Kambalda to Esperance Gas Pipeline Environmental Plan

For:
Esperance Pipeline Company

PROJECT NUMBER: 101012-00267

DOCUMENT NUMBER: C9900f47

REV	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY	DATE
A	Issued for review	PAB	WMcC/HB/LT	WMcC	25/10/12
B	Issued for further review after comments from DMP	LT	WMcC/HB	WMcC	6/12/12
C	Re-issued for further review by DMP	LT	WMcC/HB	WMcC	18/01/13
D	Clause 5.2.4 amended	NVS	WMC	WMC	21/01/14
E	Amend per Enviro Audit 2013	NVS			23/06/15
F	Amend per Enviro Audit 2013	WF	WMcC	WMcC	27/05/16
G	Amended as per DMP inputs	WF	WMcC	WMcC	28/10/16

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ABBREVIATIONS

ALARP	As Low As Reasonably Practical
ANZECC	Australian and New Zealand Environment Conservation Council
APIA	Australian Pipeline Industry Association
AS	Australian Standard
COEP	Code of Environmental Practice March 2009
CP	Cathodic Protection
DMP	Department of Mines and Petroleum[1]
DEC	Department of Environment and Conservation
EAM	Esperance Area Manager
EP	Environmental Plan
EMT	Emergency Management Team
EP Act	Environment Protection Act
EPC	Esperance Pipeline Company
ERP	Emergency Response Plan
ERS	Esperance Receiver Station
FM	Facility Manager
IBRA	Interim Biogeographic Regionalisation for Australia
IRT	Incident Response Team
KEGP	Kambalda to Esperance Gas Pipeline
KP	Kilometre Point
KIS	Kambalda inlet Station
MD	Managing Director
MSDS	Material Safety Data Sheet
MLV	Mainline valve
NPS	National Pipeline Services
PDWSA	Public drinking water source area
PP Act	Petroleum Pipeline Act 1969
ROW	Right of Way
WA	Western Australia

[1] The Department of Mines and Petroleum under delegation, and on behalf, of the Minister for Mines and Petroleum

1 INTRODUCTION

1.1 Background

The Kambalda to Esperance Gas Pipeline (KEGP) was built and commissioned in early 2003 to transport high-pressure natural gas from Kambalda to Esperance to supply the Esperance Power Station and a small gas distribution network in the Esperance town site.

The Esperance Pipeline Company Pty Ltd (EPC) is the responsible licensee for the design, construction and operation of the KEGP under the Pipeline Licence.

EPC has appointed WorleyParsons Asset Management Pty Ltd (WPAM) as Facility Manager of the KEGP, and TW Power Services provide this Facility Management service. EPC has prepared this Environmental Plan (EP) to demonstrate to itself and third parties that environmental issues associated with the KEGP have been identified, assessed, and adequately managed throughout the operations and maintenance phase of the KEGP.

Approval to establish a gas undertaking in accordance with Section 55 (1) (b) of the *Energy Operators (Powers) Act* 1979 was granted to EPC by the Controller of Energy on the 30 October 2002 and Pipeline Licence No. PL 59 was granted by the Department of Mineral and Petroleum Resources, now DMP, on the 24th February 2003.

1.2 Proponent

EPC is the owner and operator of the Kambalda to Esperance Gas Pipeline PL59 and PL98 (KEGP shown in Figure 1.1. The KEGP is laid from Line Valve KLLV2 on the Kambalda Lateral Pipeline owned by Southern Cross Pipelines Australia Pty Ltd in Kambalda (KIS) and terminates at the Esperance Receiver Station (ERS). The ERS is a filtering and step-down regulating station that is designed to supply gas to the power station located in the Port of Esperance precinct.

The pipeline is approximately 341 km in length and is mainly underground, with the exception being eight above ground facilities, inlet and receiver stations, two scraper facilities and four mainline valves (MLV). It is located mainly within a 5-metre-wide right of way (ROW) within the existing Coolgardie – Esperance Highway main road reserve and the Kambalda to Esperance rail corridor.

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1.3 Purpose and Scope

This document identifies the potential environmental and socio-economic impacts associated with the operation and maintenance phase of the gas pipeline, and outlines EPC's proposals for the avoidance, mitigation and management of the adverse impacts, and promotion of the positive impacts identified.

It also provides guidance to the pipeline operators and maintainers on how to manage the environmental aspects of a pipeline facility.

1.4 Objectives

The objectives of this Environmental Plan (EP) are to:

- demonstrate compliance with regulations;
- demonstrate that the operator has a good understanding of how pipeline operations will interact with the environment;
- demonstrate that environmental impacts and risks are as low as reasonably practicable (ALARP);
- ensure that procedures are in place to minimise the environmental effects associated with the gas pipeline activities;
- demonstrate that EPC has appropriate performance objectives, standards and measurement criteria.

1.5 Review

This Environmental Plan is revised every 5 years or earlier as required by the Petroleum Pipelines (Environment) Regulations 2012.

1.6 Legislative Requirements

The pipeline is required to be operated in accordance with the *Petroleum Pipelines Act* 1969 which is administered by the Western Australian Department of Mines and Petroleum (DMP). Under this Act EPC was granted a pipeline licence (No.PL 59) on 24th February 2003.

As part of the licence conditions EPC could not commence operation of the pipeline until an Environmental Plan (EP), acceptable to the DMP, is in place. Furthermore, continued operation is contingent on the ongoing implementation of and adherence to commitments made in this EP.

Other relevant legislation to operations and maintenance activities includes the:

Environment Protection Act 1986
Environmental Protection (Clearing of Native Vegetation) Regulation 2004
Petroleum Pipelines Act 1969
Gas Pipelines Access (Western Australia) Act 1998
Petroleum Pipelines (Environment) Regulations 2012
Environment Protection and Biodiversity Conservation Act 1999
Wildlife Conservation Act 1950 as at 30 Jan 2012
Wildlife Conservation (Specially Protected Fauna) Notice 12th Feb 2012
Aboriginal Heritage Act 2006
Australian Standard AS2885.1 AS2885.2 and AS2885.3

In addition associated regulations which address, amongst other things, matters relating to pollution and emissions are to be adhered to this legislation is administered by the Department of Mining and Petroleum.

1.7 Structure of EP

This EP addresses the following issues:

- Section 2 provides EPC's environmental policy;
- Sections 3 and 4 provide a description of the development and the environment in the vicinity of the facility;
- Section 5 details risk assessment and environmental management strategies for identified environmental effects;
- Section 6 provides the Performance Objectives, Standards and Criteria to be followed; and
- Section 7 describes the implementation strategies to be followed, including systems for monitoring, auditing and reviewing environmental performance, reporting and consultation. Details of the emergency response plans to be adopted are also provided.

2 ENVIRONMENTAL POLICY

Figure 1.2

TW Power Services

HEALTH, SAFETY & ENVIRONMENT POLICY

TW Power Services is committed to protecting the health and safety of all employees and ensuring that our activities are safe for the environment and the greater community.

Our Principles

- All incidents are preventable
- No task is so important that the risk of injury to people or uncontrolled impacts on the environment is justified; and
- Effective HSE management is a critical foundation for sustainable management.

Our Objectives

- No injuries to anyone, anytime
- Respect the community and the environment
- To show leadership in the field of HSE management
- To work in a responsible and sustainable manner

Our Methods

TW Power Services will meet these objectives by:

- Promoting a positive culture that maintains a focus on communication, consultation and employee engagement in all aspects of HSE management;
- Promoting ecological sustainability as part of our culture;
- Providing sufficient information, training, supervision and resources for staff to implement our HSE management systems;
- Applying risk management principles to the identification and control of hazards, work practices and behaviours that could cause accidents, injuries, illness, pollution or environmental harm;
- Measuring, monitoring and improving the effectiveness of our HSE management systems;
- Maintaining responsibilities and accountabilities of all employees and management personnel for the implementation of our HSE management system;
- Complying with all legal and regulatory requirements; Integrating HSE management into all aspects of the organisation;
- Building relationships with business partners who aspire to the same HSE standards; and reporting publicly and annually on HSE performance, measured against objectives and targets.

This commitment to HSE is our highest priority and will not be compromised.

This Policy applies to all operations where TW Power Services is performing work and covers all our activities and services.

Gareth Mann | Chief Executive Officer

Our Values | Commitment | Collaboration | Performance | Innovation

3 PROJECT DESCRIPTION

3.1 Route

The pipeline route was originally selected by progressively and iteratively working through commercial, social, technical and environmental criteria to identify an optimum pipeline alignment.

The pipeline corridor for the KEGP is approximately 341 km in length and alternates between existing road and rail reserves (with the exception of a small deviation into freehold land to avoid pockets of remnant vegetation adjacent to the road reserve and at the end point in the Port of Esperance precinct). Figure 3-1 shows the map route and stations along the pipeline route.

3.2 Operations

3.2.1 General

The pipeline flow of gas and control of the system is operated by the duty operator located at the Esperance Power Station control room. They are supported by 2 field operators and 1 supervisor from Programmed Facility Management who is the pipeline maintenance contractor.

The KEGP is buried in its entirety, but there are some above ground stations such as mainline valves (MLVs) and scraper stations 1 and 2. The pipeline comes above ground only at the Valve Station and Scraper Stations.

- Kambalda inlet station and Esperance receiver station.
- Two scraper station facilities.
- Bypass lines for the four MLVs.

Four MLVs have been positioned at regular intervals along the pipeline for isolation purposes. There are no inline compression facilities and the pipeline is free flow.

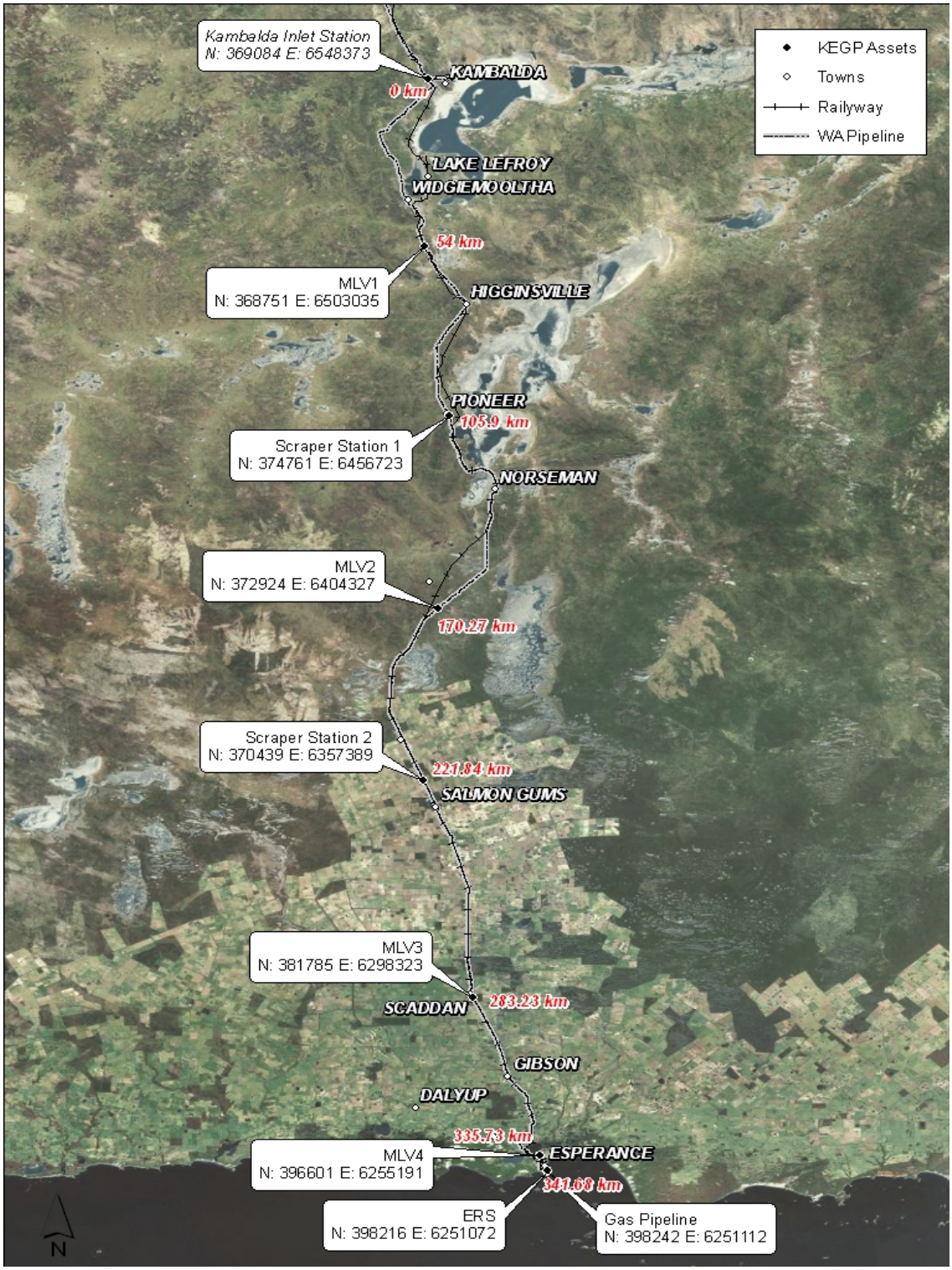
Operation and maintenance of the KEGP is in accordance with all applicable Australian Standards AS2885.3. Table 3.1 summarises the pipeline design specifications in compliance with the Australian Pipeline Standard *AS2885.1 Pipelines - Gas and Liquid Petroleum*. The gas pipeline has been designed to the have a life of 25 years. Nevertheless, it is anticipated that the pipeline will in fact be able to continue in service beyond that time line.

Operations and Maintenance Procedures are in force which will incorporate all routine and non-routine pipeline operation, maintenance and safety procedures. Odorant is injected into the pipeline at the Kambalda Inlet Station (KIS) in accordance with the Director of Energy Safety guide lines.

There is little evidence of the buried pipeline, except for pipeline marker posts and CP test points at regular intervals along the right of way (ROW). In areas of native vegetation, primarily at roadsides, regeneration of native species is evident along the right of way (ROW).

FIGURE 3-1

PL59 THE KAMBALDA TO ESPERANCE GAS PIPELINE LOCATION



The coordinates nominated on the map are UTM coordinates

TABLE 3-1 PIPELINE DESIGN PARAMETERS

Feature	Specification
Pipeline length (approx.)	341 kilometres
Operational corridor width	5 metres
Pipe diameter	150 millimetres NB
Pipe Wall thickness	Standard Wall 4.0mm Heavy Wall 6.4mm
Pipe steel grade	Standard wall API 5L Grade X52 Heavy wall API 5L Grade X65
Maximum allowable operating pressure	10.2 MPag
External coating	HDPE (Yellow Jacket) to AS1518
In-line compressor stations	None (free-flow)
Pig launching/receiving stations	4
Mainline valves	4
Depth of cover	1.2 metres depth of cover maintained As per AS2885.1 & AS4799
Cathodic protection	Impressed current
Design Temperature	60 ^{o} Celsius

3.2.2 Venting

Pipeline venting is not a normal operation, but may be required in emergency situations (e.g. sectional pipeline damage or leakages) or during In-Line Inspections (ILI) carried out on a 5 yearly basis. In such cases, venting will be a manual procedure. Venting is possible at all scraper stations and MLVs. These sites are situated at adequate distances from residences as determined by Pipeline Risk Assessment requirements in accordance with AS2885. There are no pipeline venting facilities at the Esperance Receiver Station as this is adjacent to a residential area. Emergency venting will be conducted cold will be undertaken in favourable local meteorological conditions that facilitate rapid atmospheric dispersion of the gas. A pipeline venting philosophy and procedure has been prepared as part of the (DMP approved) operations procedure 6.17 (document C9900a82).

3.2.3 Routine Inspections

Routine right of way and station patrols are undertaken to monitor the pipeline easement for operation and maintenance issues weekly. Particular attention is paid to vegetation and weed invasion, watercourse crossings and third party activities on the easement. Watercourse crossings are monitored on a regular basis and after high-flow events/rainfall for erosion and scour and potential remedial works.

In-line inspection tools (e.g. intelligent pigs) may be passed through the pipeline to inspect the integrity of the pipeline in accordance with AS2885.3

Patrol personnel will undertake scheduled field inspections on a weekly basis; the Esperance Area Manager will conduct ongoing consultation with regulatory authorities with regard to the maintenance and operation of the pipeline.

4 ENVIRONMENTAL DESCRIPTION

This section provides an overview of the main environmental features relevant to the operations and maintenance of the KEGP. In this EP information on flora and fauna is summarised from the detailed information provided in the EP.

4.1 Climate

Climatic patterns vary within the Goldfields to Esperance region and the frequency of rain in the region varies significantly. The average number of days of rainfall ranges from 65 at Kalgoorlie-Boulder to 140 at Esperance. The air masses bring year-round rainfall to the interior, but winter season rains predominate along the coastal belt and the Nullarbor. Remnants of cyclonic activity in Northern Australia bring occasional summer season rain to the region.

The Goldfields sub-region has a semi-arid climate characterised by low rainfall (averaging 260 mm at Kalgoorlie-Boulder) and a large temperature range. Average rainfall is relatively evenly spread throughout the year. The winter months of May to August have the highest and most reliable average rainfall, but intense rainfall can occur periodically in the summer months of December to April as a result of tropical cyclones.

The Esperance sub-region has a Mediterranean type climate with cool wet winters. The warm to hot summers are practically dry except for occasional thunderstorms. The coastal fringe experiences a milder climate than the inland areas as a result of the maritime influence, and strong winds are a notable feature. The town of Esperance and the immediate coastal belt receive about 625mm of rainfall annually, with some 68% occurring between May and October.

4.2 Geology and Hydrogeology

4.2.1 Geology

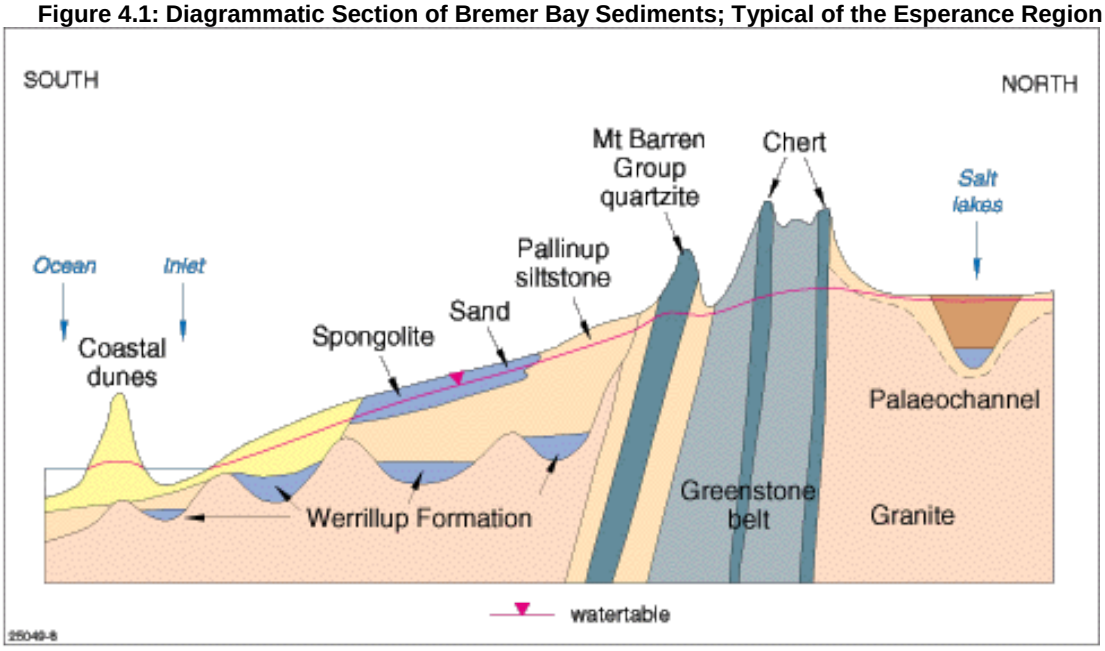
The study area is situated upon two main geological and structural units, namely the Yilgarn Craton and the Albany-Fraser Orogen. The Yilgarn Craton consists of granite, gneiss and volcanic and sedimentary rocks of Archaean age (greenstones), and hosts all the major gold and nickel mines of the region. The Albany-Fraser Orogen consists of an assortment of metamorphosed and un-metamorphosed sedimentary and volcanic rocks ranging from early to mid-Proterozoic age, with the metamorphosed rocks being associated with granite and gneiss.

4.2.2 Hydrogeology

The goldfields region overlies the Yilgarn Craton, and groundwater in the Goldfields occurs in alluvium, palaeochannels and fractured and weathered bedrock. Fresh water is extremely limited in the goldfields region. Saline or hypersaline groundwater from palaeochannels or bedrock aquifers is utilised by the mining industry. Stock supplies, where the salinity is suitable, are drawn by low yielding bores and wells in alluvium and weathered bedrock.

The Esperance Sand Plain Zone extends along the south coast and encompasses sediments of the Bremer Basin which overlie granite/gneiss bedrock of the Albany Fraser Orogen (see Figure 4.1). The main aquifers are in the Pallinup Siltstone and the Werillup Formation of the Bremer Basin. These sediments infill a buried topography on the basement rocks, and are a maximum of around 130m thick. The basal Werillup Formation is concealed by the overlying Pallinup Siltstone.

Figure 4.1: Diagrammatic Section of Bremer Bay Sediments; Typical of the Esperance Region



(Department of Fisheries and Water and Rivers Commission, 2001)

4.3 Landforms and Soils

The assessment of the landforms and soils along the alignment are based on literature reviews and desktop analysis. Five major geomorphic regions are recognised within the project area; these are represented in the following table (Table 4.1).

TABLE 4.1: GEOMORPHOLOGY ALONG THE KEGP CORRIDOR

Geomorphic Region	Land System	KP Marker	Geomorphic Description	Associated Soils
Southern Goldfields District	Not described	0 – 200	Combination of sand plain and granite outcrops, and low lying broad alluvial plains containing numerous intermittent (mostly dry) drainage lines and large playas fringed by sand dunes. (Commander et.al, 1992)	Alluvium of clayey sands and clay occurs in the main valleys, Calcrete may occur close to the centre of valleys or adjacent to salt lakes to a thickness of up to 15 metres (FD & WRC, 2001).
Esperance Mallee District	Scadden	200–295	Gently undulating plateau, with no major rivers. Some minor intermittent drainage lines. Numerous salt lakes with associated dunes and lunettes. (McArthur, 1991)	Complex pattern of soils. Typically calcareous sands underlain at a variable depth by strongly mottled and saline sandy clays. (McArthur, 1991)
Esperance Plains District	Esperance Plains	295–324	Extensively eroded lateritic plateau (McArthur, 1991); which now exists as a gently undulating sand plain with low rises and hills. (Overhue et.al, 1993)	Generally deep sandy grey sands overlying gravel layer underlain by yellow clay. Depth to clay is variable (10-500cm). Some elevated lateritic remnants. (McArthur, 1991)
Esperance Coastal District	Gore	324–328	Narrow discontinuous coastal lowlands overlain in places by the Tooregullup sand dunes. Features large areas of wetlands and lakes fed by saline watercourses of Esperance Plains (Overhue et.al, 1993)	Sandy yellow duplex soils occur on the level plain, with saline grey-blue duplex soils present on the poorly drained winter-wet flats. (Overhue et.al, 1993)
	Tooregullup	328–341	The Tooregullup Land System represents the Holocene coastal dunes, consisting mainly of parabolic sand dunes and associated swales. (Overhue et.al, 1993)	Soils are generally deep calcareous white sands with small areas of calcareous sandy loams evident in the swales. (Overhue et.al, 1993)

KP = Kilometre Point

4.4 Hydrology and Water Resources

4.4.1 Existing Environment

4.4.1.1 Hydrogeology

The Goldfields-Esperance region (with the exception of its coastal area) is the driest in WA. Rainfall is infrequent and occurs erratically throughout the year. Two hydrogeological regions occur within the study area:

Kalgoorlie Plain (KP 0 – 324) - The hydrogeology of this region is complex, reflecting the variety of bedrock types, the structure, and the degree of weathering and fracturing. Recharge is low because of the low rainfall, high evaporation, heavy soils, well-developed vegetation cover and internal drainage. Most groundwater in this part of the region is saline or hypersaline. Where drainage lines exist, they are usually short and flow only after rain, and drain into the willow salt lakes common in the region.

Esperance Sub-region (KP 324 – 341) - The hydrogeology of this region has many surface rivers and streams; a reflection of the higher rainfall experienced near the coastline. There are numerous small to large permanent lakes, with some intermittent tiny lakes and swamps and small to large areas subject to inundation.

4.4.1.2 Wetlands and Drainage Lines

The alignment crosses several salt lakes and drainage lines, including Lakes Cowan and Lefroy. The majority of the lakes and drainage lines along the alignment are saline and remain dry, except following rare heavy rainfall events. The notable exception is the Esperance Lakes system (see below), located immediately north of Esperance. No other major wet water features are present along the pipeline alignment, or are within a distance likely to be affected by the KEGP.

Esperance Lakes Nature Reserve

The route alignment deviates around Lake Warden 32257, which forms part of the Esperance Lakes Nature Reserve. The Esperance Lakes system is one of nine wetland areas in Western Australia recognised as Wetlands of International Importance under the Ramsar Convention (a treaty that provides the framework for international cooperation for the conservation of wetland habitats). The system is also listed on the National Estate Register in recognition of its significance for waterbird conservation.

The Esperance wetlands comprise a system of lakes and marshes of variable salinity set behind coastal dunes. The main lakes from west to east include Lake Warden, Windabout Lake, Woody Lake, Wheatfield Lake and Mullet Lake. The water regime varies from ephemeral to almost permanent with springs giving rise to willow brackish wetlands. Warden, Woody, Wheatfield and Mullet Lakes are saline and are permanent or occasionally dry out in autumn whereas all other wetlands are seasonal.

4.4.1.3 Freshwater and Potable Water Supplies

Superficial fresh groundwater resources are limited to the Esperance sub-region. As stated previously, the water resources of the Kalgoorlie Plain are saline to hypersaline. As such, inland regions are reliant on artesian bores and/or rainfall catchments for their drinking water supplies, although Kambalda is connected to the Goldfields Water Supply Scheme.

The major groundwater resources of the Esperance sub-region are contained in regional, catchment controlled flow systems, where it slowly migrates under gravity towards the rivers and oceans. Freshwater lakes are not common in the region and groundwater salinity in the Esperance sub-region is closely related to rainfall and evaporation with a general trend of increasing salinity towards the north. Most groundwater is saline, and drinking water resources are extremely valuable within the region due to the relatively scarce nature of fresh water.

The pipeline corridor dissects three Water Reserves and Catchment Areas which exist for the protection of town water supplies. These Catchment Areas are proclaimed under the *Country Areas Water Supply Act (1947)* and are managed and administered by the DEC. The pipeline alignment is located within road or rail reserve that passes through Public Drinking Water Supply Area's (PDWSA) for the settlements of Esperance (KP36-338), Gibson (KP307-312) and Salmon Gums (KP225-231).

4.5 Vegetation Communities

4.5.1 Existing Environment

4.5.1.1 Bioregional Representation

Beard (1990) divides WA into three primary vegetation provinces; Northern, Eremaean (or Desert) and South-West. However, Beard also identified a transition zone, which contained elements of both the South-West and Eremaean provinces, referred to as the South-West Interzone.

Within these Western Australian provinces (and the Interzone) are 26 bioregions, as listed in the Interim Biogeographic Regionalisation for Australia (IBRA); formulated by the Australian and New Zealand Environment Conservation Council (ANZECC) in 1998.

The pipeline corridor passes through three IBRA bioregions. Two are within the South-West Province (*Esperance Plains* and *Mallee*); however, the *Coolgardie* bioregion is located within the South-West Interzone.

4.5.1.2 Vegetation Communities

Beard (1979) identified vegetation systems of the Esperance area and also classified those systems into structural formations by physiography, which were then subdivided into associations based on species composition.

Past clearing for agriculture has led to widespread salinisation of the Esperance agricultural region, and unsustainable pastoral activities have caused a decline in the

native plant communities. As such, remnant vegetation in the region is significant for both its intrinsic value, and importance in maintaining the viability of the natural systems which support agriculture.

4.5.1.3 Conservation Estates

The pipeline alignment is largely within road and rail reserve and does not directly impact on any conservation estate or registered natural heritage site, however there are several such sites adjacent to the proposed alignment. These include:

- Kambalda Nature Reserve 33300
- Binaronca Rock Nature Reserve 32552
- Lake Gilmore Nature Reserve 42943
- 25 Mile Rocks Nature Reserve 8029
- Norseman Aboriginal Reserve 22465
- Brockway Forest ReserveF197/25
- Red Lake Nature Reserve 29680
- Truslove Nature Reserve 27985
- Truslove Town Site Nature Reserve 15818
- Triangular Nature Reserve 31313
- Esperance Lakes Nature Reserve (includes Ramsar Wetlands) 32257 & 15231

Name	X	Y	Longtitude	Latitude	Area sq/m
25 Mile Rocks Nature Reserve	369901	6465227	121.62	-31.94	4938048
Binaronca Nature Reserve	382460	6488960	121.75	-31.74	26365105
Brockway Forest Reserve	384480	6424364	121.77	-32.31	10319034
Esperance Lakes Nature Reserve	395429	6257393	121.87	-33.82	6440904
Kambalda West Nature Reserve	365810	6542510	121.59	-31.24	1545320
Norseman Aboriginal Reserve	376352	6447649	121.69	-32.1	3717743
Ramsar Wetland Boundary	399028	6258472	121.91	-33.81	5881661
Red Lake Nature Reserve	379659	6332024	121.71	-33.14	293375
Triangular Nature Reserve	382767	6295601	121.74	-33.47	193774
Truslove Nature Reserve	380078	6310341	121.71	-33.34	1039149

4.6 Pathogen and Weeds

The pipeline corridor is largely located within road and rail corridor, which has transported animals, goods and raw materials for over 100 years. During this time, numerous introduced flora species have colonised the road and rail reserves and their surrounds. The development of the Esperance agricultural area in the 1950's, resulted in the introduction of many non-indigenous plant species to the region, some of which have now become environmental and/or agricultural weeds.

