

14 Waste Management

14.1 Waste Management Regulations

The regulatory requirements governing waste management are provided within the Queensland *Environmental Protection Act 1994* (EP Act), the *Environmental Protection Regulation 1998* and associated *Environmental Protection (Waste Management) Policy 2000* (EPP (Waste)), and the *Environmental Protection (Waste Management) Regulation 2000*.

The main aspects of these regulations are presented in **Section 1**.

14.1.1 Waste Definition

The EP Act defines “Waste” 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 *Environmental Protection Regulation 1998* defines “general waste” as waste other than regulated waste. Regulated wastes are defined in Schedule 1 of the *Environmental Protection (Waste Management) Regulation 2000* as ‘non-domestic’ waste (which is defined in Schedule 7 of the Regulation).

14.1.2 Waste Reporting

The National Environment Protection Council (NEPC) has endorsed a National Environment Protection Measure (NEPM) in the form of the National Pollutant Inventory (NPI).

The NPI is a database designed to provide the community, industry and government with information on the types and amounts of certain substances being emitted to the land, air and water.

Reporting of these emissions under the NPI commenced in July 1998, and will be a requirement for the Project. All NPI information is publicly available through the NPI website (<http://www.npi.gov.au/>).

The main objectives of the NPI are to:

- promote waste minimisation, cleaner production and efficient energy and resource use;
- provide information to industry and government to assist in environmental planning and management; and
- satisfy community demand for accessible information on pollutant emissions to the environment.

The NPI sets out the requirements for reporting, including how a facility triggers a reporting obligation and what substances are on the reporting list. The Project will trigger the NPI because it will be engaged in the activity of coal mining and some of its emissions will exceed the threshold levels for reporting. BMA will therefore estimate and report Project emissions to the NPI annually once mining commences.

In reporting waste emissions to the NPI, BMA will refer to the Emission Estimation Technique Manual for each of the activities associated with coal mining. The key activities relevant to the Project are:

- coal mining;
- fuel and organic liquid storage; and
- explosives detonation.

14.2 Waste Management Strategy

Environmental harm will only occur if wastes are not managed properly, especially where there is the potential for hydrocarbon waste and waste water to cause land, water or groundwater contamination.

The waste management strategies proposed for the Project consider waste management from the concept and planning stages through design, construction and operation. Waste planning for the Project allows for considerable flexibility in the management of all wastes. Adequate separation of components of the waste stream at the point of generation will be practiced by the Project. For example steel, glass, paper and aluminium cans, will be segregated.

Maintaining segregation of different types of waste during generation, storage or transportation, makes recovery achievable. The appropriate management and storage of wastes will prevent on-site and off-site pollution and enhance opportunities for reuse or recycling. Waste that is not regulated will be sent for disposal to landfill if other options have been ruled out.

The Project will not generate many wastes that have a market demand. There are likely to be opportunities to reuse and recycle aluminium cans, some containers such as glass bottles, paper and scrap steel. Some other wastes will be recycled or reused on site, such as pallets, or disposed of by waste management contractors. The Project will review the marketability of its waste for recycling and reuse on a regular basis.

14.2.1 Environmental Value

During the Project construction, operation and decommissioning phases, waste will be managed to avoid adverse impacts on the life, health and wellbeing of people and the diversity of ecological processes and associated ecosystems surrounding the mine.

14.2.2 Waste Management Procedure

The Environmental Management Plan (EM Plan) for the Project (**Appendix P**) addresses waste management and endeavours to minimise the quantity of waste generated and improve on the waste disposal and management techniques adopted.

The principles for waste minimisation and management for the Project are:

- implementation of the waste minimisation hierarchy with a preference for:
 - waste avoidance;
 - waste re-use; and
 - waste recycling.
- water conservation, treatment and reuse;
- efficient energy usage;

- compliance with national and state waste management policies, the EP Act and associated regulatory instruments as a minimum; and
- effective waste disposal (as a last option).

