

AusNet Electricity Services Pty Ltd

Gas Access Arrangement Review 2018–2022

Appendix 2E: Gas Safety Case - Facility Description & Safety Management Overview

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Gas Safety Case

Facilities Description & Safety Management System Overview

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Forward

This document has been prepared by SP AusNet for the sole purpose of demonstrating compliance with the *Gas Safety Act* and the *Gas Safety (Safety Case) Regulations* with the objective that SP AusNet will manage the gas distribution network and provide consumers with an efficient, safe and reliable gas supply.

The information contained in this document might not be appropriate for all persons and it not possible for SP AusNet to have regard to the particular needs of each person who reads or uses this document.

The information contained in this document is subject to review and SP AusNet may amend this document at any time. Amendments will be indicated in the Amendment Table, but SP AusNet does not undertake to keep the reader informed unless by separate arrangements.

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1 INTRODUCTION

SP AusNet delivers gas to over 534,884 customers across a geographically diverse region spanning 60,000km². It owns operates and maintains natural gas transmission pipelines (including mainline valves, associated city gates, and field regulators) and an extensive natural gas distribution network in metropolitan Melbourne and South-West and West regional Victoria.

SP AusNet services the western half of Victoria, from the Hume Highway in metropolitan Melbourne west to the South Australian border, and from just north of Bendigo and Horsham south to the coast. SP AusNet also owns an LPG vapour reticulation network at Mt Baw Baw.

External factors, such as legislation, industry standards and practices, set out the broad directives of the SP AusNet' facilities management system. Policies, standards and procedures are then established by SP AusNet to ensure compliance with these external factors.

The Facility Description provides an overview of SP AusNet's transmission, distribution and alpine resort facilities and operations.

2 REFERENCED DOCUMENTS

Alpine Resorts (Management) Regulations

AS 1697	Installation and maintenance of steel pipe systems for gas
AS 1742	Manual of uniform traffic control devices
AS 2032	Code of practice for installation of UPVC pipe systems
AS 2033	Installation of polyethylene pipe systems
AS/NZS 2381	Electrical equipment for explosive gas atmospheres
AS 2430	Classification of hazardous areas
AS 2832	Cathodic protection of metals - Pipes and cables
AS 2885	Pipelines
AS 3000	Electrical installations
AS 3723	Installation and maintenance of plastics pipe systems for gas
AS/NZS 3931	Risk Analysis of Technological Systems – Application Guide
AS 4041	Pressure piping
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS/NZS 4360	Risk Management
AS 4564	Specification for general purpose natural gas
AS 4568	Preparation of a safety and operating plan for gas networks
AS 4645	Gas distribution network management
AS 4647	Domestic diaphragm gas meters
AS/NZS 4944	Gas Meters – In-service compliance testing
AS 5601	Gas installations

Gas Safety Act 1997

Gas Safety (Safety Case) Regulations 2009

Gas Safety (Gas Installation) Regulations

Gas Safety (Gas Quality) Regulations

Pipelines Act 2005

Vencorp Gas Quality Guidelines, October 2007

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SP AusNet Documents

SP AusNet Regulator Schedule

SP AusNet Environmental Management Plan

QMS 20-02 Records Management

QMS-20-04 Document and Data Control

QMS 21-01 Contractor Accreditation Guidelines

QMS 20-06 Design Management

QMS 21-11 Technical Compliance Audit Strategy

TS 0503 Gas Incident Reporting

10-1031 SP AusNet Learning, Development and Training Policy

30-1010 Gas Construction and Maintenance Competency Guidelines

AMP 30-01 5 Year Asset Management Plan

AMP 30-02 SP AusNet Gas Maintenance Plan

30-4006 SPIRACS - the Integrated Response and Contingency System

AMP 30-03 Pipeline Integrity Management Plan

33-2008 Gas - Work Permit and Notification Process

33-2005 Gas odour Monitoring

30-4006-13 Corporate Security Policy

30-2631 Safety KPI Reporting

30-4011 SP AusNet System Operations Manual

3 FACILITIES OVERVIEW & COMMON ELEMENTS

3.1 Networks general description

3.1.1 Natural gas transmission and distribution

SP AusNet delivers gas to over 551,000 customers across a geographically diverse region spanning 60,000km². It owns operates and maintains natural gas transmission pipelines (including mainline valves, associated city gates, and field regulators) and an extensive natural gas distribution network in metropolitan Melbourne and South-West and West regional Victoria.

SP AusNet services the western half of Victoria, from the Hume Highway in metropolitan Melbourne west to the South Australian border, and from just north of Bendigo and Horsham south to the coast. SP AusNet also owns an LPG vapour reticulation network at Mt Baw Baw. Figure 1 shows a map of the SP AusNet gas network.



Figure 1– Location of the SP AusNet Gas Network

Transmission pipelines are licensed under the *Pipelines Act 2005* – administered by Department of Primary Industries (DPI); the licences contain details of pipe location and route, length, size, operating pressure and material specification.

Field regulators are used to reduce pressure between transmission pipelines or to supply a distribution network. Similarly, ‘city gate’ stations enable gas supply from a transmission pipeline to the reticulation network of a city or town, as shown schematically in Figure 2.

SCADA operated from the Customer Emergency Operations Team (CEOT) is used to monitor 107 regulator units and 27 fringe units in the operation of the transmission and distribution systems. SCADA provides information, which can be used to maximise operational efficiency of the network and manage gas flows during routine and unplanned operations by controlling 39 of the 107 City Gate/field/district regulators.

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The distribution system consists of high, medium and low pressure networks of mains and services in road reserves and easements. District Regulators control the pressure of gas feeding into low pressure networks. Meter and regulator assemblies, varying from large industrial or commercial units to small domestic units, supply gas to consumers.

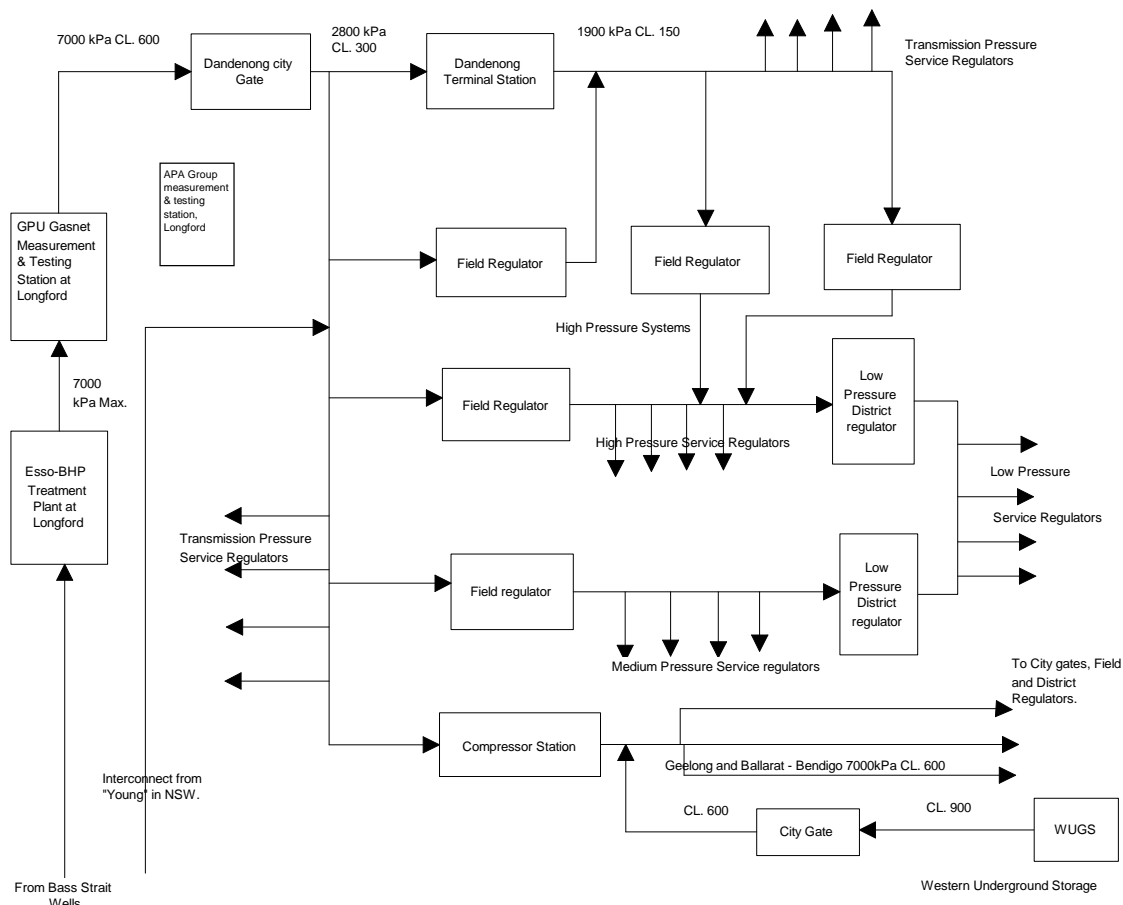


Figure 2. Schematic diagram of a typical transmission and distribution system

3.1.2 Alpine resort

SP AusNet operates a small LPG vapour network from a single source at Mt. Baw Baw village. The network supplies gas to the village commercial and club premises.

3.1.3 Reference to applicable state and federal legislation.

The applicable legislation relating to the design, construction, operation and maintenance of the distribution systems are extensive and govern such matters as storage and handling of dangerous goods, Occupational Health and Safety, Environmental Protection, Fire Protection and Safety and many other detailed and specific matters effecting the safe operation and maintenance of the distribution systems.

The primary legislation is the *Gas Safety Act 1997*.

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3.1.4 Identified risks

High-level identified risks are as follows:

Natural gas reticulation

- Gas quality & odourisation (Out of Spec. Gas)
- Pressure regulation
- Third party damage
- Valve operation
- Site access

Alpine resort

- Heavier-than-air gas (LPG)
- Emergency isolation
- Emergency response
- Environmental Conditions & Effect on Equipment

3.2 Service providers**3.2.1 Prime Service Providers (PSP)**

SP AusNet has recently entered into a contract with one of Australia's leading technology contractors, Tenix Alliance Pty Ltd; a company with over 4,000 employees throughout Australia.

The contract is to provide selected construction activities and all maintenance / operating services and includes a range of performance based measures to ensure safety, customer service levels, quality and environmental aspects are appropriately managed. The contract commenced on the 1st of April 2008 and is for a three year period with plus 1 & plus 1 options.

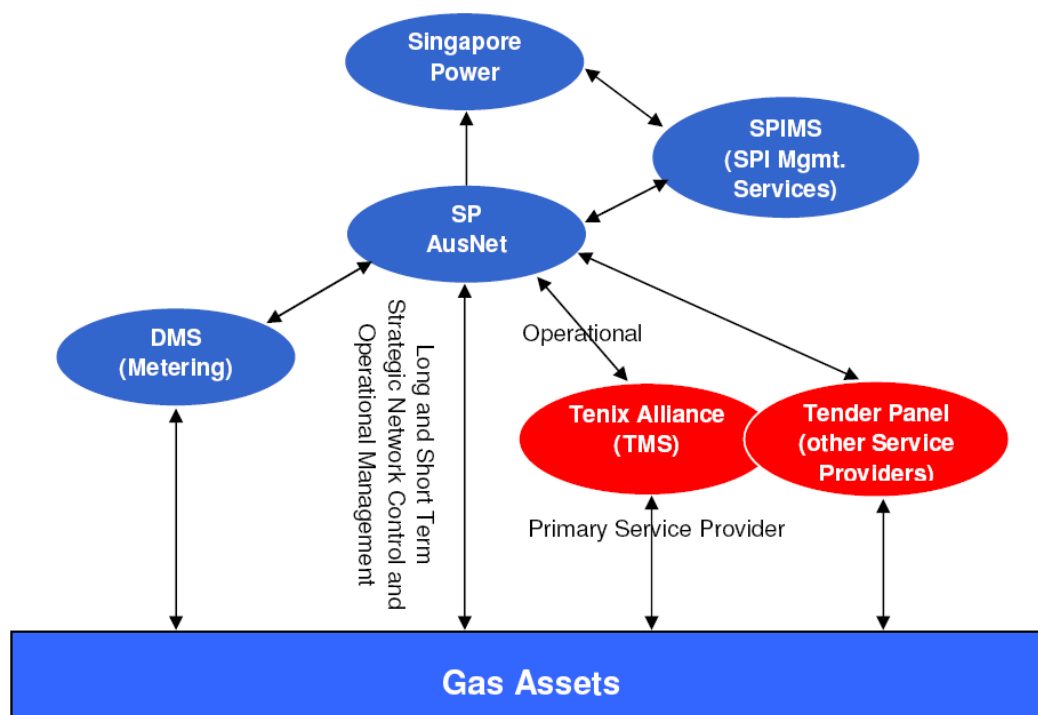
SP AusNet also conducts other major construction works through a Closed Selective Tender Panel arrangement. Stringent conditions are required to be met by contractors to be included on the panel. Work issued to service providers through the tender panel is subject to competitive bidding.

