# 18 WASTE MANAGEMENT

## 18.1 INTRODUCTION

This chapter sets out the key issues pertaining to waste generation and management of that waste during the construction and operational phases of the southern coal seam methane (CSM) water supply pipeline (the proposed pipeline) for the Wandoan Coal Project (the Project) with the aim of protecting environmental values from the impacts of wastes.

## 18.2 METHODOLOGY OF ASSESSMENT

### 18.2.1 REGULATORY REQUIREMENTS

**State Government**

Waste management in Queensland is governed by the Environmental Protection Policies and Regulations under the *Environmental Protection Act 1994* (EP Act). Specific waste management legislation includes the Environmental Protection (Waste Management) Policy 2000 (EPP (Waste)) and the Environmental Protection (Waste Management) Regulation 2000 (Waste Regulation). Together with the Environmental Protection Regulation 1998 (EPR), these provide the legal and strategic framework for managing waste.

The EPP (Waste) provides a strategic framework for managing wastes by establishing a preferred waste management hierarchy:

- waste avoidance
- waste re-use
- waste recycling
- energy recovery from waste
- waste disposal.

Certain waste management activities (disposal and transport of waste) are considered to be environmentally relevant activities (ERA) and require approval. The Waste Regulation also contains requirements for handling specific waste streams.

Certain regulated wastes are considered trackable wastes (section 17 of Waste Regulation). This provides a process to allow such wastes to be tracked from the point of generation to the point of final processing, recycling or disposal.

Under Section 188 of the *Petroleum and Gas (Production and Safety Act) 2004* (PG Act), the use of associated waters (such as CSM wastewater) for washing coal at the mine site is not authorised under the underground water rights inherent in Section 185 of the PG Act. Therefore, to use associated waters for washing coal at the mine site the following regulatory requirements apply:

- a specific approval of the resource for a beneficial use is required under Part 6A of the Environmental Protection (Waste Management) Regulation 2000
- a water license is required under Chapter 2, Part 6 of the *Water Act 2000.*

The Queensland Government has recently announced a 'Coal Seam Gas Water Management Policy' which will result in the further regulation of the treatment, beneficial reuse, aggregation and storage of treated coal seam gas water. More detailed information regarding the regulatory requirements is available in Chapter 3 Project Approvals.

**Local Government**

The pipeline is located within the jurisdiction of the Dalby Regional Council local government area. Although Council local laws do not specifically deal with issues relating to waste, current waste streams and disposal facilities are controlled and operated under this Council structure.

**Waste reporting**

Annual reporting of waste emissions to land, air and water in accordance with the National Pollutant Inventory Guide managed by the Department of the Environment, Water, Heritage and the Arts (DEWHA) will not be required for the construction and operation of the pipeline as pipeline construction is not listed as a relevant activity. Additionally, the pipeline in not expected to generate significant amounts of emissions due to the relatively short duration of the construction phase and minimal emissions anticipated in the operational phase.

### 18.2.2 IDENTIFYING WASTE STREAMS

The identification of waste streams for the pipeline was based on the conceptual design of the various pipeline components ranging from the early works phase through to the construction, operations and decommissioning phases. The characteristics and volumes of waste streams have been estimated based on similar construction works and unit operations undertaken by relevant Wandoan Joint Venture (WJV) participants' projects.

### 18.2.3 IDENTIFYING WASTE MANAGEMENT PRACTICES

The proposed waste management practices have been derived from a number of sources, including past and present practices. These will be based on on-site treatment processes identified in the concept design, typical waste management practices at relevant WJV participants operations, the availability of waste recycling opportunities, and best practice methods.

## 18.3 EXISTING ENVIRONMENT

The existing environment of the proposed pipeline corridor is described in more detail in Chapter 8 Land Use, but is generally characterised by past and current land uses which are predominantly agricultural and resource based.

The townships of Gurulmundi, Giligulgul and Guluguba are located within the northern portion of the study corridor whilst the townships of Dalwogon, Miles and Columboola are located in the southern portion of the study corridor. The balance of the land within the study corridor is predominantly utilised for agricultural purposes, including grazing and cropping activities.

The Cherwondah State Forest reserve is located within the northern portion of the study corridor and the Condamine Power Station is located at the southern extent of the study corridor, adjacent to the Warrego Highway and west of the township of Columboola.