Similarly, mining and agricultural development has also provided opportunities for the spread of native and introduced environmental and/or agricultural soil pathogens.

Pathogens

DEC has previously advised that no infections of Dieback (*Phytophthora* sp.) or Canker (*Cryptodiaporthe* sp.) are known to occur within the pipeline alignment. Current information from DEC indicates that Die-back occurrence is located only to the east of Esperance, away from the KEGP pipeline alignment. No other die-back infestation has been recorded by DEC for the pipeline alignment from Kambalda to Esperance.

Agriculture Western Australia has advised that no agricultural pathogens are known to occur within the pipeline corridor and surrounding areas, however White Snails are an emerging pest in the region, and these are known to occur in the rail reserve near Esperance. There are also unconfirmed reports of White Snail near Scaddan and Salmon Gums.

Weeds

Environmental weeds are flora species which displace or adversely dominate native species, altering not only the diversity and interactions of the flora, but also its value as fauna habitat. Most potential weeds are 'disturbance opportunists", possessing characteristics that enable them to successfully colonise disturbed ground and out-compete other plants located on the site. In bushland, weeds displace natives, inhibit regeneration, alter fauna resources, affect nutrient cycling, and change fire characteristics. The result is degradation and eventual simplification of the bushland ecosystem.

Agricultural weeds are plants that pose a threat to the viability of agricultural operations. They may reduce yield, contaminate and degrade produce or poison stock.

During the original development of this Environmental Plan Agriculture Western Australia has advised that the following weeds are known to occur within the project corridor and surrounding areas. They are not listed as declared weeds by the Agriculture Protection Board under the *Agriculture and Related Resources Protection Act, 1976*; however, they represent a threat to local agriculture and require management by land managers to prevent their spread:

- Statice (*Limoneum* spp.) also known as Winged Sea Lavender - occurs near Salmon Gums.

- Onion Weed (*Asphodelus fistulosus*) - occurs between Scadden and Salmon Gums.
- Wild Radish (*Raphanus raphanistrum*) - occurs between Esperance and Scadden.

Opuntioid cactus

Opuntioid cacti or cactus (Opuntia species, Cylindropuntia species and Austrocylindropuntia species except C. californica) are declared pests in Western Australia (WA). Additional to the original weeds identified, some of these cactus species have been identified at various locations in the KEGP RoW. It must be noted that this infestation in not limited to the KEGP RoW but this forms part of a wider spread of this weed along the rail corridor and farmland in the region.

- Life cycle

  Prickly Pear species have several features that enable them to compete and become pests. Prickly pear species are drought resistant because of their succulent nature, their lack of leaves and their thick, tough skins. These features result in plants that use the majority of their internal tissues for water storage and their outer parts to reduce water loss and damage by grazing and browsing animals. They can remain vigorous in hot, dry conditions that cause most other plants to lose vigour or even die. Some species develop underground bulbs that enable the plant to resist fire and mechanical damage.

  Prickly pear is established from either seed (by germination) or plant segments (by vegetative reproduction).

- What's been done?

  A trial of the release of the cactoblastis moth was carried out at four locations around Salmon Gums and Scaddan in 2014. This release was supported by TW Power Services and South Coast NRM. This was initially successful however due to the cold winter temperatures the larvae has died out and alternative options are now being considered.

  The Esperance Weeds Action Group (EWAG) has since been established and has been working with the Department of Agriculture and Food WA (DAFWA) and the Shire of Esperance to

  A breeding colony of cochineal insects has been established by the EWAG members to release as an alternative biological control.

- Alternative Options?

  There are a number of options for chemical control including foliar spray, stem injection and basal bark/cut stump.

  Biological control methods include cactoblastis moth or cochineal insect release.

- What is cochineal?

  Cochineal insects are soft-bodied, flat, oval-shaped scale insects (Dactylopius sp.) from which the natural dye carmine is derived. A primarily sessile parasite native to tropical and subtropical South America as well as Mexico and Arizona, this insect lives on cacti in the genus Opuntia, feeding on plant moisture and nutrients.

  The females, wingless and about 5 mm (0.20 in) long, cluster on cactus pads. They penetrate the cactus with their beak-like mouthparts and feed on its juices. After mating, the fertilised female increases in size and gives birth to tiny nymphs. Adult males can be distinguished from females in that males have wings, and are much smaller.

4.7 Fauna

Based on a search corridor extending 25 km either side of the pipeline alignment the Wildlife Conservation Act 1950 issued a Wildlife Conservation (Specially Protected Fauna) Notice on the 17th of Feb 2012 lists a number of species that may potentially occur in the area.

Details of these reported species and the types of their preferred habitat are outlined in Table 4.2.

TABLE 4.2: FAUNA SPECIES THAT MAY OCCUR WITHIN THE PROJECT AREA

Common Name	Taxanomic Name	Recorded Siting & Habitat
Chuditch or Western Quoll	*Dasyurus geoffroii* *Rare/Likely to become extinct, Div. 1 (Mammals)*	Uncommon and patchily distributed in the wheatbelt and south coast areas. It is highly mobile and appears able to utilise bush remnants and corridors. It has been recorded near Munglinup and has been reintroduced to Cape Arid National Park. There is a 1974 record from Kambalda. Individuals could occur in the project area.
Malleefowl	*Leipoa ocellate* *Rare/Likely to become extinct, Div. 2 (Birds)*	Once widely distributed across southern Australia. Prefers woodland or shrub land with an abundant litter layer that provides essential material to build its nest mound. Likely to occur along the route north of Salmon Gums, but may also occur to the south.
Carnaby's Cockatoo	*Calyptorhynchus latirostris* Threatened Species Day 2004	Frequents proteaceous scrubs and heaths and adjacent eucalypt woodlands. Breeding may occur in the area where there are stands of mature hollow bearing trees such as Salmon Gum (*Eucalyptus salmonophloia*).
Western Ground Parrot	*Pezoporus wallicus flaviventris* *Rare/Likely to become extinct, Div. 2 (Birds)*	Rare and patchily distributed along the south coastal area from Denmark to Cape Arid. Inhabits low dense shrub lands and has been recorded in the Esperance area.
Recherche Cape Barren Goose	*Cereopsis novaehollaindiae grisea* *Rare/Likely to become extinct, Div. 2 (Birds)*	Occurs mainly on the islands of the Recherche Archipelago but also frequents mainland coastal areas around Esperance.
Peregrine Falcon	*Falco perigrinus* Since 1971 all Australian raptors have been protected by legislation	Uncommon. Prefers areas with rocky ledges, cliffs, watercourses or open woodland.
Carpet Python	*Morelia spilota imbricate* *Other protected Fauna. Div. 3 (Reptiles)*	One record of this species about 90km east of the Pipeline route. Broadly distributed across much of the south-west, and has been given protected status. Prefers woodland and mallee. This species is as it is not common anywhere in its range
Quenda	*Isoodon obesulus fusciventer* *The Quenda is soon to be removed from the State Threatened Fauna List*	Still occurs in parts of the south coast. Occurs in patches of remnant vegetation with a moderately dense understorey (e.g. Esperance area)
Western Brush Wallaby	*Macropus irma*	Occurs in areas of woodland supporting a dense shrub layer

Common Name	Taxanomic Name	Recorded Siting & Habitat
Hooded Plover	*Thinornis rubricolis rubricolis* *Endangered Species*	Recorded along the margins and willows of salt lakes within the project area.
Crested Shrike-tit	*Falcunculus frontatus leucogaster* is near-threatened	Uncommon. May inhabit of woodlands and may occur in the project area.
Crested Bellbird	*Oreoica gutteralis gutteralis* *Indicators*	Sedentary and solitary specie. Inhabits the drier mallee woodlands and heaths of the southern parts of the State. It may occur within the project area.
Western Rosella	*Platycercus icterotis xanthogenys* *Rare/Likely to become extinct, Div. 2 (Birds)*	Occurs in eucalypt and casuarina woodlands and scrubs, especially of Salmon gum and tall mallees. Its distribution extends from the wheatbelt to Lake Cowan and Lake Dundas.
Unnamed elapid snake	*Rhinoplocephalus spectablis bushi*	Occurs as an isolated population near Scaddan and is known only from three specimens. Storr et al. (1986: 104) mentioned that two snakes from Scaddan (430 km SW of the rest of the species' range) possibly represented a third subspecies of Rhinoplocephalus spectabilz's. An additional two specimens have confirmed the distinctness of the Scaddan population.

4.8 Cultural Heritage

Based on previous studies (see Section 1.5), there is only one European heritage site listed (Dempster Homestead) on the State Heritage Register which is adjacent to the re-aligned pipeline corridor area.

There are no other registered cultural heritage sites that are present within the pipeline route alignment. The heritage site (Tommy Windich off Hughes Rd leading to Port) is the only listed aboriginal site but is some 200m away from the re-aligned pipeline route.

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4.9 Infrastructure

Broad infrastructure categories existing in the study area are included in Table 4.3. This infrastructure has been identified by surveyors in the field and marked on survey drawings.

TABLE 4.3: EXISTING INFRASTRUCTURE IN THE STUDY AREA

Infrastructure Category	Infrastructure	Location Description
Linear	Roads	Goldfields Highway (sealed, single carriageway) Coolgardie - Esperance Highway (sealed, single carriageway) Harbour Road (sealed, single carriageway) Sealed roads and access tracks Unsealed roads and access tracks
	Rail	Kambalda to Esperance Railway
	Electricity power lines Low voltage buried cables	Various locations None or very few
	Water and sewerage pipelines	Existing Kalgoorlie to Esperance water pipeline There are no water reservoirs in the Project Area.
	Fibre optic cables and other communications	Various locations
Non-linear (point locality)	Port	Port of Esperance
	Community infrastructure (private & public)	Towns – Kambalda West, Norseman, Salmon Gums, Grass Patch, Scaddan, Gibson and Esperance
	Agricultural processing and storage facilities	Grain Silos (Scaddan, Salmon Gums, and Esperance)

4.10 Socio-Economic Assessment

The land uses within the study area primarily comprise mining, manufacturing, agriculture, and forestry.

Mineral extraction and downstream processing has the greatest influence on the economic development and transport system of the region, particularly in the northern part of the Project Area from KP 0 to KP 200. There are approximately 6 mines currently operating within 50 km either side of the pipeline alignment. Mincor Ltd operates several mines in the Goldfields, and the ore is transported in bulk to the Port of Esperance.

Agriculture activities predominantly exist in the southern part of the study area. The pipeline alignment enters the Esperance agricultural zone at KP 200, where the predominant agricultural activities are broad-acre cropping and grazing. The agricultural zone extends south to KP324, beyond which hobby farms and various mixed uses can be found until the regional town centre of Esperance.

From Kambalda to Esperance the pipeline route traverses three local shires. Details of these shires are represented in the following table (Table 4.4).

TABLE 4.4: LOCAL SHIRES AND POPULATIONS IN THE STUDY AREA

Shire	APPROX. KP	Area (km^2)	Centres in the Project Area		Resident Population	Primary Economic Base
Coolgardie Shire	KP0 to KP87	30,400	District Service Centre	Kambalda West	3,800	Gold and nickel mining
			Local Service Centre	Widgiemooltha		
Dundas Shire	KP87 to KP185	92,725	District Service Centre	Norseman	1,600	Gold mining, tourism and pastoralism
Esperance Shire	KP185 to end point	42,450	Sub-regional centre	Esperance	15,000	Agriculture, tourism, super phosphate production, fishing, port activity, salt extraction and meat processing
			Local service centres	Gibson, Scaddan, Grass Patch and Salmon Gums		

Source: 25 September 2012 local shire

5 ENVIRONMENTAL RISK ASSESSMENT

5.1 Methodology

An assessment of the risk of potential environmental impacts of the KEGP and issues was carried out based upon a standard risk management approach consistent with the Australian/New Zealand Standard AS/NZS ISO 31000:2009 *Risk Management* and HB 203:2006 *Environmental risk management- Principles and process.*

This process involved:

1. Identifying the environmental aspects;
2. Description of potential environmental impacts;
3. Identification of management strategies;
4. Assigning a consequence severity rating (Table 5.1);
5. Assessing the likelihood/frequency (Table 5.2); and
6. Determining the level of residual risk (post management) for each potential impact (Table 5.3).

The management practices identified are designed to keep risks as low as reasonably practicable (ALARP) and economically achievable. Taking these management practices into consideration the residual risk is calculated.

TABLE 5.1: QUALITATIVE MEASURES OF CONSEQUENCE OR IMPACT

Level	Descriptor	Description
1	Insignificant	No lasting effect; Low level impacts on biological or physical environment. Limited damage to minimal area of low significance.
2	Minor	Minor effects on biological or physical environment. Minor short term damage to small area of limited significance
3	Moderate	Moderate effects on biological or physical environment. Moderate short-medium term widespread impacts
4	Major	Serious environmental effects with some impairment of ecosystem function (e.g. displacement of a species)
5	Significant	Very serious environmental effects with impairment of ecosystem function. Long term widespread effects on significant environment e.g. National Park, unique habitat

TABLE 5.2: QUALITATIVE MEASURES OF LIKELIHOOD

Level	Descriptor	Description
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time
D	Unlikely	Could occur at some time
E	Rare	May occur in exceptional circumstance

TABLE 5.3: QUALITATIVE RISK ANALYSIS MATRIX-LEVEL OF RISK

	Consequences				
Likelihood	Insignificant 1	Minor 2	Moderate 3	Major 4	Significant 5
A (almost certain)	H	H	S	S	S
B (likely)	M	H	H	S	S
C (possible)	L	M	H	S	S
D (unlikely)	L	L	M	H	S
E (rare)	L	L	M	H	H

Legend

S: Significant risk; immediate action required

H: High risk; senior management attention needed

M: Moderate risk; management responsibility must be specified

L: Low risk; manage by routine procedures.

5.2 Identification and Assessment of Environmental Effects

In general, pipeline operations and maintenance will have minimal environmental impacts. Common activities include pipeline corridor inspections, maintenance of the pipeline stations, pipeline corridor and associated facilities (e.g. valves, cathodic protection equipment), internal pigging of the pipeline every five years, and the use and handling of odorants at KIS.

5.2.1 Pipeline Management Corridor

The pipeline corridor for the KEGP is approximately 340 km in length and alternates between existing road and rail reserves (with the exception of a small deviation into freehold land to avoid pockets of remnant vegetation adjacent to the road reserve and at the end point in the Port of Esperance precinct).

5.2.1.1 Access

During operations the pipeline right of way (ROW) is regularly inspected. The majority of the pipeline is located in a road/rail corridor located in remote areas so that any access impacts are limited. However, careful planning can further reduce these potential risks and the pipeline inspection programme (as per AS 2885.3) will include those aspects listed in APIA Code of Environmental Practice (COEP, March 2009) section 5.2.

5.2.1.2 Soil and Ground Stability

The pipeline easement disturbed from trenching activities during excavation has been rehabilitated. However, this is regularly monitored to ensure any potential problems such as soil erosion, ground subsidence, and sedimentation in waterways do not arise. The inspection programme as mentioned in section 5.2.above includes a schedule and remedial action if needed. It is the Esperance Area Managers responsibility to audit the right of way by inspection every 12 months; the report includes depth of cover (DOC) erosion and general condition of the right of way (ROW).

5.2.1.3 Vegetation Management

If it is poorly rehabilitated the pipeline easement disturbed during maintenance work may result in poor vegetation cover which can cause the problems outlined in the previous section. The above mentioned procedures are implemented to reduce risks as low as practicable.

5.2.1.4 Weed/Pest Control

Weeds can invade disturbed areas to the detriment of other vegetation.

As part of the RoW Patrol Program as per Work Instruction C9900d21 and the reporting template C9900f67 is utilised to capture RoW conditions such as erosion as well as weed surveillance.

EPS supports activities to prevent the spread of the cactus species and its eradication. Section 4.6 give details regarding this weed's features.

EPS supports the eradication of this weed through:

- Support of the Esperance Weed Action Group (EWAG) activities to address the cactus weed including participation in this group and support of initiatives.
- Address risk of spreading of the weed though managing the vehicle movement in the invested areas and during the slashing activities (clearing plant growth for Right of Way) along the pipeline route to keep the KEGP ROW accessible as required by Regulatory Authority.

5.2.2 Pipeline Leaks and Ruptures

Poorly maintained and monitored pipelines can leak and rupture which can cause a range of impacts to flora/fauna, property, other land uses, infrastructure, and people. As such the pipeline is managed in accordance with AS 2885.3 to reduce these risks to ALARP.

5.2.3 Waste Management

Waste is appropriately managed so as to avoid contamination and littering of the environment, minimise risk to personnel safety and avoid visual impacts.

The site induction includes requirements for waste management.

All general wastes will be contained within temporary designated facilities such as litterbins and skips. These facilities are of a design to ensure no runoff of liquids from the waste pile.

Where possible, waste items are recycled or removed from site after work is completed

General refuse is collected for disposal to local council approved disposal sites.

The use of hazardous wastes, such as waste fuel drums, solvents, rust proofing agents and primers, is minimised and managed in accordance with the requirements of relevant legislation and standards. Spill Response, Waste Management and Chemical Handling is covered by KEGP procedure 7.13.1 – C9900b98

5.2.4 Chemical Storage

The use and temporary storage of chemicals whilst on location can potentially cause a threat to the environment. Proper handling and storage procedures ensure that these are managed in a safe manner. MSDS's are available at the maintenance contractor's workshop, as are spill clean-up kits for use during maintenance activities. In addition, a spill clean-up kit is located at KIS. Odorant is stored at KIS but no other chemicals are stored on the KEGP. During any maintenance activities involving handling of chemicals and hazardous materials, a spill clean-up kit is mobilized.

Chemical storage is in accordance with Spill Response, Waste Management and Chemical Handling is covered by KEGP procedure 7.13.1 – C9900b98

5.2.5 Air Emissions

Air emissions can be generated from a range of activities e.g. vehicles, venting, etc. All potential risks/impacts from pipeline operational activities are addressed in the risk assessment. These activities are undertaken in accordance in AS 2885.3.

Purging, venting and flaring will be conducted as per C9900a82

5.2.6 Use and Handling of Odorants

Odorants can cause environmental harm if released unexpectedly. This risk is minimised by having odorant handling and maintenance procedures in place.

Odorant handling and maintenance of the odorant injection system is in accordance with C9900b13.

5.2.7 Bushfire Prevention

The main bushfire risk comes from patrol vehicles and spark-emitting maintenance work such as welding, grinding etc. As measures set out in AS 2885.3 will be adopted, together with having bushfire risk reduction procedures in place, as per The APIA Code of Environmental Practice 5.1.8 (COEP March 2009) risks are considered to be low.

KEGP operating procedure 7.13.2 – Bushfire Prevention and risk Reduction Procedure (C9900b99) is the applicable document.

5.2.8 Noise

Noise can be generated by a range of activities and/or sources including vehicles, machinery, gas venting etc. This can disturb households, other land users in the vicinity of the operations and stock or wildlife. The APIA Code of Environmental Practice 5.3 (COEP March 2009) lists a range of measures that if adopted should reduce the potential effects to a low risk. Examples include scheduling noisy activities in periods where it will be less of a nuisance. Any complaints are documented and followed up.

In regard to gas flaring and venting, operating procedure 6.17 document C9900a82 will be applied in regard to noise control.

5.3 Risk Assessment Summary

Table 5.4 below lists the overall residual risks based on the control measures identified.

TABLE 5.4: RISK ASSESSMENT

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
Pipeline Corridor Management- Access	- disturbance to flora/fauna - damage to other land uses - temporary disruption to residents, landholders; and other third parties - soil compaction, erosion and sedimentation - damage to known sites of indigenous significance - visual amenity - dust creation	• Wherever feasible use existing tracks, roads; • Plan activities so as to keep any disruptions to a minimum; • Include environmental aspects in inspection programme detailed in COEP section 5.1; • Notify landowners and regulators of any new issues. • Notify traditional owners and monitor activities in areas of potential buried cultural heritage materials for artefacts identification. • Reinstate trenched areas or disturbed soil/ or vegetation to normal condition as quickly as practicable. • Use of water cart where practicable to mitigate dust.	1	D	Low
Pipeline Corridor Management-Soil, ground and groundwater stability	- sol erosión - sedimentation - flora/fauna impacts -damage to other land-uses - subsidence of pipeline trench - exposure of pipeline -acid sulphate soil (ASS)	• Schedule regular inspections and document; • Ensure vegetation is maintained; • Vehicle access to be restricted to stable ground where practicable; • Include in inspection programme as detailed in COEP section 5.1.1; • Conduct annual pipeline patrol including aerial survey. • Affected site to be stabilised and re-instated • Minimise exposure of ASS soils to oxygen. Trenches backfilled within 48 hrs. Test ASS	1	D	Low

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
		soil stockpiles exposed for greater than one month			
Pipeline Corridor Management-vegetation management	- excessive vegetation regrowth; - lack of vegetation can lead to erosion, sedimentation, visual amenity etc. - disturbance to existing vegetation and faunal habitats	• Where practicable restrict access to areas recently re-vegetated; • Avoid disturbance to vegetation outside immediate pipeline corridor or access track; • Revegetation to be monitored as part of structured monitoring/remedial programme; • Included in Environmental Guidelines – Operations COEP section 5.1.1.1. • Where possible avoid fauna habitat during clearing. If required, advise environmental agency and engage consultant to relocate fauna to other locations.	1	C	Low
Pipeline Corridor Management-introduction of weeds/pathogens	- impact on local flora/fauna - introduction into agricultural areas - dieback	• Routine inspections to monitor re-vegetation and regeneration of construction corridor. Include in inspection programme as detailed in COEP section 5.1; • Active weed and pest control programme is required at sites identified as infested at least one year after easement construction. Thereafter as monitoring dictates. • Importation of fill material for ROW repair activities should only utilise materials that can be certified as weed free. • Topsoil stripped and removed from site	1	C	Low

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
		• Conduct plant hazard assessment and machinery cleanliness prior to works. • Monitor corridor clearing to ensure cleared areas do not exceed those necessary for ROW operational requirements.			
Pipeline leaks and ruptures	- air pollution; - harm to flora/fauna; - disruption to other activities and/or persons.	• Comply with AS 2885.3 (pipelines: operation and maintenance). • Initiate Emergency Response Plan if warranted • Notification of all relevant stakeholders of thee release. • Isolate affected pipeline section through isolation valves and or reduce operating pressure to mitigate gas emissions • periodic leakage surveys as per AS 2885.3 requirements	1	E	Low
Commissioning and Decommissioning	Failure of pipeline assets or welds leading to unplanned emissions	• Hydrostatic testing of pipe to AS2885.3 • NATA weld inspections • Commissioning Hazid workshop • Competent personnel • Approved procedures	3	E	Medium
Planned venting and other controlled emissions	air pollution; - harm to flora/fauna; - disruption to other activities and/or persons.	• Procedure C9900a82 • planned release of gases to be minimised • purpose built gas vents to be located away from residential/infrastructure as per AS requirements	1	C	low

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
		• planned gas releases in favourable meteorological conditions • Advise adjacent occupiers/authorities of pending venting. • equipment fitted with appropriate abatement devices • Routine inspections to monitor any fugitive emissions • Procedure documented and approved			
Waste management	- pollution of land, waterways; - inefficient use of resources; - visual amenity impacts.	• Comply with waste management procedures (see COEP 5.5 and section 5.2.3). • Prevent or minimise waste generation e.g. returnable containers, recycling etc.; • Use of non-hazardous materials where feasible; • Provide drip trays, bunded area • Storage in appropriate containers in controlled area; • Disposal at approved landfill facilities; • Minimise waste disposal to landfill. • Provide spill clean-up kit at site • MSDS's to be available	2	C	Med

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
Chemical Storage and Hazardous Materials	- contamination of soil and water, including groundwater; - air and odour emissions - personnel and fauna exposure	• Spill clean -up kit at site; • MSDS's must be available; • Use drip trays; • Comply with spill response procedures (see COEP Section 5.8) • Spills to be reported and clean up immediately • Chemical/hazardous materials to be stored in approved containers and properly marked for information. • All liquid/hazardous materials must be bunded. • Periodic CP survey and inspection of pipeline assets to identify emissions or spills due to corrosion	1	D	Low
Air emissions	- release of air pollutants; - greenhouse gas emissions; - odour emissions;	• Planned release of gases to be minimised and managed in a controlled and environmentally responsible manner; • Venting procedure documented and activity to be manned 100% of the time; • Purpose built gas vents are designed to be located away from residential/infrastructure as per AS2885.3 requirements; • Planned gas releases in favourable meteorological conditions; • Advise adjacent occupiers/authorities of pending venting. •	1	C	Low

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
Use and handling of odorants	- contamination of air	• Odorisation procedure in place; • Maintenance procedure for equipment. • Odorisation storage tank re-supply procedure in place; • Odorant injection plant maintenance procedure in place. • Routine inspections to monitor any fugitive emissions. `	1	D	Low
Pigging Operations	Venting of Gas Discharge of Pyrophoric Dust.	• Possible need for venting carried out under correct venting procedures 6.17 • Dust contained by monitoring and change out of ERS line filters as per procedure 6.01.01	2	D	Low

Aspects (Activities/Emissions)	Description of Potential Impacts on the Environment	Management Measures	Consequence Severity Rating	Likelihood / Frequency	Residual Risk
Bushfire prevention	- loss of flora/fauna - damage/loss of property, crops -damage/loss of infrastructure	• Bushfire prevention procedures applied (see COEP Section 5.1.8). • Hot works permit obtained and no fires lit along pipeline corridor.	1	E	Low
Noise emissions	- reduction of amenity due to noise	• Schedule noisy activities for periods that are less likely to cause a nuisance; • Local residents and other stakeholders to be informed of noise potential prior to activities being undertaken that may create higher noise levels; • Monitor noise levels when changes to operations takes place to ensure they are within acceptable limits.	1	C	Low

6 PERFORMANCE OBJECTIVES AND STANDARDS

6.1 Definitions

Environmental Performance Objectives: means a statement of the objectives or goals for protecting the environment relevant to the specific proposed activity;

Environmental Performance Standards: means quantifiable standards for determining whether performance objectives or goals are achieved;

Environmental Performance Criteria: means monitoring and specific requirements used to measure whether performance standards are met.

These are summarized in Section 6.2 below.

6.2 Objectives, Standards & Criteria

Objectives	Standards	Criteria	Guidelines & Targets	Ref: Mitigation and Control Practices
ISSUE1: Social impact				
Minimise disturbance to existing land uses and infrastructure	PP Act 1969, Section 10, Clause 2(d)	All personnel to complete normal induction that includes environmental awareness component Manage, record and respond to all complaints received during activities EP compliance review to verify mitigation and control measures are implemented	APIA Code of Environmental Practice EPC Health, Safety, Environment Management System and Policy (refer Section 2)	7.3.2.1 - 7.3.2.4 7.3.21- 7.3.323
ISSUE 2: Natural Environment (Flora/Fauna/Soils)				
Minimise impacts on the natural environment	PP Act 1969, Clause 2(d) Bushfire prevention procedure	Inspection Procedures to include environmental checklist. Audit pipeline easement 12 months after construction completed. This will then be subsequently monitored through the annual KEGP pipeline patrol activity	APIA Code of Environmental Practice AS 2885.3 This EP	7.3.2.5- 7.3.2.13 7.3.3.20

ISSUE 3: Solid/Hazardous Materials: Handling & Waste Management				
Adopt correct handling methods and waste management to ensure no accidental chemical /hazardous spills that may cause harm to environment and or personnel.	EP Act, Section 49, 50	EP compliance review to verify mitigation and control measures are implemented	APIA Code of Environmental Practice EPC Environment Management System and Policy (refer Section 2) Pipeline contractors documented waste management procedure	5.7
ISSUE 4: Pollution Prevention: Spills/Emissions				
To have no spills of hazardous and non- hazardous materials or emissions that will impact on the environment.	PP Act 1969, Section 10, Clause 2(d) EP Act, Section 49, 50. Spill Response Procedures	All personnel to complete normal induction that has environmental awareness component. EP compliance review to verify mitigation and control measures are implemented	APIA Code of Environmental Practice EPC Environment Management System and Policy (refer Section 2) EPC Emergency Response Plan	5.8 5.8 C9900A85 – Appendix D
ISSUE 5: EP Implementation				
Ensure Environmental Plan is initiated and fully complied with resulting in nil incidents,	PP Act 1969 Licence Condition	Normal Induction to have environmental component. Compliance audit	This EP	7.2

7 ENVIRONMENTAL MANAGEMENT

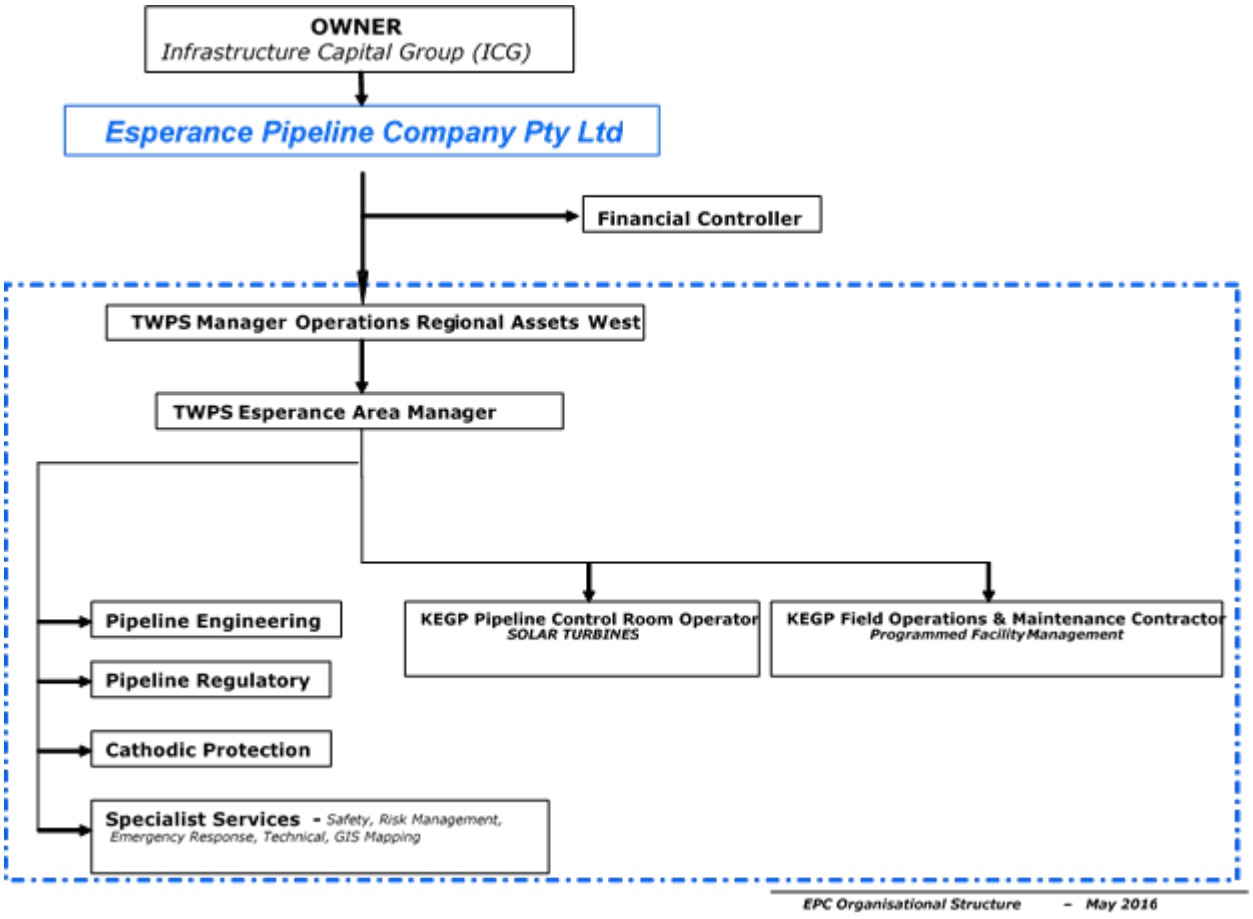
7.1 Roles and Responsibilities

The key responsibilities for Environmental Management are as follows:

- The EPC Board is responsible for ensuring that appropriate resources are allocated to meet EPC Management Systems and Policy requirements; and for establishing and regularly reviewing the Environmental Policy (see Section 2).
- The Facility Manager (FM) is responsible for the governance of the EP.
- The Esperance Area Manager is responsible and accountable for implementing the Environmental Policy within the operational area, through application of the Environment Plan;
- All Project personnel including EPC personnel and third party contractors are responsible and accountable to adhering to the Environmental Policy and this Plan in all tasks that they undertake.

