

ASSESSMENT REPORT 66

OLYMPIC DAM
EXPANSION – NT
TRANSPORT OPTION

BHP BILLITON

ENVIRONMENTAL ASSESSMENT REPORT
AND
RECOMMENDATIONS

by the

Environment and Heritage Division, NRETAS

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Glossary

AAPA	Aboriginal Areas Protection Authority
ACF	Australian Conservation Foundation
ADG7	Australian Dangerous Goods Code 7th Edition
AFANT	Amateur Fishermans Association of the Northern Territory
ALEC	Arid Lands Environment Centre
ARPANSA	Australian Radiation Protection and Nuclear Safety Authority
ASIO	Australian Security Intelligence Organisation
ASNO	Australian Safeguards and Non-proliferation Office
BCA	Building Code of Australia
DHIMRP	Darwin Harbour Integrated Monitoring and Research Program
DPC	Darwin Port Corporation
ECNT	Environment Centre Northern Territory
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESD	Ecologically Sustainable Development
HSE	Health Safety Environment
IAEA	International Atomic Energy Agency
LAT	Lowest Astronomical Tide
LNG	Liquified Natural Gas
NEPM	National Environmental Protection Measure
NRETAS	Department of Natural Resources, Environment, the Arts and Sport (NT Government)
NT	Northern Territory
NT EPA	Environmental Protection Authority
PFES	Department of Police, Fire and Emergency Services (NT Government)
PPE	Personal Protection Equipment
RMTMP	Radioactive Materials Transport Management Plan
SA	South Australia
SEWPaC	The Department of Sustainability, Environment, Water, Population and Communities (Australian Government)
TPWC Act	<i>Territory Parks and Wildlife Conservation Act (NT)</i>
UOC	Uranium oxide concentrate

Units of measurement

KL/h	kilolitres per hour
km	kilometres
km²	square kilometres
m	metres
mSv	millisievert
mSv/y	millisievert per year
Mtpa	Megatonnes per annum
tpa	tonnes per annum
µm	micrometres
µSv	microsievert
µSv/h	microsievert per hour

Executive Summary

Environmental impact assessment (EIA) is the process of defining those elements of the environment that may be affected by a development proposal and analysing the risks associated with the potential impacts that have been identified. This Assessment Report (the Report) assesses the environmental impact of the NT transport option of the Olympic Dam Expansion (the Project).

The Project has been assessed jointly by the Northern Territory Government under the *Environmental Assessment Act 1982*, the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* and the South Australian Government under the *Development Act 1993*. The Northern Territory Government was responsible for assessing the option to transport product along the Adelaide to Darwin railway line from the NT border with South Australia through to the Port of Darwin. Some assessment overlap with matters of national environmental significance occurred where Commonwealth legislation applies to nuclear matters. The Northern Territory Government took guidance from the Australian Government on these matters.

This Report forms the basis of advice to the Minister for Natural Resources, Environment and Heritage on the environmental issues associated with the project. The Minister is required to make comment and/or recommendations with regard to the proposal to the Minister for Lands and Planning (the responsible Minister) in the first instance.

The Report is based on a review of the draft Environmental Impact Statement (draft EIS), Supplement to the draft EIS (Supplement), and comments from the public and Northern Territory Government agencies on the draft EIS.

Recommendations arising from this assessment address methods to identify and mitigate environmental impacts as far as possible.

Major Issues

The key issues raised in submissions in response to the draft EIS for the NT transport Option include:

- Rail transport safety such as the risks of radiation exposure to communities from product moving through towns or rail accidents along the Adelaide to Darwin rail line;
- The inconvenience and safety concerns associated with 1.8km long trains blocking rail crossings for extended periods, preventing movement of vehicles, particularly emergency services response vehicles in Alice Springs;
- The capacity of the NT Emergency Services to respond appropriately to accidents in remote areas along the rail line;
- Threats from terrorism;
- Pollution control at the Port of Darwin, in particular, ensuring that radioactive material is not emitted to the East Arm Wharf environment from storage and loading facilities, including in the event of extreme weather events such as intense cyclones;
- Impacts to the marine environment from product spills, and accidents involving shipping; and

-
- The capital requirements, costs and risks to Government and the community. The NT Government will need to provide land, water, power and other infrastructure to the proponent in order for the NT transport option to be realised. The rail line may need to be upgraded to increase capacity as the demand for freight services increases. Some level crossings will need to be improved to reduce accident risk.

In the absence of alternative options in the short term to export the Olympic Dam concentrate, BHP Billiton is hoping to secure a commitment from the NT Government that a site will be available at East Arm for a dedicated rail loop, storage shed and loading facilities for the Project. The East Arm Expansion draft EIS indicates that timeframes for completion of relevant components of the East Arm expansion do not necessarily agree with BHP Billiton's requirements for timing of the product export from Olympic Dam. BHP Billiton has indicated that it is in discussions with Darwin Port Corporation on this matter and is aware that it will need to apply for consent under the *Planning Act* to develop a future site if it becomes available.

Conclusions

Based on the information provided and the assumptions made by the proponent, the high-level environmental issues associated with the proposed project are considered to have been adequately identified. The absence of a site in the East Arm precinct and lack of information on the final form of the storage, handling and loading facilities has not prevented the overall assessment of key risks associated with known components of the proposal. However, to ensure that the environmental impact assessment process is robust and that the Project can proceed in an environmentally acceptable manner, the proponent will need to provide further notification to the Minister once the detailed planning and design information for the Project becomes available.

Given the long lead time before BHP Billiton proposes to commence construction of East Arm facilities, there is potential for relevant policies and the regulatory environment at the Port, and indeed in the Territory, to change. A notification to the Minister at the time will allow further consideration of the NT transport option proposal in the context of any changed political and regulatory conditions.

Provided there are no unidentified, significant issues at the time BHP Billiton requires NT Government approval and provides further, detailed notification to the Minister for the NT transport option, it is considered that the Olympic Dam Expansion NT transport option can be managed in a manner that avoids unacceptable environmental impact. BHP Billiton will need to ensure that the environmental commitments, safeguards and recommendations detailed in the EIS and this Report are implemented, with regular reporting, compliance auditing, monitoring and evaluation, and appropriate responses and adaptations to any issues identified through monitoring.

List of Recommendations

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- **Identified in the Olympic Dam Expansion's Environmental Impact Statement (draft EIS and Supplement); and**
- **Recommended in this Assessment Report.**

All safeguards and mitigation measures outlined in the Environmental Impact Statement are considered commitments by BHP Billiton.

Recommendation 2

The Proponent should be required to:

- a) provide detailed design and site specific information pursuant to section 14A of the Environmental Assessment Administrative Procedures (EAAP); and
- b) prepare management plans for the NT transport option and submit them to relevant Government agencies for approval prior to commencement of infrastructure works such as the proposed bypass and rail loop. In preparing management plans the proponent should be required to include additional measures for environmental protection and monitoring described in this Assessment Report.

The Minister will consider the information provided and, if the Minister considers it appropriate, treat the information as an alteration to the proposed action that may change its environmental significance and require preparation of, and public consultation in relation to, the altered proposed action under section 14A and 8(2) of the EAAP.

Recommendation 3

The proponent is to engage as early as practicable with the NT Department of Police, Fire and Emergency Services, or relevant emergency services authority at the time, to ensure emergency services requirements and emergency response procedures associated with the NT transport option are adequately considered.

Recommendation 4

An environmental radiation monitoring program for the NT transport option should be implemented. The program should include appropriate radiological monitoring along the rail route through Alice Springs as well as the East Arm storage and handling location.

Recommendation 5

At the time of the action, the closed system of the storage, handling and loading facilities should ensure any potential losses of radioactive product are as low as reasonably practicable, such that all regulatory requirements for radiological and air quality parameters for BHP Billiton's operations at East Arm are met or improved upon.

Recommendation 6

An ambient air quality monitoring program is required for the NT transport option. The program should ensure that appropriate, agreed air quality criteria for operation of the concentrate storage facility and loading activities in the East Arm precinct are met.

Recommendation 7

The proponent's social management plan should include a stakeholder engagement strategy for the NT transport option. The strategy should provide affected communities with the means to engage with the proponent on issues of concern.

Recommendation 8

The proponent should be required to provide public access to:

- 1. final environmental management plans or relevant information in those plans;
- 2. a reporting mechanism to inform compliance with the management plans prepared in accordance with Recommendation 2(b); and
- 3. monitoring outputs at an agreed frequency

1 Introduction and Background

This report assesses the environmental impact of the Northern Territory (NT) transport option of the Olympic Dam Expansion proposed by BHP Billiton.

The NT transport option involves the transport of copper concentrate containing uranium oxide, as well as increased quantities of uranium oxide concentrate (UOC), by rail from an expanded mine in South Australia to the Port of Darwin for storage in a dedicated facility and then export.

The NT transport option is a component of a broader project, the expansion of the mine at Olympic Dam in South Australia, which is being assessed collaboratively by the Australian, South Australian and NT Governments.

This Environmental Assessment Report (the Report) is based on a review of the draft Environmental Impact Statement (EIS), Supplement to the EIS (Supplement), and comments from the public and Government agencies on the EIS. Relevant sections of the Draft EIS and Supplement can be viewed on the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) website at:

<http://www.nt.gov.au/nretas/environment/assessment/register/olympicdam/index.html>

And the full documents on the South Australian Government's website at:
<http://www.olympicdameis.sa.gov.au/>

1.1 Environmental Impact Assessment Process

Environmental impact assessment (EIA) should:

- identify potential impacts on the environment (where environment is defined broadly according to the *Environmental Assessment Act*); and
- evaluate the risks of those impacts occurring.

Through its assessment of Project risks the proponent must demonstrate:

- that these risks can be satisfactorily managed within acceptable levels e.g. impacts would not result in long term environmental detriment; and
- the effectiveness/feasibility of management measures in a precautionary/risk management framework.

Assessment gives weighted consideration to:

- values and risks;
- estimation of the likelihood of success of preventative and remedial measures; and
- the validity and comprehensiveness of programs established to provide ongoing measures of the environmental effects of the proposed development.

This assessment considers that risks can be more reliably evaluated where there is a substantial baseline of relevant information. Where this information is limited or not available, risk assessment is inevitably constrained and far less precise, and it is appropriate to use the precautionary principle in the evaluation of possible impacts. If potential impacts are understood with a reasonable level of certainty, monitoring programs can be better informed to detect impacts, and management measures can be more effectively targeted to address those impacts. Any residual environmental

detriment remaining after all practicable management measures have been proposed may be managed through an agreed offset in accordance with the draft Northern Territory Environmental Offsets Policy.

