



AusNet Gas Services Pty Ltd

Gas Access Arrangement Review 2018–2022

Appendix 2D: Gas Safety Case - Formal Safety Assessment

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Gas Safety Case

Formal Safety Assessment

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Formal Safety Assessment

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Forward

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

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

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Formal Safety Assessment

1 Background and Overview

As part of the AusNet Services Safety Case, a Formal Safety Assessment (FSA) has been carried out consistent with the Gas Safety Act 1997 and the Gas Safety (Safety Case) Regulations 2008 in order to assess risks associated with the upstream network outlined in the Facilities Description and Safety Management System Overview, GSC 10-01.

AusNet Services risk management methodology has been designed based upon AS/NZS ISO 31000 "Risk management – Guidelines and principles".

Annual FSA Review

Determined FSA risk levels are based on current technologies, materials and controls relevant to the assets or processes. A change in any of these parameters may affect the determined risk level – their measurement being inherent in the monitoring of the asset base.

In light of the above, the FSA is reviewed on a minimum annual basis, with additional, ad hoc reviews as required.

Risk assessments are completed in workshops involving personnel with a range of backgrounds in gas transmission, gas distribution and risk management.

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2 RISK ASSESSMENT METHOD

2.1 Risk Assessment Methodology

2.1.1 Consequence Criteria

A consequence rating should be chosen on the basis of the **expected consequences** on AusNet Services and its stakeholders after considering the **current control environment**. If there are consequences over a number of different types, then the **highest level of the consequence types** should be chosen. This should be based on an assessment of residual risk only.

Rating	Health, Safety and People	Environment & Community	Reputation	Customers	Regulation, Legal and Compliance	Financial impact AU\$
5	<p>Multiple fatalities and/or Significant irreversible exposure to a health risk that effects greater than 10 people</p> <p>Wide-scale employee disengagement across the company. Serious failings.</p>	<p>Catastrophic long term environmental harm off-site and/or irreversible impact to cultural heritage area</p> <p>Community outrage-potential large-scale class action</p>	<p>Critical event that the organisation could be forced to undergo significant change.</p> <p>Sustained adverse international / national press reporting over several weeks</p> <p>Total loss of securityholder support who act to divest</p> <p>Reputation impacted with majority of stakeholders</p> <p>Licence to operate threatened.</p>	<p>Loss of supply >100 system minutes/USAIDI (electricity) or > 200,000 customers (gas) or System Black or Loss of supply to entire CBD</p>	<p>Major litigation or prosecution with damages of \$50m+ plus significant costs</p> <p>Custodial sentence for company Executive</p> <p>Prolonged closure of operations by authorities</p> <p>Regulators control business through directives and suspend ability to operate</p>	\$100m+ loss or gain
4	<p>Single fatality and/or Severe permanent injury, paralysis, brain damage, life threatening exposure to health risk</p> <p>Significant employee disengagement in some company-wide critical areas. Failings in some key areas</p>	<p>Prolonged off-site environmental impact, e.g. significant impact on ecosystems or destruction of area of high cultural heritage</p> <p>High-profile community concerns raised – requiring significant remediation measures</p>	<p>Significant event that would require ongoing management and brings the organisation into the national spotlight</p> <p>Sustained adverse national press reporting over several days</p> <p>Sustained impact on the reputation of Company</p>	<p>Loss of supply >30 system minutes/USAIDI (electricity) or >100,000 customers (gas)</p>	<p>Major litigation costing \$10m+</p> <p>Investigation by regulatory body resulting in long term interruption to operations</p> <p>Possibility of custodial sentence</p> <p>Significant fines are imposed and multiple directives issued</p> <p>Extensive reporting and audit regimes are imposed</p>	\$10m - \$99m loss or gain