All waste generated on-site during the construction and operation phase will be disposed of in accordance with the EM Plan, which will include:

- waste stream characterisation and separation;
- assessment of waste reduction opportunities for identified waste; and
- management of waste in accordance with the waste management hierarchy.

Waste management procedures will be developed, consistent with the EM Plan and site Environmental Management System, to address the following activities:

- Waste minimisation, reuse and recycling;
- Waste storage and handling;
- Waste transport, disposal and tracking;
- Waste monitoring and reporting; and
- Spill response and reporting.

In accordance with Section 4 of the EM Plan (**Appendix P**), training will be provided to personnel and contractors in waste management.

14.2.3 Cleaner Production

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 - selection of the best available practicable technologies;
- improved operation and maintenance - this refers to the selection and use of the most appropriate processes and equipment;
- reuse of resources that are otherwise wastes; and
- closed-loop recycling – where a product is recycled and used again in the same form.

Aspects of the Project that contribute to cleaner production outcomes include:

- selection of the best available practicable technology for coal extraction (fixed and mobile plant and equipment) to ensure appropriate energy intensity and production efficiency of ROM coal;
- location of the mining and infrastructure areas to minimise the clearing of vegetation;
- selection of the best available practicable technology for the CHPP to ensure optimum water use efficiency and energy efficiency, minimum dust emissions and waste minimisation;
- use of the most appropriate processes and equipment for operation and maintenance, such as the reuse of wastewater within the mine water management system;

- ensuring the shortest practical water supply pipeline route (extension of the Poitrel and Millennium Project water supply pipeline to Daunia) and the use of best practice procurement and construction methods on the CHPP and pipeline, ensuring minimum wastes are produced; and
- recycling of glass, aluminium, steel and cardboard.

Contracts with construction companies will be prepared to encourage all contractors to adopt best practice waste minimisation procedures. This includes the 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.

14.2.4 Waste Tracking

The movement of regulated waste in Queensland is subject to a waste tracking system. The environmental management plan/s for the Project will incorporate an approved waste tracking system for those wastes that require tracking. The Waste Management Plan will include procedures for identification and management of trackable wastes.

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

14.2.5 Spill Containment and Remediation

The waste management procedures developed for the Project, as outlined in **Section 14.2.2**, will include procedures for the storage, handling, disposal and spill response for potentially hazardous waste materials. This will include the provision of spill containment equipment and materials at workshops and fuel/chemical storage areas. In accordance with Section 4 of the EM Plan, training will be provided to personnel and contractors in the management of chemicals, hydrocarbons and wastes.

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

There is potential for some spill containment areas to collect incident rainfall. In these circumstances water will be tested prior to either releasing to the internal sedimentation dams for reuse or off-site disposal as regulated waste.

14.2.6 Waste Monitoring

Waste monitoring and auditing will be undertaken at the Project. The purpose of monitoring waste management activities and outcomes on-site include:

- assessing actual waste results and comparing with predicted impacts and mitigation measures;
- monitoring for potential environmental impacts; and
- providing baseline data to enable continuous improvement of waste avoidance, reduction and management measures throughout the Project.

14.3 Waste Inventory, Characteristics and Management

14.3.1 Waste Characteristics

Mining wastes (spoil, coal rejects and tailings) are the major wastes generated by the Project. The characteristics of mining wastes and their management are discussed in detail in **Section 4**.

The other main sources of waste generation from the Project are shown in **Table 14-1** and **Table 14-3**. In summary they are:

- vegetation cleared from areas to be disturbed by the project;
- regulated waste (hydrocarbon waste, detergents, flocculants, flotation agents, solvents, batteries, tyres);
- general waste (food scraps, paper, rags, cans and glass);
- scrap metal and off cuts from maintenance activities, and the construction of the CHPP, water supply pipeline and mine infrastructure areas; and
- sewage effluent.