All SP AusNet contracts with all service providers stipulate that they, and including all their subcontractors must comply with all the provisions of SP AusNet's Gas Safety Case. The General Manager, Network Development Division in SP AusNet is ultimately responsible for the Gas Safety Case.

The managers of the contract Service Providers (including Data Management Services, DMS) are each responsible for ensuring compliance with all the requirements of the Gas Safety Case. All service providers have access to all the appropriate technical, engineering standards, policies and procedures.

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Figure 3: SP AusNet – Tenix – relationship organisational chart



3.2.2 Other services

The safe and efficient operation of transmission, distribution and alpine facilities relies on clear and concise communication between SP AusNet and other service providers.

Major capital works are usually undertaken on a contract basis.

3.2.3 Identified risks

High-level identified risks are as follows:

- Relationship SP AusNet - TMS
- Relationship SP AusNet – other service providers

3.3 Personnel and resources

3.3.1 Primary personnel selection and training

SP AusNet applies a rigorous recruitment process to ensure that staff competencies are well matched with resource needs. The process entails gap identification and analysis, development of position description, management sign-off for recruitment, HR recruitment process, interview process and final personnel selection.

Additionally, networks personnel are subject to regular performance review and appropriate training in accordance with 10-1031 SP AusNet Learning, Development and Training Policy, in order to maintain competencies and performance at the required levels. All permanent positions are identified in the SP AusNet and TMS organisational charts

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3.3.2 Contractor competencies

SP AusNet assessment and accreditation of service providers is conducted in accordance with QMS 21-01 Contractor Accreditation Guidelines and core competencies adopted are outlined in document 30-1010 Gas Construction and Maintenance Competency Guidelines as amended from time to time.

3.3.3 Process for monitoring personnel resources

Personnel resources for the distribution network are monitored in accordance with the SP AusNet Human Resources procedures. The monitoring of personnel resources for the distribution network is managed by the primary personnel as identified in the SP AusNet and TMS organisational charts.

3.3.4 Identified risks

High-level identified risks are as follows and assessed and captured in the Formal Safety Assessment:

- Resources and competencies - Insufficient resources or skills affecting safety of assets.

3.4 Asset Management Plan**3.4.1 Introduction and overview**

SP AusNet operate to a documented Gas Asset Management Plan AMP 30-01, for the effective short and long term management of its assets. The plan incorporates the following major elements:

Introduction – Scope and Purpose

- a) Industry Overview
- b) Business Objectives
- c) Purpose of the Plan
- d) Relationship to other management documents
- e) Structure
- f) Asset Overview
- g) Asset Data

Performance

- a) Regulated Service Standards
- b) SP AusNet targets
- c) Service Performance

Asset Management Drivers

- a) Asset Life Cycle
- b) Risk Management
- c) Health, Safety and Environmental Management
- d) Asset Protection
- e) Condition Monitoring
- f) Skills and Human Resource Management
- g) Asset Data Management
- h) Network Capex Determination

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- i) Network Operations and Maintenance Determination
- j) Other Asset Management IT Capex

Process, System and Plant Strategy

- a) Capex Plan
- b) Opex Plan

Financial Summary

- a) Network Capex 2008-2012
- b) Network Maintenance Expenditure 2008-2012

3.4.2 Expenditure Summary Implementation

Within the context of the SP AusNet Business Plan, the Asset Management Plan (AMP) sets out the business strategy for management of the gas networks. The AMP integrates the above requirements to form a consolidated plan which underpins the Safety Case. Its implementation is undertaken through, and relies on, the application of the respective SP AusNet internal policies, standards and procedures identified in this safety case.

The AMP is utilised as a directory that links the various SP AusNet reference manuals, policies, standards, procedures and investment strategies to particular issues and investment decisions.

Asset maintenance strategy is subordinate to and directed by the AMP. It is set out in the Asset Maintenance Plan (refer 4.8.3). The relationships between key external 'drivers' (e.g. legislation) and internal processes are outlined in Figure 4 below.

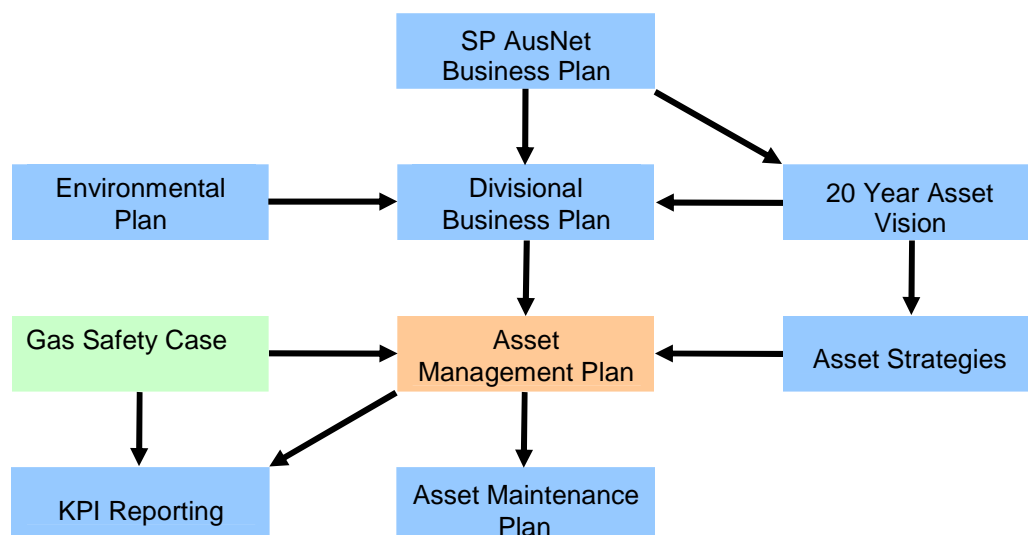


Figure 4 - SP AusNet Key Document Map

3.4.3 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Asset management planning
- Performance monitoring
- Third party damage

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3.5 Network operating parameters

3.5.1 General description of network operating parameters

Maximum Allowable Operating Pressures (MAOP) are based on sound engineering design and construction to ensure safety. Accordingly, the transmission and distribution networks are operated at the following pressures:

- Transmission pressure (TP) system is operated at a minimum of 1050 kPa to a MAOP of 2,800 kPa.
- The High Pressure 2 (HP2) systems are operated from pressures between 515 kPa and 1050 kPa.
- The majority of high pressure (HP1) distribution systems are operated from 515 kPa to a minimum allowable pressure of 140 kPa. The minimum is based on the minimum operating pressure required to maintain a secure supply for the system's industrial consumers.
- The medium pressure (MP) distribution system pressure range of 7 to 140 kPa is subdivided into 3 smaller pressure ranges (refer 6. Distribution Network).
- Low pressure (LP) systems operate up to 7 kPa but generally in the range of 3.2 and 1.5 kPa - between 3.2 kPa and 2.5 kPa at peak times and between 2.1 and 1.8 kPa at non-peak times.

The networks systems are designed to provide capacity for existing loads and for known future load increase. Systems can be augmented to provide additional capacity when new loads are connected.

There are currently 90 'separate' networks operated by SP AusNet. They comprise 4 TP, 58 HP, 4 MP and 24 LP networks.

The gas loads for the various distribution networks and current operating capacities can be summarised as follows: -

LOCATION	FLOWS (m ³ /hr)	SYSTEM CAPACITY (m ³ /hr)	CURRENT LOAD	COMMENTS
Mt Baw Baw	375	750	50%	Small commercial LPG network.
Country areas (consisting of 28 networks)	115 to 28,100	1,082 to 36,272	8% to 100%	A diverse range of gas flows, loads and capacities.
Metropolitan areas (consisting of 23 networks)	102 to 52,400	420 to 55,000	30% to 100%	A diverse range of gas flows, loads and capacities.

Approximately 10 of SP AusNet's high pressure systems are SCADA controlled for remote operation of regulators. As such, the operating pressure of the system is able to be kept at the minimum required to operate these systems. The pressure required to maintain supply rises and falls with demand but these systems are operated at minimum pressures to keep unaccounted-for gas losses and leakage rates as low as practical .

SCADA controlled HP systems are able to be operated between 140 and 515 kPa to ensure adequate gas supply and prevent uncontrolled outages.

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3.5.2 Transmission pressure pipeline operating parameters

The operating parameters of a TP pipeline are determined on the basis of–

- **risk assessment**

SP AusNet has a company wide Risk management Framework, which enables Preliminary Risk Assessments (PRA) to be conducted. A PRA identifies the risk event and takes into consideration *preconditions*, *mechanisms*. Adverse consequences are evaluated in terms of scores for *severity*, *frequency*, and *control effectiveness*. A simple algorithm then combines the individual scores to derive a single risk score.

- **materials and components**

Characteristics of steel materials and components using –

- ♦ standards of materials and components as listed in AS 2885.1.
- ♦ yield stress and carbon equivalent
- ♦ fracture toughness

- **pipeline design**

Design considerations include–

- ♦ design life, design capacity, design pressure and flow rate, design temperature, wall thickness, jointing
- ♦ maximum allowable operating pressure (MAOP)
- ♦ pipeline routing and locations of mainline valve
- ♦ pipeline classification of locations
- ♦ external interference protection
- ♦ pipeline marking
- ♦ pressure control system
- ♦ gas quality as detailed in Section 3.7.3

- **mitigation of corrosion**

Corrosion controls including–

- ♦ internal corrosion mitigation methods, including internal lining
- ♦ external corrosion mitigation methods, including external anti-corrosion coating, corrosion allowance and cathodic protection and measurement.

- **external factors**

External influences and constraints such as the load distribution between TP and HP systems.

3.5.3 City Gates and field regulators operating parameters

In addition to the nominated pipeline operating parameters, the following are specific details applicable to the city gate and field regulator facilities:

- (a) Regulator unit control system to automatically control the gas delivery pressure into the distribution network and maintain pressure within the design pressure limits and set points of the distribution system.
- (b) City Gates are either a TP/TP or TP/HP type pressure reduction stations; i.e. reducing pressure from the typical 7000 kPa operating pressure in the external transmission assets to typically 2800 or 450 kPa operating pressure in the SP AusNet transmission pipeline assets.
- (c) Field regulators are TP/HP and HP/MP pressure reduction stations and the operating pressure reduction through field regulators is typically 2800 to 450 kPa.

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3.5.4 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Pressure regulation
- Gas Leakage
- Design and review
- Construction, installation, commissioning and operation
- Contaminated gas
- Third-party damage
- Corrosion mitigation
- Squash off
- Use of Higher Operating Pressures (HP2)

3.6 Network operating capability and security of supply

The approved supply security policy is common throughout the Victorian natural gas transmission and distribution systems; i.e. capacity to supply a 1 in 2 year peak winter load. It forms the basis for recommending and undertaking works to renew, extend or reinforce mains as demand for supply grows. 'Security of Supply' criteria applicable to the network are based on detailed studies involving engineering, statistical (including equipment reliability) and economic considerations outlined in the AMP.

