23 HAZARD AND RISK

23.1 INTRODUCTION

This Chapter describes the hazards and risks that are associated with the construction, operation and decommissioning of the proposed southern coal seam methane (CSM) water supply pipeline (the proposed pipeline) for the Wandoan Coal Project (the Project).

The focus of this Chapter is on hazards affecting natural environment values and human health and safety, and assessing the risks to identify those that might be significant and have the potential to adversely affect the Project, its stakeholders, the environment and the local community. The assessment has therefore considered the risks arising from the activities to be undertaken, particularly arising from the hazardous materials used, transported or stored during the life of the Project, and the potential for interaction with members of the general public and adjoining or nearby property-owners who might be affected. It is not the objective of this Chapter to consider in any detail the risks to construction workers arising from hazards that are largely inherent in pipeline construction projects and that are to be managed under the requirements of relevant workplace health and safety legislation, or to consider issues giving rise to nuisance issues such as noise and dust impacts relating to the amenity of surrounding land users. These matters are dealt with in specific sections of this EIS listed in Section 23.2.

Impacts on aspects of the natural environment resulting from the construction and operation of the proposed pipeline are dealt with in the sections specific to those aspects, in particular Chapter 17A Terrestrial ecology.

23.2 METHODOLOGY OF ASSESSMENT

The methodology used for this Chapter generally follows the Australian Standard AS/NZS 4360:2004 — Risk Management. This includes:

- setting the context for the assessment
- identifying hazards
- assessing risks
- deciding how to treat unacceptable risks.

The context for the risk assessment is set largely by the Terms of Reference (ToR) for this Environmental Impact Assessment (EIS), together with the controlling legislation and the Wandoan Joint Venture (WJV) standards and practices relating to issues such as public safety and environmental protection.

The WJV has undertaken a project risk assessment and will continue to update it regularly as part of the Project planning process. This assessment draws on the relevant findings of that assessment in identifying hazards and assessing the resulting risks.

The objective of the risk assessment is to:

- qualitatively assess the risks posed to the human, social and biophysical environment in the locality by all activities associated with the construction of the proposed pipeline

- determine whether any significant risk remains after the proposed pipeline design factors (including all appropriate risk mitigation measures) are considered
- provide the concurrence agencies with sufficient information regarding the risks associated with the proposed pipeline to enable them to assess the Project as part of the approvals process.

This risk assessment considers the risks arising from sudden and unexpected events such as accidents and the results of equipment failure, operator error and external events. The assessment does not generally consider risks that are unrelated to a single event such as the amenity of neighbours during normal operation or any potential for chronic health issues, which are generally treated in other chapters of the EIS, including Chapter 24 Health and Safety. In particular, the assessment does not address issues that are the direct and expected result of normal activities undertaken as part of the Project, as described in this supporting EIS, and that are undertaken in accordance with relevant permits and approvals.

The results of this assessment should be read in conjunction with other chapters of the EIS including:

- Chapter 11 Water Resources
- Chapter 12 Transportation
- Chapter 13 Air Quality
- Chapter 15 Noise
- Chapter 16 Vibration
- Chapter 18 Waste.

23.2.1 LEGISLATIVE REQUIREMENTS

The relevant principal legislative requirements, regarding hazard identification and risk assessment that will apply to the proposed pipeline, relates to:

- workplace health and safety legislation to protect the construction workforce and members of the public who might be affected
- transport infrastructure legislation that governs the use of public roads
- dangerous goods legislation that ensures that dangerous goods are handled, stored and used safely
- environmental protection legislation that applies to all activities which could potentially cause environmental harm.

The relevant legislation is:

- *Workplace Health and Safety Act 1995*
- *Dangerous Goods Safety Management Act 2001*
- *Transport Infrastructure Act 1994*
- Transport Infrastructure (State-controlled Roads) Regulation 2006
- *Environmental Protection Act 1994*.

Relevant guidelines under these Acts have also been considered.

The health and safety of workers building and operating the proposed pipeline will be regulated under the *Workplace Health and Safety Act 1995* in areas outside the Mining Lease Application (MLA) areas, because these activities are not considered to be a site activity under s10(2) of the *Coal Mining Safety and Health Act 1999*.

The Dangerous Goods Safety Management Act (DGSMA) is relevant to construction and operation of all parts of the proposed pipeline that are not located within the mining lease, because these are not considered to be site activities under s10(2) of the CMSHA.

