

14 Waste Management

14.1 Introduction

This section considers solid, liquid and gaseous waste streams associated with the project and their potential impact on existing environmental values. The section does not include waste related to mining operations which is discussed in Section 5 (Mineral Waste). The Mineral Waste section includes management of overburden and tailings.

14.2 Description of Environmental Values

14.2.1 Definition

The EP Act defines environmental values as a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

Environmental values with the potential to be impacted upon by waste include:

- Visual amenity
- Receiving environments such as land, air, surface water and groundwater
- Flora and fauna
- Health and hygiene of sensitive receptors.

The environmental values to be protected during this project are the life, health and wellbeing of people and the diversity of ecological processes and associated ecosystems surrounding the mine. During construction and operational phases, waste will be managed at the mine to minimise adverse impacts on these values.

The following waste streams from the project have the potential to impact on the above mentioned environmental values:

- Solid waste (other than mineral waste)
- Waste water from the mining operations and processing plant
- Air emissions including particulates, fumes and odour from the project during construction and operation.

The following section details how waste management has been regulated to protect the existing environmental values of the project.

14.2.2 Legislative Requirements

As a generator of waste, BMA will ensure that it meets its obligations under the *Environmental Protection Act 1994*, Environmental Protection (Waste Management) Policy 2000, Environmental Protection (Waste Management) Regulation 2000 and the National Environmental Protection (Movement of controlled Wastes between States and Territories) Measure during construction and operation of the project. The details of these legislative requirements are provided in Section 1.7.1 (Legislative requirements and Approvals).

14.3 Description of waste

14.3.1 Definition of wastes

Under the EP Act waste is defined as anything that is:

Left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or

- Surplus to the industrial, commercial, domestic or other activity generating wastes.

The EP (Waste) Regulation defines general waste as waste other than regulated waste. Regulated wastes are defined in Schedule 1 of the EP (Waste) Regulation as non-domestic waste (which is defined in Schedule 7 of the Regulation).

The EPP (Waste) defines regulated waste, as any waste:

- That contains a significant quantity and concentration of a hazardous contaminant; or
- Where the hazardous contaminant exhibits hazardous characteristics because of its toxicity, carcinogenicity, mutagenicity, teratogenicity, flammability, corrosivity, reactivity, ignitability or infectiousness, through its physical, chemical or biological characteristics; or
- That may cause environmental harm if improperly transported, treated, stored, disposed or otherwise managed.

14.3.2 Waste Management Principles and Hierarchies

The EEP (Waste) provides guidance for waste management through waste management principles and hierarchies. The principles are:

- Polluter pays principle – all costs associated with waste management should, where possible, be borne by the waste generator.
- User pay principle – all costs associated with the use of a resource should, where possible, be included in the price of goods and services developed from the resource.
- Product stewardship principle – the producer or importer of a product should take all reasonable steps to minimise environmental harm from the production, use and disposal of the product.

The above three principles form a hierarchy and provide a basis for waste management programs under ERAs. Waste should be managed following the hierarchy below (in order of priority) (EPA, 2005):

- Waste avoidance
- Waste reuse
- Waste recycling
- Energy recovery
- Waste disposal.



14.3.3 Waste Management Strategies

Environmental harm caused by waste could occur if wastes are not managed properly, especially where there is the potential for hydrocarbon wastes and waste waters to enter sensitive receptors, thereby causing contamination or pollution.

The waste management strategies proposed for the project consider waste management from the concept and planning stages through design, construction and operation. BMA will provide appropriate training in waste management practices to all employees concerned.

14.3.3.1 Waste Avoidance

Waste avoidance is the first hierarchical step in reducing the amount of waste produced. The generation of waste can be avoided by substituting inputs for those that generate waste, increasing efficiency in the use of raw materials, energy, water or land, redesigning processes or products, and/or improving maintenance and operation of equipment.