To meet the criteria, the network has been designed with sufficient capability in terms of–

- (a) ability of each supply and reticulation network to meet the above conditions of supplying a 1 in 2 year peak winter load. Where it is economically feasible, the networks are built with the capability of adjusting supply conditions during periods of planned and unplanned maintenance; and
- (b) capacity to increase gas supply on peak days. The SCADA-controlled systems can be operated at an increased supply pressure of approximately 10% (which is still within the safe working pressure of 515 kPa) for a very short period.

Gas load forecasts are prepared (via computer network modelling and analysis using the Stoner's Network Modelling Program) utilising historical load and weather information together with published population growth statistics and gas consumer information.

3.6.1 Transmission pressure pipeline

The transmission pipeline system operating capability depends on the pipeline flow capacity and licensed MAOP. Those parameters and the source of supply are addressed in Appendix A1 for all SP AusNet licensed pipeline assets.

Security of supply criteria applicable to the TP pipeline are to ensure delivery of gas to customers without interruption of supply of gas via city gates or field regulators into the distribution system. The security of supply into SP AusNet TP pipelines system is governed by APA Group – SP AusNet connection Agreement that stipulates maximum flow condition and minimum delivery pressures.

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3.6.2 City Gates and field regulators

In addition to the nominated pipeline capability and security of supply issues, the following are specific details applicable to the city gate and field regulator facilities.

The security of supply criteria for city gate and field regulator installations is to deliver gas into the distribution system without interruption of supply to consumers. Regulator assemblies are designed and constructed with four levels of regulator equipment redundancy. This achieves the security of supply level to consumers with the addition of remote monitoring by telemetry of outlet pressure to alert the Customer Emergency Operations Team to abnormal conditions when they occur.

The security of supply into these facilities is governed by the transmission system capability to flow the capacity of gas required for peak winter loads, and take account of growth in the transmission system carrying capacity for the long term.

3.6.3 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Gas load forecasting
- SCADA control
- Relationship with APA Group (for security of supply, data and volume/pressure control issues)
- Contaminated gas

3.7 Network operating constraints

SP AusNet with its current gas load has no major and clearly identifiable gas constraints at this time.

Key performance indicators are maintained, indicating available and surplus network capacity as gas loading changes on the network.

Annually, VENCORP and SP AusNet undertake a review of the minimum pressure delivery obligations under the VENCORP-SP AusNet Systems Connection Deed. The review is to ensure that the maximum hourly flow at each connection point is available to meet a 1-in-20 winter peak day.

3.7.1 Transmission pipeline

The primary operating constraints of the TP Pipeline are imposed by the *Pipelines Act 2005*. The Act requires that a Pipeline Permit, Licence and written consent of the Minister of DPI must be obtained prior to operation of a TP pipeline.

The pipelines operating constraints on the technical and safety aspects impact the operating parameters referred to in Section 3.5.1. AS 2885 and the pipeline licence conditions set out general guidelines and requirements on the operating parameters as referred to in Section 3.5.1, while the licence conditions list the specific requirements including the pipeline specifications, pipeline safety and environmental management.

3.7.2 City Gates and Field Regulators

In addition to the nominated pipeline operating constraints, the following are specific constraints applicable to the city gate and field regulator facilities. Based on the facilities being fully

Facilities Description & Safety Management System Overview

automated for unattended operation, the other significant constraints that impact on operation of these facilities are listed as follows:

- (a) The facilities are classified as hazardous locations in accordance with AS 2430.
- (b) In most cases, field regulators are in-ground pit installations and are therefore confined spaces to which specific Occupational Health and Safety rules apply.
- (c) City Gate sites being shared with APA Group are jointly accessed and are therefore subject to both parties' security and operational requirements.

3.7.3 Gas heating value and quality control

The gas quality characteristics conform with the requirements of the *Gas Safety (Gas Quality) Regulations, 2007* and the *Vencorp Gas Quality Guidelines, October 2007*.

Samples of natural gas are regularly taken from SP AusNet mains or at specified sample points in accordance with specified procedures. Samples are tested by a NATA-accredited laboratory for composition, heating value, Wobbe Index and odour levels.

Records are maintained and analysed as appropriate by SP AusNet Network Operations Centre.

On behalf of the Victorian gas industry VenCorp monitors the gas quality entering the principle transmission system and has notification protocols in place to advise industry participants, including SP Ausnet of any excursions from the gas quality specifications.

3.7.4 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Out of specification gas (Natural gas and LPG)
- Contaminated gas
- KPI reporting and analysis
- Relationship with VenCorp, APA Group, Gas Pipelines Victoria
- Relationship with NATA accredited gas quality contractor

3.8 Design, construction, installation, commissioning, maintenance, modification and decommissioning

3.8.1 Network Design

Network design is performed in accordance with identified design standards - both industry and SP AusNet. SP AusNet engage the services of the PSP as the prime design services provider. External service providers are also engaged on a case-by-case basis.

3.8.1.1 Design function

The network design function is divided into three major categories as follows:

- Network overall/system design

This incorporates the high level, strategic design of the network in its entirety and takes due consideration of elements such as future load growth, interconnection asset capacity, major customer developments and overall network performance issues; e.g. reliability and

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security. It typically focuses on the entire network or sections of it. This design activity is undertaken and managed by SP AusNet.

- Unique/complex designs

This incorporates the design of complex facilities such as field regulator stations or City Gates. It typically involves site-specific designs and focuses on the design considerations and risk assessments associated with the asset concerned. Project activity is scoped and managed by personnel within SP AusNet and external service providers. Design is undertaken by contracted, specialist service providers under the terms of either specific individual contracts, turn-key type contracts for an entire facility, or a combination of both.

The contractor will customarily be required to undertake a preliminary design for SP AusNet approval prior to finalising design. Drawings of the 'as-built' design (including site-specific detail of the installation) are then captured as SP AusNet drawings.

- Generic/standard designs

This involves the application of standard network designs, documented design standards, procedures and principles to a range of less complex assets. Such design works typically incorporate mains replacement and reticulation extensions work and are undertaken on an as-needs basis (ie. for specific projects). The project design activity is performed principally by the PSP. The designs are carried out in accordance with design standards, procedures and principles developed and specified by SP AusNet.

All designs, whether performed by the PSP, external service provider or internal SP AusNet resources are risk-assessed, reviewed, verified and accepted in accordance with procedure QMS 20-06 Design Management and SP AusNet Technical Standards. Verification of design may include preliminary testing (e.g. 'shop testing').

3.8.1.2 Network construction and installation

Network construction and installation activities are undertaken in accordance with specified standards (both industry and SP AusNet). These activities can be divided into two major categories as detailed below according to the nature and complexity of the work to be undertaken. Resourcing and responsibilities vary according to the category of works being undertaken but all work is risk-assessed.

3.8.1.3 Generic constructions

Generic construction activities typically involve the application of SP AusNet standards, documented procedures, SP AusNet or industry accepted equipment and materials for the construction of an asset to a standard design. Such works would typically include mains and services reticulation work and are generally undertaken by the PSP on behalf of SP AusNet. It may be undertaken through the direct utilisation of PSP resources or through accredited contractors engaged and managed by the PSP or SP AusNet respectively. This is particularly the case for contestable consumer-funded works. For such instances customers are invited to nominate, from a listing of accredited contractors, the construction contractor they wish to perform the works.

In all cases, however, the accredited contractor retains the responsibility for the quality of the construction works undertaken and accordingly is responsible for the performance of regular audits.

The accredited contractor is responsible to SP AusNet for all aspects of the construction activity including—

- safety of personnel and the public during construction activities;

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- standard of workmanship;
- allocation of appropriate resources to the designated activities;
- planning and programming of construction activities to ensure targets, as agreed with SP AusNet, are achieved;
- appropriate training, accreditation, authorisation of personnel associated construction activities;
- maintenance of skill levels, authorisations and accreditations of personnel associated with construction activities.
- 'as-built' drawings in accordance with SP AusNet standards
- selection, management and auditing of sub-contractors associated with the construction activities;
- selection and application of materials in accordance with established and documented SP AusNet standards; and
- verification of conformance to design (including audits; refer Clause 3.11)

The PSP and SP AusNet are responsible for management of the network "as-built" records.

3.8.1.4 Complex construction

Complex construction encompasses installations which, although they comply to documented industry and SP AusNet standards, are of an essentially unique nature and incorporate non-standard items of plant and/or equipment. Such installations typically include city gates, field regulators and transmission pipelines.

Construction of such installations typically incorporates a range of different activities such as civil works, structural works, construction and commissioning etc. These may take place through the direct utilisation of PSP resources or through accredited contractors engaged and managed by the PSP or SP AusNet respectively. Construction responsibilities are as outlined in 3.8.1.3 and shared by PSP and SP AusNet in accordance with assignment of project responsibility.

3.8.2 Network maintenance

Maintenance is the regular day-to-day work that is necessary to keep the network assets operating correctly. It includes unplanned repair work for the safe restoration of supply after asset failure or damage.

Strategic asset maintenance is subordinate to and supports the Asset Management Plan. It is set out in the Asset Maintenance Plan.

SP AusNet categorises its maintenance into–

- Unplanned maintenance (breakdown): The aim of this procedure is to provide speedy, appropriate and effective response to unforeseen equipment or system breakdown, and minimise interruption and / or inconvenience to the customer. (eg. pipe failure causing leakage, mechanical failure);
- Condition monitoring maintenance (scheduled inspection/operation check): The aim of this procedure is to ensure that the plant and equipment operate reliably and economically, and to perform a series of operating inspections and checks at regular prescribed intervals, as the first part of a preventive maintenance program.
- Scheduled maintenance: The aim of this procedure is to perform routine major maintenance procedures at preselected intervals to maximise equipment life and minimise the possibility of interruption of supply to the customer, whilst at the same time maintaining

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costs at an optimum level in accordance with best practice (eg. regulator overhaul for City Gates, field and district regulators, lubrication of valves)

- Site management: The aim of this procedure is to maintain the site in a clean, functional, safe and visually acceptable condition. This includes activities such as repair of site fences, painting of buildings and associated, painting of pipework and equipment, cutting of grass to minimise fire hazards, pruning of trees, cleaning and housekeeping, and any other functions which impact on the physical and visual environment.

Maintenance and inspection activities can be broadly divided into—

- Metering,
- Regulator stations,
- Pipes (TP and distribution), and
- Gas-specific equipment

All network maintenance activities are undertaken in accordance with AMP 30-02 SP AusNet Gas Maintenance Plan and standards.

a) Meter Maintenance

Domestic meters are part of a change-over program currently replacing 'time expired' meters at 15-year intervals. A field life extension program is in place where a percentage of meters from a meter type are tested each year. Where tested meters are found to be operating within specification, a risk assessment is made to determine whether the remainder of that meter type may be left in the field for a further 12 months. Industrial/Commercial type meters are changed every 10-years. Due to recent amendments to AS 4944, new domestic meters have the ability dependent on accuracy to achieve an in field compliance period of 18 years, whilst existing meters have the ability to achieve field life extension of an additional 5 years rather than the previous 1 year extension.

On report of a meter fault, a PSP fitter is despatched to assess the meter problem and, if necessary, replace the meter.

b) Regulator Maintenance

SP AusNet has a range of pressure regulating stations. It includes City Gates, field regulators, district regulators, industrial / commercial units and domestic regulators. The larger regulator types are subject to preventative maintenance and are inspected on industry accepted maintenance periods. On report of a regulator fault, a PSP fitter is despatched to repair or replace the regulator.

c) Pipes (TP and distribution)

i) Corrosion mitigation (cathodic protection of assets)

To ensure the soundness of the network's steel pipelines, SP AusNet engages the PSP to monitor the network by a comprehensive corrosion mitigation system.