The Transport Infrastructure Act (TI Act) establishes a regime under which significant roads can be effectively planned and efficiently managed, taking into account of the need to provide adequate levels of safety, and community access to the road network. This legislation is relevant because the proposed pipeline will be partly built within road reserves and will cross road reserves.

The Environmental Protection Act (EP Act) regulates the potential for environmental harm from accidents such as accidental discharges of fuels, oils, and contaminated water that might affect sensitive areas or result in land contamination.

23.2.2 HAZARD IDENTIFICATION AND ASSESSMENT

Hazard identification has relied upon the matters raised in the ToR, together with the results of a systematic process to identify all hazards for the proposed pipeline, including the overall project risk assessment undertaken and regularly reviewed by WJV. This has involved identifying all activities undertaken as part of the construction and operation of the proposed pipeline, the materials associated with each activity, and the hazard that might arise from these activities and materials within each of a series of classes of hazardous incidents.

The hazards considered in this assessment fall generally into the following categories:

- vehicles and moving equipment (physical hazards) including travel-related risks such as fatigue
- heights, depths and confined spaces
- structures and landforms or stockpiles of materials
- storage and use of dangerous goods, including:
  - flammable and combustible materials
  - toxic materials
  - corrosive materials.
- sources of extreme heat (or cold) and pressure
- wildlife (e.g. snakes).

These hazards may result in risks to, or impacts on, either human health and safety or the environment.

The risks that might arise from these hazards as a result of the activities associated with the Project can be classified as:

- physical injury
- suffocation/drowning/asphyxiation

- burns
- poisoning
- environmental damage (habitat, ecosystems, populations or individuals)
- damage to property.

23.3 EXISTING ENVIRONMENT

The existing land uses of the proposed pipeline corridor and surrounding area are mainly grazing and cropping. The majority of the corridor has been cleared in the past for agricultural purposes.

It is therefore likely that the existing risk environment of the area would be characterised mainly by exposure to risk from agricultural and outdoor activities, and accidents related to long distance travel. Ecological assessments of the area have indicated that there is likely to be a significant existing risk from wildlife, in particular snakes (refer to Chapter 17A Terrestrial Ecology).

23.3.1 NATURAL DISASTERS

State Planning Policy SPP 1/03 requires that the risk of bushfire, flood and landslip be considered.

Council mapping shows that the corridor is mainly in an area of low to medium bushfire risk (refer Chapter 7 Climate). Overall, the existing risk to the proposed pipeline corridor and areas adjoining the corridor as a result of fire is likely to be low.

There is evidence and records of significant flood events along the corridor in recent times, however the risk for the route to be affected during the operational phase is low as it will be buried underground and will not be exposed (refer to Chapter 11 Water Resources for details of flood risks). Risks to the proposed pipeline and to surrounding areas during construction will be managed through the proper design of hydrological aspects of the work.

The proposed pipeline corridor has been chosen to avoid areas of high relief, and the risk of landslides is therefore minimal (refer to Chapter 9 Geology, Mineral Resources, Overburden and Soils).

23.4 DESCRIPTION OF PROPOSED DEVELOPMENT

23.4.1 HAZARDS ASSOCIATED WITH THE DEVELOPMENT

Based on the general categories of hazards considered in Section 23.2.2, the following sources of hazard and risk have been identified:

Construction phase:

- transport of personnel, equipment and materials to site
- clearing vegetation
- transport, storage and use of dangerous goods on-site
- trenching and other earthworks
- pipelaying and other construction works

- equipment maintenance
- transport of waste off-site.

Operational phase:

- pipeline inspection and maintenance activities.

Decommissioning phase:

Once Project mining operations have exhausted the targeted coal reserve, the mine and associated infrastructure, including the water supply proposed pipeline, will be decommissioned. The proposed pipeline will either be sealed off at each end and abandoned, or sold or donated for beneficial re-use.

23.4.2 HAZARDOUS MATERIALS STORAGE AND USE

Hazardous materials and dangerous goods will potentially contribute to risks to both human health and safety and the environment through characteristics such as flammability, explosive or corrosive potential or toxicity.