Responsibilities and accountabilities for each position within the Company are documented to avoid confusion over responsibilities and accountabilities. Figure 7.1 shows the organisational chart.

FIGURE 7.1: ORGANISATIONAL CHART



7.2 Employee Selection, Competency and Training

Job descriptions for EPC employees and its representatives include safety and environmental responsibilities. These are used by Human Resources to recruit suitably competent personnel for EPC.

EPC reviews safety and environmental awareness performances as part of the annual employee performance feedback process and recommends ongoing training needs as appropriate. The training programme complies with the National Training Package for oil and gas pipeline control.

EPC ensures that its contractors have suitable employee selection, competency and training processes in place through review of their Workforce Management Plan and audit of their processes. It also requires its contractors to provide details of training and competency assessments, at specific intervals, for work carried out on the network.

EPC and contractor personnel receive induction training that is appropriate to their position or service responsibilities. On an ongoing basis, personnel's training needs are assessed to ensure that employees maintain a level of knowledge, skill as appropriate to the task, the Regulations and Acts as appropriate. Further training needs are identified for each personnel on an annual basis during the performance appraisal process.

All personnel, including contractors, will also be required to attend an induction prior to commencing any tasks. This is to be arranged by the Esperance Area Manager and records are kept by KEGP Esperance Office for a period of 5 years. As part of this normal induction an environmental component is included that addresses the following issues.

- The importance of conforming to the EPC Environmental Management System and Policy, the requirements of the Environment Plan and regulatory requirements.
- An understanding of the significance and potential of environmental effects associated with their work requirements.
- Personnel roles and responsibilities for environmental performance.
- An understanding of the relevant objectives and requirements of this EP.
- An understanding of the Emergency Response Plan and their role.

Emergency response drills and exercises are conducted on a regular basis.

7.3 Environmental Protection

Table 7.1 provides a listing of the practices to control and mitigate the potential environmental risks and impacts identified in Section 5 and also serves to meet the objectives, standards and criteria as set out in Section 6.

It is intended this table may be utilised as a checklist for use by the Esperance Area Manager as a means to check that the requirements of this Environmental Plan are being complied with.

Note: **R** = Responsible; **C** = Contributes;

Mitigation and Control Practice		EAM	Environ. Advisor/ Operations Manager	Field Supervisor
7.3.1 General				
7.3.1.1	Have EMS/Policy in place	**R**		
7.3.1.2	All personnel to have normal induction which includes environmental component	**R**		**C**
7.3.1.3	Audit/Compliance Review	**R**	**C**	**C**
7.3.1.4	Review Contractor work practices including permits to work and Job Safety Analysis (JSA) documents for compliance with laid down procedures when EPC procedures are not used Review EPC procedures as per document Control Manual.	**R**	**C**	
7.3.2 Pipeline Corridor Management				
7.3.2.1 - 7.3.2.4	• where feasible use existing tracks, roads; • plan activities so as to keep any disruptions to a minimum; • include environmental aspects in ROW Patrol Procedure as detailed in COEP section 5.1.1. • Notify landowners and regulators of any new issues. • Notify traditional owners and monitor activities in areas of potential buried cultural heritage materials for artefacts identification • Minimise exposure of ASS to oxygen. • Mitigate dust using water cart.			**R**
7.3.2.5 - 7.3.2.7	• schedule regular inspections and document; • ensure vegetation is maintained; • vehicle access to be restricted to stable ground where practicable;			**R**
7.3.2.8- 7.3.2.11	• where practicable restrict access to areas recently re-vegetated; • revegetation to be monitored as part of structured monitoring/remedial programme; • avoid disturbance to vegetation outside immediate pipeline corridor or access track; • Include in ROW Patrol Procedure as detailed in COEP section 5.1.1. • Reinstate disturbed landscape as soon as practicable to assure reasonable visual acceptance.			**R**

Mitigation and Control Practice		EAM	Environ. Advisor/ Operations Manager	Field Supervisor
7.3.2.12 - 7.3.2.13	• Routine ROW patrol to monitor re-vegetation and regeneration of construction corridor. Include in ROW patrol procedure as detailed in COEP section 5.1.1; • Active weed and pest control programme is required at sites identified as infested at least one year after easement construction. Thereafter as monitoring dictates. • Avoid using fill material which is not weed free for any ROW repair work. • Topsoil stripped and removed from site • Conduct plant hazard assessment and machinery cleanliness prior to works • Conduct annual pipeline patrol including aerial survey.			**R**
Mitigation and Control Practice		**EAM**	**Environ. Advisor**	**Supervisor**
7.3.3 Pipeline Operations and Maintenance				
7.3.3.1	• Comply with AS 2885.3 (pipelines: operation and maintenance).	**R**		**C**
7.3.3.2 - 7.3.3.6	• Waste management procedures in place (see COEP 5.7). • prevent or minimise waste generation e.g. returnable container, recycling etc.; • use of non-hazardous materials where feasible; • storage in appropriate containers in controlled area; • Disposal at approved facilities.			R
7.3.3.7 - 7.3.3.11	• Minimal practicable storage on-site; • spill clean -up kit at site; • MSDS's to be available; • drip trays, bunded area • have spill response procedures (see COEP Section 5.8) • Spills to be cleaned up immediately. • Chemical and hazardous materials to be properly stored in approved containers and its content clearly marked. • Periodic CP survey and inspection of pipeline assets to identify emissions or spills due to corrosion.			R

Mitigation and Control Practice		EAM	Environ. Advisor/ Operations Manager	Field Supervisor
7.3.3.12 - 7.3.3.17	• planned release of gases to be minimised; • periodic leakage surveys as per AS 2885.3 requirements; • purpose built gas vents to be located away from residential/infrastructure as per AS requirements; • planned gas releases in favourable meteorological conditions; • Advise adjacent occupiers/authorities of pending venting. • Hydrostatic testing to AS2885.3 • NATA weld inspection • Use of competent personnel • Procedure documented and approved • Commissioning Hazid workshop			R
7.3.3.18 - 7.3.3.19	• Odorisation storage tank re-supply procedure in place; • Odorant injection plant maintenance procedure in place. • Routine inspections of facility to monitor any fugitive emissions			R
7.3.3.20	• Bushfire prevention procedure to be put in place (see COEP Section 5.1.8).	R		C
7.3.3.21 - 7.3.3.23	• Schedule noisy activities for periods that are less likely to cause a nuisance; • local residents to be informed of noise potential prior to activities being undertaken; • equipment fitted with appropriate abatement devices;	R		C

7.4 Incident Notification, Investigation and Reporting

EPC will provide notification to all relevant environmental regulatory agencies of ‘notifiable incidents’ in accordance with regulatory requirements.

7.4.1 Incidents

Incidents with actual or potential impacts on the biophysical environment (such as a spillage) shall be recorded and addressed immediately to DMP and DEC.
Any incidents (including actual or potential impacts on the biophysical environment, such as a spillage) are reported and documented in the weekly meetings between WPAM/TWPS and its contractors. Notifiable incidents are reported Environmental Incident report forms will be sourced on DMP’s website: www.dmp.wa.gov.au.

DMP requires that any incident identified as having a potential or actual impact of ‘moderate or more serious than moderate’ environmental consequence must be

reported to the Department as soon as practicable, but within 2 hours as required by the Petroleum (Environment) Regulations, either orally or in writing.

Verbal notification is effected through DMP's environmental branch incident reporting number 0419 960 621. Written notification must be sent to DMP as soon as practicable, but within 3 working days after the initial notification and shall cover detailed information about the incident, investigation outcome and corrective actions.

Incidents are discussed and investigated and all corrective actions are documented and followed up for implementation. Where required, approval is gained from management for any resources necessary for the implementation of these corrective actions.

EPC incident procedure is documented in the Hazard, Incident & Accident Investigation & Reporting Procedure 7.07 (document C9900A92 and associated forms C9900A93 and A94) that defines the process of identification, investigation, corrective action and close out. Any EPC employee can use this procedure to report hazards that they observe or incidents that occur during the operation of the pipeline. The Hazard/Incident reporting forms are submitted to the EPC Area Manager for action and close out.

Incident and accident investigation is driven by the EPC Area Manager with assistance from HS&E advisors. Specialist incident investigators may be called on at the discretion of the EPC Area Manager.

Contractors are required to use the EPC incident reporting process that includes notification to the EPC Area Manager of incidents and ensures security of the incident site until such time as the EPC Area Manager gives approval for the area to be restored to normal working conditions.

Incidents and accidents that trigger escalating levels of notification and involvement by the EPC Area Manager are specified in the Hazard, Incident and Accident Reporting and Investigation Procedure 7.07 (document C9900A92).

The process for investigating failures and the subsequent analysis for implications on the management of risks can be found in document C9906d02 "HSE Event Investigation, Corrective Action and Closeout". It outlines a structured process for investigating, analysing and effectively managing corrective and preventative actions relating to HSE events through:

- The development of safety and environmental related policies and procedures
- The setting of objectives/KPI's
- Undertaking audits/inspections and analysing the data from those audits/inspections
- Identification and analysis of innovations and initiatives
- Implementing and monitoring corrective and preventative actions
- Undertaking management review

7.4.2 Reportable Incidents

Under Regulation 4 of the Petroleum (Environment) Regulations, a reportable incident is defined as an incident classified as a reportable incident under

environment plan for the activity; or an incident that has caused, or has the potential to result in, an adverse environmental impact or an environmental impact that has been categorised as moderate or more serious than moderate under the environmental risk assessment process described in this document.

EPC's reportable incident scenarios are shown in Table 7.2 below.

Table 7.2- Reportable Incidents

Description	Timing	Notification Recipient
Consequence Based Incidents		
1. Uncontrolled release of a significant volume of natural gas due to faulty equipment or other items from either above or below ground pipeline facilities	Verbally as soon as practicable but within 2 hrs. then in writing within 3 days.	DMP & EPA
2. Loss of containment of natural gas due to ruptured pipeline or facilities	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
Other Reporting Requirements		
1. Spills of hydrocarbons or hazardous material in excess of 80 litres to sea or inland waters	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
2. Spills of odorants in excess of 5 litres to sea or inland waters	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
3. Spills of hydrocarbons, odorants or hazardous materials in excess of 500 litres in other areas	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
4. Spills of odorants in excess of 20 litres to ground or 5 litres to air.	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
5. Spills of hydrocarbons, odorants or hazardous materials that affect a ground surface area greater than 100m3 or more.	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
6. An unplanned gaseous release to atmosphere 500m3 or more	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA

7. Death or injury to individual(s) from a listed species during an activity	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA
8. Unplanned impact caused to a matter of national environmental significance (NES) during an activity as per the Environment Protection and Biodiversity Conservation Act 1999.	Verbally as soon as practicable but within 2 hrs. Then in writing within 3 days.	DMP & EPA

7.4.3 Recordable Incidents

Under Regulation 4 of the Petroleum (Environment) Regulations, a recordable incident is defined as an incident arising from the activity that breaches a performance objective or standard in the EP that applies to the activity, and is not a reportable incident.

Where a planned project activity exists, these incidents will be compiled into the project monthly report and will be submitted to the DMP at the end of each calendar month. Information provided in recordable incident reports will include:

- a record of all recordable incidents that occurred during the calendar month;
- all material facts and circumstances concerning the recordable incidents that the operator knows of or is able, by reasonable search or enquiry, to find out;
- any action taken to avoid or mitigate any adverse environmental impacts of the recordable incidents; and
- the corrective action that has been taken, or is proposed to be taken, to prevent similar recordable incidents.

Note: Nil reporting will be conducted if no recordable incidents occurred during that month.

EPC's typical recordable incident scenarios are shown in Table 7.3 below.

Table 7.3 - Recordable Incidents

Description	Timing	Notification Recipient
1. Spills of hydrocarbons, odorants or hazardous material less than 80 litres to the sea or inland waters	Monthly on or prior to the 15th day of each month.	DMP
2. Spills of hydrocarbons, odorants or hazardous materials less than 500 litres in other areas	Monthly on or prior to the 15th day of each month.	DMP
3. Spills of hydrocarbons, odorants or hazardous materials that affect a ground surface area less than 100m³ or more.	Monthly on or prior to the 15th day of each month.	DMP

4. An unplanned gaseous release to atmosphere 500m3 or less.	Monthly on or prior to the 15th day of each month.	DMP

Recordable incidents are considered major incidents and must be captured and filed in the company's records and submitted to DMP at the end of each calendar month until the incident has been closed-out.

7.5 Monitoring, Review and Auditing

As part of the implementation of the environmental management strategies outlined in this section the following are undertaken:

- All incidents are reported to and investigated by the Esperance Area Manager;
- The Field Supervisor plans and undertakes regular inspections which the Esperance Area Manager l attends at least once per year to ensure compliance with this EP. Any departures are documented by the field staff and follow up actions taken and recorded.
- A formal audit is initiated by the EPC FM and is undertaken every second year to determine compliance with the EP.

7.6 Records and Reporting

The following records are kept and reported as part of the HSE Management System by the Esperance Area Manager:

- Any breach of government regulations;
- Any complaints lodged by external parties e.g. general public, other land-users etc.

This EP is a controlled document and is revised by the EPC FM every five years.

7.6.1 Routine Reporting

EPC also regularly perform routine reporting to relevant regulatory agencies on the following:

- Emissions and discharges report every 3 months – to DMP Environment Division
- Environmental Plan update every 5 years - to DMP Environmental Division
- Emergency Response Plan every 2.5 years – to DMP Environment Division.
- Annual Environmental report (includes monitoring reporting) – to DEC and DMP Environment Division. The reporting period covers 1st January to 31st December each year. Reports are submitted within 3 months of the end of the reporting period.
- Any change in its asset, organisational structure or operating environment - to DMP Resources Safety Division;
- Major safety incident – to DMP Resources Safety Division.
- Integrity of pipeline report every 5 years – to DMP Resources Safety Division

7.7 Emergency Planning and Control

EPC has included environmental emergencies in its Emergency Response Plan (ERP) document C9900a85. This plan includes responsibilities and actions to be undertaken. Amongst other things this includes the following items:

- Hazardous substances/chemicals; and
- Spills and gas releases.

The ERP addresses all categories of safety and environmental emergencies, including communication internal and external stakeholders and co-ordination protocols with emergency services.

The emergency response plan is regularly tested using both desktop and actual site simulations. It will also be re-tested if significant amendments are incorporated.

A copy of the ERP is in Appendix A of this document. Spillage management is described under Appendix D of the ERP.

7.7.1 Spill Response Plan

The Emergency Response Plan (refer Appendix A) details the organisational responsibilities, reporting requirements and resources available to ensure the effective and timely management of a spill to the environment (chemical or hydrocarbon).

Response will be based on a tiered structure and shall involve an Emergency Management Team (EMTL) and Site Response Team (SRT). The EMTL leader is the Esperance Area Manager who coordinates the frontline tactical response to a spill including associated reporting and notification requirements.

Potential liquid spill/unplanned environmental release scenarios for the KEGP operations are documented and risk-assessed in Section 6.2 (Issue 4) of this EP and the EPC Hazard Register (document C9900c26).

7.7.2 Environmental Monitoring

Potential impact of environmental items resulting from operational activities is detailed in Table 7.4 below.

Table 7.4 – Items generated from KEGP operation for monitoring

Activity	**Items generated**	**General management principle**	**Data collection method**	**Report recipient**
Maintenance of pipeline valves, delivery and metering stations	Filters (non-oily, oily and gas)	Collected and transported by licensed contractor for recycling or disposal to regulated water landfill.	Waste receipt and disposal records from waste management contractor	Annual report to DEC and DMP
Ditto	Waste oils and greases	Collected and transported by a licensed contractor	Waste receipt and disposal records from waste	Annual report to

		for recycling where possible.	management contractor	DEC and DMP
Ditto	Packaging	General waste for disposal at a licensed landfill	Waste receipt and disposal records from waste management contractor	Annual report to DEC and DMP
Cleaning of pipeline – pigging (if undertaken in the future)	Pipe cleaning waste (pigging grit-scale, rust, or other foreign material)	Pigging grit – licensed contractor to transport regulated waste to a licensed regulated waste landfill.	Waste receipt and disposal records from waste management contractor	Annual report to DEC and DMP
Spills of hydrocarbon based material	Potential hydrocarbon contaminated soil from spilled oils and greases.	Remediation in-situ for small quantities. Advice sought from enviro consultant regarding treatment options for larger spills (e.g. >200 L). Removal of soil under disposal permit for remediation or disposal at suitable facility.	Waste receipt and disposal records from waste management contractor	Quarterly report to DEC and DMP as required by regulation
Emissions and Discharges	Emissions and discharges not related to spills. Items such as vehicle emissions, controlled venting, unaccounted gas.	Reduce or eliminate any activities that procedure emissions or discharge through planning of operations activities and engineered improvements.	Waste receipt and disposal records from waste management contractor. Emissions tracking sheet. Unaccounted gas tracking sheet	Quarterly Emissions & Discharges report to DMP as required by regulation
Offices, crib room(s) site amenities along pipeline	Office waste-paper, cardboard packaging etc. Kitchen bin waste in	Recyclable material to recycling facility (where available). Residual material local landfill. Wastewater from crib rooms and	Waste receipt and disposal records from waste management contractor	Nil

	facilities. First-aid waste. Kitchen and amenity wastewater .	amenities will be hauled via vacuum truck and disposed at a local treatment facility.		
Clearing and grubbing pipeline corridor and access tracks	Green waste, topsoil and excavated material (stockpiled for backfilling and application to RoW)	Stockpiled/windrowed vegetation will be reapplied during restoration/rehabilitation of RoW All topsoil and excavated material reused for backfilling in RoW Nil RoW, access / service roads and string area preparation Hardstand materials All material used	Conduct survey at end of activity.	Annual report to DEC and DMP
Ditto	Introduced weed/pathogens sightings within disturbed area boundary.	Visual inspection	Periodic pipeline patrol survey	Annual report to DEC and DMP
Trenching	Excavated material	All excavated material reused for backfilling in RoW to be spread across RoW All materials will be treated as per the waste hierarchy with general waste disposed to local licensed landfill	Conduct survey at end of activity	Annual report to DEC and DMP
Pipe cleaning and gauging Pipe testing – hydro testing 24 hour leak test	Pipe cleaning waste (pigging grit - scale, rust, or other foreign material) Hydrostatic test water not treated with biocides, corrosion inhibitor and oxygen scavengers	Pigging grit - licensed contractor to transport regulated waste to a licensed regulated waste landfill Hydro test water discharge to land (assume no chemical treatment of water is required as source is potable water)	Conduct survey at end of activity	Annual report to DEC and DMP

7.7.3 EPC Response Priorities

EPC's emergency response priorities in the event of an incident are to:

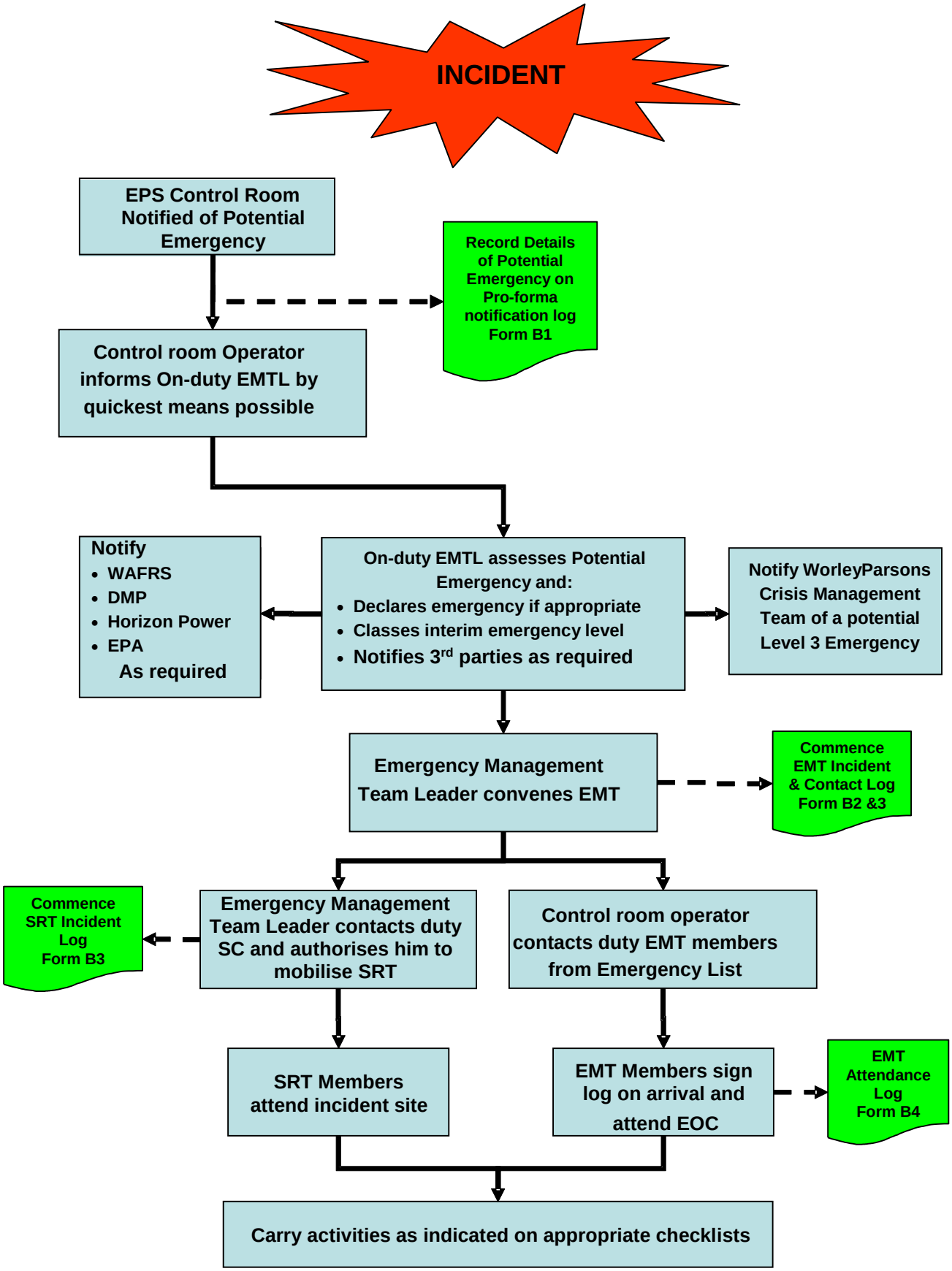
- Secure the safety of all personnel involved.
- Minimise any impact upon the environment.
- Minimise any impact on property and assets.

7.7.4 Emergency Management Structure

The Emergency Management Structure is based upon the Incident Response Team (IRT). Depending on the nature of the emergency, support will be provided to the IRT by the EPC Emergency Management Team (EMT).

The relationship between each of these groups is shown in Figure 7.5.

FIGURE 7.5: EMERGENCY RESPONSE STRUCTURE



The emergency response plan (ERP) documents the procedures, facilities and organisational roles/responsibilities required to ensure that EPC is prepared to effectively manage safety and environmental emergencies that could potentially result from the pipeline and associated facilities and any non-pipeline emergencies that may impact the KEGP.

It outlines emergency incidents that will trigger reporting requirements or notification of relevant agencies for scenarios such as gas release, explosion, major fires, odorant release, spills etc.

7.8 Decommissioning

The original design life of the pipeline was 25 years, however the Pipeline Integrity Management Plan allows for and extension of pipeline operations to 40 years or more.

Esperance Pipeline Company acknowledges a commitment to submit a de-commissioning and environmental rehabilitation plan at least 6 months prior to any planned decommissioning of the pipeline.

7.9 Consultation Held in Preparation of this EP

The following were contacted during the preparation of the various revisions of this plan:

Organisation	Representative	Comments
Department of Mines and Petroleum	Petroleum Division - Resource Safety - Environment	- Content of EP - Approvals
Department of Environment and Conservation	Petroleum Division - Perth Office - Esperance Office	- Content of EP - Approvals
WorleyParsons Safety and Risk	Malcolm Pritchard	- Risk workshops
WorleyParsons Hydrocarbons (Pipeline Systems)	Hedley Bond	- KEGP maintenance and operations - Emergency response plan
FESA	Peter Jones Manager HAZMAT Stuart McIntyre FESA District Manager, Esperance	- Site emergency exercises - Input to EPC's Emergency Response Plan
Main Roads	Randall Field	- PTA Corridor - Impact to KEGP - consultations made with key stakeholder

		- approvals
John Holland	Matt Dennison/MattTelfer	- Planned infrastructure construction activities along Harbour Road Esperance - CEMP
South Coast Natural Larvae	M. Kennewell	Release of Cactoblastis

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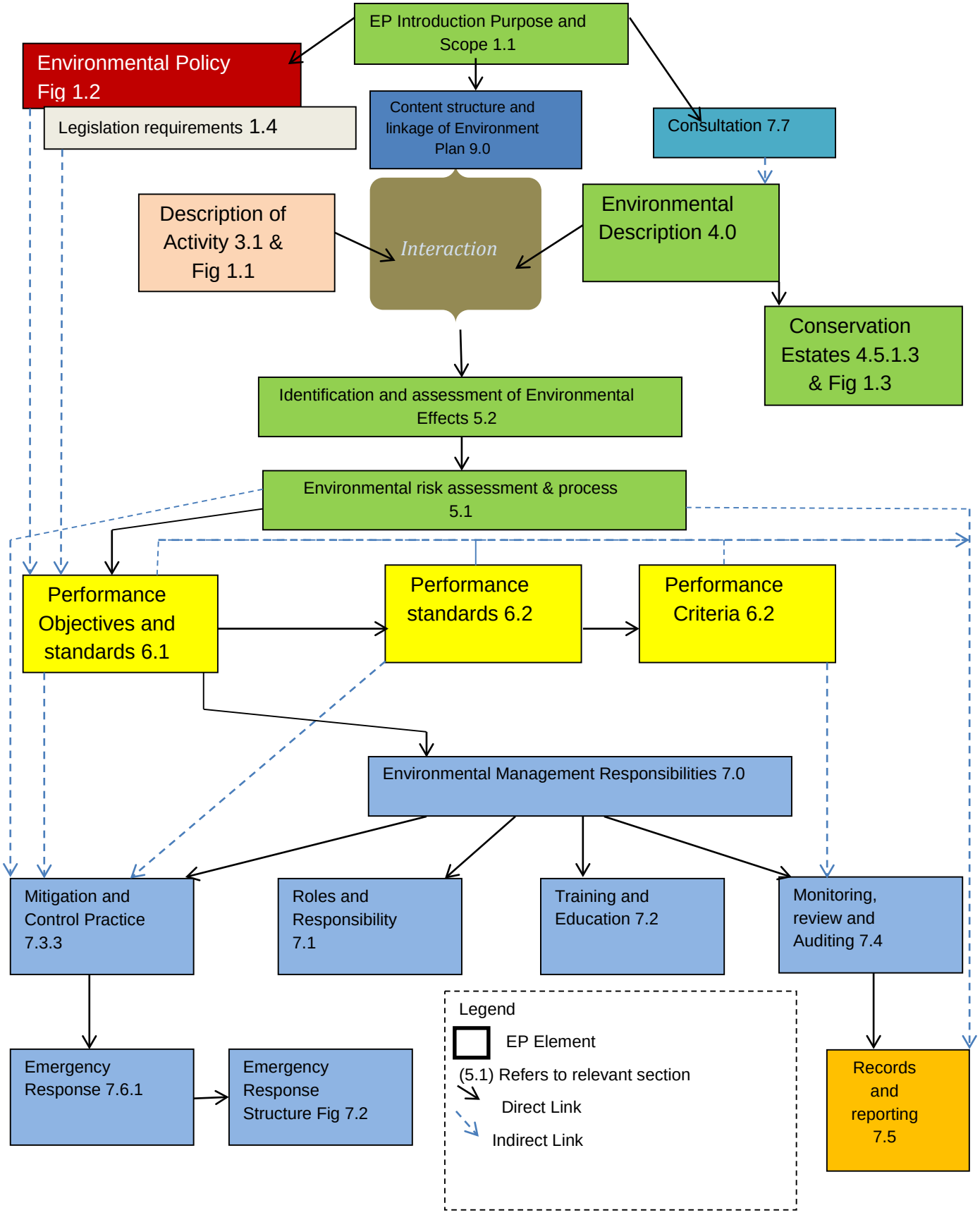
Kambalda to Esperance Gas Pipeline Project; Environmental Plan, for Esperance Pipeline Company Pty Ltd.