Careful project planning will ensure that the amount of material brought on-site for the construction and operating of the project is minimised, resulting in a cost saving and reducing the volume of waste generated. Any excess materials and used chemical containers will, where practical, be returned to the supplier or other local users.

BMA will also consider packaging issues when purchasing resources for the project and will encourage bulk purchasing to reduce the amount of packaging waste.

14.3.3.2 Waste Reuse/Recycling

The appropriate management and storage of wastes will prevent on-site and off-site pollution and enhance opportunities for reuse. Waste will be sent for disposal to landfill only once other options have been exhausted. Waste streams will be assessed for potential reuse, prior to transport to an approved disposal facility.

The following are examples of how materials, identified as construction wastes will be reused or recycled where possible:

- Vegetation wastes from site clearing will be used in on-site landscaping where possible.
- Topsoil from disturbed areas will be stored for use in future rehabilitation activities on-site.
- Where possible, recyclable materials will be purchased for use throughout the project.
- Recovering solvents, metals or oil and re-using them for a secondary purpose.
- Recyclable building wastes will be collected separately and reused or recycled, for example:
 - Timber from concrete formwork
 - Scrap steel and off-cuts
 - Pallets
 - Plastics

- Paper and cardboard
- Oils.

Waste Separation

Waste, where practicable and taking into account health and hygiene issues, will be segregated and collected on-site and stored in suitable containers for removal to approved facilities as agreed with the relevant local council prior to construction. It is anticipated that a portion of all construction materials will be recycled.

Adequate separation of components of the waste stream at the point of generation will be practiced by the project, for example, steel, glass, paper, cardboard and aluminium cans will be segregated from general waste. Maintaining segregation of different types of waste during generation, storage or transportation makes recovery achievable.

Solid waste streams will be separated into various components at the point of their production. Waste separation at the source will be achieved by providing bins for reusable or recyclable materials. A number of locations will be allocated within the project site for the collection of large quantities of waste to enable segregation of wastes for recycling.

Some of these materials collected will have a market demand. There are likely to be opportunities to reuse and recycle aluminium cans, some containers such as glass bottles, paper, cardboard, pallets, drums, timber, oils, and scrap metal. The project will review the marketability of its waste for recycling and reuse on a regular basis should sufficient amounts of reusable/recyclable waste be produced as a result of construction and operation.

14.3.3.3 Waste Disposal

Wastes generated by the project will be disposed of in a way that causes the least harm to the environment. Operational and construction solid wastes that cannot be recycled or reused will be disposed of by a commercial waste contractor at an appropriate facility, depending on the waste type. Facilities in the region include:

- Moranbah landfill on Goonyella Road
- Licensed regulated waste facilities (Mackay, Townsville and Narangba)
- Material Recycling Facility in Mackay
- Transfer stations at Nebo and at Coppabella.

14.4 Waste Management Process

14.4.1 Waste Management Procedures

The Environmental Management System (EMS) for the project will address waste management with an aim to minimising the quantity of waste generated and improving on the waste disposal and management techniques adopted.

The principles for waste minimisation and management for the project are as follows:



- The overarching principle for waste management for the project is:
 - Programs are in place to ensure that wastes are eliminated (or where possible avoided), reduced, reused, recycled, treated, or properly disposed of. Records are kept to ensure that all wastes can be tracked from source to disposal, and waste receiving facilities are audited to ensure conformance to appropriate waste standards.
- The sub-principles for waste minimisation and management for the project are:
 - Initiatives are identified and implemented to use raw materials and natural resources efficiently.
 - Initiatives are identified and implemented to reduce the environmental impact of operations. Programs are implemented to protect, manage and, where appropriate, enhance biodiversity values.
 - Existing and new products and services are assessed for their potential to provide Health, Safety, Environment and Community (HSEC) benefits or cause adverse HSEC impacts over their lifecycle.
 - Opportunities are sought to conduct or support research and innovation that promotes the use of products and technologies that are safe and efficient in their use of energy, natural resources and other materials.
 - Advice is made available to employees, contractors, distributors, customers and the community regarding the possible HSEC impacts associated with the production, transport, storage, use, recycling and disposal of BHP Billiton products.
 - Systems are in place to identify, evaluate and respond to HSEC related external influences (e.g. customer needs and expectations, regulations, voluntary standards and competitor initiatives) that could impact on BHP Billiton products and business activities.
- All waste generated on-site during the construction and operation phase will be disposed of in accordance with the contractor's construction environmental management plan or the site's environmental management plan, which will provide for:
 - Waste stream characterisation and separation.
 - Assessment of waste reduction opportunities for identified waste.
 - Management of waste in accordance with the waste management hierarchy as identified in the overarching principle for waste management.