This Report evaluates the adequacy of commitments and environmental safeguards proposed by the proponent to avoid or mitigate the risks of potential impacts identified in the assessment process. The safeguards may be implemented at various levels within the planning framework of a project and include (among other approaches):

- Design and layout of buildings and other infrastructure on the site/s;
- Management of construction activities; and
- Management of processes used in operations of the facility (e.g. inputs and outputs).

A list of commitments made by the proponent for the NT transport option is provided in Table E4.31, Appendix E of the draft EIS. Additional safeguards are recommended in this Report where appropriate.

The contents of this Report form the basis of advice to the NT Minister for Natural Resources, Environment and Heritage (the Minister) on the environmental issues associated with the project.

1.2 Regulatory Framework

Environmental assessment was undertaken in accordance with the requirements of the Northern Territory *Environmental Assessment Act (1982)* (EA Act).

This Report forms the basis of advice to the Minister on the environmental issues associated with the project and informs the decision as to whether or not the project should proceed. The Minister is required to make comment and/or recommendations with regard to the proposal to the Minister for Lands and Planning (the responsible Minister).

The responsible Minister will take the recommendations issued under the EA Act into consideration in the consent required by BHP Billiton to construct concentrate handling and loading facilities in the East Arm Wharf precinct under the *Planning Act*.

A number of secondary approvals and licences are also required for the NT transport option component. A more complete list of Government approvals and relevant legislation for the regulation of the proposal is provided in Table E4.4, Appendix E of the draft EIS.

1.3 Environmental Impact Assessment History

On 13 June 2008, BHP Billiton submitted a *Notice of Intent* for the NT Transport Option as a component of the Olympic Dam Expansion. At the time of referral, the expansion of the mine (Roxby Downs, SA) was already being formally and jointly assessed at the level of an EIS by the South Australian and Australian Governments. The NT Government agreed to work collaboratively with the other jurisdictions in assessing the project. On 2 September 2008, the Minister determined that the project required formal assessment at the EIS level and draft Guidelines were prepared. The draft Guidelines, which were intended as a supplement to existing guidelines for the larger mine expansion project, were advertised on 18 October 2008 and underwent a 2-week public exhibition period. Final EIS Guidelines were issued to the proponent on 14 November 2008.

A preliminary version of the draft EIS for the Project underwent a review by Government Agencies, a requirement of the process under the EPBC Act. Following the Government review, the draft EIS was placed on public review from 1 May 2009 until 7 August 2009, a period of approximately 14 weeks. 28 submissions were identified as having direct relevance to the NT Transport Option; however, a number of other submissions dealt with issues that have relevance to components in the NT.

From the public and Government submissions received, a range of issues were identified. These have been grouped broadly into the following categories:

- Risk to Government and the community;
- Transport safety;
- Emergency response;
- Security;
- Alternative proposals;
- Pollution and waste management;
- Regulatory responsibility and cost;
- Provision of supporting infrastructure;
- Sustainability; and
- Radiological safety.

A more detailed summary of issues raised is included in Appendix 1 of this Report.

A draft Supplementary EIS (Supplement) was lodged with the Environment and Heritage (EH) Division of NRETAS in December 2010. The Supplement was formally accepted for publication and circulated amongst relevant Government Agencies for comment until 6 June 2011. The EH Division has summarised findings of the environmental assessment process in this Report, and provided the Report to the Minister. The Minister is required to issue final advice and recommendations on the Project to the responsible Minister. In this assessment, an extension of the assessment timeframe under clause 14(4)(c) was agreed to align the NT process with those of the other jurisdictions.

1.4 Ecologically Sustainable Development

The Australian Government affirmed its commitment to sustainable development at United Nations conferences on environment and development, notably via the Rio Declaration and Agenda 21 in 1992 and the Johannesburg Declaration at the United Nations 2002 World Summit. Australia reaffirmed its commitment at the Summit to promote the integration of the three components of sustainable development — economic development, social development and environmental protection — as interdependent and mutually reinforcing pillars.

Australia developed the National Strategy for Ecologically Sustainable Development (ESD) identifying four national principles. The Strategy also identified ways to apply the principles to a range of industry sectors and issues such as climate change, biodiversity conservation, urban development, employment, economic activity, and economic diversity and resilience.

In December 1992 the NT Government endorsed the National Strategy and agreed, along with all other States and Territories, to the Intergovernmental Agreement on the Environment.

The Strategy defines ESD as:

‘Using, conserving and enhancing the communities’ resources so that ecological processes, on which life depends, are maintained and the total quality of life now and in the future can be increased.

ESD is development that aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations.’

The NT Environment Protection Authority (EPA) has defined six principles of ESD for the Northern Territory (NT EPA 2010). In addition to the four national principles (to which the NT is already a signatory) the EPA recommended the principles of integration as well as public participation. The NT Government is considering the EPA’s recommendations.

The principles of ESD as defined in the National Strategy are:

ESD Principle	Definition
Precautionary principle	Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
Inter- and intra-generational equity	The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.
Conservation of biological diversity and ecological integrity	The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
Improved valuation, pricing and incentive mechanisms	Should be promoted to ensure that the costs of environmental externalities are internalised and that the polluter bears the costs associated with environmental pollution.

To achieve the objective of ESD, the Project needs to continually be informed and guided by the ESD principles. Accordingly, the assessment of this proposal, its potential impacts (positive and negative) and the management measures used to enhance positive and reduce negative impacts will be undertaken in the context of ESD principles.

Subsequent decision-making processes by approval bodies also need to be guided by ESD principles and the continued project design and development, as well as the development and implementation of management and monitoring programs by BHP Billiton, should all aim to meet the objective of ESD.

1.5 Territory 2030 Strategy

Territory 2030 is a 20-year strategic plan for the Northern Territory developed by an independent Steering Committee and launched on 3 December 2009.

The Territory 2030 Strategic Plan was produced as a road map for the future. Developed in consultation with the Territory community, Territory 2030 is a means to setting priorities and guiding government's efforts over the next two decades.

As the principal policy document for the NT it is appropriate that the Project is considered and assessed within the framework of Territory 2030.

The Territory 2030 document also identifies a "wellbeing framework" as a key initiative for the NT suggesting a balanced decision making model that considers the economic, social and environmental impacts of every funding and policy decision made by government. The Territory 2030 document brings together targets across a range of priority areas (education; society; economic sustainability; health and wellbeing; the environment; and knowledge, creativity and innovation). This ensures that policy and decision-makers critically examine the tensions that exist between and across some of the targets. Accordingly, when decisions are made, all impacts (positive and negative) across targets are taken into consideration.

It is appropriate to apply these same decision making principles when making an assessment and decision on the Project. Where appropriate, the Report will draw from, and refer to, the targets contained in the Territory 2030 document when reviewing and assessing the key elements of the Project.

Importantly, Territory 2030 is, over the medium to longer term, intended to work as a whole-community plan. Accordingly, it is anticipated that the private and community sectors will share ownership of, and become directly involved in, progressing targets within the plan. Industries and organisations will be encouraged to "own" targets and contribute to them in meaningful ways. This provides the opportunity for BHP Billiton to offset some of the challenges that arise through its Project by contributing to other targets (such as employment).

2 The Proposal

2.1 The Proponent

BHP Billiton Olympic Dam Corporation Pty Ltd (BHP Billiton) is a member of the BHP Billiton Group, which is a large resource company with interests 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 material, oil, gas, zinc, diamonds, silver and aluminium. Its global headquarters are sited in Melbourne.

2.2 Project description

Product

The proposed expansion is a progressive ramp-up of ore production and minerals processing over an 11-year construction period. BHP Billiton proposes to export two products through the Port of Darwin from the expanded Olympic Dam mine, uranium oxide and a copper-rich concentrate.

UOC is currently transported by rail from Olympic Dam to the Port of Darwin. It is packed and sealed into 200 litre drums, which are then sealed inside standard shipping containers at the mine site and then railed north on the Adelaide to Darwin rail line.

The expanded mine would increase the production of uranium oxide from approximately 4,000 tonnes per annum (tpa) to 19,000 tpa (an increase from 200 to about 900 shipping containers per year). The proportion of this increased quantity that would be exported from the Port of Darwin is yet to be determined by the proponent as other export options are also being considered.

The current transport of uranium oxide involves the freighting of product to the Berrimah Terminal and immediate transfer by road to the Toll distribution terminal at East Arm for short-term storage in a secure, dedicated facility, approved by the Australian Safeguards Non-Proliferation Office (ASNO). The uranium oxide is then transported by road to the East Arm Wharf for loading on a nominated vessel. This transport and handling method is proposed to continue for the expansion and the proponent anticipates that no additional infrastructure would be required at the Port.

At peak production, approximately 1.6 million tonnes per annum (Mtpa) of a copper-rich concentrate is proposed to be railed from the mine to the Port of Darwin for export and processing overseas. BHP Billiton has allowed for a variation of 20% in concentrate production suggesting that there could be changes in the export volumes over time. As well as copper, this concentrate also contains recoverable quantities of uranium oxide, gold and silver and the proponent therefore refers to it as 'concentrate'.

The concentrate is an odourless black powder with the particle size averaging 25 – 40 micrometres (µm). To minimise dusting, the concentrate would be maintained at a moisture content between 8 and 11%, which would result in the volume of concentrate increasing from 1.6 Mtpa dry to 1.8 Mtpa wet. Reference to volume in the EIS refers to the dry weight of 1.6 Mtpa.

Export of the concentrate would require dedicated facilities to be constructed for storage in the East Arm precinct and ship loading at the wharf. The following sections

describe the facilities required to transport, store and handle the Olympic Dam concentrate.

Project infrastructure

The draft EIS indicates that BHP Billiton has completed preliminary design work for the proposed infrastructure required to receive, store, transfer and load the 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 general infrastructure required at the East Arm precinct for BHP Billiton to operate include:

- Rail spur and/or rail loop;
- Concentrate transfer and storage shed, and ancillary infrastructure;
- Fully enclosed conveyor to the wharf; and
- Dedicated ship loading facilities.

The exact location of the facilities at the Port of Darwin has not yet been determined and would depend on the availability of land. The draft EIS provided indicative locations including a preferred option (Figure 1) and a land-based option (Figure 2) proposed by BHP Billiton. It should be noted that there has been no agreement from NT Government on the acceptability of either of these locations and BHP Billiton will need to negotiate with Government to determine a location that is practical and acceptable to both parties. Once BHP Billiton has established a location, further detailed planning would need to be undertaken.

Construction activities

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 and unloaders, rail loaders and unloaders, conveyors and associated equipment.

