

Section 13

Health and Safety Risk Assessment



13. Health and Safety Risk Assessment

13.1 Summary

This section outlines the key health and safety issues for project personnel and the public during the construction and operation phases of the project. It presents the findings of a preliminary health risk assessment and safety assessment carried out for the project. It also outlines preventative and management measures aimed at reducing or avoiding impacts on human health and safety, as well as outlining the Emergency Response Plan. Project commitments regarding Health and Safety are included in **Table 12-1**.

13.2 Preliminary Health Risk Assessment

13.2.1 Introduction

A preliminary desk-top health risk assessment has been undertaken, in accordance with the Health Impact Assessment Guidelines, as published by the National Public Health Partnership in September 2001. The assessment comprises a high level 'screening' assessment that will be developed and built upon during the detailed design phase. In addition, the assessment will be developed for integration into future community consultation undertaken as part of the SIA process (**Section 11**).

The health assessment had the following objectives.

- Identification of health hazards with the potential for impact on the workforce and/or the public.
- Assessment of health risks, based on the likelihood of exposure, the possible extent of exposure and the potential consequences of defined exposures.
- Where there is sufficient current knowledge, development of recommended health risk management measures.
- Where there is insufficient current knowledge available to adequately assess potential risks, further studies and specific requirements will be undertaken.

This preliminary health risk assessment will be reviewed and updated as more detailed knowledge becomes available throughout the development of the project.

13.2.2 Methodology

The Preliminary Health Risk Assessment was conducted in the following manner:

- Existing, or background health hazards, which occur in the environment of the proposed pipeline route, were identified ('background hazards').
- Discrete activities for each phase of the project were then identified and screened for:
 - activity-specific health hazards ('activity hazards');
 - potential to exacerbate exposure to background hazards.

- Each activity hazard was then assessed for:
 - its potential health impact on the public and the workforce;
 - potential exposure of the public and the workforce to the hazard, in terms of likelihood and magnitude.
- Separate lists of project-related risks were then compiled for public health and workforce health, and options for risk elimination or mitigation were considered.
- In the case of identified public health risks, the aim was to ensure that the project, as a minimum standard, would not elevate the risk above pre-existing background levels.
- In the case of workforce health risk, the aim was to reduce health risk to levels as low as reasonably practicable.

13.2.3 Summary of Potential Impacts

Workforce Impacts: A summary of identified ‘background’ and ‘activity-specific’ hazards and potential impacts on the workforce are presented in **Table 13-1**.

Public Health Impacts: Although the pipeline is routed through sparsely populated areas (**Section 7.2.3**), there is some potential for project construction activities to contribute to increased public health risk in the following ways:

- Increasing the number and/or extent of breeding areas for disease vectors such as mosquitoes through poor drainage control during road, borrow pit and camp construction, disposal of hydrotest water and general waste management. The potential impact of this is to increase the incidence of vector-borne diseases such as Ross River virus, Murray Valley Encephalitis, Barma Forest virus, dengue fever and malaria.
- Contamination of water sources used for drinking and/or irrigation, through inappropriate discharge of wastewater and/or chemically treated hydrotest water. The potential impact of this is to increase the risk of gastro-intestinal diseases arising from bacteria such as *Escherichia coli* and other water-borne pathogens.
- Spills or improper disposal of fuel and/or chemicals may contaminate waters which support fish and other fauna or are exploited by the local human population. This could result in the loss of the food source or harm to health by ingestion of contaminated food or water.
- Improper disposal of hazardous and putrescible wastes, leaving them accessible to children, with the potential for harm by ingestion, or skin or eye contact with corrosives or irritants.
- Dust and noise from construction traffic and mobile equipment may cause nuisance to local communities.