14.4.2 Waste Monitoring

By monitoring waste management related activities for the project, BMA will be able to:

- Compile and analyse waste data to enable continuous improvement of waste avoidance, reduction and management measures throughout all components of the project.
- Monitor and, if required, initiate actions to fulfil waste objectives and targets.
- Assess actual waste management results and comparing with predicted impacts and mitigation measures.
- Monitor potential environmental impacts.
- Enable positive actions to be taken in the event of incidents or accidents.

14.4.3 Waste Tracking

Under the EP (Waste) Regulation, it is a requirement that the administering authority is provided with the relevant information required to manage the environmental risks associated with trackable wastes.

All waste movement from the site will be tracked in accordance with the requirements of Schedule 2 of the EP (Waste) Regulation. This will include the completion of Waste Transport Certificates for the collection, transport and management of regulated wastes from the project. Specifically this will include recording the following information:

- Name, address, local government area and contact details of generator
- Name, address, contact details and environmental authority number of receiver
- Name, address, contact details and environmental authority number of transporter
- The day and time the waste is given to the transporter
- The load number
- Registration number of the vehicle transporting the load
- If the waste is a dangerous good:
 - The type and number of containers in which the waste is contained
 - Its UN number
 - Its packing group designator
 - Its dangerous goods class and any subsidiary risk
- The following details of the waste:
 - The type of waste
 - Amount expressed in kilograms or litres



- Its physical nature (solid, liquid, paste or gas)
- Its waste code.
- The waste origin code for the activity that generated the waste.

In addition to reports for regulated wastes, DERM Waste Transport Certificates will be forwarded to the BMA Waste Management Coordinator. A copy of the certificates will be retained by the waste contractor and also sent to the DERM. The certificates will outline the type and amount of regulated waste, the name of the waste producer, and the nominated disposal/treatment/storage facility.

Waste contractors will also provide BMA with monthly reports which outline different waste types, their disposal methods and tracking.

14.5 Potential Impacts and Mitigation Measures

14.5.1 Waste Sources

The project will generate waste during the construction phase and the operational phase. These sources include:

- Regulated waste including hydrocarbon waste such as waste oil, oily water, oily sludge, grease, coolant, oil rags, oil filters, drums, detergents, solvents, batteries, tyres, paints and resins.
- General waste including food waste, packaging and food containers.
- Recyclable waste including paper, cardboard, plastics, glass and aluminium cans.
- Wood waste including timber, pallets, and off-cuts.
- Tyres including light vehicle tyres and mine truck tyres.
- Scrap metal and off-cuts from the water supply pipeline and mine infrastructure areas including drums, cans, scrap, containers, nails, screws.
- Sewage effluent and sludge.

The characteristics of mining wastes (waste rock, coal rejects and tailings) and their management are discussed in detail in Section 5.2.

14.5.2 Construction Waste

The wastes generated by mine and infrastructure construction activities and their proposed management are shown in Table 14.1. Quantities of waste were estimated based on information from other coal mine sites in Central Queensland.

Waste generated during the operational phase of the project will be managed in accordance with the project WMP detailed in Section 14.6.