The corrosion mitigation system comprises the following elements—

- CPU and power costs
- Potential survey
- Electrolysis testing
- Coating defect survey
- Coating inspection and repair
- Monitoring

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The Victorian Electrolysis Committee (VEC) conducts routine electrolysis surveys, predominantly in the Melbourne suburban area consistent with the boundaries of the DC traction system. Constituted under the Electricity Safety Act and reporting to Energy Safe Victoria (ESV), the mandate of the VEC is, in part to—

“establish and maintain standards for systems for cathodic protection and for the mitigation of stray current corrosion;..”

It conducts a co-ordinated area testing and adjustment program for water, gas and other utilities whose assets are susceptible to corrosion or interference from underground stray currents. The area testing is scheduled on a routine basis which under normal circumstances covers the complete metropolitan area in 5 to 6 years. To mitigate these adverse effects the stray current is routed back to the traction system through more than 1000 drainage bonds that are located around the Melbourne metropolitan area. As well as conducting area testing, the VEC monitors the drainage bonds on a monthly basis.

The VEC also oversees the operation of cathodic protection systems and issues permits to install and operate these systems.

For transmission pipelines, SP AusNet engages the PSP to conduct one full and one intermediate potential survey per year. During these surveys, the effect of stray current is monitored. Survey outcomes are reported to DPI and ESV.

For the steel distribution network (high and medium pressure) PSP testing frequencies vary between one and two surveys per year and are reported to SP AusNet.

ii) Pipeline surveys

Pipeline surveys are carried out within five years of the licence renewal date and at subsequent intervals approved by DPI. A survey is carried out to demonstrate to the satisfaction of DPI, that the integrity of the pipe satisfies the requirements of the AS 2885.

iii) Leakage survey

SP AusNet takes a pro-active approach to the management of gas escapes and arranges for risk-based surveys to be undertaken by the PSP.

Conduct of the leakage survey is in accordance with both SP AusNet (TS-5201 Leakage Management) and industry standards (AS4645 Gas Distribution Network Management).

Remedial work is identified and managed using the Q4 asset maintenance database.

iv) Pipeline patrol & Inspection

The PSP provides pipeline asset patrols. The pipelines are patrolled and inspected on a regular basis in accordance with 30-2507 Gas Maintenance Plan.

Periodic patrols of Transmission Pipelines are undertaken by suitable trained and experienced patrol officers in accordance with the requirements of the. These patrols report on surface conditions on and adjacent to the pipeline right-of-way, indication of leaks, unauthorised construction activity and any other factors affecting the safety and operation of the pipeline. Any actual, potential or suspected third party damage is also recorded and reported. Reports are reviewed by SP AusNet and action plans are developed as necessary.

Distribution mains installed in locations or on structures where environmental exposure, abnormal physical movement or abnormal external loading could cause leakage, eg. bridge crossings, are periodically inspected and reported on.

In general patrolling includes—

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- pipeline inspection
- pipeline easement and marker maintenance
- referral to and from other authorities
- 'Dial Before You Dig' system
- property owner visits
- hot spot risk identification

v) Transmission pipeline licence

Transmission pipelines are licensed in accordance with the requirements of the Gas Pipelines Act 2005. Amendments made to the act in 2005 no longer require license renewal and now allow all licensed pipelines managed and owned by SP AusNet to have licenses remain in force indefinitely, until the license is surrendered or cancelled.

d) Gas-specific equipment

Specialist equipment for working on gas assets is held and owned by SP AusNet's Preferred Service Provider. The equipment includes–

- butt fusion kits
- electrofusion control units
- gas detectors of various types
- large diameter butt - fusion kit
- gas stop-off (Wask bag tube and 312, Williamson equipment)

Regular maintenance on this equipment is carried out by the PSP.

3.8.2.1 Programming, scheduling and reporting

SP AusNet uses Q4 for the programming, scheduling and reporting of all gas network maintenance activities.

Maintenance programs for all network plant and equipment within the Q4 program form the basis for the scheduling of maintenance and inspection activities. The results of the maintenance and inspection activities are recorded in Q4 and are held as part of the asset-specific historical data.

The work history data is available for analysis through the reporting feature within Q4.

Q4 also references generic and type-specific maintenance instructions for network plant and equipment.

3.8.2.2 Maintenance resources

All maintenance activities are managed and performed through the PSP using primarily permanent personnel and subcontractors as required.

3.8.2.3 Failures and defects

Failures and defects are determined as follows:

- Loss of supply to customers
- Supply quality complaints from customers
- SCADA system alarms
- Loss of control or monitoring facility
- Inspection and testing

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- Planned maintenance activity
- 3rd Party notification
- Leakage survey
- Corrosion protection monitoring

SP AusNet is responsible for the allocation and despatching of resources as necessary to effect timely and safe restoration of supply. SP AusNet manages response to significant incidents in accordance with 30-4006. SP AusNet and PSP are responsible for the updating of all relevant information systems at the conclusion of restoration works.

Defects recorded through inspection and planned maintenance activities are entered into Q4 and provided directly to work planners for assessment and the programming of remedial works.

3.8.3 Commissioning

Commissioning is undertaken in accordance with SP AusNet Customer Emergency Operations Team procedures.

3.8.4 Modification

Modification of an existing design is undertaken as a process in accordance with QMS 20-06 Design Management and in the same manner as a design function.

3.8.5 Decommissioning

Decommissioning of network plant and equipment is undertaken in accordance with SP AusNet Customer Emergency Operations Team procedures.

Where a buried pipeline is to be abandoned,–

- it will be physically separated from all sources of gas supply,
- it will be purged,
- all ends effectively sealed or the pipe will be filled with a suitable material; and
- warning markers applying to the abandoned pipe will be removed.

If an abandoned pipe is of such size in any location where collapse of the pipe could result in unacceptable subsidence, the pipe will either be filled with suitable material or the pipeline will be effectively protected from corrosion.

Records of licensed assets are modified to reflect abandonment and changes to a licence condition or delicensing of an asset are determined in conjunction with DPI.

Records of abandoned mains and general assets are maintained by SP AusNet and the PSP (refer 3.8.1.3).

3.8.6 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Design and review process
- Resources and competencies
- Control room malfunction
- Emergency response
- Weather conditions
- Construction, installation, commissioning, operation
- Connection to an unsafe installation
- Contractor availability (Emergencies)
- Data integrity, data capture and information accuracy
- Decommissioning

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- Relationship with PSP / contractor
- Trips, falls, manual handling, traffic control & confined spaces
- Hot tapping
- Plant & Equipment
- Dangerous goods

3.9 Operation and system monitoring

Operation and monitoring of the network involves pipeline systems monitoring and management, testing of materials, investigation of gas supply failures and faults, easement management, pipeline integrity management and maintenance of gas-critical machinery and equipment.

3.9.1 Pipeline systems monitoring and management

Network system monitoring is provided by the Customer Emergency Operations Team by means of the SCADA system and includes the following activities:

- Identifying and reporting threats to gas supply.
- Optimising gas distribution network operations.
- Provision of business data and management information.
- Responding to gas supply-related emergencies
- Managing the Work Permit System.

3.9.2 Alarm systems

Four levels of gas pressure alarm are utilised in the network covering the 134 SCADA-monitored sites. These are; *low*, *low-low*, *high* and *high-high*. At sites of significant pressure reduction (and therefore temperature drop), gas may require preheating and temperature is monitored for the extent to which it may affect the operation of downstream equipment; e.g. regulators. Status alarms are also monitored (e.g. valve position) at City Gates and some field regulator installations.

3.9.3 Testing of materials

SP AusNet engages agencies with appropriate NATA accreditation to provide materials testing services. The services include, but are not restricted to materials identification, strength testing, determination of fitness for purpose, material compatibility and material composition.

3.9.4 Investigation of gas supply failures and faults

SP AusNet and the PSP investigate all supply failures and faults as incidents and may engage an appropriately NATA accredited laboratory to carry out or assist with investigations.

The investigations may be carried out for any of the following:

- Pipe or component failures;
- Fires or explosions;
- Injuries and property damage; and
- Potential and actual litigation.

Investigation outcomes may be remedial or preventative measures or to repair.

Serious incidents are reported, investigated and tracked utilising an internal Incident Reporting database called IMS.

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3.9.5 Easement management

SP AusNet assets, whether situated on private or public land are protected by either easement or licence agreement or memorandum of agreement. Easement acquisition is the responsibility of both SP AusNet and PSP.

Easement records are held and managed by SP AusNet.

The PSP is responsible for easement patrol and management conducted in accordance with SP AusNet policy and standards (refer also to 3.8.2 (c) (iv)). This ensures compliance with legislated requirements.

3.9.6 Dial Before You Dig

Documented information is provided to contractors and excavators on the location of SP AusNet buried assets through Dial Before You Dig (DBYD). On-site locations are also provided on request. SP AusNet actively support public awareness campaigns such as the '**Dial before you dig**' communication program.

3.9.7 Pipeline Integrity Management

In accordance with the requirements of AS2885, SP AusNet conducts Safety Management Studies individually on each licensed transmission pipeline on a 5 yearly basis. Outcomes of the Safety Management Studies enable effective development of risk mitigation activities and action plans relating to pipeline integrity management. These activities could include:

- Pipeline Pigging
- Pipeline Integrity Digs
- Hazop Studies
- Cathodic Protection Studies
- Leakage Survey Activities
- Additional Protection Measures
- Other capital activities

Details of SP AusNet's Pipeline Integrity Management framework can be referenced in document 30-2507-1 Pipeline Integrity Management Plan.

3.9.8 Land Development Proposals and Other Authorities Works

Proposed sub-divisions and infrastructure works submitted by Councils, developers and other authorities are reviewed by SP AusNet / PSP for the affect on SP AusNet buried assets. These parties are formally advised of the requirements for works, clearances, easements and access rights.

3.9.9 Machinery and equipment

To ensure the operational accuracy of the PSP gas measurement and detection devices, a calibration program is in place for the following equipment groups:

- Gas flow measuring equipment;
- Pressure measuring equipment;
- Gas density and relative density measuring equipment;
- Temperature, electrical and humidity measuring equipment; and
- Gas detection equipment (fixed and portable).

Maintenance and repair of gas-specific tooling and equipment (including emergency-related equipment) is undertaken by the PSP in accordance with "Gas Specific Maintenance Schedule".

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Completed work is inspected by and records maintained by the PSP. SP AusNet monitors the maintenance and repair process.

As gas-specific equipment is generally expensive to purchase and maintain, SP AusNet contractors outside the PSP will, under normal circumstances, make arrangements with the PSP to use equipment or second the PSP where equipment-specific skill are required.

3.9.10 Permit to work

Safe access to a site and equipment is controlled by the Permit to Work process in accordance with SP AusNet procedure 33-2008. Competencies for Permit Issuing Officer, Recipient and field staff are managed by the SP AusNet Customer Emergency Operations Team and PSP.

3.9.11 Fault call despatching

SP AusNet controls emergency response fault calls, managing the process from call receipt to despatch.

Public fault calls are received and electronically entered into a call management system, PowerOn, by the SP AusNet Faults call centre located within the CEOT. Priority 'A' and 'B' calls are monitored and assessed by the Network Operations Centre for immediate action through the PSP. Dependant on associated risks, some calls may be escalated for emergency response in accordance with the Emergency Management Plan (refer 3.10).

Fault call management constitutes a significant change from previous practice which involved an external despatching agency, National Response Centre. The connection point management capability, supported by the PowerOn system, improves continuity of call receipt services through the provision of a '24/7' gas fault call centre and removes the need for calls to be transferred to an after hours service provider.

The National Response Centre remains an additional source of public fault calls to SP AusNet and supports call referral to the 24 hour gas fault call centre.

The key outcome of this process is an improved emergency response capability generated through three key areas—

- decreased process time;
- improved data capture; and
- improved process design.