BHP Billiton has indicated that it would work closely with the appointed construction contractor to ensure the adoption of suitable mitigation strategies during construction such as dust control and biting insect management.

Given the long lead time before the facilities are required (i.e. about six years after commencement of mining), and the assumption by BHP Billiton that the expansion of the East Arm wharf would result in reclaimed land, the assessment has been undertaken on the basis that a land-based storage and handling solution would be available. BHP Billiton has therefore not included land reclamation or associated impacts in the EIS. Issues associated with site availability at the East Arm precinct are discussed further in Section 4.2 of this Report.

The closed system

The concentrate contains uranium and therefore triggers the requirement to be handled and transported as a radioactive substance. BHP Billiton proposes to implement a 'closed' transportation system to ensure that the transport, handling and loading of the concentrate for export do not lead to radiological contamination of the surrounding environment (Figure 3).

As part of the closed system, rail wagons and the transfer from rail wagon to the concentrate storage shed at the East Arm facility would be enclosed. The wagons would be unloaded inside an enclosed facility utilising a tippler operation to discharge the concentrate into an underground bin/conveyor for movement to the storage facility. Automatic doors at either end of the unloading facility would rise and drop between each rail car. The storage shed would be fitted with automatic doors, and a negative pressure particulate filtration and building ventilation system would be installed. Water recycling systems for washing the outside of the rail wagons after unloading would also be installed. The external surfaces of each rail wagon would be washed immediately after the unloading operation to remove dust particles and the water retained on-site.

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' areas (where radioactive material is likely) and 'non-supervised' areas (free of radioactive material) 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 proponent intends to fit the ship loader with appropriate spillage, washdown and control devices, though the details have not been specified at this stage. The EIS indicates that 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

BHP Billiton proposes to develop a site-wide water management strategy to maximise water self-sufficiency for the site. The water used to wash rail wagons would be collected and treated to recover concentrate particles that may have attached to the outside of the wagon during unloading. The treated water would be contained in on-site storage tanks for reuse in subsequent wash cycles, and any collected solids would be placed on the concentrate stockpile for export. This is intended to create a zero discharge water 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 which would then be 'topped up' with replacement water. The removed water would be discharged into a holding tank or similar unit and be railed back to Olympic Dam to be disposed of within the Olympic Dam tailings storage facility or incorporated into the Olympic Dam process.

Stormwater collected from supervised areas would be separated from that collected from non-supervised areas. The EIS indicates that 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. This would need to be reviewed in the context of the Port drainage system closer to realisation of the Project.

Preliminary estimates suggest that up to 0.6 megalitres (ML) would be required to wash the external surfaces of the rail 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, the annual water demand may be up to 2.5 ML. It is expected that potable water demand may be reduced by supplementing with collected stormwater.

Project timing

The draft EIS schedule gave an indicative commencement of open pit mining for 2010 and a consequent product export timetable for about 2016; however, this has since been extended and commencement of mining is now not expected until late 2011, contingent on approvals. Consequently, the export of additional uranium oxide and the introduction of concentrate product through the Port of Darwin would not commence until at least six years after commencement of the mine expansion.

It is expected that it would take two years to construct the necessary facilities in Darwin for product export and therefore specific approvals for that construction would not be required for at least another three or four years from the completion of the assessment process. Within this timeframe, BHP Billiton would require a nominated site in the East Arm Wharf precinct.

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 have further opportunity to assess the proposal in detail and ensure compliance with stated performance outcomes. Such plans would be required to address issues such as erosion and sediment control, dust management and biting insect management. As will be discussed further in this Report, once the proponent negotiates a site with Government and detailed plans of the facilities are submitted through the relevant approval processes, the NT transport option will be re-assessed to determine whether further formal assessment under the EA Act is required,

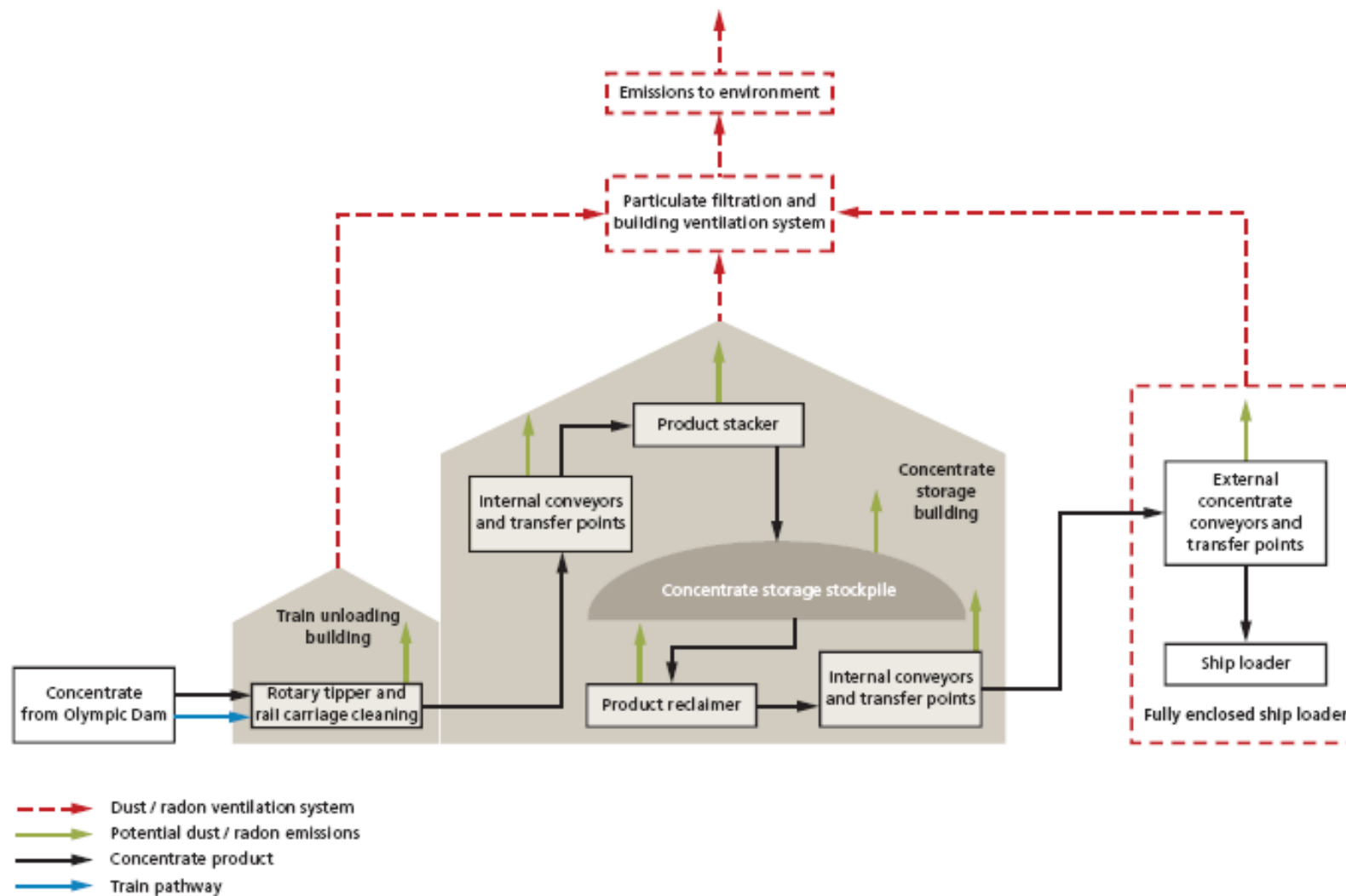
Figure 1: BHP Billiton's preferred option for the concentrate storage and handling facilities in the East Arm precinct (draft EIS).



Figure 2: BHP Billiton's proposed land-based option for concentrate storage and handling facilities at the East Arm precinct (draft EIS).



Figure 3: Concentrate storage and handling facility – closed system (draft EIS).



3 Regional Setting

3.1 Physical

The proposed NT transport option begins at the South Australian / NT border. There are 1,697 km of rail between the border and the Port of Darwin. The rail corridor is held freehold from the border to Alice Springs, and from Alice Springs to Darwin under a Crown lease.

The majority of the Northern Territory section of the Adelaide to Darwin railway passes through pastoral land (held as Crown Leases, Aboriginal Land Trusts or under freehold). The rail corridor passes through 33 pastoral leases and 15 Aboriginal Land properties (held by Trusts or Corporations) between Darwin and the border. The railway crosses 28 named watercourses between Darwin and the border and passes through or within 1 km of seven conservation reserves.

The rail line also passes through a number of towns and communities on its way from the SA/NT border to Darwin. Major regional communities include Alice Springs, Tennant Creek and Katherine, with a number of minor communities adjacent to the rail corridor.

The rail line terminates at the Port of Darwin in Darwin Harbour. Darwin Harbour is a large ria system about 500km² in extent. The Harbour is fed by three main arms arising from its catchment—East Arm, West Arm and Middle Arm—that merge into a single unit, along with the smaller Woods Inlet, before joining the open sea. Large freshwater inflows to the Harbour occur from January to April during the ‘Wet season’.

Within the Harbour, shores are characterised by extensive intertidal mud flats and mangroves. Corals exist in several areas within the Harbour.

The main channel of the Port of Darwin is around 15–25m deep. The channel favours the eastern side of the Harbour, with broader, shallower areas occurring on the western side. The channel continues into East Arm at water depths of more than 10m below lowest astronomical tide (LAT); the bathymetry in this area has been modified by dredging for the development of East Arm Wharf. The East Arm Wharf protrudes from the northern bank of East Arm, at the mouth of the Elizabeth River.

Mean sea level is approximately 4.0m above LAT. Spring tides can produce tidal ranges of up to 7.5m, while the neap-tide range can be as low as 1.4m. Tidal excursions and flows are large and produce strong currents. Sediments of the seabed vary from fine muds to coarse sands, shell grit and coral rubble. Hard rock outcrops are also present.

Many wrecks are found within Darwin Harbour. These include ships and aircraft from World War II, wrecks from cyclones and deliberately scuttled boats for use as fishing and diving sites.

3.2 Biological

The Adelaide to Darwin railway line from the border of South Australia and the Northern Territory passes through arid to semi-arid environments before reaching the wet-dry tropics where woodland ecosystems dominate. The route moves through or within one kilometre of the following NT reserves: Rainbow Valley Conservation Reserve, Ilparpa Swamp Wildlife Protected Area, Emily and Jessie Gaps Nature Park, Alice Springs Desert Park, Alice Springs Telegraph Station Historical Reserve,

West MacDonnell National Park, Karlu Karlu (Devil's Marbles), Lichfield National Park, and the Manton Dam Recreation Area, before finally terminating at the foreshore of Darwin Harbour. A detailed description and analysis of the biological environment along the rail line has not been undertaken for this Project as the risks from transportation of Olympic Dam product are considered to be very low. These risks are discussed later in this Report.