The contractor will be required to report waste management performance on a regular basis.



14.5.3 Operational Waste

The estimated volumes of each waste type (apart from waste rock and tailings) likely to be generated during operational phase of the mine and their management method are shown in Table 14.2. Waste volumes at the neighbouring Peak Downs Mine (a similar sized mine) were used to estimate waste quantities.

Waste generated during the operational phase of the project will be managed in accordance with the project WMP.

Table 14.1 Waste Management: Construction Phase

Waste Type	Source(s)	Management Method	Approximate Quantity
Cleared vegetation	Clearing necessary for mine, water pipeline, site infrastructure including dams, diversion, levee and sewage treatment plant	Reuse vegetation waste on-site for rehabilitation, landscaping and erosion control where possible.	Small amounts of vegetation
Excavated waste (soil and overburden)	Access roads, site infrastructure and site fencing.	Refill any excavations and spread any excess soil over the nearby area and revegetate.	All used as fill on site
Concrete	Site infrastructure area and water supply pipeline.	Minimise waste by producing/procuring only the amount required. Excess waste will be disposed of in the Heyford Pit spoil dump on-site.	<2 t
Steel/metal off-cuts	Site infrastructure area and water pipeline.	Minimise waste by producing/procuring only the amount required. Segregation and collection on-site. Transportation off-site by a waste contractor for off-site recycling.	4 tonnes
Timber pallets and off-cuts	Site infrastructure area and workshop.	Minimise waste by producing/procuring only the amount required. Any undamaged pallets will be returned to the supplier for reuse. Excess waste will be chipped and reused on-site as mulch for landscaping and erosion control where practical. Left over waste will be disposed of in the Heyford Pit spoil dump on-site.	4 tonnes
Paints and resins	Site infrastructure area, workshop and water supply pipeline	Minimise waste by producing/procuring only the amount required. Off-site painting where possible. Collection on-site and storage in a segregated area. Transportation off-site by licensed regulated waste transporter, and disposal at a licensed facility.	Minor amounts.



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Waste Type	Source(s)	Management Method	Approximate Quantity
General wastes including food waste, packaging materials	Construction offices and workshop.	General waste will be taken off-site for disposal at the Moranbah town landfill. Collection and segregation of recyclable waste on-site. Transportation by a waste contractor for off-site recycling.	50 tonnes
Grease trap wastes	Workshop.	Wastes will be collected and taken by licensed regulated waste transporter to a licensed facility for recycling.	1,650 litres
Waste oil and containers	Workshop.	Collected and stored on-site in a bunded tank. Transported off-site by a licensed regulated waste transporter, to a licensed facility for recycling.	45 t
Oily water	Workshop.	Oil will be separated from water. The resulting oil will be collected and transported off-site by a licensed regulated waste transporter to a licensed facility for recycling. The separated water will be disposed of through the Sewage Treatment Plant system.	4 t
Tyres	Workshop.	Light vehicle tyres will be stored on-site and transported off-site by a licensed regulated waste transporter to a licensed facility for recycling or disposal.	60
Sewage Treatment Plant (STP) waste and residues (sewage sludge)	Administration offices, workshops.	Disposed of in an appropriate facility by a licensed contractor.	15 t/ annum