■ **Table 13-1 TTP ‘Background’ and ‘Activity Specific’ Hazards**

Activity	Hazard	Potential Impacts
All construction, commissioning and operations activities	Solar radiation & heat	Sunburn, skin cancers, keratoses, heat illness/stroke
	Biting insects	Murray Valley encephalitis virus (MVEV), Kunjin virus (KUNV), Ross River virus (RRV), Barmah Forest virus (BFV).
	Soil and water-borne bacteria and parasites	Tropical diseases like meliodosis, with infection primarily caused by contact of soil or water with cuts and abrasions
	Native and feral fauna	Venomous snakes and spiders may be encountered along the TTP route – severe illness or death may result from bites Bats may carry lyssavirus (causing encephalitis) Buffalo, goats, pigs, dingoes may also cause injury and transmit disease
	Isolation	Isolation from medical centres, particularly during construction along the pipeline corridor in remote areas may result in exacerbation of injury/illness due to time taken to obtain appropriate treatment
	Fatigue	Increased risk of injury and illness
Camp management Sanitation	Waste water – bacteria, viruses	Dysentery, hepatitis
Catering	Poor food &/or water quality management	Food poisoning, gastro-enteritis
Operating, or working adjacent to mobile plant and machinery	Noise	Noise-induced hearing loss
Cleaning	Hazardous substances	Various
Welding & grit blasting	Fumes, other particulates	Respiratory disorders
Radiography	Ionising radiation	Radiation sickness, sterility, cancer
Coating/repair	Hazardous substances	Various
Hydrotesting – water treatment		
Pipeline purging	Nitrogen	Asphyxiation

13.2.4 Health Risk Management Measures

A Health Management Programme and associated management plans will be developed during detailed design. Specific health management recommendations include:

Solar Radiation and Heat: Acceptable risk mitigation will be achieved by a combination of:

- provision of shade and cooling wherever practicable (for example air conditioned vehicles, plant and accommodation);
- requiring long sleeve shirts and long trousers to be worn;

- requiring broad-brimmed hats and sun screen to be used;
- provision of cool water at all times;
- wherever practicable scheduling tasks with high physiological demand for cooler periods;
- implementing reasonable work/rest regimens appropriate to tasks;
- close observation /acclimatisation of new/returning personnel;
- education and constant reinforcement.

Biting Insects: This will be managed by a two-stage strategy comprising limitation of breeding sites and personal protection. Management of surface water will help to manage both the workforce and public health risks.

- When disturbing vegetation and soil for any reason, drainage will be optimised.
- Water storage open to ingress of insects will be avoided wherever possible. When open storage is necessary, the duration will be kept to a minimum unless the storage is to be handed over to the local community by agreement.
- Discharge of grey water, wastewater and hydrotest water will be kept to a practical minimum and care taken to prevent long term pooling.
- Inspections and evacuation of all receptacles in the project areas which can retain water and provide breeding habitat for mosquitoes.
- Flyscreens in camp accommodation will be well provided and maintained.
- Insect repellent will be provided. Personnel will be required to wear long sleeve shirts and long trousers and use insect repellent.

A biting insects study was undertaken specifically for the project; the full report can be found in **Appendix K, Volume 2** of this Draft EIS.

Soil and Water-Borne Bacteria and Parasites: The workforce induction will include awareness of these hazards, and the need for strict attention to personal hygiene and immediate treatment of cuts and abrasions.

Fatigue and Fitness for Work: It is anticipated that the normal work roster will be 28 days on followed by seven days off, with the first and last days of the break being largely taken up by travel to/from work. Climatic conditions, medications, alcohol or illicit substances can exacerbate fatigue risk, as can failure to get adequate rest when off shift in camp or on leave.

Managing fatigue is essential to controlling injury risk, particularly that related to driving. A fitness for work and fatigue management programme will be included in the implementation component of the Health Programme.

Catering and Water Supply Management: Catering will be managed in accordance with recognised best practice standards, for example, the Food Safety Standard of Practice as published by the Australian Institute of Environmental Health. The supply of drinking water will comply

with the Australian Drinking Water Guidelines, as published by the National Health and Medical Research Council.

Wastewater: Personnel responsible for camp sanitation facilities may be exposed to enteric bacteria and other pathogens in sewage and wastewater. This exposure will be controlled by package design/purchase specification for treatment plants, and working procedures. Vaccination against specific diseases will be considered if the need is indicated by a detailed risk assessment prior to start-up. Appropriate wastewater management measures will also be required to comply with environmental management requirements and avoid impact on local communities.

Hazardous Substances: All hazardous substances used on the project will be controlled and registered in accordance with a project specific Waste Management Plan. Material safety data sheets will be obtained and used, in conjunction with appropriate workplace risk assessments, for development of safe handling, storage and disposal procedures. Disposal of hazardous substances will also be covered by waste management procedures designed to protect both the environment and local communities (**Section 12**).

Dusts, Fumes, Mists, Vapours and Gases: Airborne health hazards arising from construction activities, such as welding, grit blasting, coating/repair and pipeline purging etc will be controlled by standard work procedures and workplace risk assessments, as set out in the implementation component of the Health Programme.