Emergency Response Plan, for Esperance Pipeline Company Pty Ltd

A new Rhinoplocephalus (Serpentes: Elapidae) from Western Australia, G.M. Storr.

9 CONTENT, STRUCTURE AND LINKAGE OF THE ENVIRONMENT PLAN



ATTACHMENT A – Emergency Response Plan Document C9900a85

KAMBALDA TO ESPERANCE GAS PIPELINE AND ESPERANCE GAS DISTRIBUTION SYSTEM
Emergency Response Plan

Esperance Pipeline Company Pty Ltd
ABN 46 099 425 895

Esperance Power Station Pty Ltd
ACN 086 409 949

PROJECT NUMBER: C9900

DOCUMENT NUMBER: C9900A85

REV	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY	DATE
B	Issued for review (EPC)	PJS	CJ		24/11/03
0	Issued for Use	PJS	CJ	JMO	27/11/03
5	Rev contact directory pages 27&28	CB	JMO	JMO	11/05/05
6	Included Esperance GDS	CB	JMO	JMO	31/08/05
7	Amend contact directory pg 27	CB	JMO	JMO	
8	Amended contact directory pg 26 only	DOS	JMO	JMO	17/07/06
9	General Review	LRB	JMO	JMO	14/11/07
10	General Review	LRB	JMO	JMO	03/07/08
11	General Review	LRB	WMcC	MM	02/04/09
12	Update contacts &govt agencies	TC	WMcC	MM	14/01/10
13	General Review	BS/LT	WMcC	MM	29/03/11
14	R3 Contact Review	PB	WMcC	MM	02/12/11
15	R3 Contact Review	PB	WMcC	WMcC	20/12/11
16	General Review	PB	WMcC	WMcC	29/05/12

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PROJECT NUMBER: C9900

DOCUMENT NUMBER: C9900A85

REV	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY	DATE
17	General Review page 29	PB	WMcC	WMcC	30/07/2012
18	Contact Review	PB	WMcC	WMcC	25/10/2012
19	R3 Contact Review	PB	WMcC	WMcC	25/10/2012
20	Update to meet DMP requirement	PB/LT	WMcC	WMcC	14/01/2013
21	Update contact details	NS	WMcC	WMcC	11/02/2013
22	Update contact details	NS	WMcC	WMcC	17/05/2013
23	Update contact details - DMP	NS			15/01/2014
24	Update contact Details – EAM	JL	WF	WF	05/11/2015
25	Update after exercise	WF	ST	WMcC	06/10/2016

DESIGNATED OWNER & CHANGE CONTROL

The designated owner of the Kambalda to Esperance Pipeline and Esperance Gas Distribution System Emergency Response Plan (ERP) is the Esperance Pipeline Company (EPC) Facility Manager.

The designated owner is responsible for the approval, maintenance and distribution of all parts of the ERP.

As required by the Safety Management System, any proposed changes to the ERP are submitted to the designated owner for review and approval. During this review the designated owner identifies and actions any modifications to the ERP and training that may be required as a result of accepting the proposed change and. The designated owner issues controlled copies of all revisions to the ERP.

This ERP is a controlled document and all revisions shall be distributed to the following:

Copy Number	Holder Title
1.	Emergency Management Team Leader (EMTL)
2.	Alternative EMTL
3.	EPC Control Room
4.	PIM Supervisor
5.	DFES Esperance

Glossary of Terms & Abbreviations

PIM	Programmed Industrial Maintenance - Maintenance & Project Services, Pipeline Field Maintenance Contractor.
ERP	Emergency Response Plan.
EPC	Esperance Pipeline Company.
EMTL	Emergency Management Team Leader.
EMT	Emergency Management Team consisting of expert advisors who shall assist the EMTL in the initial response to an emergency.
EOC	Emergency Operations Centre.
ERS	Esperance Receiver Station (located at the end of the KEGP at the EPS site).
EPA	Esperance Port Authority, owners of the land adjacent to the EPS.
EPS	Esperance Power Station containing the EPC control room and the EOC.
DMP	Department of Mines and Petroleum
SRT	Site Response Team who shall carry out mitigation, recovery or containment activities at the emergency incident site.
KEGP	Kambalda to Esperance natural gas pipeline, including the Kambalda Inlet station, the Esperance Receiver Station and all Main Line Valves, Scraper Stations and pressure reduction stations.
KIS	Kambalda Inlet Station (located at the beginning of the KEGP).
SMMS	Solar Turbines Machinery Management Services, Pipeline Controllers and Power Station Operators.
SRTL	Site Response Team Leader - Designated trained person who shall lead the Site Response Team.
FESA	Fire and Emergency Services Authority.
GDS	Esperance Town Area low pressure (200 kPa) gas distribution system

TABLE OF CONTENTS

ANNEXURES

1. PURPOSE & SCOPE

1.1. Purpose

This plan documents the procedures, facilities and organisational roles/responsibilities required to ensure that the EPC and EPS are prepared to effectively manage any emergencies that could potentially result from the pipeline and associated facilities and any non-pipeline emergencies that may impact the KEGP and / or the low pressure Esperance Gas Distribution System, (GDS).

The purpose of this ERP is to define the procedures to be followed in order to manage an emergency event that may arise on the KEGP or GDS during their operation.

The objectives of the procedures described in this plan are to:

- Define the roles and responsibilities of emergency response (EMT, SRT), and supervisory personnel.
- Describe the notification and support resources available to the EMT and SRT for use in an emergency and how these resources will be coordinated.
- Minimise the risk to employees, contractors and public health and safety.
- Minimise damage to the environment.
- Minimise the damage to company, public and private assets.
- Ensure that DMP, EnergySafety, Horizon Power, the community, management, the owners and other major stakeholders are kept informed of the status of any emergency or an environmental incident in a timely and organised manner.
- Minimise damage to the reputation and business continuity of the company, its contractors and Horizon Power by restoring the pipeline to its normal operating condition as quickly as possible.

1.2. Scope

This emergency plan applies to the facilities and activities associated with the KEGP and the GDS.

The KEGP and GDS contain a significant amount of hazardous material, principally natural gas, primarily used for the purpose of power generation. The major emergency scenarios arise from high pressure natural gas releases from the pipeline that may or may not ignite and the objectives of this ERP are dictated by the requirement to:

- Rescue, evacuate and treat casualties to prevent or minimise further death or injury.
- Isolate the release to prevent continuing or escalation of damage to property and the environment.
- Repair the pipeline(s) as quickly as possible in order to restore normal operations.

In addition, the ERP addresses the response to other incidents that can give rise to multiple casualties arising from pipeline activities, sabotage threats and external emergencies that can threaten pipeline integrity.

1.3. Credible Emergency Scenarios

The following credible emergency scenarios have been identified and guidance on the appropriate response and control measures is given in Annexure D.

- Gas Release, Explosion or Major Fire.
- Medical Emergency.
- Bomb/Sabotage Threats.
- Missing Personnel.
- Major Odorant Release.

Additional specific procedures have been developed to detail action to be taken during:

- KEGP Supply interruption and Curtailment procedure C9900a66
- Sabotage and Treats procedure C9900a72
- GDS Loss of Containment procedure C9906a66

This ERP will be updated to include other emergency scenarios that may be identified during the life of the pipelines.

2. EMERGENCY ORGANISATION

The initial response to an emergency may be made by personnel at site, if they are present at the time the emergency event occurs in their location, and/or by the duty controller at the EPC pipeline control room when he is notified or becomes aware of an emergency event in progress by means of the remote monitoring systems in place on the pipeline and facilities.

At site, personnel shall initially respond to an emergency in their location in order to minimise casualties, rescue injured personnel and take immediate action to control or limit the consequences of the emergency event as much as is practicable.

2.1. EMT - Emergency Management Team

The Emergency Management Team Leader (EMTL) is responsible for the initial determination of the emergency level and initiating the actions specified for that emergency level. The definition of emergency levels and the required actions are specified in Section 4. The Emergency Management Team (EMT) supports the EMTL by assisting him discharge his role and in providing him with expert advice.

The EMTL shall base himself in the Emergency Operations Centre (EOC). He shall assess the resources that he requires to manage the emergency event and shall mobilise additional EMT personnel as appropriate. EMT personnel may participate in the EMT remotely via telephone conferencing facilities if their physical presence is not required or they are unable travel to the EOC within a reasonable period of time. As the emergency event progresses the EMTL will consider the resourcing needs of the EMT and request the physical presence of EMT members at the EOC if necessary.

The TW Power Services Manager Regional Assets West is responsible for nominating the EMTL, as well as the EMT members, to ensure that there are sufficient personnel available at all times to resource the EMT. Under normal conditions the Esperance Area Manager will be the EMTL and the Power Station manager will be the Substitute EMTL.

Personnel who are available to be mobilised as members of the EMT are listed in the contact directory shown in Annexure A.

2.2. SRT – Site Response Team

The Site Response Team (SRT) is responsible for making their way safely to the site of emergency event as by the quickest means available in order to render assistance to personnel or 3rd parties, if any, at the site and responding to the incident in order to minimise further injury and if possible to contain and terminate the emergency incident.

The SRT is made up of trained personnel and is led by the Site Response Team Leader (SRTL).

The EMTL is responsible for nominating a SRTL. The SRTL is responsible for ensuring that sufficient trained SRT members are available at any time to be mobilised to the site of an incident without undue delay.

2.3. External Emergency Support Services

Depending on the location of the emergency incident, one or more external emergency support agencies may be called on for assistance or may arrive at the site as a result of notification by a member of the public. The responsibility for responding to the emergency incident will remain with EPC unless control is accepted by the Department of Fire and Emergency Services (DFES) (see Section 4). However, the various external emergency support agencies will have statutory powers that they may exercise at any time during the incident.

A directory of external emergency support agencies is provided in Annexure A.

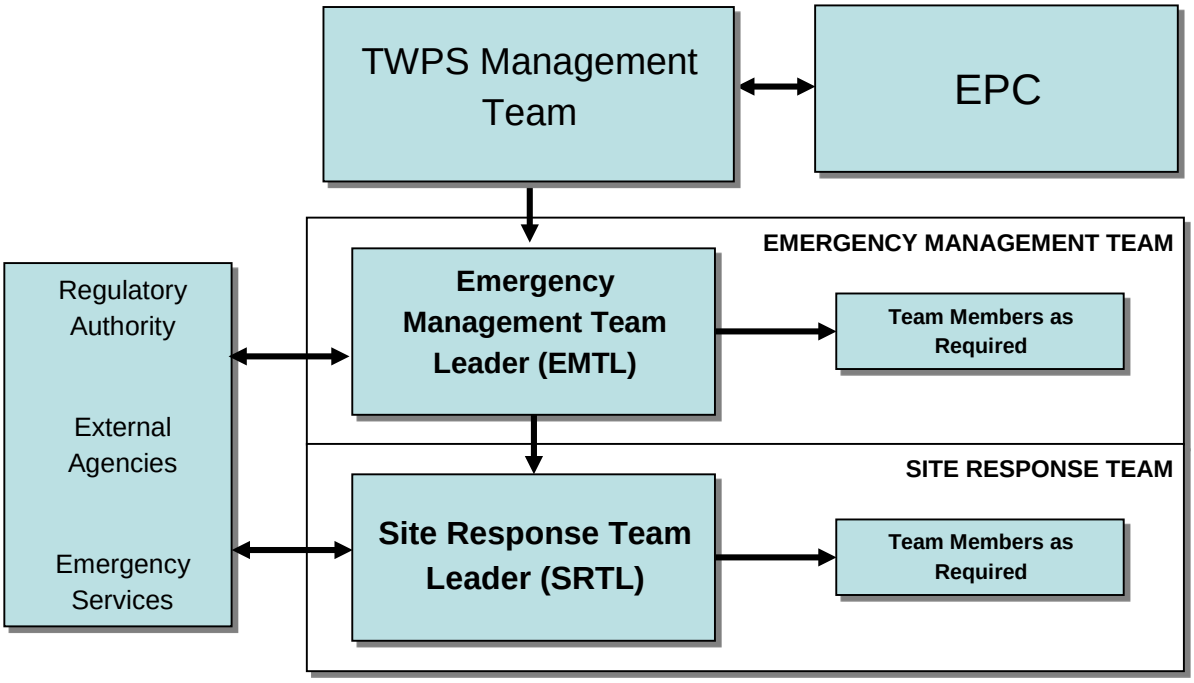
3. ROLES AND RESPONSIBILITES

3.1. General Overview

The ERP is designed to operate at 2 defined levels of hierarchy as follows:

- An Emergency Management Team (EMT) comprising Senior EPC Management; and
- A Site Response Team (SRT) comprising Site/Field/Area Contractor personnel.

This hierarchy is illustrated below:



The responsibilities are outlined as follows:

1 EMT Business / operational management, people, regional, State, Territory implications.

2 SRT People, physical emergency control and management, liaison and local issues

3.2. Emergency Roles and Responsibilities

The roles and responsibilities of designated emergency response personnel are defined as follows:

Emergency Management Team Leader (EMTL)
Occupant: Esperance Area Manager
Location: 22b Dutton Arcade,91 Dempster Street, Esperance
Reports to: TW Power Services Operations Manager - Regional Assets West
Responsibilities: • Determine the level of the emergency as defined in Section 4. • Manage the overall response to the emergency and acquire and deploy the necessary resources as appropriate to the characteristics of the emergency. • Endeavour to minimise the environmental and reputation damage that may arise due to the consequences of emergency incident and the means used to control it. • Communicate regularly with the TWPS Operations Manager as the incident progresses. • Liaise with contractor staff in order to mobilise additional resources if required • Ensure an incident and contact log is maintained. • Report level Emergency to TW Power Services Management Team.
Role: To command and coordinate the EMT and SRT and respond effectively to an emergency event.
Authority: To commit resources and actions in relation to the emergency operational response and in particular: • To commit personnel, equipment and technical resources to the response. • To represent or co-ordinate EPC operational involvement with other industry participants, external agencies and authorities, and • Support the SRT with resources in the operational response to the incident.
Critical **Tasks:** Manage the initial overall operational response and communication to an emergency incident, bringing together and coordinating the necessary people & their resources to cover all aspects of operational response & recovery.

Emergency Management Team Leader (EMTL)

Ensure overall response is managed with the following priorities:

- Protect human life.
- Reduce trauma.
- Maintain network safety/integrity.
- Protect the environment.
- Protect property, and
- Restore system operations.

Initial Actions:

- Assume initial overall control and invoke the necessary actions under the ERP.
- Appoint and notify the SRTL.
- Establish and maintain clear communications with the EMT and the SRT, as applicable.
- Determine the level of incident and response required.
- Mobilise the appropriate response to control the incident (this may involve the emergency services).
- Notify TWPS Operations Manager, as required.
- Notify the Operations and Maintenance Contractor's Management Team
- Inform stakeholders (as required), and other industry participants and external agencies.
- Commence log of events.

Ongoing Actions:

- Liaise with:
    - EPC personnel.
    - Horizon Power.
    - Expert technical personnel.
- Determine when the incident level needs to be escalated to a higher level.
- Provide updated information to senior management and ensure the flow of information is maintained.
- Maintain a log of events.

Emergency Management Team Leader (EMTL)

Stand Down Actions:

- Formulate a stand down plan with:
    - EMT.
    - SRT.
    - TWPS Operations Manager.
    - Horizon Power.
    - Other agencies (as required).
- Complete log of events.
- Prepare for debriefing.
- Ensure the EPC Hazard, Incident and Accident Reporting and Investigation Procedure 7.07 is complied with.

Site Response Team Leader (SRTL)

Occupant: Designated by Esperance Area Manager

Location: Incident Site

Reports to: EMTL

Responsibilities:

- Plan and coordinate the tactical response to the incident.
- Preserve the safety of all personnel, contractors and general public at or near the emergency incident site.
- Manage the incident in an environmentally friendly manner.
- Liaise with the EMTL on any required changes to network system pressures.
- Provide the EMTL with regular updates on the progress of the status of the incident.
- Liaise with emergency services and other authorities in attendance.
- Arrange for additional services and other authorities to attend.
- Immediately notify the EMTL if insufficient resources are available to him.
- Maintain a log of the events occurring on site.

Role: Command and co-ordinate the Site resources

Authority: At the Incident Site - command all EPC and contractor personnel and resources and control other assigned industry participant personnel and resources. When the SRTL believes that the real or potential scale of the incident will require management of resources greater than those available on-site, the SRTL must liaise with the EMTL who will act to enable and coordinate the additional resources.

Critical Tasks:

- Provide positive leadership and command Site personnel or assigned industry personnel.
- Control a response to the situation.
- Co-ordinate Site resources. This may be a supportive role to the Police Co-ordinator or Emergency Services Incident Controller appointed by DFES (if applicable).
- Manage the site response with the following priorities:
    - Protect human life.
    - Reduce trauma.
    - Maintain system safety.
    - Ensure system supply.
    - Protect the environment.
    - Protect property, and
    - Restore system operations.

Site Response Team Leader (SRTL)
Initial Actions: • Assume control of the situation until relieved by alternate. • Assume command of site personnel until relieved by alternate. • Assess the incident. • Plan initial response and allocate tasks. • Ensure the safety of all persons. • Consider the public, emergency services personnel, persons under your control. • What is the escape route if the situation escalates? • Arrange for emergency services and other agencies attendance, as required.
Ongoing Actions: • Liaise with external agencies at the site with a plan of action to repair all damage with the minimum disruption to customers. • Provide updated information to EMTL and/or EOC and ensure the flow of information is maintained. • Give briefings to all employees, contractors, and assigned personnel relating to the objectives, tasks and constraints associated with the incident. • Control access to the site if the emergency services are not in attendance. • Arrange a suitable assembly area for vehicles and equipment and access routes for attending agencies. • Maintain a log of events.
Stand Down Actions: • Formulate an action and stand down plan with the SRT. • Complete the required Incident Report Form in compliance with EPC Hazard, Incident and Accident Reporting and Investigation Procedure 7.07. • Keep original notes. • Prepare for debriefing. • Participate in any debriefing required on completion of the Incident.

3.3. Crew Change Overs

Crew changeovers can be more efficiently achieved with thorough planning at EMT or SRT level. Incoming personnel need to be briefed on their role by existing personnel who then depart as soon as the replacement assumes the role.

4. EMERGENCY LEVEL CLASSIFICATION

Three levels of Emergency are defined based on the severity of the incident and level of resources and expertise required to effectively manage its consequences. These Emergency Levels are defined below together with the actions required of the EMT following their categorisation of the emergency.

It should be noted that the reporting of all incidents irrespective of their designated level of emergency shall meet the requirements of the EPC Hazard, Incident & Accident Reporting & Investigation Procedure 7.07 and any statutory reporting requirements.

4.1. Level 1 Incident

This is a minor incident that:

- Can be managed with the on-site resources available at the time without any external assistance.
- Has little or no effect on the continuation of normal work activities.
- Has no adverse publicity, injury, environmental impacts, or
- Has minimal impact on level of customer service.

Examples of a Level 1 Emergency are:

1 Minor injury not requiring immediate offsite treatment.

Small fire (not resulting from a pipeline release), easily and immediately extinguished with local equipment.

4.2. Level 2 Emergency

This is a medium level event that:

- Can be managed with the in-house resources available at the time without any external assistance other than removal to external medical facilities.
- Affects the normal continuation of work activities.
- May give rise to adverse publicity.
- May have environmental impacts.
- May result in loss of supply, or
- May impact business continuity.

Examples of a Level 2 Emergency are:

1 Minor injury, requiring treatment at an offsite location.

Small fire (not resulting from a pipeline release), which cannot be immediately extinguished and may threaten the pipeline and requires assistance from the Site Response Team.

Incident involving minor damage to property.

4.3. Level 3 Emergency

This is a major level event that may:

- Require attendance by external support services.
- Give rise to adverse publicity.
- Give rise to the substantial risk of serious injury and/or death.
- Give rise to serious environmental impacts.
- Result in significant loss of supply, or
- Cause a serious business continuity impairment.

Examples of a Level 3 Emergency are:

1 Injury requiring attendance by external support services.

A credible threat to sabotage the company's facilities or injure its employees.

Gas leak giving rise to a fire that requires attendance by external support services.

Plant and equipment failure resulting in major property damage.

An emergency at the Esperance Port that may require the evacuation of the EPC Control Room.

In the case of a Level 3 emergency the TW Power Services Management Team must be notified.

4.4. Western Australia Hazardous Materials Emergency Management Plan

All incidents involving hazardous materials must be promptly reported to the Department of Fire and Emergency Services (DFES) who will coordinate the response of other local and state emergency services. Depending on the characteristics of the incident the Western Australia Hazardous Materials Emergency Management Plan (WESTPLAN-HAZMAT) may be invoked by the DFES.

Upon being informed that the WESTPLAN-HAZMAT has been activated the EMT and the SRT shall place themselves at the disposal of the DFES and provide such assistance and carry out such actions as is requested by the DFES until the emergency is over.

4.5. Change of Emergency Level

As the emergency develops or more information become available, the EMTL may change the classification of an emergency from one level to another.

5. NOTIFICATION OF AN EMERGENCY

5.1. Notification Procedure

In the event of an emergency arising from activities conducted by company personnel on the pipeline and facilities or adjacent to them, it is the responsibility of the person detecting the emergency to notify their respective supervisor immediately.

The chain of notification shall be as follows:

1. Crew leader/fitter/technician to notify his supervisor.
2. The Supervisor is to notify the EPC pipeline control room immediately on the Emergency Number 1800 010 272.

   On receiving notification of an emergency incident the Control Room operator shall request from the caller the information contained in the EPC Notification of Potential Emergency – Form B1 contained in Annexure B.

When notified of an emergency event, or if the monitoring equipment in the control room indicates that an emergency event is in progress, the duty controller at the EPC pipeline control room shall refer to the relevant emergency operational procedure in place to minimise the consequences of the emergency event and regain control if possible, as soon as possible. These emergency operational procedures include:

Procedure No	Procedure Title
C9906a66	GDS Loss of Containment Procedure
C9900a60	Supply Interruption and Curtailment Procedure
C9900a72	Sabotage and Treats Procedure
C9900a74	KEGP loss of containment Procedure
5.07	Control Centre Emergencies

Following implementation of the appropriate emergency operational procedure, the duty controller shall inform the duty EMTL by the quickest means available.

5.2. Notification by a Member of the Public or External Public Services.

Notification by a member of the public or external public services will usually be to the EPC Control Room via the Emergency Number.

On receiving notification of an emergency incident the EPC Control Room operator shall request from the caller the information contained in the EPC Notification of Potential Emergency – Form B1 contained in Annexure B.

5.3. Actions following Notification of an Emergency

On receiving notification of an emergency and having activated the required emergency operations procedures etc., the EPC Control Room operator shall inform, by the quickest means available, the duty EMTL of the circumstances of the emergency. The duty EMTL shall consider these circumstances against the criteria set out in Section 4 – Emergency Levels, make an interim

classification and activate the appropriate elements of the ERP. This may require the convening of the EMT and the call out of the SRT.

The duties of the EMTL are normally performed by the:

- Esperance Area Manager
- The first standby EMTL normally is the Power Station Manager
- The second standby EMTL normally is the TW Power Services Operational Manager Regional Assets West

Contact details as per Annexure A

5.4. Notification of Authorities

Depending on the nature of the incident it may be necessary for the EMTL to notify, at the earliest practicable opportunity, one or more public authorities charged with the regulation of pipelines and the coordination of public emergency services as follows:

Department of Fire and Emergency Services (DFES)

In the case of events where:

- The hazard has or could spread beyond the facility or pipeline licence area.
- It is beyond the resources of EPC to clean up.
- The protective equipment available is not adequate to deal with the event.
- It is beyond the experience of EPC or its contractors experience to deal with the event, and/or
- Employees or members of the public are or could be at risk.

Department Mines and Petroleum (DMP)

In the case of incidents where:

- A death, serious injury or significant damage occurs in connection with the pipeline.
- A death or serious injury is sustained by a person in the pipeline licence area, and/or
- Any incident that occurred that could have resulted in the above.

Minister and Office of Energy

As required by the Energy Coordination Act 1994, i.e. in the case of incidents where:

- A death, serious injury or significant damage occurs in connection with the GDS.
- A significant portion of the consumers on the GDS have their gas supply reduced or terminated
- Any incident that occurred that could have resulted in the above.

Economic Regulatory Authority (ERA)

As required by the Gas Standards (Gas Supply and System Safety) Regulations 2000, i.e. in the case of incidents where:

- A major discharge occurs on the GDS (an unplanned and uncontrolled release in excess of 1000m^3 of gas in open air or 10m^3 of gas in a building)
- A death, serious injury or significant damage occurs in connection with the GDS.

Notification details for these authorities can be found in Annexure A.

5.5. Notification of Neighbours

Depending on the nature of the incident it may be necessary for the EMTL to notify commercial or private parties whose properties are adjacent to the incident site immediately.

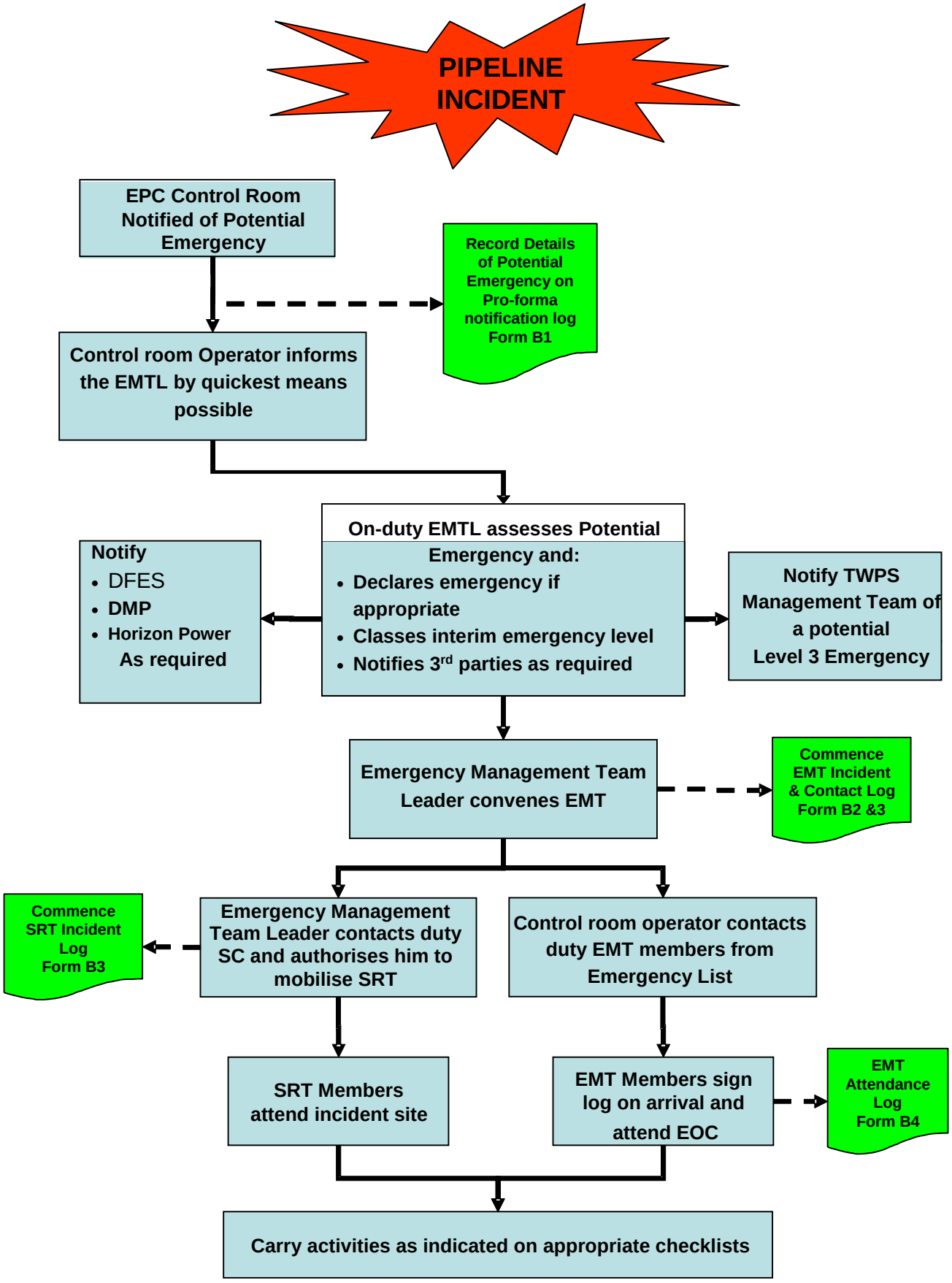
Notification details for these neighbours can be found in Annexure A.

5.6. Notification of Gas Consumers and Suppliers

Depending on the nature of the incident it may be necessary for the EMTL to notify the pipeline gas suppliers and any consumers if there is a possibility of curtailment of supply immediately.