Table 14.2 Waste Management: Operation Phase

Waste Type	Source(s)	Management Method	Approximate Quantity (per annum)
Oily sludge, absorbent, degreaser, grease, oily rags, oil filters	Workshop and mobile service vehicles.	Collected on-site then transported off-site by a licensed regulated waste transporter, to a licensed facility for recycling or treatment and disposal.	Oil sludge 7,000 litres; Grease 43,500 litres; Oil Filters 30,500 kg, 2 tonnes.
Waste oil containers	Workshop and mobile service vehicles.	Drained on-site. Drums will be transported off-site by waste contractor for off-site reuse, recycling or disposal.	121,000 litres 200 units
Scrap metal, drums	Site Infrastructure Area, including administration, workshops.	Segregation and collection on-site. Transportation off-site by a waste contractor for off-site recycling.	91 tonnes
General wastes including putrescible and organic (food waste), some plastics and paper not suitable for recycling	Workshop, office.	Collection on-site and storage in segregated area. Transportation off-site to Moranbah Town landfill.	4,000 m ³ 149 tonnes
Recyclable waste including paper and cardboard, plastics, and glass	Workshop, office.	Segregation and collection on-site. Transportation by a waste contractor for off-site recycling.	2,040 m ³ 28 tonnes
Hazardous waste- paints and resins	Workshop.	Collected on-site and stored in a segregated area. Then transported off-site by a licensed regulated waste transporter, to a licensed facility for treatment and disposal.	<2 tonnes



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Waste Type	Source(s)	Management Method	Approximate Quantity (per annum)
Timber pallets and off-cuts	Site Infrastructure Area, including administration, workshops.	<p>Minimise waste by producing/procuring only the amount required.</p> <p>Any undamaged pallets will be returned to the supplier for reuse.</p> <p>Excess waste will be chipped and reused on-site as mulch for landscaping and erosion control where practical. Left over waste will be disposed of in the Heyford pit spoil dump.</p>	3 tonnes
Tyres	Workshop.	<p>Light vehicle tyres will be stored on-site and transported off-site by a licensed regulated waste transporter to a licensed facility for recycling or disposal.</p> <p>Mine truck tyres will be buried on-site, the locations of which will need to be recorded in accordance with DERM requirements.</p>	50
Vehicle batteries	Site Infrastructure Area including administration, workshops.	Collected on-site in a segregated area. Then transported off-site by a licensed regulated waste transporter to a licensed facility for recycling.	3 tonnes
Regulated waste- sewage waste and residues (sewage sludge)	Sewage Treatment Plant.	Wastes will be transported and disposed of by licensed contractor at a licensed facility.	45 ML/Annum (based on 495 EP) Volume will vary depending on number of people on site



14.5.4 Decommissioning

Decommissioning of project components and infrastructure has not been planned at this early stage of the project development. However, decommissioning will be undertaken as/when required and will be done so in accordance with accepted industry practices, stakeholder and regulatory requirements.

14.6 Waste Management Plan

14.6.1 Introduction

The potential environmental impacts that may result from generation and disposal of waste will be effectively managed and reduced by the implementation of specific waste management procedures. These procedures will form an integral part of the project's environmental management plan and EMS. The intent of the environmental management plan is to:

- Maintain due diligence to ensure compliance with legislation.
- Support waste minimisation through a avoid, reduce, reuse and recycle approach.
- Facilitate good housekeeping practices thereby removing potential health and safety hazards.
- Ensure efficient removal of regulated wastes off-site and ensure that the disposal facilities receiving the waste are regularly audited.
- Ensure the recording of waste stream volumes, thus enabling the setting and measurement of waste management performance objectives and targets.
- Ensure that employees, contractors, distributors and customers understand their obligations under the WMP.
- Provide for continual improvement in waste management practices and processes.
- Minimise impact to future rehabilitation of the mine site as well as prevention of land and water contamination (both on-site and off-site).

Wastes will be managed to avoid adverse impacts on environmental values including the life, health and wellbeing of people and the diversity of ecological processes and associated ecosystems surrounding the project.

The disposal of major mining wastes of overburden, rejects and tailings are addressed in Section 5.3.

14.6.2 Corporate HSEC Objectives and Targets

Measurable HSEC goals are set by BHP Billiton on an annual basis for its existing mines (BMA, 2005a) and will apply to the project. The goals and associated performance indicators are consistent with the BHP Billiton-wide HSEC targets, which take into account the significant HSEC risks, legal and other requirements, technological options, business requirements and the interests of stakeholders.