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Rating	Health, Safety and People	Environment & Community	Reputation	Customers	Regulation, Legal and Compliance	Financial impact AU\$
3	<p>Serious Injury</p> <p>Moderate permanent effects from injury or exposure. For example, serious burns, serious internal and/or head injuries, gassings that require hospitalisation</p> <p>Significant employee disengagement or failures in non-critical areas</p>	<p>Major event leading to local on and off-site impact on ecology or damage to area of cultural heritage</p> <p>Medium term recovery</p> <p>High potential for complaints from interested parties</p>	<p>Major event that causes adverse local press reporting over several days</p> <p>Reputation impacted with some stakeholders</p>	<p>Loss of supply >10 system minutes/USAIDI (electricity) or >5,000 customers (gas)</p>	<p>Major breach of law with punitive fine</p> <p>Significant litigation involving many weeks of senior management time</p> <p>Fines imposed, directive issued and additional audit and reporting requirements</p>	<p>\$1m – \$9m loss or gain</p>
2	<p>Significant injury</p> <p>Medically treated injuries from which recovery is likely. For example, burns, broken bones, severe bruises, cuts, etc.</p> <p>Minor employee disengagement and failures in non-critical areas</p>	<p>Medium term recovery, immaterial effect on environment/ community required to inform Environmental agencies, (e.g.: noise, dust, odour)</p>	<p>Adverse local press reporting</p> <p>Reputation impacted with a small number of stakeholders</p>	<p>Loss of supply >3 system minutes/USAIDI (electricity) or >500 customers (gas).</p>	<p>Breach of law with investigation or report to authority with prosecution and/or moderate fine possible</p> <p>Specific regulatory audit with critical findings and recommended actions</p>	<p>\$100k – \$999k loss or gain</p>
1	<p>Minor injury</p> <p>No medical treatment. For example, cuts, bruises, no measurable physical effects</p> <p>Short-term loss of morale in non-critical areas</p>	<p>Small, unconfined event, no impact on ecology or area of cultural heritage</p> <p>Short term transient environmental or community impact- little action required</p>	<p>No press reporting or external interest</p>	<p>Loss of supply >1 system minute/USAIDI (electricity) or >100 customers (gas)</p>	<p>Minor legal issues, non-compliances and statutory fine</p> <p>Routine regulatory reporting and audits</p>	<p>< \$99k loss or gain</p>

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2.1.2 Likelihood Criteria

A likelihood category should be chosen on the basis of the chance that AusNet Services or its stakeholders could be affected at the **chosen level of consequence**. For example, the chance of loss of supply of >1 system minute (electricity distribution) every time a storm occurs in the Dandenong ranges may be a 99% probability.

Rating	Criteria
E	<ul style="list-style-type: none"> • >99% probability, or • Impact is occurring now, or • Could occur within “days to weeks”
D	<ul style="list-style-type: none"> • >50% probability, or • Balance of probability will occur, or • Could occur within “weeks to months”
C	<ul style="list-style-type: none"> • >20% probability, or • May occur shortly but a distinct probability it won't, or • Could occur within “months to years”
B	<ul style="list-style-type: none"> • >1% probability, or • May occur but not anticipated, or • Could occur in “years to decades”
A	<ul style="list-style-type: none"> • <1% probability • Occurrence requires exceptional circumstances • Exceptionally unlikely, even in the long term future • Only occur as a “100 year event”

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2.1.3 Risk Control Effectiveness

The risk control effectiveness (RCE) is an assessment of the actual level of control that is currently present and effective compared with that reasonably achievable for the particular risk.

AusNet Services Formal Safety Assessment has facilitated the identification of those risks which can be further reduced through the cost effective implementation of additional control measures that have been documented and form the basis of departmental work plans and procedures, asset management strategies and continual improvement initiatives.

The relative assessment of actual level of control that is currently present and effective compared with that reasonably achievable for that particular risk. RCE will therefore be an indicator as to whether AusNet Services is doing all that it could or should to manage the risk issue.