Notification details for these gas consumers and suppliers can be found in Annexure A.

5.7. Notification Process Chart



6. EMERGENCY RESPONSE FACILITIES

6.1. Emergency Phone List

A telephone list will be displayed at the EOC to enable key personnel, emergency services, regulatory authorities, neighbours and gas consumers and suppliers to be contacted at any time. Details of this list are defined in Annexure A. This list will be updated to include all changes and additions as required.

6.2. Registration of Personnel located at Facilities.

The names of all personnel engaged in work being carried on the KEGP or GDS are recorded as required by the KEGP Permit to Work Procedure C9900a66.

6.3. Emergency Operations Centre

The control room at the EPS is the designated Emergency Operations Centre (EOC). Should the Prime EOC become unusable or if it is required to be evacuated for whatever reason the decision to relocate will be made by the EMTL in conjunction with the EMT.

The designated alternate EOC is the EPC Head Office in Esperance. This office is fitted with duplicate pipeline monitoring facilities and control of the pipeline can be achieved via a desktop computer and dial up facilities.

A copy of this Emergency Response Plan shall be stored and maintained at the prime and alternate EOC's.

6.4. First Aid, Rescue and Fire Fighting Equipment

Other than first aid packs and fire extinguishers that may be carried in vehicles or temporally made available at site during a specific work activity, all other first aid, rescue and firefighting equipment is provided by the emergency services should they be called to assist in controlling the incident.

6.5. Pipeline Emergency Repair Equipment

EPC require that the maintenance contractor provide, maintain and store appropriate equipment for the temporary and permanent repair of the pipeline and facilities. This equipment is located at storage areas. Details of this equipment and its location is contained Annexure H.

7. EMERGENCY DRILLS

7.1. Desktop or Field Emergency Scenario Exercises

To ensure that all site personnel and contractors are aware of, and provided with refresher training on emergency response procedures, the EPC Facility Manager must organise either a field or a desktop emergency exercise every 12 months.

These exercises will normally address one of the scenarios described in Annexure D and test all aspects of the emergency response plan including the notification of third parties.

If communications to 3rd parties take place as part of these activities the exercise co-ordinator must ensure that it is understood that it is a training exercise and therefore does not require further action from the 3rd party.

Following the termination of a field exercise, the Esperance Area Manager shall schedule an exercise debriefing. The debriefing shall be attended by the EMT and SRT Members who were involved in the exercise.

The debriefing shall address the effectiveness of all relevant aspects of this ERP and make recommendations, if necessary, to amend or improve the effectiveness of EPC's response to emergencies. The debriefing will be captured in a Meeting Minute style document to identify actions and responsibilities

The scheduling of Desktop and or Field Emergency Exercises shall be included in the annual task schedule.

8. EMERGENCY REPORTING & INVESTIGATION

8.1. Emergency Reporting - Department of Mines and Petroleum

All emergencies shall be reported in accordance with the EPC Hazard, Incident and Accident Reporting and Investigation Procedure 7.07.

8.2. Emergency Reporting - Department of Environmental Protection

Any discharge, emission, or deposit of waste as prescribed under the WA Environmental and Protection Act 1986 that is associated with the emergency shall be immediately reported in accordance with the EPC Hazard, Incident and Accident Reporting and Investigation Procedure 7.07.

8.3. Post-Emergency Debriefing and Investigation

Following the termination of an emergency, the Esperance Area Manage shall conduct a post emergency debriefing. The debriefing shall take place within a reasonable period following the emergency and shall be attended by the EMT and SRT Members, representatives from the emergency services and Regulators who were involved in the emergency and TW Power Services Management as required.

The debriefing shall address the effectiveness of all relevant aspects of this ERP and make recommendations, if necessary, to amend or improve the effectiveness of EPC's response to emergencies. Action items arising from this review shall be tracked to close out as required by the EPC Hazard, Incident and Accident Reporting and Investigation Procedure 7.07.

Annexure A
Contact Directory

Document C9900f78

External Bodies

State Authorities

Authority	Number	Email	Fax	Notes
Department of Fire & Emergency Services	000 9071 3393		9071 7304	District Manager 0427002718
WorkSafe / Energy Safety	1800 678 198	energysafety@commerce.wa.gov.au	9422 5244	
Department of Environment and Conservation	1300 784 782	info@dec.wa.gov.au	08 6467 5562	Head Office - Perth
Australian Transport Safety Bureau	1800 011 034	-	02 62746434	
Director petroleum safety	9222 3595	SAFETY: - 0427 551 029; 0427 367 732 ; 0423 842 397	9222 3862	
DMP	A/H 0429 201 295 ENVIRONMENT: - 0419 960 621	petreps@dmp.wa.gov.au Petroleum.Environment@dmp.wa.gov.au		
Public Utilities Office (formerly Office of Energy)	08 6551 4652	byron.mclaughlin@finance.wa.gov.au		Byron McLaughlin 0437 753 249
Minister for Energy	08 6552 5331	Simon Helm 0419 764 323 Simon.helm@dpc.wa.gov.au		
Economic Regulatory Authority	08 6557 7900		6557 7999	
Bureau of Meteorology.	9263 2222	allfirewx@bom.gov.au	9263 2233	
Esperance Volunteer Fire and Rescue Service	9071 3911	michaeljamesrose@dec.wa.gov.au esperancevfrs@bigpond.com		Captain: Mick Rose 0429001750
Specialist Welding Contractor P&A Welding	08-94941278	peter.p@pawelding.com.au		Peter Pavlovic 0411437244
Brookfield Rail – Network Controller Karen Van Der Merwe KALGOORLIE NORTHAM	(08) 9274 9757 (08) 9212 2825 (08) 9022 0632 (08) 9622 4632	Thirdparty.Services@brookfieldrail.com		Ring first

CONTACT POSITION	NAME	BUSINESS PHONE	MOBILE PHONE	FAX NUMBER	EMAIL
Emergency Management Team					
EMTL	Wynand Ferreira	9072 1422	0418 746 376	9072 1433	wynandferreira@twps.com.au
TEAM MEMBER	Lawrence Teo	9278 8386	0403 274 954	9278 8336	lawrence.teo@worleyparsons.com
Secretarial Support	Joanna Loffler	9072 1422	0428 786 033	9072 1433	joanna.loffler@twps.com.au
Operations Manager TWPS Regional Assets West	Warren McClintock	9781 2455	0400 019 193	9781 2401	warren.mcclintock@twps.com.au
Site Response Teams					
	EPS Control Room - Gas Emergency Line	1800 010 272	1800 010 272		
GDS SRTL	Shae Turrel	USE MOBILE	0408 903 499		Shae.Turrell@programmed.com.au
KEGP SRTL	Craig Bowen	9071 7208	0400 012 644		Bowen_Craig_R@solarturbines.com
GDS TEAM MEMBER	Brett Paxton	USE MOBILE	0400 099 336		Brett.Paxton@programmed.com.au
	Sam Haberly	USE MOBILE	0400 958 910		Samuel.Haberley@programmed.com.au
KEGP TEAM MEMBER	Brendan Weckert	USE MOBILE	0409 958 910		Weckert_Brendan_L@solarturbines.com
	Eric Vincent	USE MOBILE	0409 376 230		Vincent_Eric_J@solarturbines.com
Other					
Solar Turbines	Marcus Flynn	9227 2007	0429 211 775		Flynn_Marcus_C@solarturbines.com
Programmed	Dave Reilly		043897-5470		dreilly@ativo.com.au
Operations Manager TWPS West	Brendan Dorricott		417967118		

Consumers Users & Neighbours				
Body	Emergency Number	Email	Fax	Notes
GGT (APA) Control Room	9422 4140	gcontrol@apa.com.au	9322 3703	Phone contact first
SCP (APA) Control Room	9422 4140	gcontrol@apa.com.au	9322 3703	Phone contact first
Esperance Port Sea & Land	Terminal Supervisor 0428 712 111	portsecurity@epsl.com.au	9072 3333	Phone Terminal Supervisor first John Stuart (head of security) 0412 456 334
Horizon Power Esperance	9072 3405	layton.baker@horizonpower.com.au		Layton Baker 0429 578 310
Co-operative Bulk Handling (CBH)	9071 2302 0428 932 886		9071 4040	Michael Colgan
Caltex Energy WA	09071 2394 0429 201 008			Ian Account # 128081

Shire of Esperance				
Authority	Number	Email	Fax	Notes
Esperance Shire Council	9071 0666	shire@esperance.wa.gov.au	9071 0600	
Hospitals:	9079 8000	-	9071 0777	
State Emergency Service Sea & Rescue	9071 1697	-	9071 5300	
Ambulance	000 9071 0888	-	9071 0777	
Doctor:	9071 0888	-	9071 0777	
Police:	000 9079 8999	-	9071 3030	
Fire Brigade:	000	-	-	

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Shire of Dundas				
Authority	Number	Email	Fax	Notes
Dundas Shire Council	9039 1205	-	90391359	
Hospital:	9039 9200	-	9039 9203	
StateEmergencyServiceSea & Rescue	9071 1697	-	90715300	
Ambulance	000	-	-	
Police:	000 9039 1000	-	-	
Fire Brigade:	000	-	-	

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Shire of Coolgardie				
Authority	Number	Email	Fax	Notes
Coolgardie Shire Council	9080 2111	execsec@coolgardie.wa.gov.au mail@coolgardie.wa.gov.au	9027 3125	
Coolgardie Health Centre	90250200	-	90250202	Only staffed between 8.30am & 4.37pm. Diverts to health direct.
Hospital: Kalgoorlie	9080 5888	-	9080 5444	
Hospital: Kambalda	9027 8200	-	90278212	
Hospital: Southern cross	9081 2222	-	9081 2225	
Ambulance	000	-	-	
Doctor:	1800 022 222	-	-	
Police:	000	-	-	
Fire Brigade:	000	-	-	

Account No	Name	Service House No	ServiceAddress	PostalAddress1	PostalAddress2	Town	PHONE
210003	Esperance Grain Handlers	1	Brazier Street	PO Box 885		ESPERANCE WA	9071 1020
210008	Esperance Quality Grains	626	Beckwith Road	PO Box 1758		ESPERANCE WA	9072 0055
210009	Bunnings Building Supplies	45	Norseman Road				9071 0200
210010	Esperance Laundry & Linen	42	A Norseman Road	P.O. Box 6181		ESPERANCE WA	0447 630 106
210011	Rotary	907	Simpson Street	P.O. Box 95		ESPERANCE WA	9071 5017
210012	Esperance Plumbing Service	12	Simpson Street	P.O.Box 319		ESPERANCE WA	08) 90715021
220001	Esperance Senior High School	0	Pink Lake Road	PO Box 465		ESPERANCE WA	9071 9555
220003	ECEC - Library	433	Pink Lake Road	PO Box 465		ESPERANCE WA	
220005	Esperance Residential College	830	George Street	PO Box611		ESPERANCE WA	9071 9666
220007	Pink Lake Laundry	72	Pink Lake Road	P.O. Box 630		ESPERANCE WA	0428 713 878
230002	Esperance Senior Citizen Cnt	0	Forrest Street	PO Box 507		ESPERANCE WA	9071 0666
230003	Esperance Civic Centre	0	Council Place	PO Box 507		ESPERANCE WA	9071 0666
230004	Esperance Homecare	11	Black Street	PO Box 507		ESPERANCE WA	9071 0666
230007	Frank Collett Public Library	0	Windich Street	PO Box 507		ESPERANCE WA	9071 0666
230008	The Taylor Street Tearooms	0	Taylor Street Jetty Road	PO Box 1706		ESPERANCE WA	0427 990 764
230010	Bay of Isles Leisure Centre	0	Black Street	PO Box 507		ESPERANCE WA	9071 0666
230012	Esperance Aged Care Facility	4	Randell Street	PO Box 1350		ESPERANCE WA	9071 3893
230016	Dwyer & Co (WA) Pty Ltd	57	The Esplanade	PO Box 1178		ESPERANCE WA	08 9071 2511
230018	St John's Ambulance	54	Windich Street	PO Box 806		ESPERANCE WA	08 9071 1618
230021	Esperance Bay Yacht Club	921	The Esplanade	PO Box 530		ESPERANCE WA	9071 3323
230022	Summit Rural		Esperance Port	29 Ocean Street		KWINANA BEACH	9071 5800
230024	French Hot Bread Shop	85	Dempster Street	85 Dempster Street		ESPERANCE WA	9071 7705
230025	Esperance Crisis Accomodation	14	Emily Street	PO Box 1115		ESPERANCE WA	9071 4395
230026	West End Lady	7	120 Dempster Street	Shop 7, 120		ESPERANCE WA	9071 2390
230027	Driftwood Apartments	69	The Esplanade	PO Box 1954		ESPERANCE WA	0428 716 677
230029	Esperance Yacht Club 2	921	The Esplanade	PO Box 530		ESPERANCE WA	
230030	Clearwater Motel	1	William Street	1A William Street		ESPERANCE WA	9071 3587
230032	Esperance Primary School	104	Windich Street	PO Box 150		ESPERANCE WA	9071 2084
230034	Horizon Power	143	Sims Street	P.O. Box 148		Esperance WA	6310 1605
230035	Island View Apartment	14	A The Esplanade	P.O. Box 716		ESPERANCE WA	90720044

Account No	Name	Service House No	ServiceAddress	PostalAddress1	PostalAddress2	Town	PHONE
230036	Island View Apartments	14	B The Esplanade	P.O. Box 716		ESPERANCE WA	9072 0044
230037	Esperance Supa IGA	97	Dempster Street	97 Dempster Street		ESPERANCE WA	08 90711 498
230040	West End Soapy	5	120/Dempster Street	P.O. Box 630		ESPERANCE WA	0428 713 878
230041	Golf Simulators Esperance	2	69 Windich Street	P.O. Box 504		ESPERANCE WA	0428 711 299
230042	Esperance Health Campus	1	Hicks Street	P.O. Box 339	Maintenance Dept	ESPERANCE WA	9079 8163
230043	Clearwater Apts Unit 1	1	/156 Dempster Street	1A William Street		ESPERANCE WA	9071 3587
230044	Clearwater Apts Unit 2	2	/156 Dempster Street	1A William Street		ESPERANCE WA	9071 3587
230045	Clearwater Apts Unit 3	3	/156 Dempster Street	1A Williams Street		ESPERANCE WA	9071 3587
230046	Clearwater apts Unit 4	4	/156 Dempster Street	1A Williams Street		ESPERANCE WA	9071 3587
230047	Clearwater Apts Unit 5	5	/156 Dempster Street	1A Williams Street		ESPERANCE WA	9071 3587
230048	Clearwater Apts Unit 6	6	/156 Dempster Street	1A Williams street		ESPERANCE WA	9071 3587
230049	Clearwater apts Unit 7	7	/156 Dempster Street	1A Williams Street		ESPERANCE WA	9071 3587
230050	Clearwater apts Unit 8	8	/156 Dempster Street	1A Williams Street		ESPERANCE WA	9071 3587
230051	Ricardo Pizza & Pasta	51	B The Esplanade	P.O. Box 6181		ESPERANCE WA	0459 520 778

Annexure B
Pro-Forma Documents

Pro-forma Records

1. EPC Notification Record
2. EMT Contact Log
3. EMT/SRT Incident Log
4. EOC Attendance Log

EPC NOTIFICATION OF POTENTIAL EMERGENCY- FORM B1 REV A

Date		**Time**		**How Recieved**	
Identity of Notifier			**Identity of Reciever**		
Location of Emergency					
Nature of Emergency					
Status of any Casualities					
External Emergency Services Notified or On-Site					

Instructions to Control Room Operator/Reciever of Notification

Communicate this information by the quickest means available to the duty EMTL.

Retain this form and hand to the duty EMTL on his arrival at the control room.

EMT CONTACT LOG - FORM B2 REV A

Contact Name/Organisation	In Out	Time	Message	Actions arising from Contact

Instructions to persons assigned to making/receiving contacts

Record all incoming/outgoing fax and phone messages and ensure actions resulting are communicated to responsible personnel by the quickest means possible.

EMT/SRT INCIDENT LOG – FORM B3 REV A (FOR USE BY THE EMTL AND SRTL)

Event	Time	Description	Actions arising from Event

Instructions to personsassigned to log emergency events

Record all significant events and as directed by the EMTL or the SRTL (as appropriate) including arrivals and departures of EMT / SRT members (as appropriate), emergency services and other 3rd parties directly involved in the emergency.

EOC ATTENDANCE LOG - FORM B4 REV A

Date	Name	Organisation	Arrival Time	Departure Time	Contact Details if not at EOC

Instructions to persons entering details into attendance Log

Please record the details required. If it is necessary for you to be contacted after you have logged out please include a contact details.

Annexure C
EMTL & SRTL Checklists

EMTL CHECKLIST FORM C1 Rev A

EMT KICK-OFF (1ST Hour) ACTIVITIES

☐	Assess emergency and assign emergency level
☐	Initiate actions and notifications detailed in Section 5 of the ERP
☐	Initiate & confirm callout of duty SRTL
☐	Initiate & confirm callout of all required EMT members
☐	Activate Emergency Operations Centre
☐	Ensure dedicated incoming phones are clearly marked & are not used for outgoing calls
☐	Mark up incident site & required EPC resources on area map
☐	Establish open communications with SRT for incident
☐	Assess immediate response issues
☐	Hold EMT incident briefing, determine incident classification
☐	Notify relevant Regulatory Authorities as appropriate
☐	Consider and arrange additional security arrangements

ONGOING INCIDENT ACTIVITIES

☐	Regularly hold EMT incident briefing updates
☐	Establish an incident update schedule for the EMT
☐	Advise EPC Facility Manager of any known or likely Media impact & determine any immediate action required
☐	Ensure that dedicated 'Incoming' phones are not used for outgoing calls
☐	Activate extra resources to support EMT (catering, admin support, etc.)
☐	During extended response, ensure an alternate is assigned to your role after no more than 12 hours
☐	If going to site, nominate an alternate for your role and ensure their contact details are communicated to EMT members
☐	Obtain contact liaison details for 3rd Party Contractors (ie. media, legal, relatives response etc.)
☐	Let team members know when you are leaving the EOC temporarily and where you can be contacted
☐	Provide your alternate with a briefing plan & expectations for the period they will relieve you
☐	Keep the EMT informed of all relevant incoming information
☐	Ensure if any of your contact numbers change, the change is communicated to the EMT Leader
☐	Ensure incident financial activities are recorded & maintained (ie. charge accounts, cost centres etc.)
☐	Ensure resources are available to respond to family members of personnel who may be injured or otherwise involved in the emergency event.
☐	Maintain personal Log of Incident Activities
☐	Consider need for trauma counseling for personnel who may be injured or otherwise involved in the emergency event.

POST INCIDENT ACTIVITIES

	With Site Response Team Leader, (SRTL), EMT Leader to declare an 'End of Emergency" when:
☐	Incident site/facility has been returned to a safe condition
☐	All personnel involved in the incident are accounted for
☐	Any injured personnel have been stabilised &/or evacuated
☐	All authorities, organisations & support services contacted, have been advised the emergency is over

INCIDENT CLOSE-OUT CONSIDERATIONS

☐	Ongoing resources required for incident control & recovery
☐	Next of kin & relatives response activities 'needs' assessed
☐	Close down additional security arrangements
☐	Close down additional catering, hygiene & support services
☐	Arrange/continue trauma counseling of incident victims
☐	Arrange for appropriate incident investigation & analysis
☐	Arrange ongoing media interface, briefings & monitoring
☐	Debrief all personnel involved in the incident

SRTL CHECKLIST FORM C2 Rev A

SRTL KICK-OFF ACTIVITIES

☐	Initiate & confirm callout of SRT Members
☐	Establish open communications with EMT
☐	Assess immediate response issues
☐	Hold SRT incident briefing
☐	Consider equipment and resource requirements
☐	Consider optimum method of access to emergency incident site
☐	Make contact with appropriate emergency services local to emergency incident site
☐	Proceed to Site

INITIAL SITE ACTIVITIES

☐	Reconnoitre site and identify characteristics of the emergency incident.
☐	Liaise with emergency services if already at site and hand over command of site response to DFES Site Commander if requested.
☐	Remove bystanders from site and setup exclusion zone.
☐	Identify any casualities and retrieve and render first aid/dispatch to hospital if safe to do so.
☐	Identify any potential escalation factors and mitigate if possible or extend exclusion zone.

ONGOING SITE ACTIVITIES

☐	Identify repair equipment required and arrange transport to site
☐	Maintain contact with EMTL
☐	Support emergency services and DFES Site Commander
☐	Ensure personal and SRT members safety at all times

Annexure D
EMERGENCY SCENARIO GUIDELINES

Guidelines

1. Gas Release, Explosion or Major Fire**.**
2. Medical Emergency
3. Bomb Threats
4. Lost Personnel
5. Major Odorant Release

1. Gas Release, Explosion or Major Fire.

If a gas release, explosion or fire occurs requiring the attendance of emergency services then the incident comes under the scope of WESTPLAN – HAZMAT. DFES should be contacted by calling 000 and asking for the fire brigade. DFES will then engage other emergency agencies as appropriate. This applies even in situations where the fire brigade is not the agency required on site, e.g. only police are required for traffic management purposes.

1. **Gas Releases – GDS –** The initial response to a gas release may be made by personnel at site, if they are present at the time the release occurs in their location, and/or by the duty controller at the EPC pipeline control room when he is notified or becomes aware of an release in progress by means of the remote monitoring systems in place on the pipeline and facilities or an individual calling the power station to notify them of the sight, smell or sound of a GDS gas leak

   When notified of an emergency event, or if the monitoring equipment in the control room indicates that an emergency event is in progress, the duty controller at the EPC pipeline control room shall refer to the GDS Loss of Containment Procedure 5.02 that has been put in place to minimise the consequences of the release and to isolate the release if possible, as soon as possible.

   Isolation of a release/pipe damage on the GDS network shall be achieved by the site response team squeezing off the Polyethylene pipe. The isolation valve at the pressure reduction skid should remain open to ensure positive pressure is maintained and to prevent air ingress into the GDS network. The pipeline control room operator should not close the remote operated GDS gas supply valve unless instructed to by the EMTL or SRTL.

   If the gas release has not ignited, steps should be taken to ensure all personnel are moved away from the gas plume, vehicles or personnel do not approach the site and that all ignition sources are isolated as soon as possible.

   As the GDS runs at low pressure then if the gas release should ignite the fire may be extinguished by trained personnel.

2. **Gas Release - KEGP** -The initial response to a gas release may be made by personnel at site, if they are present at the time the release occurs in their location, and/or by the duty controller at the EPC pipeline control room when he is notified or becomes aware of an release in progress by means of the remote monitoring systems in place on the pipeline and facilities.

   When notified of an emergency event, or if the monitoring equipment in the control room indicates that an emergency event is in progress, the duty controller at the EPC pipeline control room shall refer to the EPC Loss of Containment Procedure 5.03 that have been put in place to minimise the consequences of the release and to isolate the release if possible, as soon as possible.

Depending on the location of the release the time to blowdown the line to atmospheric can be as long as 4 hours depending on its location and the proximity of the isolation valves that can be closed.

Guidance on the likely blowdown time for releases can be found in report 4085-PIL-005 “Pipeline Depressurisation and Re-pressurisation” included in this Annexure.

If the gas release has not ignited, steps should be taken to ensure all personnel are moved away from the gas plume, vehicles or personnel do not approach the site and that all ignition sources are isolated as soon as possible.

Gas concentrations should monitored continually from moment of arrival until the line has blown down following isolation in order to determine the extent and direction of the gas plume.

If the gas release should ignite then treat as a major fire.

3. **Major Fires** - no attempt to fight the fire shall be made other than to prevent/contain potential bushfires if it possible to do so safely with the equipment available. Firefighting shall be carried out by the emergency services when they arrive.

   Guidance on the severity of the thermal radiation that may be expected from an ignited gas release can be found in the report R 6324 “A Prediction of Individual and Societal Risks from the Kambalda to Esperance Pipeline” included in this Annexure.

4. **Explosions** – if the explosion has resulted in a major fire, treat as above, otherwise assume potential loss of containment of exposed gas containing equipment and institute immediate isolation.
5. **External fires** – that may threaten the pipeline and facilities shall be continuously monitored and the decision to isolate the line shall be taken in consultation with the emergency services.
6. **Isolation of pipeline or facilities –**In the event of a fire, major explosion or gas release isolation of the line will be the primary mitigation activity. The appropriate valves to be closed and sequences to be followed depend on the location of the emergency incident, in the case of the GDS this may mean squeezing off the pipe. Close liaison shall be maintained with the pipeline controllers located at the EPC control room to ensure that the isolation procedure is conducted quickly and effectively.

Report 4085-PIL-005 “Pipeline Depressurisation and Re-pressurisation.

DELCO AUSTRALIA PTY LTD

PROJECT TITLE:	**KAMBALDA TO ESPERANCE PIPELINE (KEGP) PROJECT**
CLIENT:	**ESPERANCE PIPELINE COMPANY LTD**
DOCUMENT NAME:	**PIPELINE DEPRESSURISATION AND REPRESSURISATION**
DOCUMENT NUMBER:	**4085-PIL-005**

APPROVED: 

PROJECT MANAGER

DATE: 25 / 9 / 2003

Rev	Effective Date	Author Initial & Date		Checked By Initial & Date		Approved By Initial & Date		Issue Description
A	23/08/03	PBV	23/08					Internal Review
B	25-9-03	PBV	25-9-03	MTSF	25-9-03			Minor Revision for consistency with other documents
0	25-9-03	PBV	25-9-03	MTSF	25-9-03	RHC	25-9-03	Issued for construction
1	30-9-03	MTSF	30-9-03	RHC	30/9/03	RHC	30/9/03	Issued for design book

TABLE OF CONTENTS

1 INTRODUCTION

Each gas transmission pipeline is intended to operate continuously throughout its approved life transporting gas within the normal range of operating pressures.

Occasionally throughout its working life, it may be necessary to depressurise a section of the pipeline to permit maintenance, damage rectification or modification. Once the work is completed it is necessary to repressurise the section to return the pipeline into normal operation.

This document addresses the engineering requirements of these activities. It identifies the process conditions that may constrain the design, and it discusses procedures by which these activities can be safely undertaken.

These procedures are provided as guidelines. Specific procedures are required for each depressurisation – repressurisation activity because the pipeline conditions and system requirements will invariably differ on each occasion.

2 PIPELINE CONFIGURATION

2.1 General

The pipeline is divided into sections with isolation valves installed at the locations shown in the following table. Except at the finish of the pipeline, each isolation valve is provided with a vent on each side of the valve for pipeline depressurisation, and a valve with throttling characteristics for pipeline repressurisation.

Site	Chainage (kP)	Section Length (km)	Upstream Vent	Downstream Vent
Kambalda Inlet Station	0		N/A	Yes
MLV 1	54.06	54.1	Yes	Yes
Scraper Station 1	105.9	51.8	Yes	Yes
MLV 2	170.1	64.2	Yes	Yes
Scraper Station 2	221.7	51.6	Yes	Yes
MLV 3	284.7	63.0	Yes	Yes
MLV 4	335.5	50.8	Yes	Yes
Esperance Receiver Station	341.5	6.0	No	N/A

These facilities are located in positions where gas can be safely released if required (a sufficient distance from population, power lines and associated public installations to permit safe gas discharge). The Pipeline Isolation Plan (Document 4085-PIL-004) describes these facilities in more detail, including an estimate of the time for each pipeline section to depressurise from its maximum operating pressure.

2.2 Depressurising and Repressurising Equipment

Each mainline isolation valve is equipped with a DN 80 ball valve to vent the upstream and downstream pipeline section, and each is equipped with a DN 80 bypass plug valve that is used to control gas flowing into a downstream section during repressurisation.

At the Kambalda inlet station, a DN 50 valve is installed in the station pipe upstream of the station isolation valve for pipeline (and station) depressurisation.

At scraper stations, two DN 50 plug valves are installed, one on either side of the pipeline isolation valve. The pipework permits both of these valves to be used to vent gas from either the upstream or downstream pipeline section, if required to expedite depressurisation.

The Esperance receiving station has no provision for pipeline depressurisation because of the proximity of residential and industrial areas.

Each vent is provided with a flanged closure to provide positive pressure containment, irrespective of the condition of the valve. This connection can be used if required to connect temporary pipework to permit gas to be discharged through a silencer. Discharge through a flare is not envisaged at any location because the energy release rate for efficient depressurisation will cause organic matter within 100-150 metres of the flare to ignite,

In principle, during depressurisation gas in the pipeline on either side of the isolation valve is discharged through the vent valve installed on the pipeline side of the MLV. The design intends that this discharge is undertaken with the vent isolation valve fully open to minimise the risk of abrasive damage to the valve seats. Should it be necessary to vent gas at a reduced rate, the design provides for the gas flow to be controlled using the bypass valve, and discharged through the vent on the opposite side of the isolation valve.

The pipework design at each MLV provides flanged connections for the bypass valve to permit it to be removed for maintenance. The bypass valve is subjected to large pressure drops and extreme velocities, and is the component in the valve assembly that may be damaged during extended operation at these conditions.

3 PIPELINE OPERATING PARAMETERS

The pipeline system is designed for continuous operation at 10.2 MPa.

The gas in the pipeline prior to depressurisation or re-pressurisation will be at a temperature equal to the soil temperature at pipeline burial depth at the time of the event. The design basis nominates the minimum soil temperature at pipeline depth is 12°C in winter, and 30°C in summer.

Between the pipeline inlet facility and the outlet (or between the inlet facility and compressor suction) the pressure reduces with distance from the inlet at a rate that is proportional to the gas flow rate. Consequently, only those sections of the pipeline close to a pipeline inlet, or to a compressor station discharge (future) could be at pressures near MAOP at the time of pipeline isolation, and hence be required to be used to re-pressurise a downstream pipeline section from near MAOP at minimum pipeline temperature.

The pipeline parameters that exist at the time of any depressurisation / repressurisation event will be particular to that location at that time, such that each event represents a unique activity.