3.9.12 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Loss of SCADA/Control room
- Poor charting
- Control room malfunction
- Easement management
- Availability of serviced and calibrated equipment
- Plant & Equipment, Tools of Trade
- Fault call despatching
- Data integrity

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3.10 Emergency Management Plan

SP AusNet SPIRACS - the Integrated Response and Contingency System (30-4006) ensures effective and timely response to emergencies which may affect the operation of the network, the health and safety of personnel or the public.

The SPIRACS system contains policies, frameworks, standards and procedures that create a single point of reference within SP AusNet for the management of those risks involving the disciplines of business continuity, crisis, emergencies or security.

The purpose of this system is to:

- Ensure the outcomes of the emergency are managed and planned;
- Control events which may interrupt a safe supply;
- Prepare for those events which are not preventable;
- Respond to those events which impact the business; and
- Recover from events.

Documents within the SPIRACS manual define emergency roles and responsibilities across SP AusNet and PSP organisations and the communication interface arrangements within its facilities and with outside organisations such as–

- Emergency Services (Police, Fire Authorities etc.);
- gas companies (other distribution or retail businesses);
- government;
- media; and
- community groups and the general public.

It incorporates an emergency organisational structure and operating protocols to be adopted by SP AusNet for the formal declaration of an emergency and emergency management including–

- immediate response;
- emergency site management and declared Emergency Operations Centre;
- ongoing management of the emergency;
- personnel resourcing and management; and
- recovery and reinstatement of processes.

Documents within the SP AusNet SPIRACS manual align with those of the other gas industry participants to ensure an effective industry response to emergencies.

3.10.1 Call-out roster system for facilities

In addition to the SPIRACS Manual, SP AusNet and the PSP maintain a 'call out' roster system for the Networks and PSP Duty Managers, in accordance with SPIRACS. The roster is prepared and issued on a quarterly basis and distributed to rostered personnel.

3.10.2 Emergency response support services

To assist with an emergency involving the SP AusNet systems, the PSP manages–

- emergency welder qualification to AS 2885 Part 2, Category 1;
- retention of welder qualification records;

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- emergency pipeline damage assessment and repair;
- provision of emergency stocks of pipe and fittings from the emergency store;
- emergency store maintenance;
- emergency welder after-hours contact details; and
- damage assessment and repair procedures for transmission pipelines using American Gas Association Pipeline Research Committee reports and other documents.
- APA Group for specialist TP fitting and technical assistance.

3.10.3 Security of facilities

All SP AusNet facilities are secured to prevent unauthorised access and to ensure public safety.

City Gates and above-ground regulating stations are securely fenced in accordance with documented SP AusNet standards. Entrances are padlocked and warning signage attached to boundary fences.

Similarly other facilities such as indoor meter rooms, industrial/commercial meter regulating units and district regulator kiosks are also locked and posted with warning signage.

SP AusNet utilise a “security keying” system with all keys registered and issued only to appropriately trained and authorised personnel.

All SP AusNet facilities are subject to regular inspections to ensure the integrity of the security systems.

In addition, all station valves installed within regulating station compounds are secured by padlocking to ensure their operation only by appropriately authorised personnel.

Reference can be made to SP AusNet’s high level Corporate Security Policy (30-4006-13), which further highlights SP AusNet’s requirements for an effective security management capability.

3.10.4 Isolation in an emergency

At design stage, the method of emergency isolation of a facility and placement of key isolating (‘gas-critical’) valves is determined from HAZOP risk assessments which are undertaken to ensure public safety.

All assets for which a maintenance regime is required are identified in the asset maintenance database Q4. Prescribed maintenance regimes for gas-critical valves and equipment ensure that such valves and equipment are operable at all times. The location of valves - also registered in Q4 – is accessed and available by means of the AM/FM GIS.

District Plans, derived from AM/FM, provide the necessary key data for isolation. The manner in which isolation is carried out, however, is dependent on the severity of an emergency, urgency of response needed, availability of any specialised equipment and the effect of isolation on consumers. In practice, activation of isolating valve(s) in the vicinity of the emergency (first option), squash-off or stoppling are option employed.

3.10.5 Gas-critical equipment

All equipment essential for emergency response (‘gas-critical’ equipment) is subject to scheduled maintenance. Equipment calibration (as relevant), servicing and testing and availability status for each piece of equipment is kept up to date by means of a dedicated maintenance database.

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Gas-critical equipment includes gas detectors, 'squash-off' gear, Williamson gear, Stopping equipment, valve operating handles and repair bands.

3.10.6 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Emergency response and management
- Emergency response support services availability
- Emergency isolation (valves and equipment)
- Data integrity of AM/FM (accuracy of District Plans)

3.11 Audits

SP AusNet facilities are subject to regular audits to verify compliance with specified technical, operational and safety standards and legislative requirements. Audits are undertaken in accordance with QMS 21-11 Technical Compliance Audit Strategy to ensure the requisite compliance is achieved in all aspects of the design, construction, installation, operation and maintenance of the SP AusNet network.

Audit teams, whether sourced from external consulting firms or internal staff, are trained to ensure a competent and consistent approach, suitability and effectiveness of auditing.

3.11.1 Design audits

Design audits are undertaken in the form of "Design Review" in accordance with QMS 21-11 Technical Compliance Audit Strategy for all network generic and complex designs. The PSP undertakes day-to-day design reviews for generic design in accordance with SP AusNet technical standards. SP AusNet conducts audits of the PSP in accordance with QMS 21-11 Technical Compliance Audit Strategy to ensure compliance.

3.11.2 Materials procurement

SP AusNet and the PSP, through established and documented procedures, conduct regular audits to ensure the appropriate quality and functionality of materials to be utilised within the network.

3.11.3 Health and safety

Occupational health and safety audits are undertaken on a regular basis in accordance with QMS 21-11 Technical Compliance Audit Strategy for all worksites, plant and equipment.

3.11.4 Contractor performance

SP AusNet conduct regular reviews and audits of contractor and service provider performance in accordance with QMS 21-11 Technical Compliance Audit Strategy.

3.11.5 Quality Management System

SP AusNet design, construction and operations activities are managed in accordance with the accredited ISO AS/NZS 9001 management system. The certification authority for maintenance of this accreditation undertakes external bi-annual audits of the Management Systems. Additionally, scheduled internal audits are conducted on all facets of the certification and compliance requirements in accordance with QMS 21-11 Technical Compliance Audit Strategy.

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3.11.6 Odourant levels

SP AusNet monitors and reviews gas quality and fringe point gas odourant levels on a monthly basis in accordance with 30-2627 Monitoring Gas Odour and Quality. Fringe point odourant level reports are summarised quarterly in ESV KPI reports to ESV in accordance with 30-2631.

3.11.7 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Performance monitoring
- relationship with PSP
- Contractor management

3.12 Network performance

Processes are established to ensure that the distribution network performance objectives, hazard indicators and critical process control elements are monitored and assessed in accordance with 30-2631.

SP AusNet monitors the performance of its network by initiating information gathering by means of –

- SCADA;
- pressure recording charts;
- data loggers; and
- winter testing programs.

3.12.1 Key performance indicators

Safety performance of the gas networks is monitored by means of a number of key performance indicators (KPIs). KPI data is reviewed and analysed both monthly and quarterly to assess the adequacy of controls in the gas network and to ensure compliance with regulatory requirements. Selected KPIs are summarised and reported to ESV quarterly in accordance with procedure 30-2631. These include–

- gas leaks;
- gas quality;
- emergency response;
- security of supply; and
- asset integrity.

3.12.2 Incident reporting

SP AusNet has in place an Issue Management System (IMS) which is utilised for the management of gas incidents. IMS is an incident data base which allows actions to be assigned and tracks the progress of an investigation.

All gas incidents are reported to SP AusNet's Customer Emergency Operations Team (CEOT) in accordance with the requirements set out in 33-2218. The NOC enters all gas reportable incidents into IMS and assigns a relevant incident investigation manager. The investigation is to take place in accordance with the guide lines as outline in Appendix B of TS 0503.

SP AusNet reports required incident types to ESV as outlined in TS 0503:

SP AusNet's CEOT will notify ESV by email, phone or fax within 8 hours of a reportable incident occurring, followed by a written notification within 7 days of the incident. A detailed investigation report is forwarded to ESV by the Manager, Gas Asset Management or delegate within 20 business day of the incident.

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IMS generates the Gas Incident Investigation Report as submitted to ESV. This report includes:

- Time and date of incident
- Detailed description of incident including cause
- Remedial actions undertaken
- Asset/Systems affected details
- Incident pre conditions
- Police/Medical Officer in attendance details
- Incident details
- Incident consequences
- Witness details

SP AusNet reports gas incidents to ESV in the form of a statistical summary on a quarterly basis. This report is completed in accordance with the ESV Information Specification for Gas Distributors document.

3.12.3 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- adequacy of KPIs
- adequacy of incident review and analysis
- risk reviews

3.13 Training

SP AusNet provides training programs to ensure personnel skills at all levels are appropriate and adequate for gas-related work. Training is conducted in accordance with procedure 10-1031 Learning Development and Training.

The PSP provides details of training and competency assessments, at intervals specified by SP AusNet, for gas-related work carried out on the distribution and transmission systems.

A personnel skills register and matrix, and individual training records are maintained by the PSP.

Safety Case general awareness and specific training is delivered on an annual basis and is formulated and outworked to SP AusNet by the DSCGC. Training of PSP personnel is conducted by the PSP with training outline specified by the DSCGC.

3.13.1 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Resources and competencies

3.14 Occupational health and safety

SP AusNet and the PSP have in place an externally accredited Occupational Health and Safety (OH&S) scheme to be equal to or better than industry best practice and to comply with legislation.

SP AusNet is committed to protecting the health and safety of its employees, contractors and others who may be affected by the workplace activities of the company. It carries out its commitment by—

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- providing and maintaining, as far as practical, a working environment that is safe and without risks to health;
- providing and maintaining equipment and systems of work that are, as far as practical, safe and without risk to health;
- providing adequate information on hazards; and
- providing instruction, training, leadership and supervision of employees and contractors, as far as practical, to ensure workplace safety.

OH&S procedures are detailed in SP AusNet and PSP Occupational Health and Safety manuals but gas-critical such as 'Permit to Work' and for management of confined spaces are part of the SP AusNet Safety Management System.

The responsibility of ensuring that OH&S requirements are met is delegated to SP AusNet line managers and the PSP.

SP AusNet's Health and Safety Policy embraces all safety matters, including those relating to Safety Case.

The Health and Safety Policy is outlined below:

SP AusNet Health and Safety Policy

SP AusNet is committed to providing a safe and healthy working environment for all while delivering energy across our electricity and gas transmission and distribution networks.

To achieve this, the commitment and contribution of each and every employee is required to maintain, so far as is practical, a working environment that is safe and without risk to health. We will do this through:

- *Taking responsibility for the health and safety of ourselves and our fellow workmates in all of our activities aiming to eliminate work-related injury and illness.*
- *Not compromising personal health and safety in the mistaken belief that other requirements are more important.*
- *Placing people first, then plant safety and system performance followed by other issues.*
- *The identification, assessment and control of workplace risks and hazards*
- *Complying with all regulatory and legislative requirements, Industry Codes and relevant Australian Standards.*

SP AusNet fosters this safe work environment by:

- *Implementing and maintaining an effective Health and Safety Management System with commitment and involvement from all levels of the organisation*

Facilities Description & Safety Management System Overview

- *Ensuring that there is a systematic identification of hazards and there is assessment and control of risks associated with those hazards*
- *Providing appropriate education and training*
- *Systemic planning and control of workplace activities and the establishment of measurable objectives and targets.*
- *The provision of appropriate facilities, plant, equipment and supervision*

SP AusNet will also ensure that contractors, suppliers and co-venturers apply similarly high standards.

SP AusNet will facilitate continuous improvement in our Health and Safety performance by periodic reviews of objectives and targets and regular and rigorous monitoring and analysis of performance. Health and safety considerations will be taken into account in all our business decisions.

