a planned export volume of approximately 250,000 tpa, and the use of kibbles provides a more efficient solution only at these smaller volumes.

The rail wagon selected to carry Olympic Dam concentrate is a relatively simple, open-topped tippler wagon that is emptied by rotating through 170 degrees by specialised equipment. The tipping process involves removing the lid as a wagon is moved into the tippler mechanism and rotating the wagon while the train remains coupled.

The principal reasons for selecting this type of wagon are:

- it is an established technology used to transport bulk concentrates in similar industries
- the design is simple and is expected to perform reliably
- the environment would not be exposed to the concentrate during normal operations, when the wagons have been fitted with purpose-designed lid and seals.

The wagon would be a traditional construction of fabricated steel. It would have a suitable lining and protective coating of epoxy or stainless steel to maximise corrosion protection and have large-radius internal corners to minimise the build-up of the concentrate product. Externally, there would be few ledges or external corners on which concentrate could lodge during the tippling process. This maximises the dispatch of concentrate and minimises the water usage required to remove particles during the washdown of the wagon's exterior.