4 PIPELINE MATERIALS

The pipeline consists of API 5L, PSL2 line pipe. Two pipe types are used:

- 4.0 mm thick, API 5L Grade X52 (SMYS = 358 MPa)
- 6.4 mm thick, API 5L Grade X65 (SMYS = 448 MPa)

Station piping is generally A106 Grade B material, with the thickness selected as the minimum complying standard schedule pipe.

Pipeline isolation valve assemblies and scraper stations include standard fittings with a thickness calculated for a design factor of 0.6. Isolation valve assembly vents are DN 80, A106 schedule 40 with a wall thickness of 5.49mm. Scraper station vents are DN 50, A106 schedule 80 with a wall thickness of 5.54 mm. The fitting branch thickness for the small diameters are nominated as the larger of the calculated thickness, and a thickness that will permit welding without a transition piece to the branch.

The 6.4 mm thick API 5L-X65 line pipe exceeds with the minimum specified fracture toughness properties tested at -15°C. Toughness testing was not undertaken on the 4.0 mm thick API 5L-X52 line pipe because of its dimensions.

Transition tests were not undertaken on any of the line pipe supplied to the project. Consequently, the pipe is considered to be suitable for use at a minimum temperature of -29°C, in accordance with API 5L and AS 2885.1.

Pipe complying with ASTM A106 specification is certified to be suitable for operation at a minimum temperature of -29°C without specific toughness testing.

5 PIPELINE DEPRESSURISATION

5.1 General

The pipeline is designed to be depressurised in sections, when required.

The design is provides for safe gas discharge by:

- A simple, well supported and unrestricted vent that allows gas to discharge in a symmetrical plume that exits at sonic velocity (370-390 m/s). Because the gas is pressurised until the constraint imposed by the pipe discharge orifice (pipe diameter), no significant cooling of the pipeline or pipework in the vent assembly occurs during the depressurising process.
- The design requires that a depressurisation operation be undertaken with the vent valve opened fully, both to minimise the risk of damage to the valve seats when used for throttling, and to minimise possible turbulence introduced to the piping by the throttling action of a plug valve.
- A short length of pipe (300-500 mm) below the discharge point is observed to develop an ice coating during a depressurisation activity, but this is not associated with temperatures below the brittle/ductile transition temperature, and because of the pipe thickness, the pressure at which the threshold stress for brittle fracture is exceeded is higher than the pressure prevailing in the vent pipe.
- Excluding sources of ignition from within the envelope where a combustible gas mixture may be present. (Dispersion calculations suggest that this is zone has a radius of approximately 45 metres at an elevation of approximately 75 metres. At ground level ignition is not credible).
- Personnel protective measures, including exclusion from a safe distance from the vent point.

The design also provides for controlled venting using the bypass valve to restrict discharge flow. In this operating mode gas flows from the pipe section being depressurised, through the bypass valve to the opposite vent if required. This design ensures that the throttling action and the associated potential wear, and possible abrasion at elbows and bends takes place in a section of the pipe that can be isolated from the pipeline if required for maintenance.

Each depressurisation activity is undertaken in accordance with a Standard Operating Procedure, developed as part of the Safety and Operating Plan for the Pipeline. The procedure will address activities including:

- Notification of Public Authorities, including civil and where necessary military aviation authorities and the public.
- Planning, preparation and equipment including safety equipment
- Authorised personnel
- Personal protective equipment
- Remote monitoring
- Gas management and if required, curtailment
- The depressurisation procedure
- Odorised gas release

This report does not discuss the standard operating procedure and its inclusions further.

5.2 Depressurisation Time

Document 4085-PIL-004 (Pipeline Isolation Plan) discusses the time to depressurise each pipeline section and the basis of the calculation method. The following table copied from that document presents the time required to depressurise each isolatable section of the pipeline. The variations in time recognise the combination of DN 50 and DN 80 valves that are available all but the MLV3-MLV4 and MLV4 to Esperance Receiving Station sections of the pipeline.

Location		Length (km)	Diameter	Depressurisation Time from MAOP (h) (DN 80 Vent)	
From	To			1 Vent	2 Vents
Kambalda	MLV 1	54.1	150	7.5 or 8.8	4.1
MLV 1	SC 1	51.5	150	6.9 or 8.3	3.8
SC 1	MLV 2	64.2	150	10.9 or 9.3	5.1 or 4.7
MLV 2	SC 2	51.6	150	8.3 or 6.9	5.9 or 3.5
SC 2	MLV 3	63.1	150	10.7 or 9.1	5.0 or 4.6
MLV 3	MLV 4	51.8	150	6.2	3.1
MLV 4	Esperance	6.3	150	0.41	-

This shows that each pipeline section can be depressurised from near maximum operating pressure in less than 4 hours.

5.3 Depressurisation Process Conditions

Each section of the pipeline operating at or near MAOP contains a large volume of gas.

When a pipeline section has to be depressurised in an emergency, there is no option other than to isolate the section and release the gas to atmosphere as quickly as practicable.

When a pipeline section has to be depressurised in a planned manner, the pipeline process conditions can be managed to reduce the gas volume in the section (by lowering its pressure) by:

- Selecting a time for the work when the pipeline is not required to operate at maximum capacity, allowing the operating pressure to be reduced over the length of the pipeline.
- Operating a compressor (if installed) to lower the pressure in an upstream section, by transferring the gas to a downstream section.

Ideally the volume in a section to be depressurised should be minimised to the greatest extent practicable to minimise the environmental impact of the gas discharge, and to minimise the cost to the pipeline operator of the wasted gas.

5.4 Noise Management

5.4.1 General

Because time is of the essence during a depressurisation process (because the pipeline is an essential service, and depressurisation necessarily involves curtailment or interruption of supply), it is essential that gas is vented from the pipeline at the maximum practical rate to minimise the time until the pipeline can be returned to service. Gas discharge under this condition is at sonic velocity and necessarily generates a very high noise level.

Studies have shown that the noise generated by the gas release is in the order of 130-140 dB(A). This is severe, requiring:

- Special protection of personnel required to operate equipment in the vicinity of the release point.

- Exclusion of unauthorised personnel within a zone where the noise levels are reduced to a safe value.
- Notification of public authorities and where necessary, the community, that controlled pipeline operations are responsible for the noise.

5.4.2 Vent Silencers

High pressure vent silencers with the necessary capacity are available, and they do make a significant contribution to reducing the noise generated.

Noise absorption and staged subsonic pressure reduction designs are also available. However because they must reduce the pressure to near atmospheric, they necessarily discharge the gas at low velocity. This significantly increases the risk of ignition of a large volume gas cloud close to ground level.

The unsilenced design implemented at each valve site discharges the gas vertically at sonic velocity (450+ m/s). Under this condition it is extremely difficult to ignite the gas plume from ground level, because combustion cannot be sustained at the discharge velocity in this region, and above ground where combustion can be supported, there are no ignition sources.

5.4.3 Flare Disposal

Environmental considerations, and on occasion, safety considerations may require that vented gas is stabilised by controlled combustion in a flare, rather than discharging natural gas directly to the environment. Flare disposal is practical for discharge small volumes at low pressures only, because the heat energy associated with combustion of gas at high rate is so high that it will cause combustible materials in the proximity of the vent to ignite.

Disposal by flare is impractical for most transmission pipeline conditions because the time to discharge the gas at a rate that will not damage the surrounding area is not permitted.

5.5 Hazardous Environment Management

Because the depressurisation vent is designed to discharge the gas vertically at sonic velocity at an elevation higher than normal personnel activities, a hazardous environment will not exist in the working area, provided the activity is not undertaken in severe weather conditions (wind and rain).

However the high gas release rates (in the order of 200 kg/s) will create a large dense (but lighter than air) vapour cloud above the discharge point that does create a hazard. The following issues are possible:

- Environmental hazards – bird kills from both asphyxiation and cold.
- Aircraft hazards – entering the cloud prior to natural processes dispersing it sufficiently to reduce the concentration to non hazardous levels.
- Ignition from a remote source such as an overhead transmission line, or on days with high winds, from a source beyond or higher than the site (power line isolation may in some cases be required).
- Odour impacts on the community during periods of high winds and at sites where the topography may cause the cloud to travel toward populated areas.

These issues occur to a greater or lesser extent at each depressurisation site. Unfortunately the bird kill issue cannot be managed, since it is not practicable to exclude them from the vapour cloud.

Other hazardous issues can be managed safely by appropriate communication with air traffic management, public safety authorities, and the community.

Standard operating procedures for pipeline section depressurisation must as a minimum address the above issues.

6 PIPELINE REPRESSURISATION

6.1 General

Repressurisation of a pipeline section involves two components:

1. Purging the pipeline section to remove air from it and,
2. Repressurising the pipeline.

If the pipeline section was managed to prevent the ingress of air during its period of shutdown, then it will not be necessary to undertake purging.

Both components of the operation are undertaken using gas taken from either the upstream or downstream end of the pipeline section.

Both pipeline purging and pipeline repressurisation require the supply of gas at high pressure and at the soil ambient temperature and the delivery into the depressurised pipeline section at a pressure that is essentially atmospheric pressure. The Joule-Thompson effect causes the gas temperature to fall to between -30°C to -50°C, depending on the gas temperature prior to depressurisation, and assuming that the pipeline is initially at MAOP.

The magnitude of the downstream temperature is a direct function of the upstream pressure (a process condition which can be controlled), and the prevailing soil ambient temperature (a natural condition which cannot be managed). While it is possible to pass the gas through a heater prior to pressure reduction, but repressurising flows in particular are so high that the equipment is too large to be practically transported.

6.2 Objectives

Any event that requires pipeline repressurisation necessarily involves curtailment or cessation of gas delivery to customers. Consequently, the objective of the repressurisation activity is to return the pipeline to service in the minimum time consistent with pipeline and personnel safety.

6.3 Purging

The American Gas Association (AGA) document Purging Principles and Practice provides a basis for developing a purging scheme controlled using gas to displace air.

The following principles govern safe pipeline purging:

- The pipeline purge must be continuous from the time of commencement until the time that all air is displaced from the pipeline.
- Gas flow at the interface is maintained at a velocity greater than the laminar – turbulent transition velocity. (This ensures that the velocity profile at the interface is essentially constant across the pipe diameter, minimising interfacial mixing).

The gas purge is considered complete when 100% gas (or 0% N_2 or O_2) is measured at the gas vent. The measured value selected depends on the monitoring instrument being used.

During the initial purge of the new pipeline, constant purge flow can be maintained using the measured pipeline inlet flow rate. This approach is not possible at any other than a pipeline inlet point.

At MLV's, the purging operation is most easily controlled by operating the MLV bypass valve at the pipeline inlet to maintain a constant pressure (measured by the pressure transmitter or a purpose fitted pressure gauge on the downstream vent pipe). The following tables illustrate purge at a number of constant pressures for the DN 150 pipe 54 km long between Kambalda and MLV1.

In each case, the minimum velocity for turbulent flow is 0.6 m/s.

Kambalda to MLV1 – DN 150, 54 km long				
P(inlet) (kPa)	Mean Velocity (m/s) [1]	Mix Zone Length (m)	Gas Vented (sm^3)	Purge Time (minute)
100	5.6	480	5	162
200	7.8	480	5	117
300	9.3	465	5	98
400	10.4	440	5	87
500	11.3	410	5	80

It can be seen from the mean velocity above that purge at practical pressures (and purge time) will always be fully turbulent.

The repressurising strategy may be varied to:

- Purge at a constant gas flow (if it can be measured). This method provides more positive control on the gas / air interfacial velocity, but since none of the repressurising facilities installed incorporate flow measurement devices, it is impractical unless temporary measurement equipment is developed by the pipeline Operator.
- Purge using an inert gas interface (carbon dioxide or nitrogen). An inert gas interface must be used if there is any possibility of the continuous gas purge operation being stopped. The interface will provide a buffer that will limit the extent of density, temperature and dispersion controlled mixing between the air and gas during the shutdown period. Calculation shows that the minimum inert gas slug volume required to separate gas and air is 10 scm.
- Because the interface length is so small with a well controlled gas purge, the effort and cost associated with injecting the inert gas at the rate required to ensure turbulent flow, and the immediate switch to gas after buffer gas injection is completed is generally not sufficient to measurably improve the safety of the operation.

Concern is sometimes expressed about the risk of explosion within the pipe should ignition occur in the interface gas. This concern is not warranted because:

- There is no ignition source in the pipe.
- It is readily shown that the overpressure in the pipe following combustion of a mixed gas-air interface is a maximum of 10 times the pressure at the interface at the time of combustion (simple stoichiometric calculation of the gas volume before combustion, and the volume of gas products after combustion).
- The small mixed gas-air interface volume at the discharge point is vented in a very short time (see above tables), during which time proper control of ignition sources in the vicinity of the vent pipe will ensure that ignition does not occur at this location.

The AGA Purging Principles and Practice recommends that the purging pressure is limited to 700 kPa (100 psi) to minimise the risk from overpressure in the unlikely event that ignition occurred during the process. This recommendation is based on the principle that the maximum overpressure in the event of ignition is 10 times the pressure in the pipe at the time of ignition – 100 psi = 1000 psi, the MAOP of many existing gas transmission pipelines in the USA. Clearly this limit is appropriate for a Class 600 pipeline with a MAOP of 1480 psi.

It must be noted that increasing the purge rate will cause the pressure at the vent end of the section to rise, creating a substantial noise emission. While not as severe as the noise emitted during depressurisation, it may create a nuisance to the community. Where this occurs, it must be managed procedurally or by noise attenuators.

During the purging operation the gas temperature entering the pipe will be between -30 and -50°C (under maximum conditions) because of the high supply pressure and the low section inlet pressure. This is an unavoidable, but safe situation as discussed in the following sections.

6.4 Brittle Fracture Temperature Limit

Because the MLV piping consists of a combination of A106 and higher grade materials, this repressurisation plan has adopted a transition temperature limit of -30°C for all materials used in and in the immediate vicinity of low temperatures generated during repressurisation.

6.5 Pressure at Brittle Fracture Threshold Stress Limit

Brittle fracture is a phenomenon that occurs with all substances as their temperature is lowered. For steels, the temperature at which the failure mode changes from brittle fracture to ductile failure (as defined by an 85% fracture appearance limit) is known as the transition temperature.

There is also a stress limit below which brittle fracture will not occur, irrespective of the temperature. For low alloy carbon steel, the threshold stress is considered to be 85 MPa.

Knowing the diameter and thickness of the pipe components, in areas where low temperatures can occur, and knowing that the temperature induced stresses are relatively low, it is possible to determine for each component a pressure below which brittle failure will not occur.

The following table presents the values of pressure at brittle fracture threshold stress for each significant component in a mainline valve or scraper assembly equipped with a DN 150 repressurising valve.

Pipe Component	Outside Diameter (mm)	Grade	Schedule	SMYS (MPa)	Thickness (mm)	Pressure at Brittle Fracture Threshold Stress (MPa)
Line Pipe	168.3	X52		358	4.0	4.04
Line Pipe	168.3	X65		448	6.4	6.46
Barred Tee (run)	168.3	A106	40	241	7.11	7.18
Barred Tee (Branch)	168.3	A106	40	241	7.11	7.18
Barred Tee (Branch)	88.9	A106	40	241	5.49	10.5
Pipe	60.3	A106	40	241	3.91	11.02
Pipe	114.3	A106	40	241	6.02	8.95
Pipe	168.3	A106	40	241	7.11	7.18

In each case the limiting pressure occurs at the standard wall mainline pipe installed beyond the bounds of the facility piping (ie blowdown and bypass piping does not limit the pressure-temperature relationship during repressurisation).

6.6 Criterion for Repressurisation

The above table shows that the component thickness governs the pressure at which the threshold stress for brittle fracture occurs. Section 4 has separately shown that brittle fracture cannot occur if the temperature of the material is higher than its brittle-ductile transition temperature.

The criterion for managing repressurisation therefore is that:

1. Temperatures below the transition temperature any component can be tolerated provided the threshold stress of that component is not exceeded.

2. Once the threshold stress of any component is reached, the repressurisation process must be managed so that the temperature of that component does not fall below the brittle-ductile transition temperature.

When the transition temperature of each component is known, either by compliance with a Standard, or by test, that temperature limit may be used for that component.

6.7 Repressurisation Process

Repressurisation is a transient process. Conditions in the pipe change continuously from the time that the process starts until the time that the pipeline is returned to normal service.

Initially the pressure in the upstream pipe is high, while the pressure in the downstream section is low, or atmospheric.

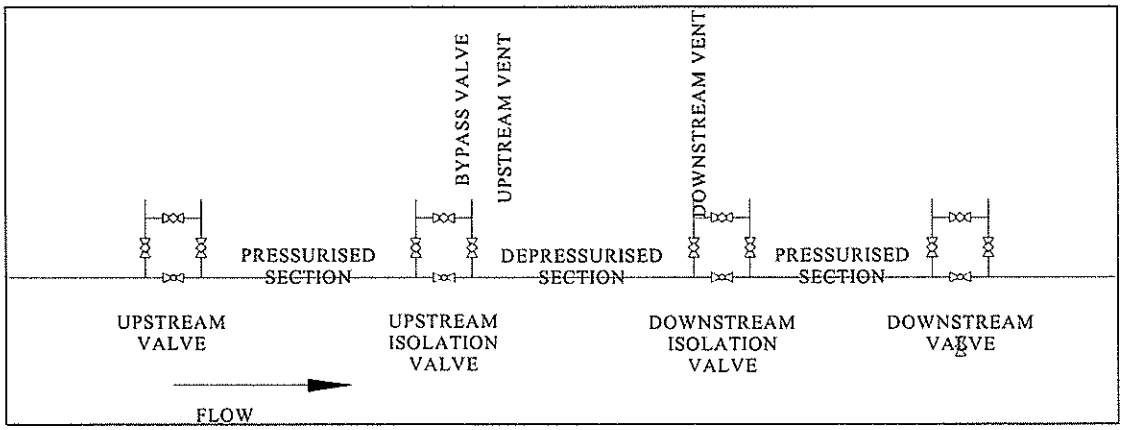
When flow is commenced:

- The pressure immediately downstream of the bypass valve starts to rise, and the pressure immediately upstream starts to fall. At this time, because the pressure drop across the valve is the highest possible, the temperature drop across the valve will also be the highest.
- As the process continues the pressure downstream of the bypass valve will increase while the pressure upstream of the valve will decrease, reducing the pressure drop across the bypass valve and hence the temperature change across the valve will reduce, causing the temperature in the downstream section to rise.

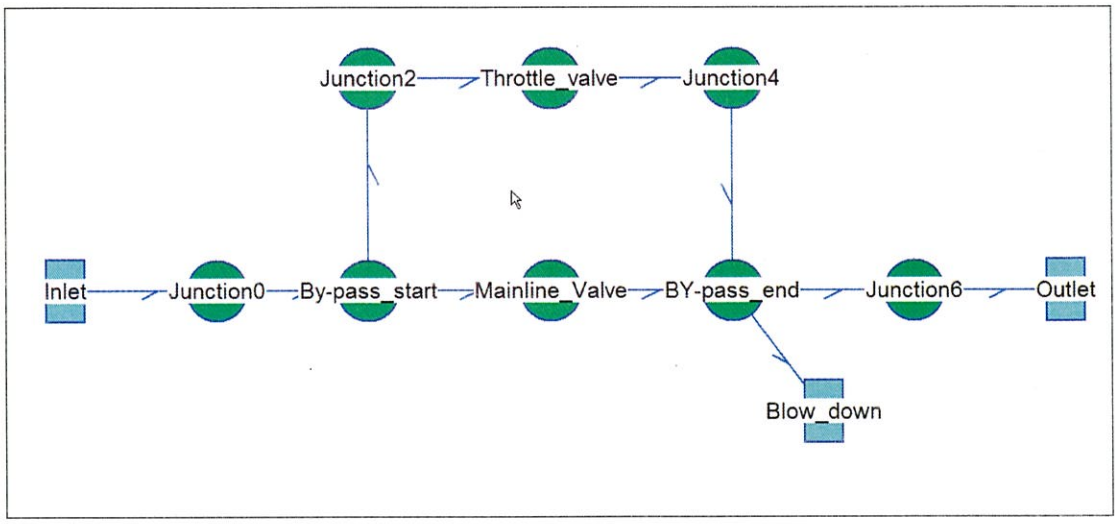
The repressurisation process was modelled using the transient hydraulic model Flowtran. Unlike most gas hydraulic simulation programs that use a constant Joule-Thompson coefficient, Flowtran properly models the gas thermodynamics, and the temperature change with pressure change. The model assumes that:

- The mainline valve is located at the mid point of a 100 km section of pipeline
- The mainline valve configuration is similar to the design proposed for the KEGP. The bypass configuration and piping diameters are the same, but fittings and vent valves are not included in the model.
- The soil temperature is 12°C
- The upstream pressure prior to repressurisation is 10 MPa.
- The upstream valve is left closed until the temperature on the downstream side of the mainline valve is warmer than -30°C when the pressure at this location rises above 4.0 MPa. After this condition is satisfied the upstream valve may be opened at any time.

The following illustration shows the terminology used in the discussion.



The following illustration shows the pipeline and mainline valve model used in the simulation:



The lengths Inlet to Junction 0 and Junction 6 to Outlet are each 50 km, and the inside diameter is 160.3 mm. The bypass pipework around the mainline valve is DN 80 with individual pipe lengths of 2 m.

The simulation commences with steady state flow. After a short period the flow into the pipeline is stopped, the Mainline and Bypass valves are closed and the downstream section is depressurised. During the depressurisation period the pipe upstream of the mainline valve is packed to maximum pressure.

The repressurisation simulation opens the bypass valve at a controlled rate allowing gas to flow into the downstream depressurised section. Temperatures, pressures and flows are monitored during the simulation. These simulations assume that the upstream valve remains closed until such time as the temperature downstream of the repressurising valve is higher than -30°C at a pressure of 4.0 MPa. Once this condition is achieved the upstream valve can be opened in accordance with procedures.

The output for a simulation showing the bypass valve being opened over an interval of 10 minutes is shown in the following two plots (Figure 1 and Figure 2). These show that because the DN 150 pipeline diameter is small and its friction losses are relatively high, relatively rapid opening of the bypass valve creates sufficient flow to rapidly drop the upstream pressure and rapidly raise the downstream pressure. The effect of this is to quickly reduce the differential pressure across the bypass valve and hence the differential temperature.

The plots show that by the time that the pressure downstream of the bypass valve reaches 4 MPa, the lowest temperature is -20°C (simulation time 408 min). At this time the differential pressure across the bypass valve has fallen to 3.0 MPa.

(It should be noted that the valve moves from closed to 5% open in the first 5 minutes, and from 5% to 100% open in the second 5 minutes)

Figures 3 and 4 show the output from the model run with the valve opened from zero to 50% in 30 minutes, and from 50% to 100 % in the 51st minute. This simulation shows a simular result, although the pressure and temperature changes occur over a longer period.

It can be seen that as the upstream pressure falls there is a corresponding drop in the temperature upstream of the bypass valve as a result of the pressure drop in the upstream pipeline, and in the small diameter (DN 80) pipework installed in the bypass system.

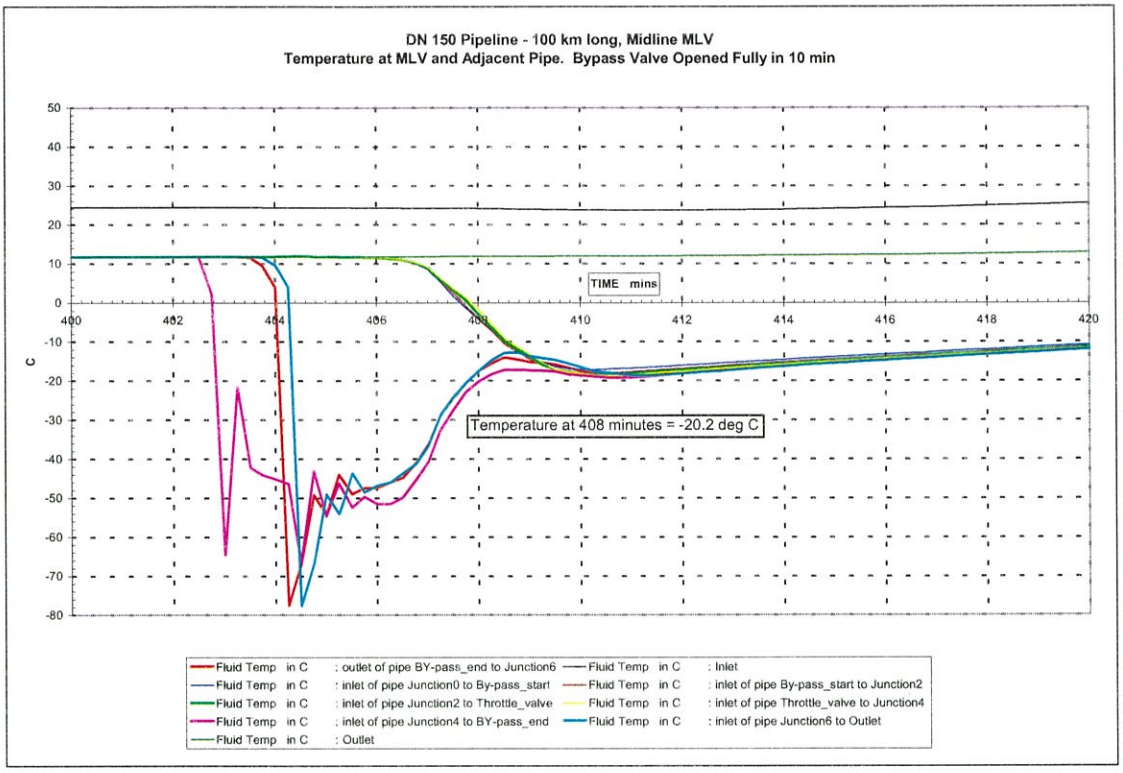


Figure 1

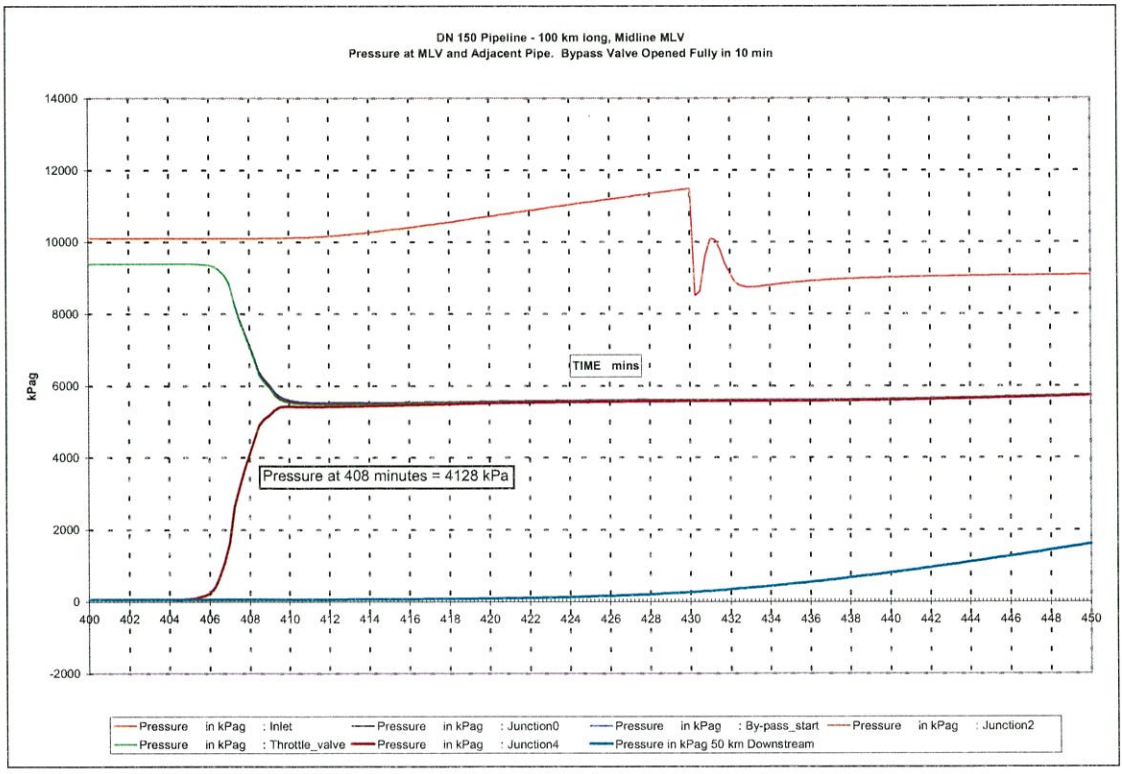


Figure 2

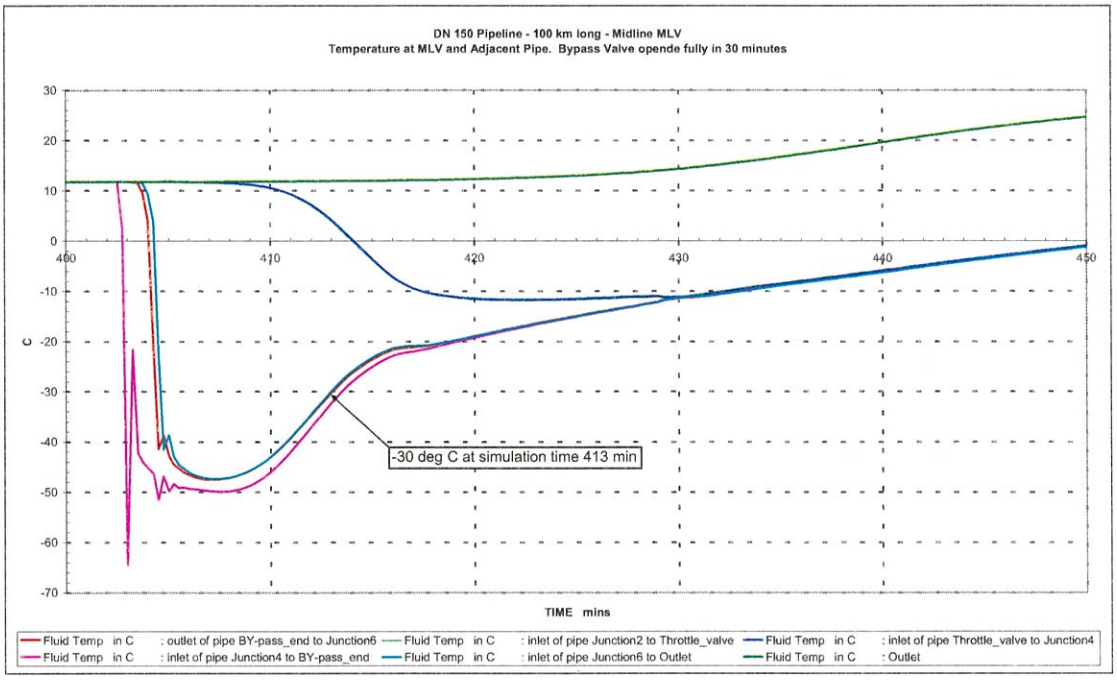


Figure 3

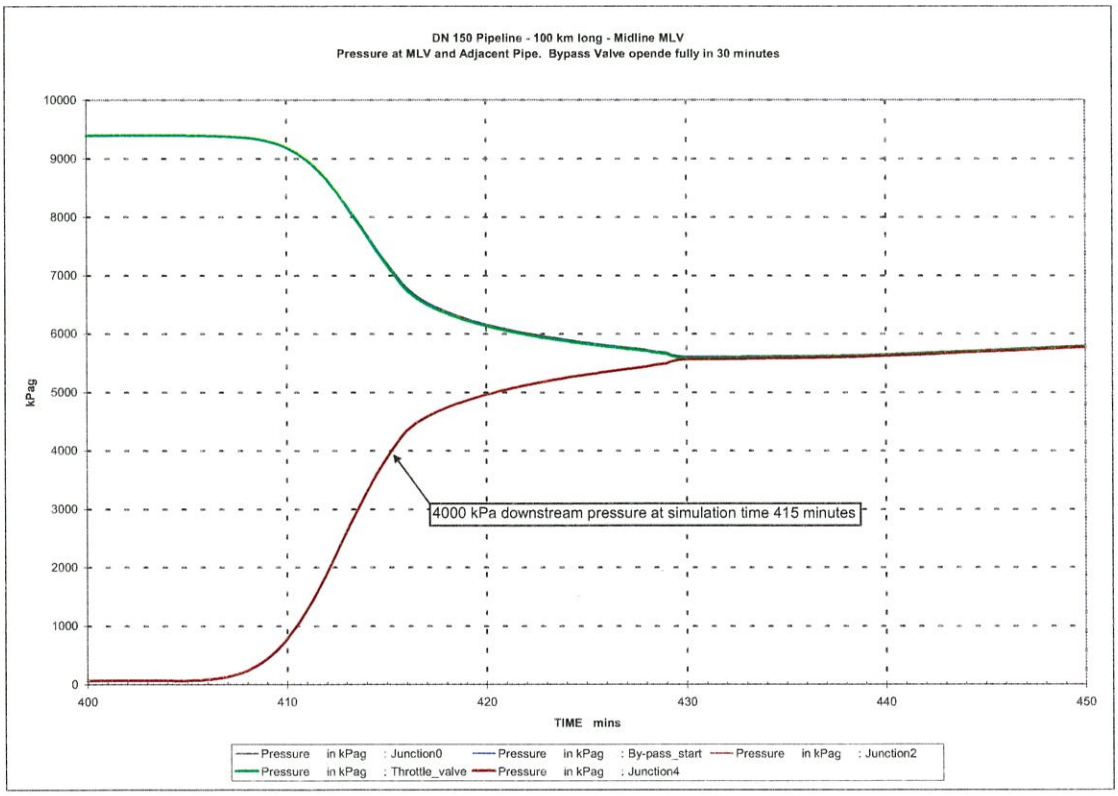


Figure 4

6.8 Temperature Rise with Downstream Compression

Gas in the pipe section being repressurised is being compressed through the whole repressurisation cycle. When the rate of repressurisation is low the temperature rise with compression is balanced by the temperature loss to the environment. However in short sections the effect of rapid repressurisation can cause the pipe temperature at the downstream end to rise to levels that exceed the design temperature of the pipeline, and in extreme cases, have the potential to cause damage to the pipeline coating and possibly to inline equipment.