Darwin Harbour has a diverse assemblage of species typical of the Indo-west Pacific Biogeographical province. Protected species in the Harbour include turtles, sea-snakes, sea horses, sawfish, dugongs and several species of coastal dolphin, including the snub-fin dolphin. These species are all listed under the Australian Government EPBC Act and some under the *Territory Parks and Wildlife Conservation Act* (TPWC Act).

Coral communities occur where the substrate is rocky in the lower intertidal and shallow subtidal zones and hydrodynamic conditions permit. The intertidal platform between Channel Island and the mainland is listed on the Register of the National Estate and has been declared a Heritage Place under the NT *Heritage Conservation Act 1991*. This declaration was based on the presence of an unusually diverse coral community. A number of coral communities also exist in the area of East Arm.

Other intertidal communities include rocky shores and pavements, sand beaches and sand and mud flats.

Other areas of conservation significance include the Charles Darwin National Park, Casuarina Coastal Reserve, East Point Aquatic Life Reserve and Doctor's Gully Aquatic Life Reserve.

The undeveloped areas north and south of East Arm Wharf, including Bleasers Creek and Hudson Creek, are fringed by an extensive mangrove community, typical of the majority of the shoreline of Darwin Harbour.

The East Arm Wharf and associated land is primarily reclaimed and the site for Project facilities has not yet been determined. It is likely that further areas of the Port will need to be filled to provide useable space for Project infrastructure. These areas could be subtidal hard or soft substrate habitats, and/or intertidal mangrove communities. As discussed later in this Report, this is beyond the scope of the current assessment.

3.3 Socio-economic

The existing rail line between Tarcoola and Darwin passes through or adjacent to a number of communities within the Northern Territory including:

Kulgera (11,650m); Alice Springs (50m); Wauchope (2150m); Tennant Creek (550m); Newcastle Waters (33 750m); Mataranka (32 200m); Katherine (9650m); Pine Creek (350m); Adelaide River (75m); Palmerston (Marlow Lagoon – 25m and Durack – 100m); and Darwin (city centre - 8,600m and Berrimah – 3000m).

The rail corridor from Olympic Dam to Darwin also passes within 1 km of 15 Aboriginal communities in the Northern Territory.

The rail line traverses an area targeted for growth in the Litchfield Shire municipality, including future urban growth areas incorporated into the proposed city of Weddell.

Based on updated population estimates since the 2006 census, the total population in the NT as of June 2010, was approximately 229 700 with 127 500 of those people living in the Darwin region (ABS 2011). Palmerston's estimated population was approximately 30 100 and Alice Springs approximately 27 990 for the same period

(ABS 2011). The 2006 census data indicated approximately 5% of the NT Aboriginal population lived in the Darwin region and this has been increasing. Based on 2001 population estimates, by 2021 the Northern Territory's population is expected to grow to between 227 700 and 308 700 people with the greater part of this growth likely to occur in the Darwin region (ABS 2006). The age structure of Darwin's population is much younger than that of the general Australian population.

At present, there is limited heavy industry in the Darwin region. The Darwin LNG facility operated by ConocoPhillips is adjacent to the Blaydin Point site at Wickham Point. The Ichthys Gas Field Development LNG facility is proposed for Blaydin Point. Other major industry occupies land in the region of the East Arm precinct, which has become a major point of export for access by the resource sector to Asia. These include the Territory biofuels facility, the Vopak Darwin Industry Fuel Terminal and stockpiles of manganese, iron ore, copper and other bulk concentrates. Livestock and agricultural products are also exported from the East Arm Wharf.

The terminus for the Ghan passenger train is located in the East Arm precinct and an option put forward by BHP Billiton sees its storage facility located in close proximity to this train station.

The Darwin Harbour is widely used for a variety of activities. Commercial fishing effort is low in the Harbour whereas recreational fishing is a well established activity, concentrating on mud crabs, barramundi and a wide variety of reef fish. Aquaculture activities focus on mud crabs and trepang. Scuba diving and boating are other important recreational activities that occur in the Harbour.

The Port of Darwin also serves as the hub for regional barge supply services that serve communities along the NT coast.

3.4 Cultural/Historical

The rail line traverses country belonging to many different Aboriginal language groups that maintain connection to country. These affiliations and cultural attachments were considered in the environmental impact assessment for the rail line. A number of sites of historical interest from the late 19th century to early 20th century are located close to the rail corridor, including the Pine Creek goldfields and the Adelaide River War cemetery. The archaeological survey undertaken as part of the EIS studies in 1984 also identified 30 archaeological sites within the rail corridor.

The East Arm Wharf area is relatively devoid of culturally significant sites due to its 'built' characteristics. The Aboriginal Areas Protection Authority (AAPA) identified a key site in the East Arm area. It is not expected that this site would be impacted by BHP Billiton's project. Sacred sites are surrounded by "restricted works" areas in which, under the provisions of the *Northern Territory Aboriginal Sacred Sites Act*, no land or maritime development works of any kind are allowed.

Two flaked stone points were found near the higher sections of Quarantine Island during the archaeological survey for the first East Arm Wharf Expansion in 1993. No sites of cultural significance were identified near the proposed location of the facilities.

Approximately 80 non-Aboriginal heritage sites or places in the Town of Darwin, Darwin Harbour, Berrimah and East Arm are listed on the Register of the National Estate, Northern Territory Government Heritage Register or have been identified as having local heritage value. Of these, only the Quarantine Anti-Aircraft Battery Site is near the area of the proposal. The site is listed on the Northern Territory Heritage Register and consists of revetted emplacements, the central bunker, and slabs where the administration, mess and kitchen building stood. It was established in 1941 to

defend the south-west section of Darwin. It is described as highly significant, and is unique in Darwin and the Northern Territory.

4 Environmental Impact Assessment

4.1 Introduction

The purpose of this Report is to evaluate the Project and to determine whether it can proceed without unacceptable environmental impacts. This is achieved by identifying the potentially significant risk of an environmental impact occurring as a result of Project components and activities, and evaluating the proponent's corresponding safeguards or prevention measures to remove or mitigate the risks. Where the proposed safeguards are considered insufficient, or where a safeguard is deemed particularly important, recommendations are made in this Report to add to or emphasise those commitments made by the proponent.

The environmental acceptability of this project is based on analysis of the following from the EIS:

- Adequacy of information outlining the proposal (particularly which components or activities are likely to impact the environment);
- Adequacy of information on the existing environment (particularly environmental sensitivities);
- Adequacy of information on the range and extent of potential impacts and the risks of those impacts occurring within the Project context; and
- Adequacy of the proposed safeguards to avoid or mitigate potential impacts.

Conclusions and recommendations are then based on comments from the review of the draft EIS by relevant government agencies and the public, and responses from the proponent to those comments in the Supplement.

In this Report, the recommendations (in **bold**) are preceded by text that identifies concerns, suggestions and undertakings associated with the project. For this reason, the recommendations should **not** be considered in isolation.

As new information is expected with the detailed design and specifications of the proposal following the conclusion of the EIS process, it will be necessary for approval mechanisms to accommodate subsequent changes to the environmental safeguards described in the EIS and the recommendations in this Report. If the proponent can demonstrate that such changes are not likely to significantly increase the risks of an impact on the environment, an adequate level of environmental protection may still be achieved by modifying the conditions attached to relevant statutory approvals governing this project. Otherwise, further environmental assessment may be required.

Therefore, subject to decisions that authorise / permit the project to proceed, the primary recommendations of this assessment are:

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- **Identified in the Olympic Dam Expansion's Environmental Impact Statement (draft EIS and Supplement); and**
- **Recommended in this Assessment Report.**

All safeguards and mitigation measures outlined in the Environmental Impact Statement are considered commitments by BHP Billiton.

Recommendation 2

The Proponent should be required to:

- a) provide detailed design and site specific information pursuant to section 14A of the Environmental Assessment Administrative Procedures (EAAP); and**
- b) prepare management plans for the NT transport option and submit them to relevant Government agencies for approval prior to commencement of infrastructure works such as the proposed bypass and rail loop. In preparing management plans the proponent should be required to include additional measures for environmental protection and monitoring described in this Assessment Report.**

The Minister will consider the information provided and, if the Minister considers it appropriate, treat the information as an alteration to the proposed action that may change its environmental significance and require preparation of, and public consultation in relation to, the altered proposed action under section 14A and 8(2) of the EAAP.

4.2 Issues outside the scope of the assessment

A number of submissions to the draft EIS identified issues associated with aspects of the proposal that are beyond NT Government jurisdiction or could not be considered the direct responsibility of the proponent in light of National and NT policy positions and are therefore deemed outside the Project scope in the NT. This section provides some consideration of these aspects.

Olympic Dam mine site and ancillary infrastructure

The key components of the Olympic Dam Expansion are located in South Australia and include:

- Olympic Dam mine site;
- Roxby Downs village;
- Desalination plant at Point Lowly;
- New rail spurs;
- Port facilities (SA);

These components form the bulk of the assessment process and are being assessed by the South Australian and Australian Governments. The NT Government is only assessing the option for transport of products from the expanded mine through the Port of Darwin.

Response capacity of NT Emergency Services

The capacity of the NT Emergency Services to respond to an incident involving radioactive spills or accidents along the rail line has been questioned by a number of respondents to the draft EIS.

Constitutionally, the NT Government has responsibility for emergency management within its jurisdiction. All levels of government have responsibility within their own

jurisdiction for emergency planning, preparedness and mitigation in regard to land, property and the environment, assets and infrastructure, agencies and programs. To achieve an effective emergency management framework, a high degree of collaboration and coordination within, and across, all levels of government and with non-government stakeholders is required.

The NT Department of Police, Fire and Emergency Services (PFES) has in place response strategies, protocols and procedures for dealing with spills and accidents throughout the NT in accordance with the provisions of the NT *Disasters Act*. The effectiveness of these has been called into question in comments on the draft EIS based on perceptions of the agency's reaction to previous incidents and the remoteness of large sections of the rail line with respect to key centres from which coordination of these emergency responses would occur. Although BHP Billiton's involvement with the NT Government in enhancing the capacity of emergency services for dealing with specific Project-related incidents is important, the NT Government is responsible for ensuring that there is adequate capacity to respond and appropriate protocols are in place to react effectively to any such incidents.