Waste management objectives and time-bound targets will be established using the following initiative rankings (BMA, 2005a):

- **High priority initiatives:** These shall be implemented to treat high level risks or to take advantage of significant financial opportunities and shall be implemented as soon as reasonably practicable.
- **Medium priority initiatives:** These shall be implemented to treat moderate level risks and thus incur financial costs commensurate with the level of risk. They also includes initiatives that provide operational improvements with marginal financial benefits and/or provide less tangible benefits e.g. improved environmental, community or public relations outcomes.
- **Low priority initiatives:** These should be implemented over the longer term to treat low-level risks and will be considered on a cost benefit basis.

The targets and performance indicators will be documented, communicated, monitored and reviewed, with the progress of actions monitored and reported by the Waste Management Coordinator on a monthly basis to site management. Where trends indicate failure to achieve targets, the Waste Management Coordinator will initiate investigations and identify corrective actions to enable targets to be achieved.

The following are specific BHP Billiton waste management key performance indicators (KPIs) relevant to the project:

- Storage and disposal of waste and hazardous substances:
 - 98% correctly disposed of in accordance with procedures (tracked in contamination reports).
 - All hazardous substances disposed of according to the relevant Australian Standard or BMA standard.
- Waste minimisation which is defined relative to a base year – waste to be considered include:
 - Waste to landfill
 - Volume of coolant and degreaser
 - Diesel spills
 - Air filter usage.

Additional waste management objectives for the project include:

- Development of project departmental recycling targets based on information on department waste streams and volumes.
- Investigation of potential reuse of certain streams of regulated waste like the use of waste oil in on-site operations.
- Enhancement of workforce knowledge on correct segregation of general and recyclable waste streams.



14.6.3 Risk Assessment

The waste management plan will include a risk assessment process. The assessment will be used to identify the potential risk of various wastes on the surrounding sensitive receptors. This will allow the contractors (during construction) and BMA (during operation) to focus resources on the high risk issues.

14.6.4 Roles and Responsibilities

The roles, responsibilities and authorities for effectively and continually improving the waste management system for the project will be detailed in the project WMP.

14.6.5 Employee and Contractor Training and Awareness

All waste management contractors will have the necessary qualifications to remove waste from site. This will include attendance at generic inductions, obtaining appropriate licenses, being classed as Queensland Coal Board competent, and undergoing a Queensland Coal Board medical examination.

All site personnel and contractors must implement the site waste management standards and procedures.

14.6.6 On-site Waste Tracking and Reporting

The movement of regulated waste in Queensland is subject to a waste tracking system. The WMP for the project will incorporate an approved waste tracking system for those wastes that require tracking. The WMP will include procedures for identification of regulated wastes.

In addition, the treatment, storage and transport of regulated waste require an Environmental Authority under the EP Act. Where the proponent and/or a contractor carry out these activities, BMA and/or contractor will be required to hold the appropriate approvals. This requirement will be incorporated into the project WMP.

14.6.6.1 Waste Transport Certificate

Wastes potentially generated by the project are listed in Section 14.5. If the waste is regulated and is listed as trackable under the EP (Waste) Regulation, all waste handlers (generators, transporters, and receivers) need to complete their part of a Waste Transport Certificate. The purpose of the document is for reference information for the DERM. With this document the DERM can then follow the waste from the point of origin, transportation route and final destination. The waste properties and characteristic will be known to make sure the waste has been properly handled, treated, stored, transported and disposed of correctly by appropriate licensed personnel and facilities.

The Waste Transport Certificate is available from DERM offices. A copy of the certificate will travel with the waste from the loading point to the delivery of the waste at the final disposal facility. Each document is numbered. The document number then becomes the waste load reference number. Two versions of the Waste Transport Certificate are available, one for intrastate waste transport and one for interstate waste transport. These documents are required to be kept for minimum 5 years, however it is BMA policy to retain these documents for 10 years. If the waste contains asbestos, the documents will be kept for 40 years. The waste tracking documents will remain on-site for six months after the waste was transported off-site. After the six months the documents will be forwarded to head office and archived after two years.