Types of dangerous goods

Classes of materials that might give rise to, or be involved in hazardous incidents and that might be present during the various phases of the Project are:

- fuels (principally diesel)
- lubricants
- other construction and maintenance-related materials (e.g. industrial gases, adhesives, paints and solvents)
- wastes (such as lubricants, wastewater).

Only those materials with an allocated UN dangerous goods number fall within the formal definition of dangerous goods according to the DGSMA and Australian Code for the Transport of Dangerous Goods.

Dangerous goods inventory

The full range of dangerous goods that might be handled, stored and used during construction and operation of the proposed pipeline can not be determined in detail at this stage. However, it is expected that by far the great majority of dangerous goods is likely to consist of diesel fuel either stored in small portable tanks or delivered to site as needed in tankers.

It is not expected that the quantity of dangerous goods involved would exceed the criteria requiring registration of storages or any form of special management systems or practices to protect the safety of Project personnel, the public or the environment under the Queensland DGSMA.

Fuel

Diesel fuel for construction equipment will be transported to worksites along the proposed pipeline corridor by road and stored in small portable tanks. The fuel storage tanks facilities will be designed and located in accordance with AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids. In particular each tank will have secondary containment through either separate or integral bunding to minimise the risk of

leaks and spills. The quantities involved are likely to be sufficient to cause environmental harm if a leak or spill should impact a watercourse or sensitive area.

Lubricants

No maintenance of construction equipment will be undertaken on-site during construction. Lubricants will therefore be limited to small quantities that may be needed for topping up equipment levels.

Other dangerous goods

Other dangerous goods will be handled, stored and used during construction of the proposed pipeline. These will include materials such as welding gases, paints, and cleaning solvents.

The quantities of these miscellaneous materials are expected to be small in all cases, and will be stored in accordance with relevant standards, including secondary containment where appropriate. No significant risk is considered likely to arise for any of them. Quantities are unlikely to be large enough to give rise to any serious environmental harm.

Wastes

General waste, construction material waste and sewerage will be collected and removed by a licensed contractor. As no equipment maintenance is to occur along the proposed pipeline route, there should be no generation of waste oil or similar materials. Waste construction material and packaging is not expected to generate any significant level of risk. This aspect is discussed in more detail in Chapter 11 Water Resources.

Other materials used in the operation

The potential of materials not listed as dangerous goods to create a hazard is generally very small, and significant risks are unlikely to arise.

23.5 POTENTIAL IMPACTS

Based on the hazards outlined above, the following risks to the community and occupants of surrounding areas have been identified as those that are most likely to be significant to the public and occupants of surrounding areas if not appropriately managed. Risks to Project personnel are normally considered to be adequately managed by the relevant legislation and codes of practice.

In the following sections detailing possible impacts, the following broad descriptions of likelihood or frequency have been used:

- almost certain — occurring several times each year
- likely — typically occurring each year
- possible — occurring once in 10 years
- unlikely — occurring once in 100 years
- rare — likely to occur less than once in 100 years.

In addition to this assessment, cumulative risks to the surrounding land uses are considered in Chapter 26 Cumulative Impacts of Volume 1. Impacts on human health are also addressed in Chapter 24 Health and Safety.

23.5.1 CONSTRUCTION PHASE

Construction phase activities and incidents that could involve significant hazards are:

- increased movements of heavy vehicles, deliveries, and traffic from construction workteams — increased risk of accidents. Accidents involving injury are considered possible during construction, fatalities are considered unlikely
- interaction between the construction work and users of public roads at road crossings and in road easements — increased risk of accidents involving injury to either work teams or members of the public considered possible
- disturbance of underground services — risk of contacting or damaging unmarked, unregistered or unexpected underground services. Accidents involving asset damage considered possible, accidents involving injury from services such as power or gas lines considered very unlikely, with no known services in area
- general construction site activities — falls or engulfment in trenches, contact with equipment or vehicles or items falling from height, and proximity to blasting (if explosives are used), resulting in injury/death. Serious injury considered unlikely, frequency expected to be low
- access to the construction site by unauthorised members of the public — falls or engulfment in trenches, contact with equipment or vehicles and proximity to blasting, resulting in injury or fatality. Considered very unlikely, frequency expected to be very low
- spills of dangerous goods, typically fuel from temporary storage tanks or during transport — loss of containment typically resulting in environmental impacts: soil contamination, pollution of surface waters, impact on water quality and beneficial use, impacts on aquatic ecosystems. While minor incidents are considered possible, significant impacts to the environment or the public are expected to be unlikely
- encounters with venomous snakes and insects during clearing and construction works — potential to be bitten, resulting in illness or death. Incidents are considered possible, but fatalities are not considered likely.