Northern Territory All Hazards Emergency Management Arrangements have been produced under the provisions of the NT *Disasters Act* to describe an emergency management framework for the Territory. The document details emergency prevention/mitigation, preparedness, response and recovery arrangements for all hazards across the Territory. This document is available on the PFES website at: <http://www.pfes.nt.gov.au/documents/File/emergencyservices/publications/>.

The EIS indicates that rail movements from the expanded mine would not occur until at least six years after commencement of the Project. In that time, BHP Billiton has committed to work with the NT Government to develop emergency response systems to ensure a co-ordinated response to rail incidents involving Olympic Dam products.

Further discussion of BHP Billiton's emergency response planning is included in Section 4.4.1 of this Report.

Storage, handling and loading facilities site selection

BHP Billiton proposes to construct dedicated facilities in the East Arm precinct 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; and
- transfer the product via conveyor and ship loader to the nominated export vessel for shipment to international customers.

In June 2009, the NT Department of Lands and Planning (formerly Planning and Infrastructure) provided notification to the Minister of proposed expansion works at the wharf and hardstand, and reclamation and infrastructure developments such as a rail loop and marine supply base. The current proposed expansion of the East Arm area does not fully encompass the area considered in the East Arm Masterplan, which BHP Billiton has relied on to propose its EIS location options. The East Arm Expansion proposal has also been modified since the original notification and there is no clear indication that a suitable site for concentrate storage would be available at the time BHP Billiton intends to implement the transport option.

The EIS indicates that 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. BHP Billiton has committed to ongoing cooperation and consultation with the Northern Territory Government and particularly with the Darwin Port Corporation (DPC), to facilitate a mutually beneficial integration of the proposed BHP Billiton facilities and the East Arm Master Plan during the planning process for the NT transport option.

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

This is a significant risk for BHP Billiton and it will need to continue to work closely with the NT Government to determine whether a preferred location for the required facilities can be available and if so, to negotiate an agreement to secure a future site.

Nuclear weapons proliferation

This EIS process will not assess Australian Government nuclear policy. Issues relating to the use of exported uranium in the nuclear fuel cycle are beyond the control of the proponent and have not been addressed in the EIS and will not be addressed in the government assessment. Uranium mining is an acceptable practice providing environmental and social values are protected. There are strict regulatory requirements for the handling, storage, transport and export of uranium.

Under Commonwealth legislation, Australian uranium may only be exported for peaceful purposes under Australia's network of bilateral safeguards agreements. Australia retains the right to select the countries with which it is prepared to conclude safeguards arrangements. Receiving countries must:

- be party to and comply with the Treaty on the Non-Proliferation of Nuclear Weapons;
- have a bilateral safeguards agreement with Australia; and
- in the case of a non-nuclear weapon state, have an Additional Protocol with the International Atomic Energy Agency (IAEA).

The safeguards system has three main elements:

- accounting for uranium as it moves through the fuel cycle to ensure that it is not diverted to military uses;
- physical security of nuclear material; and
- inspections to verify compliance.

Currently there is no bilateral safeguard agreement in place with China that covers the export of the uranium contained within the copper concentrate. Such an agreement would need to be finalised before any export of copper concentrate can take place. The Australian Safeguards and Non-proliferation Office would determine the accounting arrangements and security measures required. An export permit would also be required from the Department of Resources, Energy and Tourism under the *Customs (Prohibited Exports) Regulations 1958* to ensure that all handling, transport and non-proliferation requirements were met.

Safety of the nuclear power industry

The safety of nuclear power is an issue raised in a number of public submissions to the draft EIS. The issue has been heightened as a result of the nuclear incident following the earthquake and tsunami in Japan on 11 March 2011.

Internationally, there are a number of measures in place addressing nuclear safety, including the Convention on Nuclear Safety, Convention on Early Notification of a Nuclear Accident or Radiological Emergency, and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The IAEA provides safety services and is actively involved in promoting high safety standards. There is an international regime of inspections and peer reviews of nuclear facilities in IAEA member countries under the Convention on Nuclear Safety. The IAEA has also established an International Nuclear Safety Group to provide authoritative advice and guidance on nuclear safety approaches, policies and principles. The Group comprises experts in nuclear safety working in regulatory organisations, research and academic institutions and the nuclear industry.

The nuclear crisis in Japan has resulted in further consideration of ways in which the international safety framework can be improved. Australia's Foreign Minister, the Hon Kevin Rudd MP, has, for example, argued for additional roles for the IAEA. Consequently, it is reasonable to expect that international mechanisms and work to promote nuclear safety will continued to be further developed and strengthened over the life of the Olympic Dam project.

A number of countries are reviewing nuclear energy policies and nuclear power safety requirements in the wake of the Fukushima crisis. The EH Division is unaware of any moves by the Australian Government to review uranium export policy.

Storage of radioactive wastes

In the context of the NT, this Project does not include the storage of nuclear wastes, either from the mining of uranium or from the spent fuels from nuclear power production. Management of wastes from the mining and processing of ore from Olympic Dam is being considered by the South Australian Government. There are concerns that nuclear waste, returned from reprocessing overseas, could be transported on the Adelaide to Darwin railway line to a nuclear dump site proposed for Central Australia.

Legislation regarding storage of radioactive wastes is currently being considered in Federal Parliament (National Radioactive Waste Management Bill 2010). The NT Government has previously indicated its opposition to this Bill in its submission to the Senate Legal and Constitutional Affairs Committee inquiry into the Bill.

Value adding to product

Some respondents to the draft EIS considered the processing of the concentrate on the Olympic Dam site to be a more beneficial alternative to exporting the concentrate in its raw form. A number of reasons were cited with relevance to the NT transport option, including:

- Significantly reduced rail journeys required to transport finished copper product rather than a mixed bulk concentrate, with a proportional reduction in transport safety risks; and
- Avoidance of the risks associated with exporting unspecified quantities of uranium oxide in the concentrate by removing this component at Olympic Dam.

BHP Billiton's selected option is to upgrade the existing metallurgical plant (particularly the smelter and refinery) to produce up to 350,000 tpa of refined copper,

and construct a new concentrator and hydrometallurgical plant to produce enough concentrate to feed the upgraded smelter and to export up to 1.6 Mtpa. Although the exported concentrate would contain recoverable quantities of copper, uranium oxide, gold and silver, BHP Billiton claims that this option still provides the optimal return on investment.

The draft EIS indicates that the selected option removes the operating constraint that is inherent in trying to match the design capacity of an on-site smelter with the volume of ore mined. This means that at any given time, the volume and grade of ore extracted would vary depending on the distribution and mineralisation of the ore within the basement material being mined. Smelters, on the other hand, have an optimal design capacity. Therefore the variable supply of ore typically results in either large ore stockpiles required to blend the various grades of extracted ore, or the smelter operating under capacity or inefficiently. The selected option allows for an unconstrained mining operation to supply more than enough ore of a consistent high grade to operate the on-site smelter at its design capacity and to export the additional concentrate.

BHP Billiton rejected the alternatives of constructing a new processing plant at Olympic Dam because returns on investment would not be optimised due to capital costs involved and different smelting technology would be required increasing the complexity of on-site metallurgical processing. An additional alternative to upgrade the existing smelter and construct a new metallurgical plant in Upper Spencer Gulf was also rejected for similar reasons.

The final outcome of a decision on whether or not the proponent should pursue processing of the additional concentrate on site is outside the jurisdiction of the NT Government and would be determined as part of the SA Government's approval process. Consequent impacts to the NT transport option would be reassessed if there were any changes to the Project based on a final decision by the SA Government and the proponent. The current proposal to export concentrate has been assessed on its merits.

4.3 Alternative options

4.3.1 Export via other ports in Australia

In selecting the location of a port to export concentrate, BHP Billiton investigated the following alternatives:

- Port of Darwin;
- Port Adelaide;
- Port Bonython (SA); and
- Whyalla (SA).

The Port of Darwin was selected as the preferred option because:

- the East Arm Wharf at the Port of Darwin already has sufficient capacity to accommodate the large Panamax-class vessels preferred for transporting bulk materials;
- the existing East Arm Wharf can accommodate a new bulk loading facility for the transfer of the Olympic Dam concentrate to the vessel;
- the export of bulk materials from the Port of Darwin is already supported by the Northern Territory Government under the Australasian Trade Route major project;

- Olympic Dam has an existing relationship with the DPC through the current export of uranium oxide;
- the cost is comparable to other options investigated; and
- the location of the Port of Darwin at East Arm, avoids potential social issues associated with urban encroachment on port facilities.

Port Adelaide was rejected because:

- a new wharf would be required to accommodate the new bulk loading facility; and
- urban encroachment at Port Adelaide exacerbates the potential social issues surrounding the export of radioactive materials.

The draft EIS indicates that neither Whyalla nor Port Bonython has the capability to accommodate the vessels required for the expansion. In addition, the port at Whyalla is privately owned and therefore access constraints are expected. If these issues could be overcome in the future and if BHP Billiton determined that it wished to export concentrate from either of these ports, use of the ports would be subject to obtaining the relevant environmental and other consents from the Australian and South Australian governments.

The NT transport option is considered by BHP Billiton to be a viable option at this stage of Project planning. However, BHP Billiton still needs to secure a site in the East Arm precinct for the proposed storage and handling facilities. The East Arm area is currently proposed to expand and is undergoing formal assessment at the level of an EIS under a separate process. Information presented in the assessment documentation for the East Arm expansion proposal does not clearly demonstrate that BHP Billiton's requirements will be met at the site and the timeframes outlined for construction of components that may be relevant, such as the rail loop, are well beyond the proposed timing of the NT transport option.

If it is assumed that the necessary approvals for the East Arm Expansion Project are received and components relevant to the NT transport option completed within BHP Billiton's proposed timeframes, DPC would then be expected to invite expressions of interest for the use of the available land. BHP Billiton has been advised that it would be informed of that process by DPC at the appropriate time. If the proponent is successful in tendering for a site against competing interests, BHP Billiton would still need consent under the NT *Planning Act* to develop its dedicated facilities on Port land. This would require a further public process and the potential for further formal environmental assessment under the EA Act if it was considered to be warranted at the time.

BHP Billiton will need to continue to work closely with the NT Government to determine whether a preferred location for the required facilities will be available. It is considered prudent that BHP Billiton also continue to explore other options for product export in the event that a site for concentrate storage and loading facilities for expanded mine product is not secured and constructed within the timeframes required for commencement of the NT transport option.