*Nino Ficca
MANAGING DIRECTOR*

3.15 Document Management

Document control and records management is undertaken in accordance with SP AusNet document QMS-20-02 Records Management and SP AusNet Document QMS-20-04 Document and Data Control.

4 TRANSMISSION SYSTEM

4.1 General facilities description

The SP AusNet natural gas transmission network comprises various pipelines, pipeline valves and associated City Gates and field regulators throughout the Melbourne metropolitan area North-West and West regional Victoria. The total length of transmission pipelines as at December 2008 is approximately 183 km, with operating pressures up to 2,800 kPa.

4.2 Pipeline titles and brief description of pipelines

Transmission pipeline details are listed and summarised in the table in Appendix A. The table lists pipeline licence numbers, the pipeline number, size, operating pressure and brief description of the pipeline route. The sizes and operating pressures of the pipeline vary to suit the gas demand of the supply areas.

The material specification and commissioning dates of the respective pipelines are tabulated in Appendix A,

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4.3 Key plan of pipelines system

A Key Plan showing the pipelines system is given in Appendix B to provide an overall view of the SP AusNet pipeline network.

4.4 Licence plan of pipelines system

A set of Licence Plans is attached in Appendix C showing the approved routing of the pipelines and the locations of the associated City Gates, field regulators and mainline valves.

4.5 Safety Management Study/Plan

Each licensed pipeline is subject to a Safety Management study which is conducted 5 yearly. The outcomes of the Safety Management Study for each pipeline are highlighted in the individual Pipeline Safety Management Study report held at SP AusNet's offices.

4.6 Field regulators and city gates

Field regulators are pressure reducing stations used to supply gas from the transmission pipelines into other transmission pipelines or into high or medium pressure distribution networks.

A City Gate station is essentially a field regulator station which provides supply to a city or town from a transmission pipeline.

SP AusNet's gas network includes 101 field regulators and 36 City Gate installations. These units are generally located above or below ground and are distributed across the network. The average age of City Gates is 22 years and of field regulators is 26 years. The field regulators and City Gates are numbered and listed in the SP AusNet Regulator Schedule. Detail layout, piping arrangement and maintenance records of each field regulator and City Gate are maintained by SP AusNet.

A typical regulator arrangement comprises an inlet and outlet shut-off valve (actuated or hand operated), a series of regulators, an array of inter-connecting pipes and an associated auxiliary control system.

4.7 Pipeline line valves

Line valves are provided to isolate segments of the pipelines system for operation, maintenance or repair and for protection of the public and the environment in the event of an escape.

Most line valves are equipped with by-pass facilities to ensure security of supply during maintenance operations.

Spacing of line valves is in accordance with industry standards.

4.8 Gas pressure monitoring and control facilities

Monitoring and control of the SP AusNet transmission pressure networks are enabled by means of SCADA. Both monitoring and control is selective and confined to where the facility is installed. SCADA operates 24 hours per day; 7 days per week from the Customer Emergency Operations Team. It provides information, which can be used to maximise operational efficiency of the network and manage gas flows during routine and unplanned operations.

SCADA has the following 3 main components:

- A master station with telemetry interfacing equipment, host computer and SCADA software;
- Communication system including analogue radio and PSTN and GSM; and

Facilities Description & Safety Management System Overview

- Remote telemetry units with telemetry interface, data acquisition and processing units and I/O devices for digital / analogue signals.

SCADA is used for–

- acquisition of analogue and digital values from the field via Remote Terminal Units (RTU);
- monitoring of the inlet and outlet pressures of City Gates and field regulators;
- monitoring of network fringe pressures
- display of information (real time and historical);
- storage and retrieval of historical data from the on line database or archival system;
- guidance on gas network operational matters;
- gas metering information;
- monitoring heater operation at City Gate sites; and
- monitoring entry alarms at City Gates and field regulator sites;

4.9 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- relationship with external providers
- loss of SCADA system
- operability of line valves
- Over or under pressurisation
- Third Party Damage
- Corrosion Prevention

5 DISTRIBUTION NETWORK

5.1 Gas distribution mains

SP AusNet gas distribution system as at December 2008 includes 9,282 km of mains.

5.1.1 Distribution system by pressure

For the distribution system, the following operating pressure classifications apply:

(a) High pressure mains (HP2 mains)

HP2 mains operate at pressures of 515 kPa to 1,050 kPa. These mains receive gas from transmission mains and are typically used as network supply (feeder) mains to supply high, medium and low pressure networks.

(b) High pressure mains (HP mains)

High pressure mains operate at pressures of 140 kPa to 515 kPa. These mains receive gas from transmission mains to supply high pressure service customers and/or supply gas to lower pressure steel and polyethylene mains.

(c) Medium pressure mains (MP mains)

Medium pressure mains operate at pressures of 7 kPa to 140 kPa. Materials used for these mains are steel, cast iron, and polyethylene.

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(d) Low pressure mains (LP mains)

Low pressure mains operate at pressures up to 7kPa. These mains are normally located in the older sections of the reticulation system and comprise steel, cast iron, polyethylene, and PVC pipes.

Figure 5 indicates length of pipe by pressure classification for distribution (and transmission).

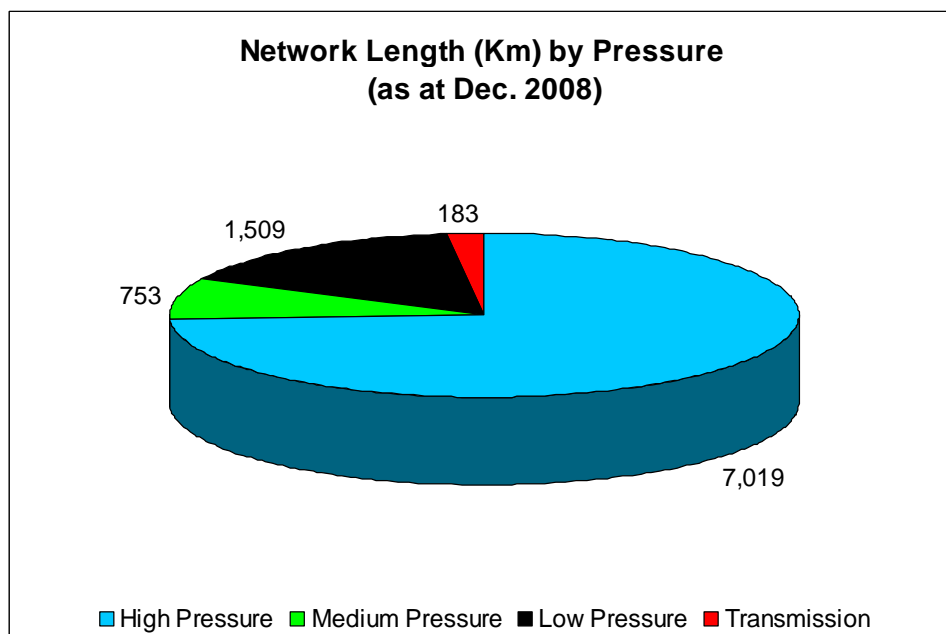
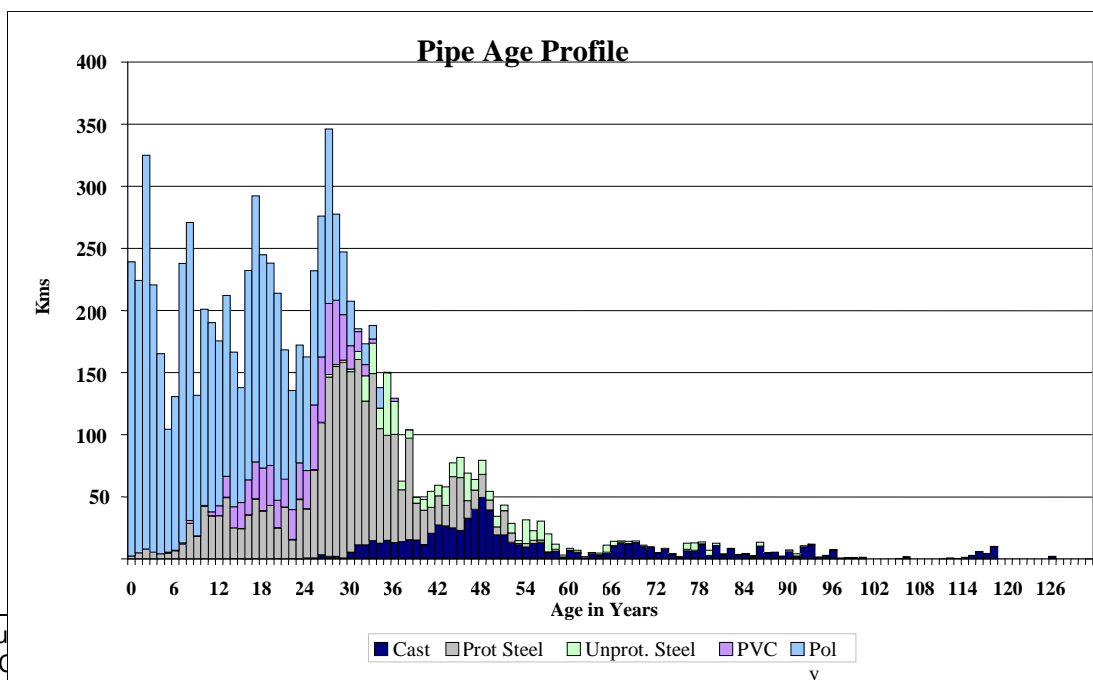


Figure 5. Transmission and distribution mains by pressure

5.1.2 Distribution system by age

The majority of the SP AusNet gas system was installed during the 1970s and thus is approximately 30 to 40 years old. This is shown in Figure 8. All new pipe is installed to high-pressure standard, in line with SP AusNet policy. SP AusNet is implementing a mains renewal program to replace the low-pressure networks, which contain the majority of the older cast iron pipe.



Facilities Description & Safety Management System Overview

Figure 7. Age of mains by decade

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5.1.3 Distribution system by material

PE pipe constitutes 54% of the network; steel and PVC comprising 31% and 6% respectively, as shown in Figure 8. All steel pipe in the transmission and high pressure systems is cathodically protected against corrosion, with the exception of a small proportion of the Medium Pressure network. The network steel mains are in good condition, but cast iron (8%) and unprotected steel (4%) are prone to leakage and are managed in accordance with the Asset Management Plan and Asset Maintenance Plan to ensure network supply is maintained.

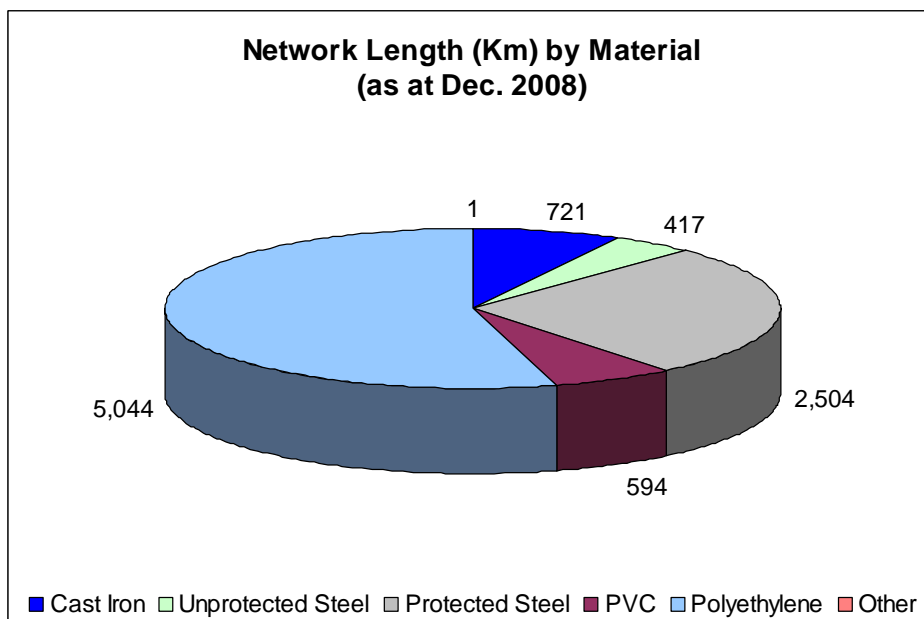


Figure 9: Mains by material

5.1.4 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Long term damage due to squash off
- 3rd-party damage to mains

5.2 Gas services

SP AusNet gas distribution assets include approximately 523,542 gas services which supply domestic, commercial and industrial consumers. The services provide consumers with a connection to the gas distribution mains. Of these services, 336,014 are high pressure polyethylene, with the remaining 187,505 being low or medium pressure services constructed using a variety of materials.