The section length in the KEGP are sufficiently long for this not to be a concern except in the 7 km section between MLV 4 and the Esperance Power Station. This pressure at this end of the pipeline is most unlikely to reach a value where there is potential for excessive temperature to be reached at the Esperance Power Station.

Transient modelling in winter shows that if the MLV 4 bypass valve is opened in 10 minutes (0-5% in the period 0-5 minutes and 5-100% in the period 5-10 minutes) the temperature at the Esperance terminal will rise to approximately 30°C if the initial pressure upstream of the MLV is 10MPa and the initial temperature 12°C. During summer the soil temperature is likely to be 25-30°C, and the temperature at the Terminal could reach 50°C with rapid repressurisation.

This is within the limits of the pipeline design.

6.9 Conclusion

Transient modelling of the repressurisation process during winter conditions and at maximum pressure differential shows that the pressure in pipework downstream of the bypass valve can be maintained at a level where it does not exceed the threshold stress for brittle fracture during the time that the temperature in this location is lower than -29°C.

At times when the soil temperature is higher than the winter minimum, the higher upstream gas temperature will increase the margin between the threshold stress for brittle fracture and the lower temperature limit.

All sections of the pipeline can be safely repressurised by operating the bypass valve and during extreme conditions.

7 RECOMMENDED PROCEDURES

7.1 Pipeline Section Depressurisation

Pipeline depressurisation is an unavoidable process when a section of the pipeline must be removed from service for maintenance or in response to an emergency. Nevertheless it is a process that does not introduce any unsafe conditions into the pipeline operation, provided that the depressurisation is undertaken as it is intended, with the gas being released through a fully open vent valve.

There are very significant community issues that require planning and management including:

- Noise and possibly odour, and the associated community and public authority awareness activities required to manage the potential impact of this.
- The gas cloud and its potential affect on aircraft that may inadvertently pass through the cloud.

There are associated issues that require planning and managing including:

- Management of gas delivery to essential delivery points during the period that the pipeline is out of service.
- Managing the pressure in the pipeline upstream and downstream to simplify and expedite the repressurisation activity.

Managing and planning the work to be undertaken during the period of pipeline section depressurisation to ensure that it is conducted safely and expeditiously.

In all remote areas, pipeline depressurisation should:

- Be undertaken using the vent at both upstream and downstream ends of the pipeline to expedite the process.
- Be undertaken with the vent valve fully open. After the valve is opened personnel and public must be maintained a safe distance from the site.
- The control room SCADA system should be used to gather detailed data on the depressurisation process for later analysis by the pipeline engineers (time, pressure, temperature).
- A public information and media management procedure must be developed and implemented prior to and throughout the depressurisation period.

In developed areas, the depressurisation process should be managed to as great an extent as possible by consuming the gas at one or more of the delivery points, so that the public nuisance created is minimised. The remaining gas can be released in the normal manner with appropriate community information.

At some locations it may be practical to release gas through silencer to reduce the emitted noise level (although this carries with it an increased risk of ignition), and if time permits and the residual pressure is sufficiently low, the gas may be released through a small flare.

7.2 Pipeline Section Repressurisation

7.2.1 Repressurisation Planning

It is not practical to present a standard plan for repressurising a pipeline section because the key process parameters, gas temperature, gas pressure and section volume will be different on each occasion.

Consequently the pipeline operator must develop a repressurisation plan on each occasion that a pipeline section is to be repressurised using the process conditions that are relevant to the section under consideration.

The plan must ensure that the objectives identified in Section 6.6 are achieved in each case.

The FlowTran (or equal) transient model can be used to develop a suitable procedure for each case, although it must be recognised that the field operator has no means of monitoring the process, other

than by temperature and pressure, and consequently the plan must ensure that the limiting pressure and temperature condition for each site is clearly stated, and Operators instructed to cease repressurisation once the limiting condition is reached.

7.2.2 Planning Options

When the pressure and temperature conditions are such that the pressure in the pipe downstream of the bypass valve is expected to exceed the threshold stress for brittle fracture in any component before the temperature is warmer than -30°C, and the schedule will not permit the operation to be stopped to allow the system temperature to recover, the following options are available:

- The pipeline operations prior to depressurisation should be managed so that the pressure in the sections adjacent to the section being depressurised are as low as practicable.
- To facilitate this, gas flow into the upstream pipeline section should be stopped or curtailed, to maintain the pressure upstream of the bypass valve at as low a level as practicable.
- Use gas from the pipe section that is at the lowest pressure to repressurise the pipe to a level that will limit the temperature drop to an acceptable level when the gas is supplied from the higher pressure section. This approach is not always practical because the gas in the lower pressure section may be required to be preserved to maintain supply to customers.
- Ensure that the next isolation valve upstream of the repressurisation valve is closed during the repressurisation operation. Gas transferred from the high pressure section to the low pressure section will deplete the high pressure section causing its pressure to fall, effectively causing the differential pressure to fall across the bypass valve more rapidly than if the upstream section remained connected to the gas supply.
- Partially depressurise the upstream pipe section, causing its pressure to fall to a value where the Joule Thompson temperature drop is acceptable to the process.

7.2.3 Repressurisation – Long Pipeline Sections

Pipeline repressurisation can be accomplished for each section of the pipeline with appropriate planning. The repressurisation task involves both a purge of the pipeline section which can be safely conducted using the AGA "Purging Principles and Practice" manual, and repressurisation.

Repressurisation of the longer pipeline sections is safely accomplished by managing the gas inflow so that the pressure does not exceed 4.0 MPa at any time that the pipeline temperature is lower than -30°C. This will eliminate the risk of brittle failure.

The repressurisation activity is unlikely to be affected by this limit when the work is undertaken during summer, and when the pipeline pressure is no higher than 10 MPa.

It is unlikely that the combination of low soil temperature and maximum pressure will create a condition where special procedures (involving a two stage process with partial repressurisation followed by a hold period to allow the pipe contents to warm before resuming the repressurisation). Nevertheless the pipeline operator should recognise potential extreme conditions and consider them when developing the repressurisation plan.

7.2.4 Repressurisation – Short Pipeline Sections

The repressurisation activity for short pipeline section in Esperance should be undertaken at a modest rate to maintain the temperature at downstream isolation valve within safe limits.

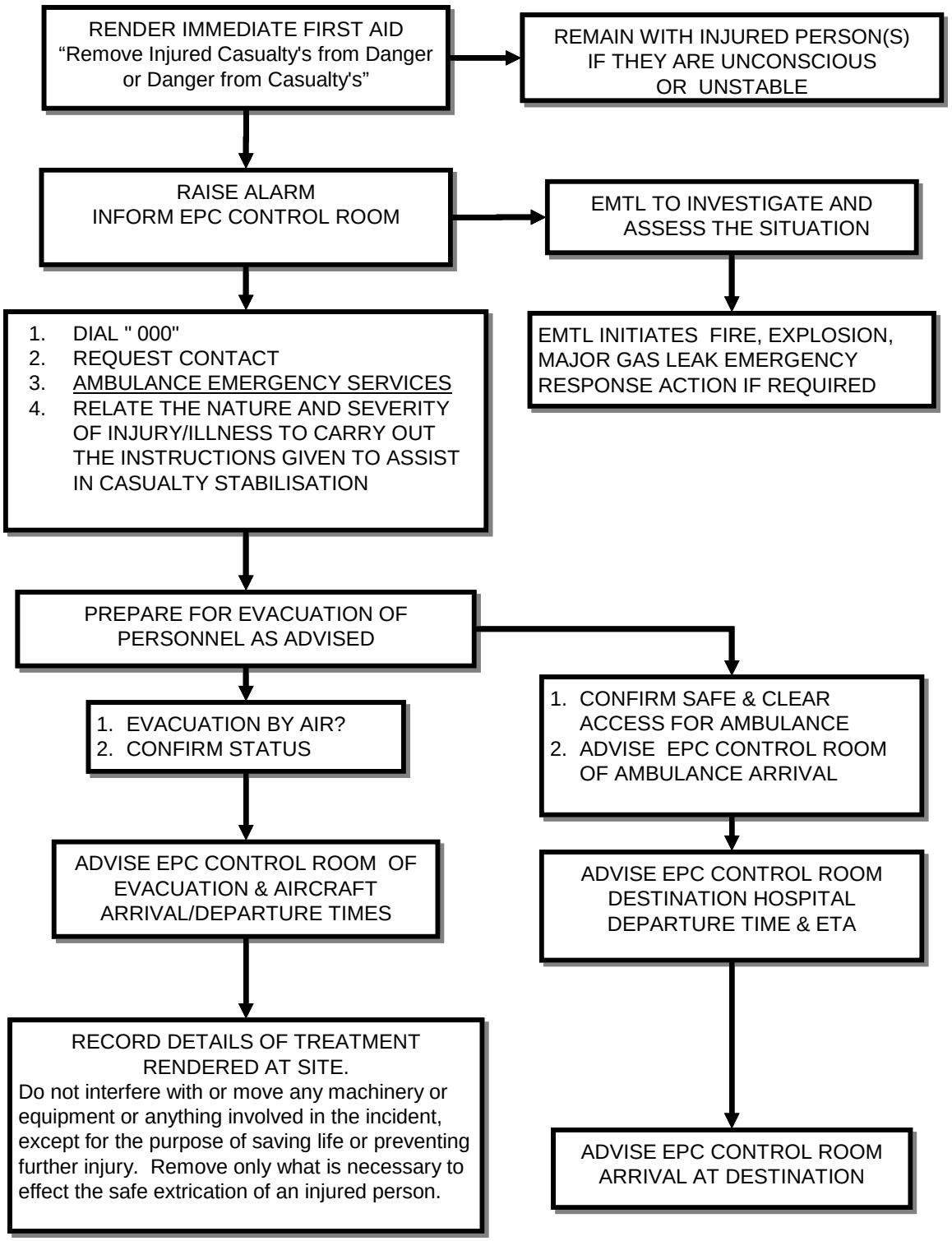
The small volume downstream of the mainline valve will cause it to repressurise relatively quickly

7.2.5 Repressurisation Monitoring

It is important that each repressurisation activity is monitored by SCADA, and the data gathered, together with associated field records provided to Pipeline Engineering for analysis, and preferably for comparison with transient models. This will improve the process understanding, and aid development of improved models for future use.

Report R 6324 "A Prediction of Individual and Societal Risks from the Kambalda to Esperance Pipeline"

2. Medical Emergency



3. Bomb/Sabotage Threats

General

The EPC Facility Manager, or his delegated representative, shall convene the EMT and assume the role of EMTL to coordinate the response to acts of sabotage or threats. This shall include responsibility for assessing the level of threat and the appropriate response.

Sabotage

All incidence of sabotage identified, or suspected, shall be reported to the KEGP Control Room immediately. The EPC Control Room Operator shall immediately notify the EPC Facility Manager.

Incidence of sabotage shall include any tampering with the pipeline or above ground pipeline facilities. Sabotage can results in damage to the pipeline, loss of supply from the pipeline or interruption to pipeline operations and / or maintenance activities.

All incidences of sabotage shall require an investigation and reporting. The Reporting Procedure protocols should be followed when attending incidence of sabotage or possible sabotage.

Sabotage Threats

Threats to sabotage the pipeline, associated facilities or pipeline operations shall be dealt with in a similar manner to Bomb Threats. The EMTL is responsible for coordinating the response to threats of sabotage.

Bomb Threats

Bomb threats can be received in either written, electronic or telephone form.

Written Threats

The written material should be kept, including any envelope or container. Further handling should be avoided in order to preserve evidence such as possible fingerprints, handwriting or typewriting, paper and postmarks. Place the evidence in an envelope, preferably plastic.

Electronic Threats

Threats that are delivered in the form of emails, SMS messages or should be printed out and “saved” at the first opportunity.

Telephone Threats

An accurate analysis of a telephone threat can provide valuable information on which to base action and subsequent investigation.

The person receiving the threat by phone should not hang up but stay on the line to assist in tracing the call, and as soon as possible should complete the Bomb Threat Checklist. This Checklist should be placed next to every telephone and computer that can accept incoming calls.

Evaluation of the Threat

After an analysing all information received, the EMTL will categorise the bomb threat as either:

Specific – the caller will provide detailed information, which could include describing the device, why and where it was placed, the time of activation and other details. The specific threat is less common but more credible.

Non-specific – the caller may state that a bomb or other device has been, or will be, placed and may give very little or no additional information before hanging up. This type of threat is more common but cannot be discredited without investigation.

ALL THREATS SHOULD BE TREATED AS SERIOUS UNTIL PROVEN OTHERWISE.

Notification

The local police should be contacted immediately on receiving a threat or discovering a suspicious parcel. Local police are generally not trained in bomb search procedures. However they will assist the occupants of the building, if applicable, to carry out a systematic search, and will call in Police Bomb Technicians if something suspicious is found. The EPC Facility Manager, or his delegate, shall be contacted immediately and informed of the threat.

Evacuation or Suspension of Work

Depending upon the assessed level of threat, there are four options:

- Take no further action, the "do nothing" option.
- Search without evacuation or suspension of work.
- Evacuate or suspend work and search, or
- Evacuate or suspend work immediately (without search).

Each of these options has advantages and disadvantages related to safety, speed of search, thoroughness, productivity and morale and have to be assessed against potential risk.

The EMTL shall make the decision as to which level of response is most applicable to the received threat. Suspension of work requires the EPC Control Room Operator to contact all Permit Holders and suspend all Permits to Work.

Other Areas. Once the external and public areas have been searched, a search should be conducted beginning at one end of the site and continuing until the whole area has been searched. A location should be clearly marked once searched to avoid duplication of effort. Designated staff members should assist the authorities in the search because of their intimate knowledge of the site.

IF A SUSPECT OBJECT IS FOUND, DO NOT TOUCH OR MOVE IT.

The location should be conspicuously marked, e.g. a paper trail to the nearest exit is the most suitable. After ensuring there are no other suspicious objects in the vicinity, evacuate and isolate the area. Continue to search other areas in case there are other suspicious objects.

RECORD OF CALL (BOMB THREAT CHECKLIST)

WHO ARE YOU??? (get caller to repeat)……

WHERE IS IT? ……

WHAT TIME WILL IT EXPLODE? ……

TIME OF CALL: …….. DATE OF CALL: ……

CALLERS EXACT WORDS:……

……
……

KEEP CALLER TALKING ON TELPHONE AND ASK

HOW WILL IT BE SET OFF? ……

WHAT TYPE OF BOMB IS IT?……

WHAT DOES IT LOOK LIKE?……

HOW BIG IS IT? ……

WHEN WAS IT PLACED? ……

WHY WAS IT PLACED? ……..

WHY ARE YOU DOING THIS? ……

VOICE OF CALLER

MALE FEMALE CHILD INTOXICATED APPROX. AGE: ……

ACCENT:…… SPEECH IMPEDIMENT:……

OTHER: ……..

BACKGROUND NOISE

MUSIC: …… MACHINERY: ……

AEROPLANE: …… TRAFFIC:

ADULT VOICES: …… CHILDRENS VOICES:

OTHER SOUNDS: ……

4. Missing Personnel

In the event that EPC or Contractor personnel go missing reference should be made to the EPC Field Operations and Maintenance Procedures 1.07 Personnel Monitoring. Should the person not be located following execution of this procedure then the police station nearest the last known location should be notified and EPC should take further instruction from them and assist in the search in any way possible.

If it is necessary to alert the police to assist in locating a missing person then the EPC Facility Manager shall inform the next of kin, in the case of EPC staff, and the Contractor in the case of contractor staff immediately.

5. Odorant Release

Requirements/ Tools**:**	Material Safety Data Sheet (MSDS) Safety Equipment, Personal Protective Equipment such as heavy duty rubber gloves, goggles, SCBA (**REFER TO THE MSDS)** Diluted (5%) Bleach solution (DO NOT USE CONCENTRATED BLEACH SOLUTION) Sand and/or earth other non-combustible absorbent material Shovels and Clean re-sealable drums, Fire extinguishers
Objective:	To safely clean up an odorant spill in compliance with Environmental requirements.
Notification:	The EPC Control Room at Esperance must be notified of a *large spill* immediately (see Procedure for definition of *large spill*) Landholders and local residents as appropriate. Emergency Services and Police
Preliminary:	Correct protective safety equipment **must** be worn when handling odorant **(refer to the MSDS)**.
Precautions:	A *large spill* is most likely to be experienced during changeover of tanks and connection/disconnection of dosing equipment. All equipment is to be inspected and in good condition before changeover of tanks and connection/disconnection are undertaken to prevent spills from occurring. Replace any faulty, damaged or suspect equipment. A *small spill* is most likely to occur during maintenance operations such as change out or bleeding of the odorant injection pump etc. All precautions are to be used to prevent any spills from occurring. Heavy Duty Rubber gloves and chemical goggles should be worn to protect skin and eyes when handling odorant. If odorant contacts the skin or eyes, flush the affected area immediately and thoroughly with water (refer to MSDS). Self-contained breathing apparatus must always be on standby and must be worn in areas of high vapour concentrations or for prolonged exposure to lower concentrations. Do not enter these areas unless absolutely essential. Odorant is a Highly Flammable Liquid. Fire extinguishers must always be checked and on standby. Become aware of the prevailing wind direction and all possible ignition sources downwind in the event of a *large spill.*

PROCEDURE

Isolate the Leak Site from the Odorant Supply

The appropriate personal protective equipment must be worn before attempting this task (refer to the MSDS).

In cases where the odorant supply cannot be shut off and the odorant leak continues to be sprayed into the air, water fogging can help reduce the odorant concentration in the air.

Determine Spill Size

The classification of the spill is determined by the on-site personnel using the following guideline;

	Small spill	Large spill
Spill to ground	Less than 20 litres	More than 20 litres
Spray to air	Less the 5 litres	More than 5 litres

Initiate Spill Response

In all spill cases it is necessary to neutralise the odour of the escaped odorant as quickly as possible. This can be achieved by placing a barrier over the spill or by oxidising the odorant to form less noxious products.

Small Spills

Neutralise the spill immediately with copious quantities of Household grade (5%) bleach, the bleach must be at least 3 times the quantity of odorant. **Never use concentrated bleach, solid bleach or other concentrated oxidising agents on odorant, as this may cause a fire or explosion.**

Once the spill has been neutralised with diluted bleach solution, the odorant can be washed away with large amounts of water.

Large Spills to Ground

Evacuate the area downwind of the spill for 200m.

Immediately notify EPC Control Room at Esperance.

The EPC Control Room at Esperance is to arrange notification of police, fire brigade, emergency services and adjacent landholders (priority to be given to those downwind).

Contain the spill to prevent spreading. **The appropriate personal protective equipment must be worn before attempting this task (refer to the MSDS).**

If the spill has been absorbed into the ground, apply copious quantities of household grade bleach to neutralise the odorant. Do not spread the odorant by the application of the bleach. Cover with additional soil if odorant vapours are still present and disposal cannot be arranged quickly. **Never use concentrated bleach, solid bleach or other concentrated oxidising agents on odorant, as this may cause a fire or explosion.**

If the spill has not been absorbed into the ground, cover the spill area with sand or other absorbent non-combustible material. Neutralise with bleach if practical.

The contaminated soil can be removed and disposed of by burial in a suitable location or transferred to sealed containers for disposal as contaminated waste.

In the case of burial, apply sufficient cover to prevent odours from escaping to the air. Apply a dose of household grade (5%) bleach prior to back filling.

Any residue at the spill site can be neutralised with bleach and flushed with water.

Large Spills to Air

Evacuate the area downwind of the spill for 200m.

Immediately notify EPC Control Room at Esperance.

The EPC Control Room at Esperance is to arrange notification of police, fire brigade, emergency services and adjacent landholders (priority to be given to those downwind).

Prevent any possible ignition sources from entering the spill affected area, including the area downwind of the spill site.

In cases where the odorant supply cannot be shut off and odorant continues to be sprayed into the air, water fogging can help reduce the odorant concentration in the air.

Annexure E

Supply interruption and Curtailment Procedure

C9900a60

KEGP Operating Procedure 5.02
Supply Interruption and Curtailment Procedure

Esperance Pipeline Company Pty Ltd

ABN 099 425 895

PROJECT NUMBER: C9900

DOCUMENT NUMBER: C9900a60

REV	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY	DATE
A	Issued for review	HSB	RBS		22-Sep-03
0	Issued for Use	HSB	RBS	JMO	24-Nov-03
1	General review after exercise	WF	ST	WMcC	30-aug-16

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Index

1 INTRODUCTION

The purpose of this document is to describe actions to be undertaken in the event of a gas supply interruption that necessitates or results in the curtailment of gas delivery to Esperance Power Station (EPS).

Events that could cause this situation are as follows: -

- Third party damage to the KEGP requiring interruption to mainline gas flow to repair.
- Interruption to mainline gas flow due to malicious mainline valve closure.
- Fault at delivery stations resulting in flow interruption.
- Long term gas supply interruption at KIS.

Note that EPS require a minimum delivery pressure at ERS of 1800 kPa. They are able to run their turbines on liquid fuels stored on site in an emergency.

A gas supply interruption by definition is an emergency in accordance with EPC's Emergency Response Plan (Procedure 7.11). As a consequence, incidents of this nature will be managed as an emergency and will be investigated as an incident (refer Procedure 7.07) and reported in accordance with Procedure 1.02: Reporting – Fault Incident and Regulatory.

This procedure describes field response actions required to respond effectively to incidents that may or do result in loss of supply.

Solar is the Esperance Power Station Operations and Maintenance Contractor and also man the KEGP 24-hour Control Room. Emergency number is 1800 010 272

Solar site team manages the nomination of gas supply via the KEGP pipeline.

2 REFERENCES

AS 2885.3 Pipelines – Gas and Liquid Petroleum Part 3: Operations and Maintenance

Proc 5.03 Loss of Containment Procedure

Proc 5.04 Pipeline and Facility Damage Procedure

Proc 7.11 Emergency Response Plan

Proc 7.07 Hazard, Incident Reporting and Investigation

Proc 1.02 Reporting – Fault, Incident and Regulatory

3 DETAILS

3.1 Third Party Damage – no loss of containment

In the event of the KEGP being damaged by a third party, Operations and Maintenance contractor or natural disaster without loss of containment, EPC representative (under normal conditions this will be the Esperance Area Manager) who will take the following actions.

1. Activate the Emergency Response Team

2. Notify the Esperance Power Station's Control Room and KEGP Operations and Maintenance contractor of the damage, if they are not already aware it, and ask them to:
    a. close the upstream Main Line Valve (MLV) and reduce downstream pressure to 30% of MAOP, through the consumption of the power station, as a precaution before proceeding promptly to the incident area to inspect and assess the damage. The assessment strategy in Section 9 of AS2885.3 shall be used as a basis for determining an appropriate course of action.
    b. Close the Main gas supply valve at KIS and via APA control room.
3. Advise EPS of the incident and the possibility of further pressure reduction or flow interruption to repair.
4. Advise Agility of the incident and any likely impact to gas supply into the KEGP.
5. Following Operations and Maintenance contractor's assessment of the damage (refer AS2885.3 Sect 5.4 Pipe Wall Defect Assessment), EPC will determine whether the pressure restriction implemented needs to be maintained and plan the repair work. This may require a cut out to repair (flow interruption required), or may only require a clockspring or sleeve type repair (no flow interruption required).
6. Maintain regular contact with Solar and gas supplier. Advise them of the likely sustainable flow rate and the expected duration of the incident if known. If an interruption to mainline flow is necessary to enable repair, provide the affected parties with EPC's best estimate of the repair timing and the effect on gas supply and delivery.
7. Return to normal operation as soon as practicable after completion of repair, while keeping EPS and Gas Supplier aware of service restoration plans.

3.2 Third Party Damage – loss of containment

In the event of the KEGP being damaged by a third party Operations and Maintenance contractor or natural disaster resulting in loss of containment, EPC will take the following actions.

1. Activate the Emergency Response Team
2. Following confirmation of the loss of containment, promptly isolate the damaged pipeline section by closing the remotely operable upstream and downstream isolation valves.
3. Close the Main gas supply valve at KIS and via APA control room.
4. Additional to this procced to isolate any manual isolation valves at the MLV stations to further reduce gas release as appropriate
5. Notify Operations and Maintenance contractor to proceed promptly to the incident area with the view to repairing the pipeline as promptly as possible.

The assessment strategy in Section 9 of AS2885.3 shall be used as a basis for determining an appropriate course of action.

6. Advise Solar of the incident and the likely impact on gas delivery to them. Depending on the location of the loss of containment and the downstream linepack available, there may be sufficient time for Solar to make orderly arrangements to reduce or cease gas flow.
7. Advise Gas Supplier of the incident and any likely impact to gas supply into the KEGP.
8. Proceed to address interruption of gas supply the Esperance Gas Distribution System as set out in document C9906a66. Where possible the securing of gas supply to the GDS needs to be considered to reduce impact on GDS system
9. Following the Operations and Maintenance contractor's assessment of the damage (refer Procedure 5.03 – Loss of Containment), determine with them the plan for repair and the expected time before mainline gas flow can be re-established.
10. Maintain regular contact with Solar and gas supplier. Advise them of the expected duration of the repair if known, EPC's best estimate of the repair timing and restoration of mainline gas flow. A plan for restoring gas flow to EPS will be developed in accordance with pressure recovery at ERS.
11. Return to normal operation as soon as practicable after completion of repair including the purging of affected pipe sections, while keeping Solar and Gas Supplier aware of service restoration plans.

3.3 Spurious Interruption to Mainline Gas Flow

In the event of interruption to mainline gas flow as a result of spurious mainline valve closure or similar event, the following actions will be taken.