Wastes generated from townships and agricultural activities within the study corridor are currently disposed of at facilities managed by the Dalby Regional Council.

Chapter 8 Land Use discusses potential issues relating to land contamination from existing land uses.

## 18.4 DESCRIPTION OF PROPOSED DEVELOPMENT

The majority of waste generation associated with the proposed pipeline will apply over the construction phase of the pipeline with minor amounts of waste produced from maintenance work during the operational phase.

### 18.4.1 CONSTRUCTION PHASE

Waste generated during the early works phase of the pipe construction will predominantly be green waste associated with the clearing of vegetation along the pipeline route.

Wastes generated during the construction phase will be from the installation and assembly of the pipeline and will include construction materials, vehicle emissions, effluent and general waste. The pipeline is expected to be constructed from either ductile iron with cement mortar lining (DICL) or mild steel with cement mortar lining (MSCL). However other construction materials such as polyethylene and PVC will also be considered. All potential construction materials have been considered in the assessment of waste generation. Construction of the pipeline will also involve the use of some materials such as joint coating and hydrocarbons (e.g. lubricants, hydraulic oil) which will generate solid and liquid wastes. Chapter 5 Project Construction discusses in detail the planned activities to be undertaken during the construction phase.

### 18.4.2 OPERATIONAL PHASE

General operation of the pipeline is not expected to generate significant amounts of waste materials. Minor amounts of liquid waste may be a result of routine maintenance activities on the pipeline. Additionally, any leaks that develop along the pipeline during operations will result in the discharge of saline water to the surrounding environment. Chapter 6 Project Operations provides detailed discussion of the planned activities to be undertaken during the operational phase.

## 18.5 POTENTIAL IMPACTS

Wastes generated have the potential to impact upon the visual amenity of the site and the air, water (surface and groundwater) and soil quality of the surrounding environment if they are not properly managed. The following sections discuss the waste streams identified for the individual Project phases.

### 18.5.1 CONSTRUCTION WASTE INVENTORY

The following wastes will be generated during the construction phase:

**Green waste**

Green waste includes all vegetation cleared to create the construction corridor (approximately 20 m width) for installation of the pipeline. The volume generated is expected to be low as the land has been significantly cleared by past land uses such as agriculture and cattle grazing. The route selection criteria also considered minimisation of impacts to vegetation through clearing. Additionally, vegetation clearing and grading for construction activities will follow the Environmental Management Plan to minimise vegetation loss. Potential impacts related to the generation of green waste are discussed in further detail in Chapter 17 Ecology.

### Soil waste

Where possible, screened trench subsoil will be used as backfill material. The subsoil will be placed in the trench in layers with heavy compaction between each layer as the soil is expected to be dispersive. Due to the heavy compaction of the soil, it is expected that little excess soil will be left over upon completion of backfilling resulting in minimal soil wastes.

### Construction waste

Construction of the pipeline is expected to generate wastes in the form of pipe off-cuts (concrete, metals and/or plastic), construction consumables (such as grinding disks), plastic packaging and cardboard. It is anticipated that pipe materials equating to approximately 5% of the total pipeline length will be wasted due to transportation damage or off-cuts.

### Effluent

Hydrostatic testing will be undertaken once the pipeline has been installed to demonstrate the integrity of the pipeline and confirm the design operating pressure.

It is expected that about 30 megalitres of water will be required to undertake the necessary tests. Following the completion of the tests, this water will be tested for compliance with relevant environmental standards and captured in the mine's Water Management System (WMS). Potential impacts caused by the discharge of effluent from the pipeline are discussed further in Chapter 11 Water Supply and Management.

### Hydrocarbon waste

Small amounts of hydrocarbon contaminated wastes will result from oils and lubricants used in the construction of the pipeline and pump station. Minor hydrocarbon wastes may result from the use of construction vehicles/equipment (e.g. oil from hydraulic rock breaking equipment). Activities such as refuelling and maintenance will be undertaken off-site.

### General waste

The establishment of temporary construction compounds and facilities will be required during the construction period. These compounds will be used for the temporary storage of construction equipment and materials, and contain administration offices and crew amenities. Based on the length of pipeline to be constructed (approximately 91 km), it is envisaged that two construction compounds will be required. Domestic wastes generated from construction personnel on-site will typically comprise food scraps, paper and cardboard, glass, aluminium cans, plastics and packaging.