All services are designed, constructed, commissioned, operated and maintained in accordance with SP AusNet technical standards.

5.2.1 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- 3rd-party damage

Facilities Description & Safety Management System Overview

5.3 Supply to consumers

5.3.1 Gas meters and regulators

SP AusNet has a total of approximately 551,097 installed meters. Domestic customers constitute 535,502, with a capacity of 6 m³/hr. The standard pressures for domestic supply are 1.1 or 2.75 kPa (for medium or high mains pressure). All domestic meters are of the diaphragm type construction with an average age of 12 years. After removal from the field, the majority of domestic meters can be refurbished economically and re-installed. An annual sampling program has demonstrated that most meters meet accuracy requirements for at least 15 years and are able to meet or exceed the 15 year lifespan of field service, dependent on outcomes of sampling, before refurbishment is required.

There are approximately 15,595 larger capacity (non domestic) meters used in industrial and commercial applications and approximately 98% of these are of diaphragm type construction

Of the industrial and commercial meters, 219 (1%) are rotary positive displacement meters with an average age of 7.6 years and 162 turbine meters with an average age of 11.8 years. All industrial and commercial meters are removed from the field and refurbished every ten years.

Larger industrial and commercial meter installations may include multiple regulators and sophisticated instrumentation. SP AusNet has 343 consumer sites with installed flow computers or data loggers and of these 83 are accessed by telemetry systems. Dataloggers account for 163 sites whilst flow computers are installed on 180 sites.

Control of delivery pressure for domestic and small industrial consumers is by preset pressure regulators, and for large industrial consumers, by purpose-designed regulator equipment.

5.3.2 Supply to a safe installation

SP AusNet ensures that gas is not knowingly supplied to an unsafe installation. The process is outlined in procedure 30-2633.

5.3.3 Restoration of supply

Restoration of supply is a planned activity which follows loss of supply to a consumer as a result of a planned or unplanned outage, and is carried out only when it is safe to do so.

An unplanned outage generally occurs as a result of unintentional 'third-party' damage, interference (vandalism), equipment failure, operating error or contaminant in a gas pipe (e.g water or 'dust'). Sensitivities associated with an unplanned outage include the magnitude of disruption in terms of number of consumers affected, safety to the general public and duration of an interruption. Following incident investigation and reporting, a supply restoration plan is developed which may be formal or informal, depending on severity of damage. Restoration of supply and relighting of appliances takes place in accordance with the plan, under PSP supervision and with their assistance.

A planned outage, by definition, takes place as a result of works planned by SP AusNet and PSP; e.g mains upgrades, maintenance work or consumer meter changes. Sensitivities associated with a planned outage include consumer load, time and duration of outage and the need to cooperate with significant consumers to minimise disruption. Restoration of supply and relighting of appliances takes place with SP AusNet and PSP supervision and assistance.

5.3.4 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- gas supply to an unsafe installation
- restoration of supply after planned or unplanned outage
- contaminated gas

Facilities Description & Safety Management System Overview

5.4 Gas pressure monitoring and control facilities

Monitoring and control of system gas pressures is conducted either by means of SCADA system or manually-set pressure control units. Three-stage over-pressure protection is integral with design of City Gates and Field Regulators. Dual (series) regulators offer a degree of redundancy, and gas-operated 'slam-shut' downstream isolation, should both regulators fail.

A number of high pressure systems can further be automatically controlled and maintained by Network Operations Centre.

5.4.1 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Over pressurisation/under pressurisation, equipment failure and damage

5.5 District regulators

The distribution system includes 120 district regulators which are used to supply gas into low pressure networks from the high and medium pressure systems.

Regulator installations are located in the older reticulated areas and may be above-ground (kiosks) or below ground (pits). They may be located on either public or private land. The units have an average age of 23 years and are maintained in accordance with the Network Control and Maintenance Guide.

5.5.1 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- Over pressurisation/under pressurisation, equipment failure and damage
- Poor chart resulting in downstream supply issues

6 ALPINE RESORT

6.1 Introduction

SP AusNet operates a liquefied petroleum gas (LPG) vapour reticulation network at Mt. Baw Baw alpine village from a single LPG source. SP AusNet supplies reticulated gas to village commercial and club premises, the Mt. Baw Baw ARMB office and visitor centre. The system also feeds 2 gas-fired generators operated by SP AusNet (electricity) which supply electricity to the mountain village.

The gas mains distribution system comprises a small network of approximately 1,700 metres of PE pipe of sizes 110 mm DN and 63 mm DN manufactured in accordance with AS/NZS 4130. The network is shown on SP AusNet District Plan Horsfall 32-10.

The approximate lengths (metres) and grades of each size of pipe are as follows:

- 110 mm DN SDR11 - PE80B Series 2 Gas Pipe, 1,100
- 63mm DN SDR11 - PE80B Series 2 Gas Pipe, 600

The reticulation network has a single supply. A buried, but accessible 100mm NB diameter, isolating valve at the corner of Candleheath and Currawong Drives enables a large part of the supply network, south east of the valve, to be isolated independently of supply to the generator station. This valve has a standard access cover flush with the pavement surface.

A key and a valve extension, to operate this valve, are located in the generator control room 70 metres to the south-west.

All mains operate up to a maximum pressure of 140kPa.

The temperature range is minus 10⁰ C to plus 30⁰ C. The design of the distribution network provides for a 20 year forecast gas demand for the village, including the generator station. Commissioning of the whole network occurred in late May 1998.

This Facility Description applies only to the gas component of the system whose boundaries are the LPG vessel compound fence, the outlet of each consumer's meter and the generator building external isolating valve.

NOTE: The LPG storage vessel, pressure regulators, over-pressure protection and vaporiser installation are not owned by SP AusNet and are regulated under provisions of the Occupational Health and Safety Act.

6.2 LPG (bulk liquid and vapour) supply

Gas supply to the storage vessel is made on a standard commercial supply agreement. The LPG supplier, Elgas Limited, owns and is responsible for the control, maintenance, safety and security of the LPG storage vessel, the pressure regulators and pipework to the boundary of the security compound. Two-stage over-pressure protection is provided, with a monitor on the primary regulator and pressure relief on the secondary regulator. There is no valve at the compound boundary transfer point.

SP AusNet has been assured that the owner inspects the installation in accordance with Elgas's Gas Safety Case and other legislated requirements.

The vessel foundations have been designed to allow for full hydrostatic testing of the vessel.

A gas-fired water heater, situated in a small ventilated and lockable building 6 metres east of the security compound fence, is used to supply hot water to a shell-and-tube heat exchanger within the compound which heats the vapour stream to maintain and control vapour pressure.

Two self-draining fire hydrants are located outside the vessel compound; each fitted with hose and nozzle. The hydrant location and hose lengths are designed to provide a full fire water coverage of the vessel, delivery vehicle and transfer point.

Facilities Description & Safety Management System Overview

The vessel location is accessible to normal road transport for replenishing stock under all but exceptional winter snowfall conditions. In exceptional weather conditions local heavy vehicles, fitted with wheel chains are available to tow the road tanker into place.

SP AusNet receives LPG vapour for the reticulation network at a maximum regulated pressure of 140 kPa.

6.3 Services and meter regulator assemblies

Consistent with natural gas reticulation, each consumer service installation includes an upstand with a ball isolating valve, regulator and meter. The assembly is located in a readily accessible position adjacent to the respective building.

The regulator delivers 2.75 kPa metering pressure reduced from 140 kPa mains pressure. The meter and service regulator assemblies are placed approximately one metre above ground level to ensure they are above snowline in winter and protected from damage. They are situated so as to ensure that any escaped gas disperses and is not able to pool or collect under buildings.

Each service regulator has an over pressure shut off device designed to prevent over-pressurising of consumer piping and appliances.

Gas installations at the village are classified as 'complex' in accordance with the Gas Safety (Gas Installation) Regulations and require Office of Gas Safety certification before operation.

The ARMB controls all work associated with gas mains and service installation at the village. All mains and services pipes are installed with conductive marker tape for ease of locating, especially in adverse weather conditions.

6.4 Gas quality, odour and supply pressure

Elgas Limited is responsible for the supply of gas and maintenance of stock.

The gas quality and odourant levels are monitored by Elgas daily and monthly respectively. Elgas Limited provides reports which are available for SP AusNet scrutiny.

The gas producer odorises LPG delivered to the storage vessel. No further odorisation is necessary to maintain the odour concentration in the network.

Elgas Limited is responsible for implementing procedures at their load out terminal to ensure that only propane can be loaded for delivery into the Mt. Baw Baw storage. The product type is recorded on the weigh bridge docket.

6.5 Gas system pressure control

Elgas Limited is responsible for supply of gas in the vapour phase at controlled pressure to the inlet of the reticulation network at the eastern boundary of the LPG storage compound by use of a duplicate set of Fisher 99 pressure control regulators. The pressure regulators are located immediately above the vapour outlet valve on the top of the LPG vessel. This location ensures that, in the event that liquid may form in the inlet vapour pipework, it will drain back into the vessel.

These regulators are designed to meet the forecast demand on the network for 20 years and beyond and each run has an inlet and outlet valve enabling it to be isolated and the regulators serviced without interruption to supply.

Over-pressure protection is provided by a pressure relief valve (1 inch Fisher 289H) fitted to the pipework after the regulator isolating valves.

The operation and maintenance of the regulators, relief valves and other associated valves are the responsibility of Elgas Limited.

Facilities Description & Safety Management System Overview

6.6 Operating constraints

The network has no current or foreseeable constraints on the ability to supply all forecast gas demand, although there is a dependence upon continued supply of LPG by road transport. There are no indications of this becoming a problem as the gas supplier has a very extensive LPG storage, transport and delivery facility.

6.6.1 General.

Due to the characteristics of LPG (a heavier-than-air gas), it is necessary to ensure that network pressure does not exceed the pressure at which vapour can condense. The design maximum pressure of 140 kPa ensures that there is adequate margin at the specified minimum temperature of minus 10° C.

As the village is small, remote and environmentally highly sensitive, local control over all work activities in the village by the ARMB provides a high standard of continuous security to the reticulation network in accordance with the Alpine Resorts (Management) Regulations 1998.

The Mt. Baw Baw network is within the area covered by the Dial Before You Dig (DBYG) service.

6.7 Security of supply

This is a small network able to be managed in close detail. The design provides for all gas demand (including that for the generators), to be met at maximum use winter periods with stock replenishment required at manageable intervals.

A full vessel will provide for approximately 15 days of peak load winter use. Deliveries are usually made twice a week during the winter period.

LPG stock is noted weekly and at each delivery and this information together with records of past use and forecasts form the basis of the delivery schedule, which is controlled by and is the responsibility of Elgas Limited.

The delivery capability of the supplier is adequate to ensure that stock does not fall below a practical operating minimum level.

6.8 Emergency response

6.8.1 LPG gas storage installation (an Elgas facility)

In the event of an emergency associated with the LPG gas storage facility, initial telephone contact must be made with the Elgas Emergency Response Centre (refer Appendix D). This number is displayed at the LPG storage site, the generator building and ARMB office.