4.4 Rail transport

4.4.1 Rail accidents involving Olympic Dam product

Many of the responses to the draft EIS included references to the potential for accidents and spills to occur along the length of the rail line and the risks posed by such events to the community and environment. The capacity of the NT Government

emergency services to respond to incidents is not discussed here and is outside of the scope of this assessment (see Section 4.2 of this Report). Issues associated specifically with level crossings are considered further in Section 4.8.1.

The draft EIS included consideration of rail transport safety in the context of increased usage of the rail line as a result of the Project. The export of additional uranium oxide and the new concentrate product from an expanded operation would result in seven return rail trips each week between Olympic Dam and the Port of Darwin or 14 movements per week. BHP Billiton has calculated that this would equate to a 100% increase in rail traffic above current levels in the Territory based on the freight track kilometres travelled. The proponent recognises that there would be a relative increase in accident rates due to the rail traffic increase.

A risk assessment was conducted by BHP Billiton on the rail transport of uranium oxide and copper concentrate to the Port of Darwin from the expanded mine. According to the draft EIS, no 'extreme' (unacceptable) risk events associated with the transport of product through the NT were identified and while one high risk event was identified, this risk did not relate to rail safety within the NT but rather potential contamination of the external surfaces of rail wagons with concentrate particles. This is discussed further in Section 4.4.2 of this Report. Other moderate risks were generally associated with the effects on the physical environment and water receptors. A discussion of these risks is included in Section 4.4.3 of this Report.

The risk assessment process did not address the direct safety aspects of rail accidents within the NT. The risks of derailments, collisions between trains, collisions at level crossings and with obstructions on the line are expected to be borne primarily by the rail operator.

BHP Billiton contends that the impacts from any spills involving copper concentrate during rail transport to Port of Darwin would be minimal as the concentrate product emits low levels of radiation in relation to the mass of the material, with minimal impact expected to the surrounding communities and environment. With respect to the uranium oxide concentrate, the proponent emphasises the minimal risk of spills due to the nature of the packaging associated with its transport. The likelihood of an accident leading to the loss of containment of uranium oxide concentrate from 200L drums sealed in shipping containers was considered rare as significant forces would be required to open drums and break seals.

The proponent has deferred to Northern Territory fire and emergency services organisations for emergency response to an accident or spill event, indicating that, in the event of an incident in which loss of containment of the concentrate occurred, the spill response would be consistent with existing Northern Territory response systems, protocols and procedures involving any dangerous or hazardous material. While the capacity of the NT Emergency Services and the adequacy of the regulatory regime governing the transport of dangerous goods in the NT are elements considered outside the scope of this assessment, some discussion is included in Section 4.2 of this Report.

The transport of radioactive substances is governed by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) 'Code of Practice for the Safe Transport of Radioactive Material', which was adopted into NT legislation through gazettal as per Section 25 of the regulations under the *Radioactive Ores and Concentrates (Packaging and Transport) Act*. This Act is administered by the NT Department of Justice through NT Worksafe. The ARPANSA Code of Practice adopts the IAEA's Regulations for the Safe Transport of Radioactive Material. The Code is intended to establish uniform requirements for the transport of radioactive material in Australia. Similarly, the Australian Dangerous Goods Code 7th Edition

(ADG7) is intended to establish uniform requirements Australia-wide for the carriage of all other dangerous and hazardous materials. The NT Government has adopted the ADG7 through commencement of the *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act*, also administered by NT Worksafe. BHP Billiton will need to meet the requirements of these Acts and subordinate regulations to transport the uranium oxide and concentrate through the NT.

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. BHP Billiton has committed to progressively revising and refining the draft RMTMP 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. BHP Billiton indicates that it would amend this plan to include the transport of the concentrate product. A draft framework was prepared by BHP Billiton for the EIS to cover the logistics chain for both Olympic Dam concentrate and uranium oxide, including the rail movement between Olympic Dam and the Port of Darwin.

Specifically, the Draft Emergency Incident Management Response Plan includes consideration of the following:

- BHP Billiton's maintenance of Crisis and Emergency Management plans in the event of an incident that may have an impact on the surrounding community;
- The development, regular testing and updating of an integrated and functional Emergency Incident Management Plan following consultation with appropriate authorities;
- Lessons learned from a review of the Australian Transport Safety Bureau's 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. Training programs would 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.

BHP Billiton indicates that 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.

BHP Billiton will need to submit the RMTMP and Emergency Incident Management Response Plan to the relevant NT Government regulatory authorities as well as the NT emergency services for scrutiny, and approval where relevant.

Provided that all regulatory requirements and management plan commitments are met by the proponent in regards to the safe transport of Olympic Dam product and appropriate response mechanisms for accidents are developed in conjunction with NT emergency services, it is considered that the identified risks can be adequately managed.

Once the proponent undertakes detailed planning and design of the transport option, and the degree of certainty around emergency management improves, further notification should be provided to the Minister in accordance with Recommendation 2 of this Report.

4.4.2 Impacts on adjacent communities

The Adelaide to Darwin rail line passes through Alice Springs and close to a number of other regional community centres in the NT including Tennant Creek, Katherine, Pine Creek, Adelaide River and Palmerston.

Concerns were raised in submissions to the draft EIS about the interference that would be caused by trains preventing line crossings in regional centres, particularly with respect to emergency vehicle access in Alice Springs. There were also concerns raised about the radiological risks posed to communities adjacent to the rail line by transport of radioactive materials.

BHP Billiton responded by noting that existing rail operational procedures prevent trains stopping in certain locations within and north of Alice Springs, ensuring that trains would not block level crossings unnecessarily and traffic delays in Alice Springs would be minimised.

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. This is a significant delay, particularly in the event of an emergency on either side of the line when access would be urgently required. Whilst the likelihood of an emergency occurring as a train impedes level crossing access is expected to be low, the consequences of a delay could be extremely serious. Additionally, as rail traffic increases along the rail line, the cumulative impact on vehicle crossing access is expected to increase.

BHP Billiton has suggested a number of initiatives to minimise delays to traffic in Alice Springs and at other locations along the rail line including, 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; and
- securing semi-unimpeded train paths.

The avoidance of peak traffic periods may alleviate traffic congestion issues associated with level crossings but does not resolve emergency vehicle delays, which can happen at any time. One solution may be for rail operators, train drivers and emergency services to integrate local communication networks so that in the event of an emergency, where vehicular access across the rail line is urgently

required, train drivers are alerted and can delay entry into or expedite departure from Alice Springs or relevant centres accordingly.

A further option to reduce delays might be to vary the length of the trains that would travel the line. It is currently proposed to transport concentrate from Olympic Dam on 1.8km long trains. While a reduction in length might reduce the time delays for road traffic at level crossings, this benefit could be offset by an increased frequency of train movements through Alice Springs.

The installation of overpasses at level crossings was also explored as an option in the context of general increases in freight traffic in the future, regardless of BHP Billiton's Project. The rail corridor through Alice Springs is extremely constrained and therefore the options for changes to road or rail infrastructure to minimise interference with road traffic are limited.

The NT Emergency Services has considerable concerns in regards to this matter and it is expected that BHP Billiton will engage with the relevant authority to ensure that the issue is adequately resolved well in advance of the commencement of product transport.

Recommendation 3

The proponent is to engage as early as practicable with the NT Department of Police, Fire and Emergency Services, or relevant emergency services authority at the time, to ensure emergency services requirements and emergency response procedures associated with the NT transport option are adequately considered.

In response to the radiological effects to communities of passing trains, BHP Billiton indicated in its draft EIS that the closed rail system with sealed wagons 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.

The draft EIS assessed the radiation levels from this source as negligible, with all doses significantly less than the 1 millisievert (mSv) annual dose limit to members of the public and cited the typical Australian natural background dose as about 2.4mSv per year (mSv/y). BHP Billiton provided relevant examples of radiation doses in the EIS to demonstrate the negligible risk as follows. An individual would have to:

- stand at a pedestrian rail crossing each day for a full year as a daily 1.8km train of copper concentrate containing uranium passed to receive radiation exposure of 0.29mSv/y above background;
- sit in the first car at a level crossing each day for a full year as a daily 1.8km train of copper concentrate containing uranium passed to receive radiation exposure of 0.05mSv/y above background; or
- remain within 5m of the train for 1250 hours a year (the equivalent of 156 eight-hour days) in order to receive the maximum public dose limit of 1mSv/y from gamma radiation alone from a train carrying Olympic Dam concentrate (which is 0.8µSv/h at 5m).

It is accepted that the risk to the public of radiological exposure above safe levels from rail movements of product is negligible if all measures proposed by BHP Billiton to safeguard communities from radiological sources during product transport are implemented. However, the NT Government considers that an environmental radiation monitoring program will be required. The program will need to:

- Establish a critical group for potential radiation exposure that represents members of the public most likely to be exposed; and

-
- Collect baseline radiation data before the start of the project in order to establish background levels for calculation of an effective dose to the critical group, including all pathways and types of radiation.

Whilst radon and radon progeny would not be expected to present a significant risk of a radiation dose from the transport of concentrate, environmental monitoring of radon is needed to establish background levels for dose calculations.

BHP Billiton currently operates in accordance with a Transport Plan for uranium oxide from Olympic Dam to Australian shipping ports. As discussed in Section 4.4.1 above, BHP Billiton indicates that an RMTMP for concentrate is also being developed for the expansion products.

These plans will need to be provided to relevant authorities prior to commencement of the NT transport option.

Recommendation 4

An environmental radiation monitoring program for the NT transport option should be implemented. The program should include appropriate radiological monitoring along the rail route through Alice Springs as well as the East Arm storage and handling location.

4.4.3 Impacts on the environment

Some respondents to the draft EIS expressed concern that spills of copper concentrate could have an impact on terrestrial and aquatic systems adjacent to the rail line.

The risk assessment conducted by BHP Billiton on the transport of concentrate identified some moderate risks associated with potential loss of product to the physical environment and aquatic receptors along the route. The risks to the environment from spills of uranium oxide were identified as low.

The low-level radiological aspects of Olympic Dam concentrate have been discussed previously in this Report and are not considered further here. A primary concern is the solubility of the copper contained in the concentrate. The EIS indicates that the Olympic Dam concentrate consists of copper sulphides (CuS and Cu₂S), which are not considered to be water-soluble and are unlikely to be absorbed by organisms.

The EIS includes a comparative description of the insolubility of copper sulphides as follows:

- a saturated solution of copper sulphide has less than 1/10,000,000 the natural 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 BHP Billiton asserts that it is unlikely to be toxic to organisms. Impacts would be limited to physical smothering of organisms by product, which would only be considered significant in the event of large spills.

BHP Billiton has committed to ensuring every practicable effort would be made to recover product in the event of a spill, in consultation with relevant authorities. Product recovery would be included as part of the incident response planning.