The management methods proposed in **Table 14-1** and **Table 14-3** are based on minimising the potential environmental impacts associated with waste generation at the Project. These impacts can be grouped as:

- Wastage of raw materials (e.g. wastage of construction materials such as steel and concrete)
- Wastage of embedded energy and greenhouse gas emissions
- Consumption of landfill air space (e.g. where waste is sent to local landfills)
- Generation of landfill leachate and landfill gas (e.g. from waste sent to local landfills)
- Risks to human health or safety (e.g. through poor management of hazardous materials)
- Pollution of soil, groundwater, or surface water (e.g. through accidental spills or releases)

14.3.2 Construction Wastes

The wastes generated by mine and infrastructure construction activities at the Project and their proposed management are shown in **Table 14-1**.

Quantities of waste were estimated based on experience at other coal mine sites in Central Queensland.

Table 14-1 Waste Management: Construction Phase

Waste Type	Source(s)	Management Method	Approximate Quantity
Cleared vegetation	Mine, access road, CHPP, water pipeline, power transmission line, dams and STP.	Where possible use on revegetated areas. Where this is not practical, stockpile and burn.	Small amounts of vegetation.



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Waste Type	Source(s)	Management Method	Approximate Quantity
Excavated waste	Access road, power transmission line, dams and STP, site fencing.	Refill any excavations and spread any excess over the nearby area and allow to revegetate. Waste materials will be reused as much as practicable to construct, haul roads, pads, etc.	All used as fill on site.
Concrete	CHPP, power transmission line, water supply pipeline	Minimise waste by producing / procuring only the amount necessary. Disposal in spoil dumps.	<2 t
Steel/ metal off cuts	CHPP, power transmission line, water pipeline.	Minimise waste by producing / procuring only the amount necessary. Segregation and collection on-site. Transportation off-site by a waste contractor for off-site recycling.	6 t (CHPP) <1 t (Transmission line) <1 t (Water pipeline)
Timber – pallets and timber off-cuts	CHPP, workshop.	Minimise waste by producing / procuring only the amount necessary. Good pallets returned to sender. Damaged pallets disposed of to landfill.	<2 t
Paints and resins	CHPP, workshop, water supply pipeline, power transmission line.	Minimise waste by producing / procuring only the amount necessary. Collection on-site and storage in a segregated area. Transportation off-site by licensed regulated waste transporter and disposal off-site by a regulated waste receiver.	Minor amounts.
General wastes including putrescible & organic (food waste), some plastics and paper	Construction Offices, workshops.	General waste will be taken off-site for disposal at the Moranbah landfill.	180 t
Paper and cardboard, plastics, glass, aluminium cans	Construction Offices.	Collection and segregation on-site. Transportation by a waste contractor for off-site recycling.	<9 t
Grease Trap wastes	Workshop	Wastes will be collected and taken by licensed regulated waste transporter, to a licensed regulated waste receiver, for recycling.	3 t
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 regulated waste receiver, 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 regulated waste receiver, for recycling. The separated water will be disposed of through the STP system.	4t
Tyres	Workshop	Tyres will be stored and disposed of in the spoil dumps or transported off-site by a licensed regulated waste transporter to a licensed regulator waste receiver for recycling or disposal.	60

Waste Type	Source(s)	Management Method	Approximate Quantity
Sewage effluent	Construction and Administration Offices	Sewage will be pumped to the Sewage Treatment Plant at the Poitrel Mine for treatment and disposal in accordance with the Poitrel Environmental Authority.	32 ML /annum (based on 350 EP). Volumes will vary depending on number of personnel living and working on the site.

14.3.3 Operational Wastes

The Project involves the mining of about 118 Mt of ROM coal (at about 5.6 Mt/a) to produce 84 Mt of product coal (at about 4 Mt/a) over the 21 year life of the Project. The coal has a relative density of about 1.4 t/m³. The mining waste produced as a direct result of the operation is shown in **Table 14-2**.