If the waste is regulated but not trackable then only the following needs to be documented:

- Date of transport
- Type and quantity of waste
- Waste Transport Certificate Number (if required)
- Transporters company name
- Selected route of transport
- Final destination/facility
- Accepted by (transporters signature)
- Records of any incidents that may have occurred *en route*.

14.6.7 Auditing

The WMP will be subject to regular internal and external audits. The findings of these audits shall be used to develop methodologies aimed at improving waste reuse, recycling and minimisation.

The targets and progress of actions will be monitored and reported by the project's Waste Management Coordinator on a monthly basis to mine management. Where trends indicate failure to achieve targets, the BMA will initiate investigations and identify corrective actions to enable targets to be achieved.

Monitoring of waste management activities will be conducted for the following:

- Assessment of actual waste management results and comparing with predicted impacts and mitigation measures.
- Monitoring for potential environmental impacts.
- Providing baseline data to enable continuous improvement of waste avoidance, reduction and management measures throughout the project.
- Provision of baseline data to enable continuous improvement of waste avoidance, reduction and management measures throughout the project.

The DERM may also audit any aspect of the project WMP at any time.

14.6.8 Incident Reporting and Investigation

The mine will maintain a HSEC process to ensure appropriate management of unplanned incidents, including reporting, notification, investigation, analysis, corrective and preventive action, follow up and incident closure.

Incidents related to waste management will be handled in accordance with the Corporate HSEC. Where appropriate, recommendations made through this system will be incorporated into the project environmental management plan.



14.6.9 Emergency Preparedness

BMA's current hazard and emergency response protocol will be amended and implemented to respond to emergency situations and potential incidents so that impacts on environment, employees and surrounding communities are mitigated. Relevant documentation that contains the protocol includes the Emergency Management Plan and the procedures for spill response. These documents are discussed further in Section 19.10 Hazard and Risk.

Standard procedures for the storage, handling, disposal and spill response for potentially hazardous waste materials will be adopted. This will include the use of spill containment material and spill clean up kits located at workshops.

Sites that become contaminated will be investigated, managed and remediated in accordance with the requirements of the contaminated land provisions of the EP Act.

14.6.10 Cleaner Production and Waste Minimisation

14.6.11 General

Generally, cleaner production can be achieved through any or all of the following techniques:

- Input substitution (this is not readily applicable to this project)
- Product reformulation (this is not readily applicable to this project)
- Production process modification including selection of the best available practicable technologies
- Improved operation and maintenance including the selection and use of the most appropriate processes and equipment.
- Reuse of resources that are otherwise wastes.
- Closed-loop recycling where a product is recycled and used again in the same form.

Aspects of the project that will potentially contribute to cleaner production outcomes include:

14.6.11.1 Construction

- Utilisation of best practice procurement methods to ensure minimum wastes are generated during construction.
- Contracts with construction companies will encourage all contractors to adopt best practise waste minimisation procedures.
- Purchase of materials cut to standard sizes, reuse of concrete formwork where practicable, and source separation and segregation of all recoverable materials .
- Separate skips will be provided to maintain segregation and maximise economic reuse and recycling, in preference to disposal to landfill.



14.6.11.2 Operation

- Employing production processes that are efficient in their consumption of energy, materials and natural resources.
- Selection of energy efficient equipment for use in the CHPP, and mobile equipment used around the mine.
- Minimising generated wastes through recycling and by reusing process residues.
- Safely disposing of any residual wastes and process residues.
- Promoting the safe use, handling, recycling and disposal of BMA's products through an understanding of their life cycle.
- Reuse of process plant water as the primary source of water for the CHPP.

14.6.12 Natural Resource Use Efficiency

Details of natural resource use efficiency for the project is discussed in Section 2.3.