It is considered that the risk to the environment of a concentrate spill is low and if appropriate management measures are implemented by the proponent, significant impacts to terrestrial and aquatic environments from a product spill are unlikely.

As information from BHP Billiton's detailed planning and design of the transport option becomes available, further notification should be provided to the Minister in accordance with Recommendation 2 of this Report.

4.5 Storage and handling of product

The draft EIS presented preliminary design work for the proposed infrastructure required to receive, store, transfer and load Olympic Dam concentrate. As discussed previously in this Report and the EIS, new infrastructure is not anticipated for the export of Olympic Dam UOC.

NRETAS requested that further detail be provided on the proposed concentrate storage and handling system, in particular, the negatively-pressured ventilation system and wash down facilities, and the planned spillage, wash down, collection and control devices on the ship loader.

BHP Billiton was not able to provide detailed descriptions of the infrastructure as the detailed design for this component of the Project had not yet commenced. The proponent did present assessments of the facilities in the EIS and identified environmental and social performance outcomes to be achieved during the construction, operation and decommissioning of the facilities. These outcomes are summarised as follows:

- Air quality – BHP Billiton expects that there would be no change in ambient air quality at the nearest sensitive receptor as a result of the Project and would implement a monitoring program to ensure management was effective (discussed further in Section 4.5.3 of this Report);
- Noise – BHP Billiton asserts that the Project would have negligible effect on noise levels at sensitive receivers during construction and operation;
- Surface water and soils – after implementation of controls, the impacts on the environment from erosion and sedimentation, stormwater run-off and drainage, and contaminants including product and acid sulphate soils, are considered low to negligible by the proponent;
- Flora and fauna – BHP Billiton expects negligible residual impacts on the marine environment from construction and operation of the facilities, or from increased shipping movements;
- Biting insects – mosquito breeding opportunities would be minimised by adhering to NT Government guidelines for construction of the facilities;
- Cultural heritage – would be managed in accordance with the *Heritage Conservation Act*. No known sites would be disturbed;
- Visual impact – the area is consistent with the existing industrialised character of East Arm precinct and impacts would be negligible;
- Waste management – low level radioactive waste material would be railed to the Olympic Dam site for disposal; and
- Decommissioning – any radiological contamination would be remediated and site would be used for other commercial enterprises or rehabilitated to an agreed condition.

BHP Billiton will need to submit a Development Application under the NT *Planning Act* to develop an allocated site in the East Arm precinct. The Development Application process will provide for further public and Government scrutiny of the detailed plans for the proposed product storage and handling facilities at East Arm.

Further environmental assessment may be required depending on the detail of the proposed facilities at that time in accordance with Recommendation 2 of this Report.

As discussed in Section 4.3.1 of this Report, BHP Billiton may need to consider alternative port options for exporting its radioactive products should an East Arm site not be available for the Project's NT transport option when required.

Recommendation 5

At the time of the action, the closed system of the storage, handling and loading facilities should ensure any potential losses of radioactive product are as low as reasonably practicable, such that all regulatory requirements for radiological and air quality parameters for BHP Billiton's operations at East Arm are met or improved upon.

4.5.1 Extreme weather events

Concerns were raised about the design of the facilities at East Arm Wharf to withstand a serious tropical cyclone and associated extreme weather.

The draft EIS and the accompanying risk assessment 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 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 concentrate with a 'medium' consequence for the surrounding environment. As discussed in the draft EIS, a medium-risk rating is defined as tolerable in accordance with Australian risk standards. BHP Billiton has committed to incorporating further mitigation and controls through its management systems, which is expected to reduce the risk rating further.

The following matters were taken into consideration by BHP Billiton 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.

During the detailed design 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; and
- ongoing inspections and maintenance of all buildings to reduce the likelihood of corrosion damaging the structural integrity of all buildings.

These initiatives are strongly supported. BHP Billiton also indicates in the EIS that appropriate site-based procedures would be developed for extreme weather events such as cyclones. The procedure would cover the key periods associated with such extreme weather events, namely the cyclone watch period, cyclone expected warning, cyclone imminent warning, and post-impact and pre-commencement of normal operations.

BHP Billiton proposes to extend these procedures 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.

Provided that appropriate site-based procedures and contingency plans are developed and implemented by the proponent to safeguard the site in the event of extreme weather, it is considered that the identified risks can be adequately managed to an acceptable level.

4.5.2 Waste water

Concerns were raised through the assessment about the fate of storm water from the site and wash water from the wash down of product wagons at the Port of Darwin. The radioactivity of the wash water was of particular concern.

The closed system for the storage and handling facility at East Arm Port proposed by BHP Billiton is described previously in Section 2.2 of this Report.

Although a small amount of radionuclides could dissolve into the washdown water, along with other metals and salts, the radionuclides in the Olympic Dam concentrate have very low solubility. BHP Billiton conducted tests on the flotation concentrate slurry at Olympic Dam. The tests showed that only minor amounts of the radionuclides dissolved into the water. 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 that would be required for the material to be defined as 'radioactive' as defined under ARPANSA's Code of Practice for the Safe Transport of Radioactive Materials 2009. BHP Billiton expects that the amount of dissolved radionuclides in the washdown water would be negligible.

Nevertheless, BHP Billiton proposes to collect, filter and treat the washdown water 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.

The management of waste water is considered to be a low-risk activity. Provided that the closed system for the storage and handling of concentrate is maintained as

proposed by BHP Billiton, it is considered that the risks can be managed to an acceptable level.

Further scrutiny of the waste water management will be undertaken once more detail is available, in accordance with Recommendation 2 of this Report.

4.5.3 Air emissions

The Territory 2030 air quality target aims to continue to meet or better national air quality standards across the Territory.

Several respondents to the draft EIS were of the view that there should be zero emissions from the storage and handling facilities at the Port of Darwin or that the National Environmental Protection (Ambient Air Quality) Measure (Air NEPM) should be met at the site boundary, specifically for PM₁₀ concentrations (dust).

The EIS indicates that the proposed concentrate handling facilities are to be designed as a closed system in which all generated fugitive dusts would be captured and cleaned prior to the release of ventilation gases to the atmosphere. A combination of wet scrubbers and dust baghouse filters would be used to capture the fugitive dust generated within the storage and loading facilities and conveyors, these typically have a cleaning efficiency of greater than 99%. As a result of the closed system design of the facility and the implementation of fugitive dust collection and cleaning systems, BHP Billiton asserts that ambient air quality would not be expected to change at the nearest sensitive receptors as a result of the Project.

While BHP Billiton did not commit to achieving the Air NEPM objective at the storage site boundary in the Supplement, the company has committed to work with the NT Government to establish suitable air quality criteria specific to the Port of Darwin facilities.

BHP Billiton has committed to establishing a particulate monitoring station at a suitable location adjacent to the site before commencement of construction. Monitoring would continue during construction and operation of the facility. Additionally, the ventilation discharge stacks would be sampled during facility commissioning, and at regular intervals thereafter to ensure the effectiveness of the fugitive dust collection and cleaning systems. All air control measures would need to be maintained in good working order.

It is expected that a monitoring plan for the operation of storage and handling facilities in the East Arm precinct would be implemented in conjunction with radiological monitoring at the East Arm site.

Recommendation 6

An ambient air quality monitoring program is required for the NT transport option. The program should ensure that appropriate, agreed air quality criteria for operation of the concentrate storage facility and loading activities in the East Arm precinct are met.

4.6 Shipping in the Port of Darwin

The draft EIS indicates that the Olympic Dam concentrate would be conveyed to a Panamax-class vessel approximately every two weeks. Given the 20% variation in concentrate production allowed for by the proponent, the frequency of ship movements in the Port of Darwin attributed to the Project could also vary.

The risks associated with shipping in the Port of Darwin include:

- collision with other vessels including recreational boat users;
- spills of product or hydrocarbons during loading or refueling respectively;
- introduction of exotic marine species;
- shipping noise; and
- grounding or loss of a vessel.

Most of these risks are considered low and can be managed adequately by the proponent through standard protocols and procedures.

BHP Billiton maintains an Olympic Dam Emergency Incident Management Plan to address incidents relating to the shipping of materials, including uranium oxide, currently being transported by rail to the Port of Darwin. BHP Billiton indicates that it would amend this plan to include the transport of the concentrate product. A draft framework was prepared by BHP Billiton for the EIS to cover the logistics chain for both Olympic Dam concentrate and uranium oxide, including shipping in the Darwin Harbour area and from Darwin Harbour to international customer(s).

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

- BHP Billiton's commitment 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 shipment to end customers.

BHP Billiton indicates that 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.

BHP Billiton will need to submit the Emergency Incident Management Plan to the relevant NT regulatory authorities as well as the NT emergency services for scrutiny.

In the event of a significant oil or product spillage, a monitoring program may be necessary to determine the extent and magnitude of impact caused by the spill. A potential mechanism for providing baseline information on Darwin Harbour is the Darwin Harbour Integrated Monitoring and Research Program (DHIMRP).

It is anticipated that the DHIMRP would draw together existing monitoring and research programs undertaken by various stakeholders into an integrated program, to achieve cost efficiencies, to improve understanding of the health of the Harbour

and to provide a tool for environmental planning and decision making. The DHIMRP is still in the early development stages. It is anticipated that the DHIMRP will be a voluntary program.

It is considered that BHP Billiton would benefit from being involved in such a program if it were to be established in the Harbour or any similar program determined in collaboration with other harbour stakeholders.

Further consideration of the available opportunities for involvement in collaborative marine monitoring programs should be provided in any future notification to the Minister in accordance with Recommendation 2 of this Report.

4.7 Socio-Economic impacts

Many of the submissions to the draft EIS associated with the NT transport option have been submitted by residents of Alice Springs. The Adelaide to Darwin rail line passes through the town, essentially dissecting it. It is apparent from submissions that the majority of concerns from Alice relate to the effects of radiation from transport of Olympic Dam product through the town, the potential for accidents to occur and issues relating to access across the line when trains are moving through. These issues are discussed in more detail in Section 4.4 of this Report. Irrespective of BHP Billiton's commitments and proposed impact management for the Project, there may still be concerns in parts of the Alice Springs community associated with BHP Billiton's operations. BHP Billiton should be cognisant of these concerns and engage with the community to provide an opportunity for residents to express their views and to improve the transparency of its management of issues associated with transport of its products, in particular, the response by the proponent to accidents.

Recommendation 7

The proponent's social management plan should include a stakeholder engagement strategy for the NT transport option. The strategy should provide affected communities with the means to engage with the proponent on issues of concern.