The most significant of the risks identified is expected to be the increased risk of traffic accidents as a result of increased movement of both vehicles and the construction workforce on local roads and construction at road crossings and in road reserves. The other risks detailed above are not expected to be significant or to need more than standard controls for management. No group outside the Project is expected to be particularly vulnerable to any increased level of risk from any source.

23.5.2 OPERATIONS

Operations phase activities and incidents that could involve significant hazards include potential for snakes and insect bites at entry into pits.

No significant risk to the public is expected during operation of the proposed pipeline.

23.5.3 DECOMMISSIONING AND REHABILITATION

If the option chosen for decommissioning is to abandon the pipeline in the ground, then over a long period of time minor subsidence could occur along the pipeline corridor leading to small potential erosion sites. If the option selected is to remove the pipeline, then the pipeline corridor would be subject to erosion unless rehabilitated.

23.6 MITIGATION MEASURES AND STRATEGIES

23.6.1 CONSTRUCTION

The following mitigation measures will be implemented to limit the identified risks during construction:

- develop awareness of the importance of safe road use behaviours, and training programs for construction personnel
- keep local communities informed of work in progress
- provide appropriate traffic control personnel and/or devices for all work within road reserves
- prevent unauthorised access to excavations and any other hazardous areas during construction
- keep any works that can not be secured easily in a safe state with appropriate signage and/or fencing or guarding
- transport all dangerous goods during construction in accordance with the current Australian Code for the Transport of Dangerous Goods
- locate temporary fuel storage tanks away from watercourses and drainage paths, and provide secondary containment through self bunded tanks or with external bunding designed in accordance with AS 1940-2004: The Storage and handling of flammable and combustible liquids
- maintain appropriate procedures and equipment to manage leaks and spills of all dangerous goods used during construction
- provide workforce with awareness training regarding venomous snakes and biting insects, areas and times they are most likely to be encountered, and how to react and provide first aid treatment. Provide workteams with appropriate first aid equipment to treat bites.

23.6.2 OPERATIONS

The following mitigation measures will be implemented to limit the identified risks during operation:

- educate work teams regarding the need to check for dangerous wildlife during pipeline inspections
- ensure the integrity of the proposed pipeline is maintained, and shut down if a major failure occurs.

23.6.3 DECOMMISSIONING AND REHABILITATION

The following mitigation measures will be implemented to limit the identified risks due to the decommissioned pipeline:

- seal off the gas supply and remove the gas engine(s) and pump(s)
- fill or seal all inspection pits, and seal off the proposed water pipeline
- rehabilitate the pipeline corridor if the option to remove the pipeline is selected
- if the option is to abandon the pipeline is selected, then given the very low rate of subsidence expected, then no further action would be taken
- establish a beneficial re-use to a third party if the condition of the pipeline allows sale or donation of the infrastructure.

23.7 RESIDUAL IMPACTS

It is considered that if the mitigation measures detailed above are followed, no significant residual risk will remain.

23.8 EMERGENCY MANAGEMENT PLAN

An Emergency Response and Action Plan (ERAP) will be developed for the Project, in consultation with relevant stakeholders, in particular with each of the agencies of the Department of Emergency Services likely to be involved in any emergency: the Queensland Police Service, the Queensland Ambulance Service, the Queensland Fire and Rescue Service and the Rural Fire Service. The Dalby Regional Council will also be consulted. The plan will include appropriate response to any emergency that might arise during operation of the proposed pipeline, as identified in Section 23.5 or in ongoing Project risk assessments.

Emergency response facilities

Appropriate first aid facilities and trained personnel will be provided at strategic locations during construction of the proposed pipeline. An ambulance station and trained staff will be located together with first aid and health facilities at the mine site during the operational phase in case of any accidents during inspection or maintenance of the proposed pipeline.

Given the length of the proposed pipeline corridor, outside assistance will be called upon where necessary, including local ambulance services.

23.9 REFERENCES

AS 1940-2004: The Storage and handling of flammable and combustible liquids.

AS/NZS 2187.1-1998: Explosives-Storage, transport and use Part 1 (Storage).