### Emissions

Vehicle emissions will be generated by construction vehicles during land clearing and earth moving activities, and light vehicle movements to and around the pipeline site. These impacts have been discussed in greater detail in Chapter 13 Air Quality and Chapter 14 Greenhouse Gases and Climate Change (refer Volume 1).

### Sewage

Sewage will be generated during the construction phase. Portable toilets will be used.

### 18.5.2 OPERATIONAL WASTE INVENTORY

Waste streams generated during the operational stage of the pipeline are described below.

#### Operational waste

If treatment of the raw CSM water to reduce salinity is deemed necessary, then hyper-saline brine will be generated as the waste product of the reverse osmosis process. Disposal of this waste will be the responsibility of the proponents for the Talinga and Berwyndale South CSM facilities. This is consistent with the recently announced Queensland Coal Seam Gas Water Management Policy which will require CSM producers to treat and dispose of coal seam gas water.

The operation of the pipeline has been designed to operate as a zero discharge facility. However, unplanned discharges of saline water to the surrounding environment have the potential to occur due to events such as leaks from the pipework. Potential impacts caused by the discharge of effluent from the pipeline are discussed further in Chapter 11 Water Supply and Management.

#### Maintenance waste

Limited amounts of wastewater will be generated during periodic maintenance activities undertaken on the pipeline. In addition, minor quantities of waste materials such as seals and welding rods will be produced. Wastewater produced from pump station maintenance will be managed within the water supplier's water management system. Any hydrocarbon waste will be contained and disposed of by the pipeline operator to an appropriate facility.

Additionally, routine flushing of the pipeline will be required during the operational phase to confirm the integrity of maintenance works on the pipeline. The section of the pipeline requiring work will first be isolated at both ends and flushing will result in the discharge of saline water from respective sections. Potential impacts caused by the discharge of effluent from the pipeline are discussed further in Chapter 11 Water Supply and Management.

#### Pigging

It is expected that pigging (the placement of an object in the pipeline and propelling it through the line by liquid or gas pressure from behind to clean it out or check its internal working) will be required periodically over the life of the pipeline, to maintain the pipeline's design hydrostatic pressure. The pig will be run through the length of the pipeline to remove sludge and scale build-up from the pipe wall resulting in discharge of wastewater and sludge/scale material into the mine's WMS.

## 18.6 MITIGATION MEASURES

### 18.6.1 WASTE MANAGEMENT STRATEGY

The principal approach to waste management for the proposed pipeline is to minimise the impacts on air, water and land resources, and to manage waste in a manner that avoids any direct or indirect impacts on the environment or health of people working at the mine and the community. The main strategies that will be adopted for the project include waste minimisation (including waste segregation for re-use or recycling) and ensuring wastes are disposed of to appropriate facilities.

#### Waste minimization

The waste management hierarchy was considered when selecting the waste management strategies for each waste stream. It is a framework for prioritising waste management practices to achieve the best environmental outcome. The waste management hierarchy as specified in the EPP (Waste) is outlined as follows, with waste avoidance being the preferred option and disposal being the least preferred outcome:

- waste avoidance
- waste re-use
- waste recycling
- energy recovery from waste
- waste disposal.

#### Waste collection and disposal facilities

Where waste materials cannot be recycled, they will be segregated and disposed of to an appropriate facility. All hazardous and regulated wastes will be collected by a licensed waste contractor and transported off-site for disposal to an appropriately licensed facility. Waste materials awaiting collection will be stored within facilities designed to AS 1940 – The Storage and Handling of Flammable and Combustible Liquids to prevent and seepage and contamination of groundwater.

General waste that cannot be re-used or recycled will be disposed of to a nearby landfill facility. The landfill facility will be required to meet acceptable standards to minimise the risk of potential contamination to surface water and groundwater.

### 18.6.2 CONSTRUCTION PHASE

#### Waste minimization

A list of the waste materials likely to be generated during the construction phase of the pipeline, and the management of those materials, is shown in Table 18-1. These strategies will be continually reviewed during the pipeline construction phase.