There were concerns raised by some respondents to the draft EIS that the transport of radioactive material through Alice Springs would affect the perception of the town as a 'clean' destination for tourism.

BHP Billiton did not appear to address this concern in the Supplement. However, it could be argued that the rail line brings tourists to the 'Red Centre' and tourists will continue to visit Alice Springs irrespective of the freight that is transported through the town. While there may be concerns from some visitors that radioactive material may be present periodically in close proximity to the rail line, this is not expected to have a significant impact on tourist visitor numbers in the region.

Concerns were also raised that the costs and risks to the NT Government and community had not been adequately considered for the NT transport option. The costs cited by the Australian Conservation Foundation (ACF) and Environment Centre NT (ECNT) included:

- Upgrades to the rail network including proper safe crossings and maintenance;
- Provision of enhanced emergency service response capabilities for potential rail transport, port and shipping accidents; and
- All NT Government development and investment costs for the East Arm of Darwin Harbour, including land reclamation to provide a facility for BHP Billiton's storage and handling of concentrate product.

It is considered that many of these issues are the responsibility of Government and the owner of the rail network. However, decision makers would need to be assured that benefits would flow from projects requiring such investments of capital. As further mining developments occur in the interior of Australia, the demand for the rail transport option to the Port of Darwin is expected to increase significantly. This will require upgrades to existing infrastructure and it is expected that the costs of these upgrades will likely be recouped from proponents by Government and the rail owner.

4.8 Infrastructure and services

4.8.1 Level crossings

An issue associated with the safety of rail transport and road users is the level crossing sight line distances. Some level crossings within the NT require upgrades to bring them into line with safety requirements. Since the EIS was published, some upgrades have been completed, such as the Elizabeth River Boat Ramp level crossing.

Other crossings are being upgraded through the NT Government's Level Crossing Upgrading Program; however, any outstanding issues of sight distance on constrained level crossings will need to be addressed prior to the transport of concentrate. Prior to Project commencement, BHP Billiton will need to engage with the Road Network Division of the NT Department of Planning and Infrastructure or relevant authority at the time, to discuss any outstanding sight line distance issues.

4.8.2 Water supply

Concerns were raised about the capacity of Darwin's water supply to cater for the Project requirement of 2.5ML of potable water per annum.

BHP Billiton states that a key component of the detailed planning 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 kilolitres per hour (KL/h) across the port, but have the capacity to deliver more water if required. However, the current reticulated water supply regulated by the Power and Water Corporation is being challenged by existing demand.

As part of the proponent's 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; and
- 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.

The Territory 2030 Strategic Plan encourages Government, industry and the community to deliver on the objectives, and meet targets where ever possible. BHP Billiton and Government will need to work towards the target of efficient use of water.

4.9 Security

Concerns were raised about the possibility of terrorist attack or other risks to public safety associated with security breaches in the product transport chain. A review of the consequences of a potential terrorist action was requested as well as response capacities.

The risk of malicious intent was considered by the proponent in the risk assessment, which identified a number of potential risk events, as follows:

- malicious intent including theft of commodity leading to a potential security threat;
- perceptions of terrorist threats during various handling stages;
- malicious action or sabotage leading to derailment; and
- malicious release of uranium oxide in urban, rural and sensitive areas.

BHP Billiton 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. 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 DPC and other relevant authorities and agencies along the rail line from Olympic Dam to the Port of Darwin. BHP Billiton listed measures in the EIS including:

- 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; and
- 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 BHP Billiton cites measures such as:

- 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; and
 - any incidents or delays that adversely affected the journey.

Additionally, 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 that have obligations to track all Australian-obligated nuclear materials back to ASNO.

BHP Billiton again cite the long lead times to project inception and indicate that more detailed and extensive security assessment 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 ASNO and the Australian Security Intelligence Organisation (ASIO), along with NT Government agencies such as the PFES and DPC, 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 could be transported via East Arm to international customers.

4.10 Environmental Management Program

A number of management plans have been proposed through the course of the assessment process for the Project. All management plans and procedures proposed to be developed for the project must be approved by, or developed to the satisfaction of, relevant Government agencies and in consultation with key stakeholders in the timeframes specified.

These plans and procedures will be one of the primary tools by which the proponent will implement management and monitoring commitments made in the EIS, the recommendations detailed in this Report and any outcomes from future assessment and approvals.

The proponent employs a structured approach to the management of Health, Safety and Environment (HSE) issues via a formal and documented HSE Management Process based on a continuous improvement model as defined in internationally recognised standards (*AS/NZS ISO 14001:2004, Environmental management systems—Requirements with guidance for use*; and *AS/NZS 4801:2001, Occupational health and safety management systems—Specification with guidance for use*).

This system will form the overarching framework for the management of environmental, health and safety issues. A key component of the HSE Management Process is the development and implementation of management plans which detail the environment protection and management measures and controls necessary to avoid, reduce or mitigate the environmental impacts of the Project.

The implementation of the HSE Management Process should provide for continual improvement in the management plans and performance of the Project as the management system elements and the requirements within each of these are applied i.e. policy, planning, implementation, audit and review.

It is vital to the performance of the Project that the requirements in management processes, plans and procedures are incorporated into the proponent's tendering and contracting procedures and that all contractors are fully aware of, and act in compliance with, relevant management plans.

Proposed monitoring programs are associated with some of the management plans. These monitoring plans may be detailed in the management plans or developed as separate documents linked to the relevant management plans.

Another important consideration for this Project is transparency and accountability in impact management. Some regulatory instruments provide for public availability of management plans and monitoring outputs; others do not. The proximity of this development to Darwin Harbour and the nature of the product increases the importance of transparency. Therefore, as well as seeking engagement with key stakeholders in the preparation of these management plans, the proponent is encouraged to make the final management plans or a simplified version thereof available to the wider public. Furthermore, outputs from Project monitoring programs should also be publicly available at an agreed frequency.

Similarly, the proponent is encouraged to continue to engage and inform the relevant communities as certainty around the transport option improves. It is expected that this would include reporting of monitoring outcomes and ongoing management actions to minimise impact.

Management plans are to be provided to relevant Government agencies for scrutiny and/or approval well in advance of the activity for which the plan is intended to manage.

Recommendation 8

The proponent should be required to provide public access to:

- 1. final environmental management plans or relevant information in those plans;***
- 2. a reporting mechanism to inform compliance with the management plans prepared in accordance with Recommendation 2(b); and***
- 3. monitoring outputs at an agreed frequency.***

5 Conclusion

Based on the information provided and the assumptions made by the proponent, the high-level environmental issues associated with the proposed project are considered to have been adequately identified. The absence of a site in the East Arm precinct and lack of information on the final form of the storage, handling and loading facilities has not prevented the overall assessment of key risks associated with known components of the proposal. However, to ensure that the EIA process is robust and that the Project can proceed in an environmentally acceptable manner, the proponent needs to provide further notification to the Minister once the detailed planning and design information for the Project becomes available.

Given the long lead time before BHP Billiton requires commencement of construction of East Arm facilities, there is potential for relevant policies and the regulatory environment at the Port, and indeed in the Territory, to change. A notification to the Minister at the time will allow further consideration of the NT transport option proposal in the context of any changed political and regulatory conditions.

Provided there are no unidentified, significant issues at the time BHP Billiton requires NT Government approval and in the further, detailed notification to the Minister for the NT transport option, it is considered that the Olympic Dam Expansion NT transport option can be managed in a manner that avoids unacceptable environmental impacts. BHP Billiton will need to ensure that the environmental commitments, safeguards and recommendations detailed in the EIS and this Report are implemented, with regular reporting, compliance auditing, monitoring and evaluation, and appropriate responses and adaptations to any issues identified through monitoring.

6 References:

ABS, 2006, *Cat 3222.7 – Population Projections, Northern Territory 1999 - 2021* accessed 15 July 2011 at: (<http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/7672AED078A407F4CA256A930080EEB1?OpenDocument>).

ABS, 2011, *Cat 3218.0 – Regional Population Growth, Australia, 2009–10* accessed 15 July 2011 at: (<http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2009-10~Main+Features~Northern+Territory?OpenDocument#PARALINK28>).

Department of the Chief Minister, 2009, *Territory 2030 Strategic Plan*, Northern Territory Government.

NT EPA, 2010, *Ecologically Sustainable Development in the Darwin Harbour Region: Review of Governance Frameworks*.

Appendix 1

A summarised list of issues raised from public review of the draft EIS corresponding with the individuals / organisations responsible for raising those issues.

Issue	Raised By
Radiation exposure Transport of radioactive material through Alice Springs and other regional centres Contamination from spills of Olympic Dam product Radiation safeguards not adequate	Jess Abrahams ALEC Angela Day Scott Foyster Lisa Hall Alex Kelly Charlotte McCabe ACF Libby Nuss Clive Rosewarne Derek Schild Katherine Taylor William Fisher
Level Crossings Traffic delays at crossings Emergency services vehicle delays in Alice Springs	Jess Abrahams ALEC Clive Rosewarne Katherine Taylor

Issue	Raised By
Rail transport Increased accident risk due to long distance and more frequent rail journeys Railway line not safe NTG Dangerous Goods transport report not made available	ALEC Scott Foyster Bindi Isis Charlotte McCabe ACF ECNT Clive Rosewarne
Port facilities Difficult to assess impacts with so little detail High water use at facility and consideration of water sources Zero emissions and waste discharge requirements for handling facilities Effects of extreme weather events on facilities	AFANT ACF ECNT
Risk Assessment Risk assessment difficult to understand Did the risk assessment address uranium oxide transport as well as concentrate? Concern that no risk assessment workshop was conducted for the NT transport option The lack of risk assessments for concentrate entering land, aquatic and marine environment	Craig Cross AFANT
Security Potential for terrorism – ‘dirty bomb’	ACF ECNT Hans Peter Schnelboegl
Emergency response	Craig Cross

Issue	Raised By
Contingency plans for accident response should be published for comment Transparency required for emergency planning Lack of detail on emergency response capacity and preparedness for spills and accidents No emergency response plan for rail accidents included in EIS	AFANT ACF Clive Rosewarne Derek Schild Katherine Taylor
Socio-economic impact The social and economic impacts of spills need to be considered Costs and risks to NT Government and community of the transport option Inadequate consultation with Aboriginal land owners regarding radioactive materials transport Impacts to Alice Springs tourism	Craig Cross ACF Libby Nuss ECNT Derek Schild Charlotte McCabe
Scope of assessment Assessment should include consideration of nuclear fuel chain and international stewardship Future increased mine production rate should either be accounted for in NT transport option or not approved through this assessment process.	ACF ECNT Clive Rosewarne