The Elgas Emergency Response Centre will then determine—

- whether gas is escaping and the magnitude of the escape
- the event or condition which caused the problem
- the level of hazard if any
- any damage resulting
- the perceived risk to public and / or property and equipment safety
- who is in attendance and a contact telephone number

From this information, the most appropriate actions will be decided and personnel directed to site to attend.

Facilities Description & Safety Management System Overview

In the event of a major gas escape at the LPG storage facility, the Elgas Limited Emergency Response Centre will contact the Elgas Limited Engineer and SP AusNet Network Operations Centre. A trained crew and emergency equipment will be dispatched immediately by Elgas. Assistance from DSE, the ARMB and Police will be called upon to make and keep the area safe.

6.8.2 Mt.Baw Baw LPG gas reticulation (a SP AusNet facility)

For the Mt Baw Baw reticulation system beyond the boundary of the Elgas storage facility, SP AusNet provides response capability by means of contracted response personnel on 24-hour call (refer to Appendix E).

In the event of an incident that restricts supply to the reticulation a load curtailment process can be activated. The load curtailment process is shown in Appendix G.

6.9 Construction control

Construction of additions to the facility is undertaken in accordance with AS 3723 and SP AusNet technical standards and PSP construction procedures.

Agreement is sought from the ARMB at the design stage and their approval must be obtained prior to commencement of work.

The ARMB has responsibility for the safe, secure and ecological soundness of all works carried out in the village.

6.10 Identified risks

High-level identified risks are as follows and captured in the Formal Safety Assessment:

- emergency staffing and protocol training
- emergency response on-site (including load curtailment) and from Elgas
- isolation in the event of emergency
- environmental conditions & effect on network / equipment
- flammability of heavier-than-air propane gas

7 APPENDICES

Appendix A – Licensed pipelines and materials listing

Appendix B – Key plan of licensed pipelines – Melbourne & environs

Appendix C – Key plan of licensed pipelines - Country

Appendix D - Mt Baw Baw Emergency Response

Appendix E - Mt Baw Baw Emergency Phone Numbers

Appendix F - Mt Baw Baw Load Curtailment Processes

Facilities Description & Safety Management System Overview

Appendix G: Glossary of terms

AM/FM	Acronym for “Automated Mapping/Facilities Management” – a generic term used to describe proprietary Smallworld Geo-spatial Information System (GIS).
ARMB	Alpine Resort Management Board (Mt Baw Baw)
DSE	Department of Sustainability and Environment
DPI	Department of Primary Industries
IMS	Issues Management System
KPI	Key performance indicator
LPG	Liquefied Petroleum Gas
MAOP	Maximum Allowable Operating Pressure
DBYG	Dial Before You Dig
CEOT	Customer Emergency Operations Team
ESV	Energy Safe Victoria
PE	Polyethylene
PSP	Prime Service Provider
PVC	Polyvinylchloride
Q4	Asset management information system
SCADA	Supervisory Control and Data Acquisition
DSCGC	Distribution Safety Cases Governance Committee
VENCorp	Gas transmission system operator

Facilities Description & Safety Management System Overview

Appendix H: Published technical standards for design, construction, installation and operation of the facility.

AS 1596	The storage and handling of LP Gas
AS 1697	Gas transmission and distribution systems (known as the SAA Gas Pipeline Code)
AS 1742	Manual of uniform traffic control devices
AS 2032	Code of practice for installation of UPVC pipe systems
AS 2033	Installation of polyethylene pipe systems
AS/NZS 2381	Electrical equipment for explosive gas atmospheres
AS 2430	Classification of hazardous areas
AS 2832	Cathodic protection of metals – Pipes and cables
AS 2885	Pipelines
AS 3000	Electrical installations
AS 3723	Installation and maintenance of plastics pipe systems for gas
AS/NZS 3931	Risk Analysis of Technological Systems – Application Guide
AS 4041	Pressure piping
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS/NZS 4360	Risk Management
AS 4564	Specification for general purpose natural gas
AS 4568	Preparation of a safety and operating plan for gas networks
AS 4645	Gas distribution network management
AS 4647	Domestic diaphragm gas meters
AS/NZS 4944	Gas meters – In-service compliance testing
AS 5601	Gas installations

Facilities Description & Safety Management System Overview

Appendix I: SP AusNet technical standards for design, construction, installation and operation of the facility.

The Safety Management System for a facility must specify all internal technical standards regarding the design, construction, installation, operation, maintenance, decommissioning and disposal of the facility.

These internal technical standards are as follows:

Standard No.	Title
TS0500	Staff Participation in Committee and Drafting Work of Standards Aust and AGA
TS0501	Gas Specific Materials and New Technologies Approval Process
TS0501F01	Field Evaluation Report
TS0501F02	Submission for Material Approval
TS0501F03	Request for Laboratory Report
TS0503	Gas Incident Reporting
TS0503	Industrial Commercial Fitting Line Recommissioning
TS0506	MOCS Protocol and Procedure
TS0511	Refurbished Appliances (Type A)
TS1300	Site Drainage
TS1301	Prevention of Soil Erosion
TS1302	Trade Waste and Effluent Discharge
TS1305	Design of Pits – Vaults and Kiosks
TS1308	Construction of Site Works for Industrial & Commercial Metering/Regulating Installations – LP/MP/HP Inlet Pressures
TS2601	Field Recording of Special Crossings
TS2606	Distance and Angular Measurement Accuracies
TS2607	Conditions for works near Gas Transmission Pipelines and Mains
TS2607 Part 1	Conditions for works near Gas Mains and Infrastructure
TS2607 Part 2	Conditions for works near Gas Transmission Pipelines
TS2607 Part 3	Conditions for the Use of Explosives near Gas Transmission Pipelines and Mains
TS2612	Procedure for identifying the need for an easement for reticulation mains
TS2613	Recording of Pipelines & Mains Information on Record Plans
TS2614	Drawing Number System
TS2615	Policy – Signatory Requirements For Gas Engineering Drawings
TS2901	Earthing of Vessels and Holders
TS2902	Earthing of Tanker Transfer Points
TS2905	Policy – Classification of Hazardous Locations
TS4000	City High Pressure System (Design and Construction)
TS4001	Design Guide for Gas Pipework on Bridge Crossings up to 1050kPa
TS4004	Policy on Valves in Systems operating at <1050Kpa
TS4005	Design Temperatures for System Components
TS4011	Service Valves – High Pressure DN15 to DN20 (Internal Inlet Thread – External Outlet Thread)
TS4014	Service Valves (HP) – DN20 Internal Threads
TS4037	The Permanent use of Stainless Steel Repair Clamps
TS4061	Internal Lining of Pipe – HP
TS4062	Land Conservation and Pipework

Facilities Description & Safety Management System Overview

TS4063	Policy on Valve Security
TS4065	Design of Sensing Lines and Bleed Valve Connections
TS4066	Field Recording of Assets
TS4067	Management of Major Transmission and Distribution Projects
TS4069	Policy – PE 100 Pipe and Fittings
TS4070	Storage of Polyethylene Coated Pipe – Stock Rotation
TS4071	Buried Plastic Pipe – Marker Tape and Tracer Wire Detection
TS4072	Flanged Joints
TS4073	Colour Code for Valve and Syphon Covers
TS4074	Site Selection for District and Field Regulators
TS4075	Consumer Piping Systems – Operating Pressure Exceeding 515kPa
TS4077	Design Life of Gas Transmission and Distribution Systems
TS4078	Management of Transmission Pipeline Easements
TS4078F01	Application for Permission to Erect Fencing/Obstruction across/on Gas Transmission Pipeline Easement
	Design of Pressure Regulating Installations with Inlet Pressures Between 7kPa and 10 000 kPa
TS4079	Storage, handling and transport of pipe
TS4081	Selection of Components and Materials (Transmission and Distribution Systems)
TS4082	Abandoning or Removing of Buried Distribution Mains and Services
TS4084	Purging for Commissioning of Transmission and Distribution Pipe
TS4090	Plant Design (Consideration of OH&S Legislation)
TS4092	Noise Control for Transmission and Distribution Systems
TS4093	TS4098 Design Pressure Regulations with Inlet Pressures between 7 kPa and 10 000 kPa
TS4098	Depth of Cover to Underground Assets
TS4099	Consumer Piping Systems – Operating Pressure Exceeding 200 kPa but not exceeding 515 kPa
TS4101	Design and Construction of Large Diameter PE Pipe
TS4102	Safety Assessment for Distribution Mains and Services
TS4103	Polyethylene for Gas Pipes
TS4104	Inspection and Repair of Damaged Steel Pipelines
TS4107	Pre-Commissioning Treatment of Gas Pipelines
TS4115	Natural Gas Odourisation
TS4116	Configuration Management (Technical)
TS4117	Approved Welding Procedures – Transmission
TS4121	Distribution Mains and Services
TS4122	Glossary of Terms for the Gas Grid
TS4127	PE Pipe Insertion
TS4130	Construction of Industrial and Commercial Metering Regulating Installations (LP HP Inlet Pressure)
TS4132	Directional Boring of Mains
TS4135	Domestic Regulator Freezing Protection
TS4136	Portable Gas Detector Calibration Intervals
TS4137	Safety Shut-Off Valves in Fire Alarm Systems
TS4142	Location of Underground Services
TS4143	Policy for Plastic Pipe Joint Systems
TS4147	Quality Assurance Process for Designated Materials
TS4148	Materials Management Systems – Gas Grid Critical Materials
TS4149	
TS4153	

Facilities Description & Safety Management System Overview

	Vegetation and Planting of Trees near Gas Mains, Compounds & Licensed
TS4156	Transmission Pipelines
TS4158	Approved Welding Procedures – Distribution
TS4163	Inspection of HP2 distribution Mains
TS4164	Transmission Pipeline Inspection
TS4164	01 Transmission Pipeline Inspection Checklist
TS4165	Internal Gas Services Installations
TS4290	Removal of Decommissioned Regulator Installations Above and Below Ground
TS4303	Standard Metering Pressures - Industrial and Commercial
TS4306	Requesting Inline MK1
TS4318	Authorised Meter Inspectors
TS4320	Testing Metering Pressure - Industrial and Commercial
TS4340	Calculating Inline Instruments MHQ and MDQ1
TS4343	Access to Regulator and Valve Installations
TS4349	Site Selection - Industrial and Commercial Metering Stations
TS4350	Guide for Selecting and Specifying Standard Dual-Run Regulator Units
TS4350-A	Service size maximum load capacity
TS4350-B	Selection charts
TS4350-C	Selection guides
TS4351	Selecting and Specifying Single Run Regulator Units
	Selecting and Specifying Single Run Regulator Units - Service Size Minimum Load Capacity
TS4351-A	Capacity
TS4351-B	Selecting and Specifying Single Run Regulator Units - Selection Charts
	Selecting and Specifying Single Run Regulator Units - Spring and Orifice Selection
TS4351-C	Guide
TS4351F01	Selecting and Specifying Single Run Regulator Units - Meter - Instrument Request
TS4352	Gas Meter Location - Single Occupancy Domestic Premises
TS4353	Domestic Meter Diversification and Selection
TS4355	Metering Pressure for Domestic Billing Meter
TS4356	Metering Rooms
TS5201	Leakage Management
TS6303	Ducted Central Heating Systems
TS6304	Pipework Blowdown and Gas Flaring - Transmission
TS6600	Security Fencing (General Security)
TS6601	Security Fencing (Inner High Security)
TS7401	Preparing Engineering Standards
TS7600	Pressure Classifications and Operating Pressure Ranges
TS7601	Maintaining Gas Supply during TP Pipeline Blowdown Operations
TS7900	Policy on Valves in a TP System
TS7955	Assessment and Repair of Damage to Transmission Pipelines
TS7960	Renewal of Pipeline Permits - Licences
	Procedure for Permission / Rejection of Works within 3 metres of an SP AusNet
TS7962	Licensed Transmission Pipeline