**Table 18-1: Construction waste streams and management**

| Waste streams | Waste sources | Estimated quantity | Management strategies |
|---|---|---|---|
| Green waste | Clearing of vegetation along the pipeline route | Approximately 500 ha | Activities to follow the Construction Management Plan for vegetation clearing to minimise vegetation loss. Suitable material will be used on site to provide fauna habitat where practical. Remaining material to be mulched and reused where possible. |
| Soil waste | Excess soil excavated during trench formation | Nil | Suitable top soil will be segregated from subsoil and reused on-site for revegetation activities. |
| Excess/ damaged pipe materials (concrete, metals, and/or plastics) | Construction and installation of pipework | Approximately 5 km | Material to be segregated and recycled where possible by pipeline contractor. Otherwise materials will be disposed of to an appropriately licensed landfill. |
| Hydrocarbon contaminated waste | Hydrocarbon spill/leak from construction equipment | Minimal | Spill-kits will be available on-site for immediate incident response. Any resulting contaminated waste will be disposed of to a licensed facility. |
| Effluent (saline water) | Testing pipeline integrity | Nil | Discharge resulting from the pipeline testing will be collected in the mine WMS and reused. |
| Sewage | Workforce | < 2,000 kg | Portable toilets provided. Sewage will be collected from portable toilets by a licensed waste contractor and disposed of at an appropriately licensed facility. |
| General waste (including metals, paper, cardboard and plastics) | Construction materials, packaging and general/ putrescible waste from contractors | < 5 tonnes | All general wastes generated will be removed from site and disposed of to an appropriate waste facility. |
| Exhaust emissions | Vehicle and fuel/electrical operated equipment | Minimal | Vehicles and other equipment to be maintained in good condition. |

A detailed Waste Management Plan (Construction) will form part of the Project Environmental Management Plan and will be prepared prior to the commencement of construction (refer Chapter 27 Draft Environmental Management Plan). The Waste Management Plan will address the following items:

- identification of waste streams
- consideration of the waste management hierarchy when selecting waste management strategies, with emphasis on minimising any hazardous waste
- identification of solid, liquid or hazardous waste collection, storage and disposal strategies
- training of all relevant contract personnel on procedures concerning waste minimisation, recycling and disposal
- waste removal and transport from site

- waste tracking requirements.

### 18.6.3 OPERATION

#### Waste minimization

The waste streams generated from operation of the pipeline and the selected management strategies are listed in Table 18-2. These strategies will be reviewed periodically by the proposed pipeline operator and updated throughout the operational phase.

**Table 18-2: Operational waste streams and management**

| Waste material | Waste sources | Estimated quantity | Management strategies |
|---|---|---|---|
| Maintenance waste (eg seals, oil, lubricants) | Pump station maintenance | < 1 t/annum | Hydrocarbon waste will be disposed of to a licensed facility. |
| Effluent (saline water) | Flushing sections of the pipeline following maintenance work | Nil | Discharge resulting from the pipeline flushing will be collected in the mine WMS. |
| Sludge/scale waste | Periodic pigging of the pipeline | < 1 t/annum | Water discharge resulting from pipeline pigging will be included within the mine WMS. Sludge and scale materials will be disposed of in a spoil. |
| Leaks | Leaks from pipework | Minimal | Routine servicing and maintenance activities to reduce risk leaks. |

A detailed Waste Management Plan (Operations) will form part of the Project Environmental Management Plan will be prepared prior to the commissioning of the pipeline (refer Chapter 27 Draft Environmental Management Plan). The Waste Management Plan will address the following items:

- identification of waste streams
- consideration of the waste management hierarchy when selecting waste management strategies, with emphasis on minimising any hazardous waste
- identification of solid, liquid or hazardous waste collection, storage and disposal strategies
- training of all relevant contract personnel on procedures concerning waste minimisation, recycling and disposal
- waste removal and transport from site
- waste tracking requirements.

### 18.6.4 DECOMMISSIONING

The proposed pipeline will be decommissioned at the end of the Project. Chapter 25 Rehabilitation and Decommissioning describes the conceptual decommissioning and rehabilitation strategies developed for the pipeline including performance indicators to ensure minimal residual impacts to the surrounding environment.

## 18.7 RESIDUAL IMPACTS

Provided that the requirements of the relevant Waste Management Plans are complied with, potential environmental impacts arising from waste materials associated with the proposed pipeline are expected to be low.

## 18.8 REFERENCES

**Legislation**:

Environmental Protection (Waste Management) Policy 2000.

Environmental Protection (Waste Management) Regulation 2000.

*Environmental Protection Act 1994.*

Environmental Protection Regulation 1998.