Isolation: Procedures to cover medical emergencies will include:

- Evacuation procedures based on quickest possible response and access to hospital.
- Sufficient numbers of personnel trained in first aid, with appropriate mobile and camp-based equipment. The required level of first aid capability will be determined via detailed assessment of available options for evacuation and access to treatment centres from each spread.
- Reliable communication with appropriate centres for medical advice.

Fauna: The workforce will be instructed on the fauna which may be encountered, their typical behaviours and where applicable, the hazards they present. Measures will be taken to minimise the potential for workforce-fauna contact.

13.3 Safety

13.3.1 Safety Overview

TTP is fully committed to excellence in safety, with a goal to protect and promote the safety of all personnel working on the project, or those who may be affected by the project activities, for the life of the project.

Safety will be achieved through the use of best practice methods and compliance with the relevant in-house standards and Northern Territory legislation. The project will comply with the latest revisions of AS/NZS 4804 Occupational Health and Safety Management Systems – General

Guidelines on Principles, Systems and Supporting Techniques, and AS2885 Pipelines – Gas and Liquid Petroleum. A project-specific Safety Policy will be issued as part of the Pipeline Licence application.

Safety Management Plans will be implemented to address the specific aspects of each stage of the project. The plans will be approved prior to the work commencing. The plans will ensure that all risks and threats are identified, and that all appropriate resources, measures and procedures will be in place to reduce the risk rating to low or negligible, and ensure that a risk level As Low As Reasonably Practical (ALARP) is achieved.

13.3.2 Safety Management Plans

The main stages of the project are design, pre-construction, construction, commissioning and operation. At each stage, project work is carried out in both office and field locations. Inductions, work procedures and project safety requirements apply to both locations.

The project Safety Management Plan will be revised at each stage, to reflect the work that is to be done, and will address the following main categories:

- safety policy;
- management and employee commitment;
- roles, responsibilities and accountabilities of key personnel, with organisation chart;
- performance indicators;
- training and competency skills register;
- health and fitness for the work;
- compliance register;
- contractor management;
- work procedures;
- job hazard analysis;
- risk assessment and management;
- communication and consultation;
- incident reporting and investigation;
- inspections, tests and audits;
- design and planning;
- emergency response.

13.3.3 Design

The pipeline will be designed in accordance with Australian and International Standards for pipelines, in particular AS2885. The established design processes ensure that all stages are checked and verified through a number of reviews, including specific EHS reviews, Hazard and

Operability study (HAZOP) and risk assessments. These reviews will identify EHS hazards, assess the risk and implement control measures in accordance with the following hierarchy of control:

- elimination;
- substitution;
- engineering control;
- administrative control;
- personal protective equipment.

13.3.4 Pre-Construction

Pre-construction work involves office work and field work, such as pipeline surveys, site visits by helicopter and vehicle, and geotechnical investigations. As such, in addition to the standard contents of a Safety Management Plan outlined above, the following issues will be addressed through job-specific work procedures:

- required personal protective equipment;
- pre-start/toolbox meetings;
- induction and visitors to site;
- driving in remote locations;
- travel management plan with daily communications schedule.

The workplace hazards that will be considered for all field work on the pipeline project include the following:

- snakes, spiders and biting insects;
- dangerous animals;
- topical infections and illnesses;
- dehydration, fatigue and exposure to heat, humidity and sun;
- travelling in remote areas;
- extreme weather (lightening strikes, cyclones, intense tropical downpours, flooding);
- fire restrictions and fire response;
- falls, trips and other work hazards;
- communications (may be satellite phone or radio system);
- use of mobile equipment;
- use of plant, equipment and tools;
- manual handling.

13.3.5 Construction and Commissioning

During the construction and commissioning phases of the project the following additional safety procedures will be developed:

- corridor access management;
- permit to work system;
- plant and equipment;
- welding;
- hydrotesting;
- trenching and excavation;
- confined spaces;
- manual handling;
- noise;
- electrical safety.

13.3.6 Operation

A Safety and Operating Plan (SOP) is required under AS2885 Part 3 – Operations and Maintenance. The plan that will be prepared will become the umbrella document that draws together the engineering and operation details. The plan will become the key document for use by the Pipeline Licence holder and will be pipeline specific, and will include the following information:

- roles and responsibilities of key personnel with organisation chart ;
- training/competency skills register;
- pipeline description, including locations of pipeline and facilities;
- pipeline operating parameters and gas delivery points;
- piping and instrumentation diagrams and engineering overviews of pipeline and facilities, including lists of major equipment and operating philosophies;
- CP system characteristics;
- SCADA and other communications systems;
- integrity management plan;
- operations and maintenance procedures;
- corridor management plan, contractor management and approval matrix;
- travel management plan with daily communications schedule;
- risk assessment and risk identification and evaluation processes, and measures to manage risks;
- safety, quality and environmental management plans;
- auditing and internal HAZOP review plans;
- emergency response plan including fire and gas detection and leak response procedures;

- gas venting procedures, including public safety;
- workplace hazards;
- ongoing community and industry consultation.