1. Promptly notify the KEGP Operations and Maintenance contractor of the incident and ask them to proceed to the mainline flow interruption site with the view to restoring gas flow as promptly as possible.
2. Advise Solar of the incident and the likely impact on gas delivery to the power station. Depending on the location of the mainline flow interruption, downstream linepack and the time the KEGP Operations and Maintenance contractor require to restore flow, The KEGP gas intake may need to reduce by Solar.
3. Request Solar to advise Gas Supplier of the incident and any likely impact to gas supply into the KEGP.
4. Return to normal operation as soon as practicable after KEGP Operations and Maintenance contractor have restored mainline gas flow, while keeping Solar and Gas supplier aware of service restoration timing.

3.4 Fault At Delivery Station Resulting In Flow Interruption

In the event of a delivery station fault at the Esperance Pressure Reduction Station (ERS) that interrupts flow to the power station, the following actions will be taken. Incidents of this nature will cause EPS to loose gas supply almost immediately.

1. Promptly notify KEGP Operations and Maintenance contractor of the incident and ask them to proceed to the ERS with the view to restoring gas flow as promptly as possible.
2. Liaise with Solar to determine if the loss of flow is due to a fault on their own equipment or due to equipment failure at the ERS.
3. KEGP Operations and Maintenance contractor are to work with Solar to restore gas flow as promptly as possible.

3.5 Long Term Gas Supply Interruption at KIS

A gas supply interruption at KIS will only have an impact on the EPS or GDS if the pipeline has been operating with very low linepack or the gas supply interruption at KIS is protracted. Under these circumstances the following actions will be taken.

1. Determine if the KIS supply interruption is the result of closure of the the upstream Gas Supplier's equipment or failure of KIS equipment, and callout the Gas Supplier or KEGP Operations and Maintenance contractor as appropriate.
2. Following maintenance attendance at KIS, determine the time required to restore gas flow into the KEGP. If the restoration time is short and won't impact on delivery to EPS or GDS notification will not be required. If the restoration time is long and has the potential to impact on delivery to EPS or GDS, notify them of the incident and the possible impact on gas delivery to them. Emergency response team needs to also take action in accordance the C9906a66 the secure gas supplies the GDS
3. Return to normal operation as soon as practicable after restoration of inlet gas supply, while keeping Solar and Gas Supplier aware of service restoration timing.

4 FAULT AND INCIDENT REPORTING

1) All faults and incidents listed in this document needs to be reported as incidents and investigated as per procedures C9900a65.

2) Reporting of the incident to the regulatory bodies needs to be completed as per requirements.

Annexure F

Sabotage and Treats Procedure

C9900a72

KEGP Operating Procedure 5.08
Sabotage and Threats Procedure

Esperance Pipeline Company Pty Ltd

ABN 099 425 895

PROJECT NUMBER: C9900

DOCUMENT NUMBER: C9900a72

REV	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY	DATE
A	Issued for Comment	JET			01-Oct-03
B	Issued for Review	JET	DR		01-Oct-03
0	Issued for Use	JET	HSB	JMO	24-Nov-03
1	Clause 3.2 revised	CB	JMO	JMO	08-Sep-05
2	General review	WF	WMcC	WMcC	30-Aug-16

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Index

1 INTRODUCTION

The National **Terrorism Threat Level** for Australia is available at any time from the Australian National Security website (www.nationalsecurity.gov.au). This Public Advice is set at one of 5 levels as shown below.

In recent times the threat level has remained steady at **Probable** but this could change at any time. Recent advice is that large scale terrorist attacks are unlikely but random "one off" attacks could occur, most likely in places of mass gathering.

The specific purpose of this Procedure is to outline the guidelines for dealing with the unlikely event of sabotage, threat of sabotage or bomb threats to the Kambalda to Esperance Gas Pipeline (KEGP).

This document provides guidelines only and any reported case of sabotage or a threat to the pipeline shall immediately be reported through your supervisor / manager to the KEGP Facility Manager.

- **An act or possible act of Sabotage or a Threat must always immediately be actioned by activation of the Emergency Response Plan C9900a85.**

- **The Local Police must also immediately be informed of the incident (call 000).**

2 REFERENCES

WA Police Service	- Bomb Squad's booklet entitled "Bombs: Defusing the Threat"
AS 3745:2002	Emergency control organization and procedures for buildings, structures and workplaces

3 DETAILS

3.1 Definitions

EMTL	**Emergency Management Team Leader. The EMTL role is normally performed by the Esperance Area Manager. The Power Station manager normally will be the stand-in EMTL**
SABOTAGE	A deliberate act of damage to, or interruption to the operation of, the pipeline or associated facilities.
THREAT	An expressed intention to cause harm, damage or interruption to the pipeline, associated facilities or personnel.

3.2 General

Deliberate threats to safety and energy infrastructure are a high-priority issue in the community.

The EMTL, or his delegated representative, shall be responsible for coordinating the response to acts of sabotage or threats. This shall include responsibility for assessing the level of threat and the appropriate response in accordance with the Emergency Response Plan.

Evacuations - At first thought, immediate and total evacuation may seem the best response to any bomb threat. However, it is generally better to 'work around' evacuation if possible. There are a number of factors, which may weigh against an immediate evacuation: see section 3.4.7 for more detail.

3.3 Sabotage

All incidence of sabotage identified, or suspected, shall be reported to the KEGP Control Room immediately. The Control Room shall immediately notify the

Emergency Management Team Leader (EMTL) as set out is the Emergency Response Plan C9900a85.

Incidence of sabotage shall include any tampering with the pipeline or above ground pipeline facilities. Sabotage can result in damage to the pipeline, loss of supply from the pipeline or interruption to pipeline operations and / or maintenance activities.

All incidences of sabotage shall require an investigation and written report. Procedure No.1.02 Reporting Protocols should be followed when attending incidence of sabotage or possible sabotage.

3.3.1 Sabotage Threats

Threats to sabotage the pipeline, associated facilities or pipeline operations shall be dealt with in a similar manner to Bomb Threats. The EMTL, or his delegate, is responsible for coordinating the response to threats of sabotage.

3.4 Bomb Threats

Bomb threats can be received in either written or telephone form.

3.4.1 Written Threats

The written material containing the threat should be kept, including any envelope or container. Further handling should be avoided in order to preserve evidence such as possible fingerprints, handwriting or typewriting, paper and postmarks. Place the evidence in an envelope, preferably plastic.

3.4.2 Telephone Threats

An accurate analysis of a telephone threat can provide valuable information on which to base action and subsequent investigation.

The person receiving the threat by phone should not hang up but stay on the line to assist in tracing the call, and as soon as possible should complete the Bomb Threat Checklist. This Checklist should be available near the Control Room emergency phone)1800 010 272). This check list to be included in all printed copies of Emergency Response Plan.

3.4.3 Evaluation of the Threat

After an analysing all information received, the EMTL, or his delegated representative, will categorise the bomb threat as either:

Specific – the caller will provide detailed information, which could include describing the device, why and where it was placed, the time of activation and other details. The specific threat is less common but more credible.

Non-specific – the caller may state that a bomb has been placed and may give very little or no additional information before hanging up. This type of threat is more common but cannot be discredited without investigation.

ALL THREATS SHOULD BE TREATED AS SERIOUS UNTIL PROVEN OTHERWISE.

3.4.4 Notification

The local police should be contacted immediately on receiving a threat or discovering a suspicious parcel. Local police are generally not trained in bomb search procedures. However, they will assist the occupants of the building, if applicable, to carry out a systematic search, and will call in Police Bomb Technicians if something suspicious is found.

The EMTL, or his delegate, shall be contacted immediately and informed of the threat.

3.4.5 Evacuation or Suspension of Work

Depending upon the assessed level of threat, there are four options:

1. take no further action
2. search without evacuation or suspension of work
3. evacuate or suspend work and search
4. evacuate or suspend work immediately (without search)

Each of these options has advantages and disadvantages related to safety, speed of search, thoroughness, productivity and morale and have to be assessed against potential risk.

The EMTL, or delegate, will make the decision in consultation with the Police as to which level of response is most applicable to the received threat.

Suspension of work requires the KEGP Control Room Operator to contact all Permit Holders and suspend the Permit.

3.4.6 Search – Under the control of the EMTL &/or his delegate

The best-qualified people to carry out a thorough search in any given area are the regular occupants or users of the space. These people have a good understanding of what belongs or not in a location at any given time. Police generally do not have such an intimate knowledge of the threat area and would be less likely to recognise something that is suspicious or out of place.

Personnel can assist a search by looking carefully around their work area, along the pipeline route or at pipeline facilities and identifying anything, which, does not belong there, or which is not in its usual place.

The aim of the search is to identify any object which is not normally found in an area, or for which an owner is not readily identifiable, or which becomes suspect for any other reason. For example, suspiciously labelled objects – similar to that described in the threat; unusual size, shape and sound; presence of pieces of tape, wire, string or explosive wrappings, or other unfamiliar materials.

If the decision to evacuate to suspend work and search is made, people should be asked to take with them all tools and equipment brought to site as well as personal belongings. This will help in identifying suspicious objects that may be in the evacuated area.

Priorities for searching follow a set sequence:

- Outside areas including evacuation assembly areas and car parks;
- Building entrances and exits, and particularly paths people will use to evacuate;
- Public areas within buildings.

These are areas in most buildings, which are accessible for placement of an object. They are also areas which evacuees pass through, or near, during an evacuation.

Other areas. Once the external and public areas have been searched, a search should be conducted beginning at the lowest levels and continuing upwards until every floor, including the roof has been searched. A room or floor should be clearly marked once searched to avoid duplication of effort. Designated staff members should assist the authorities in the search because of their intimate knowledge of the building.

IF A SUSPECT OBJECT IS FOUND, DO NOT TOUCH OR MOVE IT.

The location should be conspicuously marked, e.g. a paper trail to the nearest exit is the most suitable. After ensuring there are no other suspicious objects in the vicinity, evacuate and isolate the area. Continue to search other areas in case there are other suspicious objects.

3.4.7 Limitations of Total Evacuation or Work Suspension

At first thought, immediate and total evacuation may seem the best response to any bomb threat. However, it is generally better to ‘work around’ evacuation if possible. There are a number of factors, which may weigh against an immediate evacuation:

Risk of Injury - Generally the easiest area to plant an object is in the shrubbery outside a building, in an adjoining car park or in an area to which the public has the easiest access. Immediate evacuation through these areas might increase the risk of injury. Car parks should not be used as assembly areas.

Search Limitation - Total evacuation will remove staff that may be required to make a search.

Panic - A sudden evacuation may cause panic and unpredictable behaviour, leading to the risk of injury.

Essential Services - Some evacuations may be precluded because of the need to operate essential services in the building.

Loss of Operations - While the protection of life should outweigh any economic loss, repeated threats might lead to loss of business and unacceptably high disruption to services.

3.4.8 Partial evacuation

This is particularly effective when the threat includes the general or specific location of the placed object, or where a suspicious object has been found without prior warning.

Partial evacuation can reduce risk of injury by removing non-essential personnel. Personnel essential to a search can remain, critical services can be continued, and where there is repeated threat, high loss of output is avoided.

NOTE: Partial evacuation requires a high degree of planning, training, supervision, coordination and rehearsal.

3.4.9 Suspect Mail Bombs/Devices

All staff responsible for handling mail should be trained in identification and subsequent handling of suspect mail items.

3.5 Exercises

As part of the Emergency Planning Exercises specific exercises shall be held for preparation to deal with acts of sabotage and threats to the pipeline, pipeline facilities &/or personnel.

Appendix 1

Telephone call- Bomb Threat Check List

Appendix A: Phone Bomb-Threat Checklist

AFP
AUSTRALIAN FEDERAL POLICE

PHONE BOMB-THREAT CHECKLIST
Remember to keep calm

Important questions to ask

Where did you put it?

When is the bomb going to explode?

What does it look like?

Exact wording of threat

Threat:

General questions to ask

How will the bomb explode?

or

How will the substance be released?

Did you put it there?

Why did you put it there?

Bomb threat questions

What type of bomb is it?

What is in the bomb?

What will make the bomb explode?

Chemical/biological threat questions

What kind of substance is in it?

How much of the substance is there?

How will the substance be released?

Is the substance a liquid, powder or gas?

For immediate or emergency advice please contact your local police service.

PHONE BOMB-THREAT CHECKLIST
Remember to keep calm

Other questions to ask

What is your name?

Where are you?

What is your address?

Notes for after the call

CALLER'S VOICE

Accent (specify):

Any impediment (specify):

Voice (loud, soft, etc):

Speech (fast, slow, etc):

Dictation (clear, muffled):

Manner (calm, emotional, etc):

Did you recognise the caller?

If so, who do you think it was?

Was the caller familiar with the area?

THREAT LANGUAGE

Well spoken:

Incoherent:

Irrational:

Taped:

Message read by caller:

Abusive:

Other:

BACKGROUND NOISES

Street noises:

House noises

Aircraft:

Voices:

Music:

Machinery:

Local call noise:

STD:

OTHER

Sex of the caller: Estimated age:

CALL TAKEN

Duration of call: Number called:

ACTION (Obtain details from supervisor)

Report call immediately to:

Phone number:

Who received the call

Name (print):

Telephone number:

Date call received:

Time received:

Signature:

Annexure G

GDS Loss of Containment Procedure

C9906a66

Esperance Power Station Pty Ltd
ACN 086 409 949

Esperance Gas Distribution System
DISCONNECTION OF A GAS SERVICE

GDS Procedure

Disclaimer, Limitation, Ownership and Confidentiality

PROJECT NUMBER: C9906

DOCUMENT NUMBER: C9906A66

REV	DESCRIPTION	PREPARED BY	REVIEWED BY	APPROVED BY	DATE
A	Issued for Comment	CB	HSB		08-Sep-05
0	Issued for Use	CB	HSB	JMO	09-Sep-05
1	Rebadged	BS	LT	BS	20-Aug-10
2	General Review	BS	LT	BS	2-Feb-11
3	Re-issued for use	LT	NS	NS	20-Jun-13
4	Review after Emergency exercise	WF	WMcC	WMcC	8-Aug-16

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Table of Contents

1 INTRODUCTION

The purpose of this document is to outline the procedure for dealing with a loss of containment on the Esperance Gas Distribution System (GDS).

REFERENCES

AS 4645.1:2008	Gas distribution networks – Network management
AS 4645.3:2008	Gas distribution networks – Plastics pipe systems
C9906a63	Asset Management – Operating Plan
C9906a66	Asset Management – Maintenance Plan
C9900a85	Emergency Response Plan

DETAILS

1.1 Definitions

Nil.

1.2 General

The design and operation & maintenance activities of the GDS all contribute to prevention or minimisation of the likelihood and impact of a loss of containment scenario.

All personnel shall take the necessary action to first protect the public, then property and then environment with initial on-site judgment being critical in reacting to the loss of containment conditions.

Power Station operators needs to specifically be aware of sections 1.1 up to and including to 1.4.2.1

1.3 Emergency Response

The GDS has an Emergency Response Plan C9900a85, which defines the roles and responsibilities of all participants in the Emergency Command Structure.

An emergency is an unexpected event that poses a threat to life, property or the environment and requires immediate action to prevent or limit such a threat. Any unplanned loss of containment from the GDS is considered an emergency situation. It is important to recognise and understand that a loss of containment emergency response scenario will involve a number of different authorities and organisations responding to the incident, each with a different and important role in resolving the situation.

A coordinated response, in accordance with the Emergency Response Plan, is crucial to ensuring that all parties respond in a manner to ensure the safety of all

GDS personnel, other response organisation personnel, the public, the pipeline, the environment and the surrounding land users & properties.

The timely and effective response to a network supply interruption situation is to carry out emergency load management by interrupting and/or curtailing consumers to prevent widespread loss of gas supply.

Maintaining positive pressure within the network at the expense of consumer loss of supply should always be a consideration during supply disruption situation to avoid air ingress.

Where possible and as part of a curtailment of supply, consumers supply valves will be turned off as necessary to prevent the consumption of gas. This will avoid the introduction of air into the network if the total depressurisation of the network occurs.

1.4 Loss of Containment

Loss of containment is any gas escape from the GDS, which is not part of a planned or controlled pipeline activity. Any loss of containment of gas in the GDS is a serious situation and requires immediate corrective action. Action will be taken in accordance with the Leak Management Manual C9906d48 and the Emergency Responses plan C9900a85

1.4.1 Notification of Loss of Containment

Loss of Containment will be advised to the Pipeline Control Room via a number of mechanisms. This may include:

- Alarms from the SCADA system.
- Public or EPS staff and contractors call to the emergency number - 1800-010-272.
- Emergency Response Call to the dedicated Control Room Number.

1.4.2 Initial Response

The Control Room Operator will confirm the loss of containment via site information (maintenance call out) or instrumentation (SCADA).

The Control Room Operator will initiate the Emergency Response Plan notification protocols following notification of a loss of containment situation.

The Control Room Operator will initiate mobilisation of the Site Response Team and the Emergency Management Team Leader (EMTL).

The Site Response Team shall take action in accordance with the Leak Management Manual C9906d48. This may include squeeze off in a particular area of the network to isolate the section experiencing loss of containment.

The Control Room Operator shall **not** close, or instruct Maintenance Call Out staff to close, the Pressure Reduction Station (PRS) slam shut and GDS downstream valves unless instructed to do so by the EMTL.

The Control Room Operator will determine in conjunction with the EMTL if Curtailment Procedures should be initiated.

1.4.2.1 Damage to KEGP pipeline.

Where damage to KEGP pipeline has occurred the EMTL in conjunction with the Site Response team will assess the requirement to stop the use of Gas for Power Station production so as to contain gas in the pipe section Scraper Station 2 to ERS. This will enable the GDS gas supply to be maintained as long as possible. (This pipe section normally contains sufficient stored gas for two to four weeks of GDS gas demand).

1.4.2.2 Loss of containment in DN 160 PE trunk - PRS and Brazier St/Jane St

For an event on the DN160 trunk main in the section between the PRS at MLV4 and network secondary mains the following actions should be taken:

- The Control Room Operator (CRO), with approval from EMTL, shall undertake the necessary operations to close the main isolation valve (HV 076) at the PRS if major fire has developed at the pipe break. If there is no fire at pipe break, CRO shall NOT close isolation valve.
- Site Response Team, with approval from EMTL, shall perform squeeze off at the location of the trunk main break.
- Gas escaping from a trunk main shall be contained as quickly as possible.
- EMTL will take practical means to inform all customers to not use gas and switch to alternative fuels where available and turn off the meter set isolation valve.
- Control Room Operator shall keep the PRS shut until advised by the EMTL to open.

Loss of containment procedure for DN 160 trunk main from Brazier St/Jane St to Mungan St/Padbury St shall be as per ensuing Section 1.4.2.3

1.4.2.3 Loss of containment - GDS network

This involves loss of containment in a pipeline section of the DN40, DN100 and DN 160 (between Brazier St/Jane St to Mungan St/Padbury St) network mains. It requires the following actions to be taken;

- The Control Room Operator shall NOT undertake any action to close the main isolation valve (HV 076) at the MLV4 PRS
- Site Response Team to address loss of containment at affected main and ensure correct squeeze off tools are available for repair.
- If the affected main is not interconnected with other mains and has consumers on line of main, EMTL shall issue instructions to close all

consumers' meter set isolation valves to prevent ingress of air or water into the consumer's pipework if practicable.

1.4.2.4 Loss of containment - major gas customer facility/downstream pipework

Upon discovery of an emergency condition which affects a major consumer's facility the following actions shall be taken:

- The Control Room Operator shall NOT undertake any action to close the main isolation valve (HV 076) at the MLV 4 PRS
- Close customer's main isolation valve located at customer's property boundary.

1.4.3 Pipeline Pressure

It is important that the pressure in the system be maintained above atmospheric pressure to prevent the ingress of air or water into the pipes.

This is achieved by leaving the valves at the MLV 4 PRS open. If the control room operator or site response team have been instructed to close the isolation valves at PRS then positive pressure may be maintained by partially opening the bypass valves at the PRS.

1.4.4 Site Safety

Personal Protective Equipment (PPE) shall be brought to site and shall include as a minimum the following:

- Personal safety gear, with possible breathing apparatus.
- Gas detection devices.
- Handheld fire extinguishers.
- Warning Signs and temporary barricading.

1.4.5 On site external services support for a loss of containment on the GDS

External services support shall be coordinated by the WA Department of Fire and Emergency Services (DFES) who will engage other emergency services as appropriate. DFES are alerted to the situation by calling 000 and asking for the fire brigade.

Fire control will be provided by the DFES and associated volunteer fire service organisations.

Closure of roads and tracks must be performed by the Police Service.

Requirement to close rail tracks shall be coordinated through the Emergency Response Plan to Brookfield Rail.

1.4.6 Gas Escape

At the location of the loss of containment a perimeter shall be established to exclude the public from the vicinity of the gas escape. Emergency response crews shall remain upwind of the gas escape and outside of any gas cloud. Gas detection shall be maintained at all times while gas is escaping from the GDS.

1.4.7 Gas Fire

A gas fire situation must be contained with the assistance of the DFES representatives. Gas fires should not be extinguished. Radiant heat or other spot fires may later ignite a gas escape leading to an explosion and gas fire. The decision to extinguish a gas fire shall be made in agreement with the EMTL and DFES.

Bushfires pose a significant risk to personnel, the public, property and the environment and should be controlled. DFES or Bush Fire Brigade staff may respond to bush fires. Operations and Maintenance personnel shall remain upwind and well clear of the area of a bush fire.

1.4.8 Damage Assessment

On site, the Site Response Team must conduct an assessment of the extent and type of damage. This information shall be discussed with a representative from the EPC Engineering Group in determining an appropriate repair. The repair strategy in AS 4645 shall be used as a basis for determining an appropriate course of action.

An approach to any damaged site must be subject to a JSA prior to commencing the approach.

1.4.9 Temporary Repair

Temporary repair techniques for equipment and pipe work at stations must be approved by the EPS Engineering Department.

Any fittings used shall be installed in accordance with the manufacturers' instructions. Manufacturers' instructions shall be on site and attached as part of the Job Safety Analysis (JSA) for the temporary repair activity.

The EPS Engineering Department may determine if the operating pressure for the GDS shall be lowered while a temporary repair is on the piping.

1.4.10 Incident Notification and Investigation

When responding to the site incident the first priority is SAFETY.

Where possible, preservation of evidence related to the loss of containment incident shall occur. This includes the collection of photographs and physical evidence of the loss of containment. As soon as practicable a site plan shall be drawn up showing the position of all items (vehicles, equipment, etc.) in the vicinity

of the loss of containment or that may reasonably have been assumed to be related to the loss of containment. A note shall also be made of vehicle and equipment registrations including the operating status of the vehicle (on or off) when personnel arrived on site. Notes should be made of any discussions with persons present on site.

Notification to Energy Safety (ES) of 'notifiable incidents' shall be made in accordance with Regulation 43 of the Gas Standards (Gas Supply and Systems Safety) Regulations 2000. For incidents requiring submission of an investigation report to ES, the Regional Operations Manager shall approve the investigation report prior to submission to ES.

1.4.11 Preparedness

Emergency response staff shall participate in regular field or table top exercises for a loss of containment scenario. These exercises shall be conducted as part of the GDS Emergency Response Plan. Familiarity with the approved repair techniques shall form a component of the regular exercises.

1.4.12 Communications with Media and Public

All staff and contractors shall not respond to media requests unless authorised to do so by the EPS management. The Emergency Response Plan (C9900a85) details the protocols and procedures for communication with the media and public.

1.4.13 Restoration of service

If service is lost to a section of the network then the EMTL shall develop with the Site Response Team a plan for restoration of service to customers. This plan shall give consideration to:

1. The repair of the network piping (both temporary and permanent repairs)
2. Purging and resupply of gas to the network
3. Notification of affected customers of service interruption, restriction and restoration

Dependent on the widespread nature of any gas supply restrictions all consumers supply will be restored in reverse order to the original curtailment, starting with priority customers followed by domestic consumers.

For total loss of supply disruption to the network resulting in total depressurisation and air ingress, the network will be isolated and purged in sections. Gas will then be introduced into those sections of the network. Consumer reconnection will be initiated after the recovery of the entire disrupted network.

Annexure H

Pipeline Emergency Repair Techniques & Equipment

Appendix E - Pipeline Emergency Repair Techniques & Equipment

Pipeline and Facilities Emergency Repair Techniques & Equipment		
Pipeline Repair Techniques		
Excavation of Damaged Pipelines	C9906d48 - Leak Management Manual C9906c84 Locate Underground Assets GDS - C9906c63 Excavation and backfilling GDS - C9906c90 Soil Types and excavation KEGP -C9900d23 Pipeline excavation	
Pipeline Defect Assessment	AS2885.3 appendix C	
Flow Stopping Equipment	GDS – C9906c65 Squeeze -off Operations GDS- C9906a85 - Purging venting and Flaring KEGP - C9906a82 - Purging venting and Flaring	
Cut Line Pipeline Repair or Modification	External contractor – see contacts list	
Installation of Clamps and Sleeves – Steel piping	As per OEM manuals	
Emergency Response Equipment		
Category	**Inventory**	**Location**
Emergency Response Welding, Lighting, Earthmoving and Transport Equipment	PE welder PE materials Portable Gas Detector Steel pipe welding equipment Underground asset locations equipment Excavators/Transport Venting and flaring equipment PE squeeze-off equipment Electrical test for dead equipment	W/Shop W/Shop W/Shop Spec/Cont W/Shop Rental W/Shop W/Shop W/Shop

Pipeline and Facilities Emergency Repair Techniques & Equipment		
	Mobile lighting equipment Cranage	Rental Rental
Emergency Response Steel Pipeline Repair Equipment available	• 2 off 6-inch class 600 steel pipe clamps • Canusa Wrap System	PFM w/shop
Emergency Response PE Pipeline Repair Equipment available	• PE piping of various sizes • PE weld fittings of various sizes	PFM w/shop
Emergency Breathing Apparatus and Gas Monitoring Equipment.	None	
Replacement Pipe	20 lengths of Hydro-tested 150NB 6.4mm API5LX65	EPC shed
Odorant Spill Kit	Yes	KIS

Annexure I
Maps & Plans

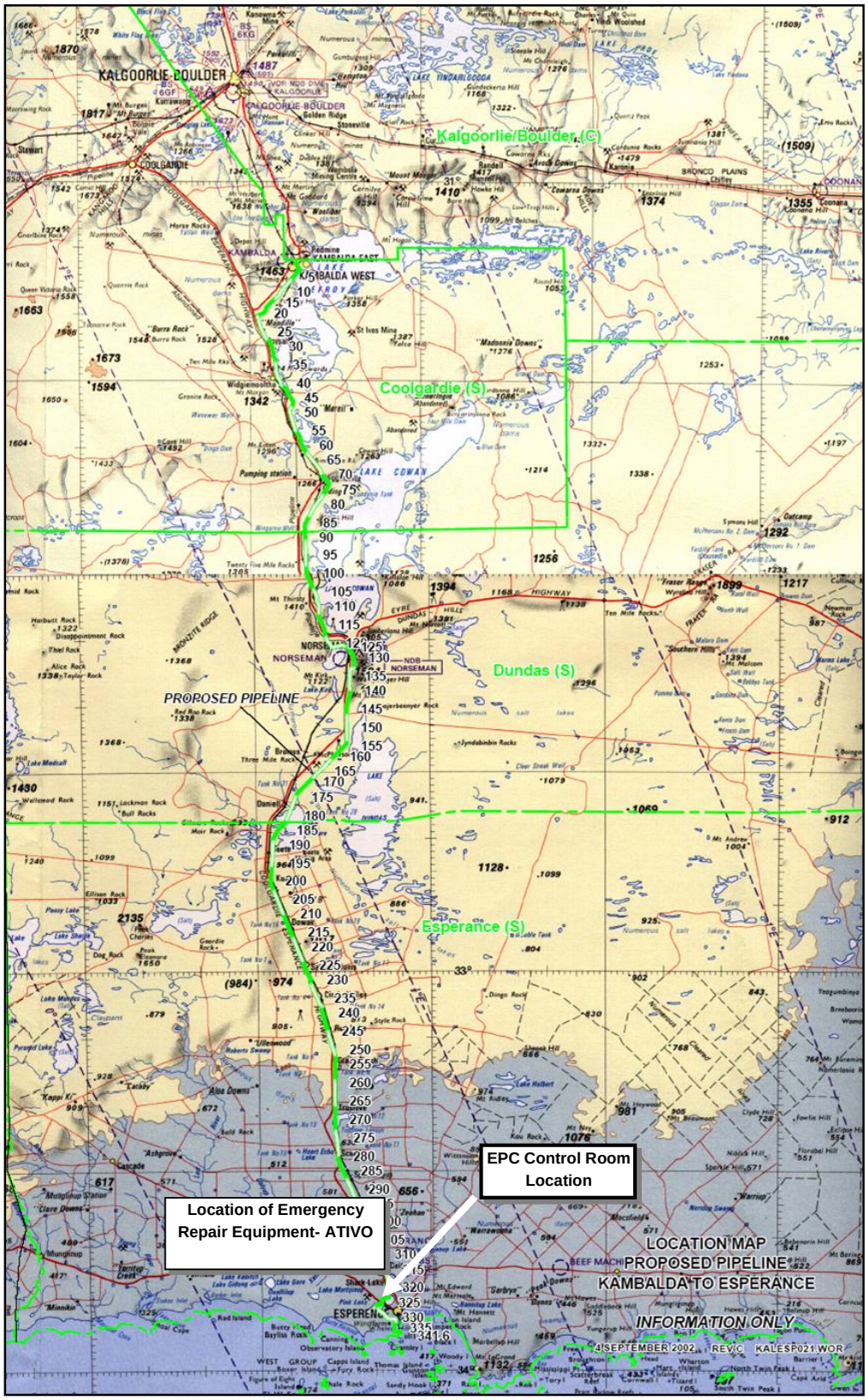
Maps and Plans

- KEGP Pipeline route and location of pipeline repair equipment map.

  Detailed plans of pipeline route and facilities – these plans are not attached to the ERP but copies are located in the EOC, EPC Administration Office in Esperance.

- GDS Asset Location drawings

  Detailed plans of GDS facilities – these GIS based drawings are not attached to the ERP but copies are located in the EOC, EPC Administration Office in Esperance.



Pipeline Route and location of Emergency Facilities