Table 14-2 Mining Waste

Materials	Estimated Volume of Waste	Waste: Coal (v:v)
Spoil	560 Mbcm	6.6:1
CHPP waste (Tailings/Rejects)	24 Mm ³	1:2.5

The estimated volumes of each waste type (apart from spoil and coal washing wastes) likely to be generated during mine operation and their management method are shown in **Table 14-3**. Quantities of wastes were estimated based on BMA experience at other coal mine sites in Central Queensland and from other industrial developments.

During construction and operation, colour-coded, signed bins will be used to segregate and collect food wastes, paper and recyclables. The bins will be located throughout offices and site infrastructure areas to achieve maximum economic waste recovery. These bins will be emptied into larger bins or skips regularly. All smaller bins and larger bins or skips will have lids, to reduce the potential for attracting insects and vermin. General wastes will be collected regularly and transported for disposal to the Moranbah landfill on Goonyella Road. Recyclables will be transported to the Material Recycling Facility in Mackay.

There is also a landfill at Glenden (for commercial and residential use, including facilities for oil, battery, plastics and cardboard recycling) however this is relatively distant from the Project Site and unlikely to be used by the Project. There are transfer stations at Nebo (which may be used on occasions) and at Coppabella, but the latter is not for public use.

Table 14-3 Waste Management: Operation Phase

Waste Type	Source(s)	Management Method	Approximate Quantity
Waste oil, oily waste and waste from oil separator	CHPP; Workshop	Collected and stored in a bunded tank, then transported off-site by a licensed regulated waste transporter, to a licensed regulated waste receiver, for recycling or treatment and disposal.	20 t per Mt coal



Waste Type	Source(s)	Management Method	Approximate Quantity
Oily sludge, absorbent, degreaser, grease, oily rags, oil filters	CHPP; Workshop	Collected on-site. Then transported off-site by a licensed regulated waste transporter, to a licensed regulated waste receiver, for recycling or treatment and disposal.	3 t per Mt coal (oily sludge, absorbent, greases) 25 000 L/a (rags) 0.75 t per Mt coal (filters)
Waste oil containers	CHPP; Workshop	Drained on-site. Drums will be transported off-site by waste contractor for off-site reuse, recycling or disposal. Oil will be collected, and then transported off-site by a licensed regulated waste transporter to a licensed regulated waste receiver, for recycling.	Approximately 200 units per year
Scrap metal	CHPP; administration, workshops	Minimise waste by producing / procuring only the amount necessary. Segregation and collection on-site. Transportation off-site by a waste contractor for off-site recycling.	3 t/a
General wastes including putrescible & organic (food waste), some plastics and paper not suitable for recycling.	Workshop, office	General waste will be taken off-site for disposal at the Moranbah landfill.	190 t/a
Recyclables – including paper and cardboard, plastics, and glass.	Workshop, office	Collection and segregation on-site. Transportation by a waste contractor for off-site recycling.	150 t/a
Paints & resins	CHPP; Workshop	Minimise waste by producing / procuring only the amount necessary. Collection on-site and storage in a segregated area. Transportation off-site by licensed regulated waste transporter and disposal off-site by a regulated waste receiver.	<2 t/a
Timber pallets and off-cuts	CHPP; administration, workshops	Minimise waste by producing / procuring only the amount necessary. Good pallets returned to sender. Damaged pallets disposed of to landfill.	<2 t/a
Tyres	Workshops	Tyres will be stored and disposed of in the spoil dumps or transported off-site by a licensed regulated waste transporter to a licensed regulator waste receiver for recycling or disposal.	50 / a
Vehicle batteries	Workshops	Collected on-site in a segregated area. Then transported off-site by a licensed regulated waste transporter to a licensed regulated waste receiver, for recycling.	150 / a
Sewage effluent	Administration offices and workshops.	Sewage will be pumped to the Sewage Treatment Plant at the Poitrel Mine for treatment and disposal in accordance with the Poitrel Environmental Authority.	18 ML /annum (based on 200 EP). Volume will vary depending on the number of personnel on site