13.3.7 Visitors to Site

Any visitor to site, or any visiting driver of a vehicle that is required to travel along the corridor, such as pipe trucks and fuel trucks, will be required to attend a site induction. The induction will outline the project requirements and the hazards and control measures inherent in the project operations, including; travelling in remote areas, communications, maps and contact details; corridor restrictions; prohibited activities and items, such as pets, firearms and illegal drugs; first aid requirements and emergency response. Speed limits and safe driving will be reinforced.

13.3.8 Transport In Remote Locations

Due to the remoteness and rough terrain along the pipeline route, personnel travel will be a combination of air and road travel. The appropriate mode of transport will be selected to be suitable for the activities undertaken and the terrain to be traversed. Materials and equipment transportation to the corridor will be by road (from the railway siding at Katherine, or the Gove or Darwin ports).

During all phases of the project, the following safety requirements for transportation and travelling along the pipeline route will be put in place:

- All drivers of personnel vehicles will be licensed and competent, and those requiring access along the corridor will be required to attend a suitable recognised off-road driving course.
- Work groups will be required to include a senior first aid person.
- All vehicles will be equipped with first aid kits, fire extinguishers and radio or satellite phone communication.
- A travel management plan with daily communications schedule will be implemented.
- A pre-qualification system will be implemented to assess potential contractors transporting equipment and materials to site. Checks will be performed to ensure that safe procedures and practices are used and that the BOO consortium has a system of ensuring that risk assessments are carried out, adequate training and competency of drivers, and suitability of equipment.

13.3.9 Public Safety On Roads

The increased number of vehicles and trucks on the public roads during pipeline construction, and the use of the open cut road crossing method, will increase the risk of a vehicle accident. The risks will be managed through the following management measures:

- encouraging the use of full occupancy or multiple person vehicles for travel to and from worksites, to reduce the number of work vehicles;
- using HDD to cross sealed and main road crossings;
- carrying out road/track crossing excavation as quickly as possible;

- maintaining public thoroughfare at all times during the work;
- avoiding night traffic, where possible;
- implementing a traffic management plan, including safety signs and flagmen, in compliance with road authorities;
- installing warning signs and restricting speed on both the corridor and the road/track, approaching the crossing;
- erecting barriers to restrict public access to the corridor;
- planning equipment and material transport routes and storage areas in consultation with local and state authorities to minimise disruption to the public;
- using a dedicated crew to coordinate the movement of traffic across a public road or track;
- enforcing appropriate speed limits on sealed and unsealed roads, access tracks and along the construction corridor.

13.3.9.1 First Aid Treatment

Each main working crew will include at least one person who is qualified to senior first aid. First aid kits will be installed in each vehicle. Medical facilities will be established at each main camp and a medical officer stationed on each spread, with a 4WD ambulance and medical equipment. All work vehicles will be fitted with satellite phone or radio communications. Emergency Position Indicating Radiobeacon (EPIRB) units will be issued to personnel, where appropriate.

13.4 Emergency Response

In accordance with AS2885 Part 3, an Emergency Response Plan (ERP) will be implemented for all stages of the project. All foreseeable potential emergencies will be identified, both safety and environmental, and appropriate response procedures and training developed. Measures will be put in place to ensure that relevant personnel and resources will be available in the event of an incident.

Part of the ERP will include details of the nearest medical facilities and methods of transporting an injured person from site. An injured person will be transported offsite using helicopter, light plane, ambulance, or using the services of the RFDS, depending on the nature of the injury and location of the incident.

The ERP will be developed in association with the relevant emergency services and community resources and will address the following issues:

- definition and classifications of incidents;
- incident notification and initial response measures;
- incident management groups;
- roles and responsibilities of key personnel;
- liaison with external authorities and services;
- identification and communications with evacuation transportation and medical facilities;
- internal incident investigation and reporting;

- employee support;
- external incident investigation and reporting;
- records management;
- terminating the incident and debriefing;
- resuming normal operations;
- location specific and non-specific risk analyses;
- reviewing and updating the work procedures or SOP.

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