RCE	Guide	Indicators
<p>Fully Effective</p>	<p>Nothing more to be done except review and monitor the existing controls</p> <p>Controls are well designed for the risk, address the root causes and management believes that they are effective and reliable at all times.</p> <p>Control is deemed to be operational in excess of 95% of the time</p>	<p>The control is:</p> <ul style="list-style-type: none"> • Designed appropriately to meet its objectives • Operating as anticipated at all times • Documented and accessible • Communicated to and understood by relevant persons • Reviewed on a regular basis (at least annually) & updated when necessary • Approved by the relevant Committee • Reviewed as part of the Internal Audit (IA) process and no issues were identified
<p>Substantially Effective</p>	<p>Most controls are designed correctly and are in place and effective . Some more work to be done to improve operating effectiveness or management has doubts about operational effectiveness and reliability</p> <p>Control is deemed to be operational between 75% and 94% of the time</p>	<p>The control is:</p> <ul style="list-style-type: none"> • Designed appropriately to meet its objectives • Operating as anticipated the majority of the time • Documented and accessible • Communicated to and understood by relevant persons • Reviewed on a regular basis (at least annually) but may not be updated when necessary • Approved by the relevant Committee • Reviewed as part of the IA process and only low rated issues were identified

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RCE	Guide	Indicators
<p>Partially effective</p>	<p>Whilst the design of controls may be largely correct in that they treat most of the root causes of the risk, they are not currently very effective OR</p> <p>Some of the controls do not seem correctly designed in that they do not treat root causes, those that are correctly designed are operating effectively</p> <p>Control is deemed to be operational between 50% and 74% of the time</p>	<p>The control is:</p> <ul style="list-style-type: none"> • Designed appropriately to meet the majority of objectives • Operating as anticipated some of the time • Documented and accessible • Communicated to relevant persons • Reviewed on an ad hoc basis and may or may not be updated when necessary • Approved by the relevant Committee • Reviewed as part of the IA process and medium issues were identified or not reviewed as part of the IA
<p>Largely ineffective</p>	<p>Significant control gaps. Either controls do not treat root causes or they do not operate at all effectively.</p> <p>Control is deemed to be operational between 25% and 49% of the time</p>	<p>The control is:</p> <ul style="list-style-type: none"> • Not designed appropriately to meet the majority of objectives • Not operating as anticipated at any time • Documented but not accessible • Not communicated and understood by relevant persons • Not reviewed on a regular basis (at least annually) or updated when necessary • Not approved by the relevant Committee • Reviewed as part of the IA process and medium to high rated issues were identified or not reviewed as part of the IA
<p>None or totally ineffective</p>	<p>Virtually no credible control.</p> <p>Management has no confidence that any degree of control is being achieved due to poor control design and/or very limited operational effectiveness</p> <p>Alternatively, the risk is new and controls are yet to be implemented</p> <p>If any control exists it would be operational less than 25% of the time</p>	<p>The control is:</p> <ul style="list-style-type: none"> • Not designed appropriately to meet its objectives • Not operating as anticipated at any time • Not documented or accessible • Not communicated and understood by relevant persons • Not reviewed on a regular basis (at least annually) or updated when necessary • Not approved by the relevant Committee • Reviewed as part of the IA process and high rated issues were identified or not in existence

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2.1.4 Risk Matrix

The matrix should be used to determine the priority of attention to the risk

Consequences	5	II	II	I	I	I
	4	III	II	II	I	I
	3	III	III	II	II	I
	2	IV	III	III	II	II
	1	IV	IV	III	III	III
		A	B	C	D	E
		Likelihood				

2.1.5 Risk Exposure Acceptance

The decision to tolerate a risk should be based on a consideration of:

- whether the risk is being controlled to a level that is reasonably achievable;
- whether it would be cost-effective to further treat the risk;
- AusNet Services willingness to tolerate risks of that type.

Risks rated as Level IV (low risks) or tolerable risks may be accepted with minimal further treatment. They will be monitored and periodically reviewed to ensure they remain so. If risks are not judged low or tolerable, they should be treated.

For those risks achieving a 'Fully Effective' classification within the Risk Control Effectiveness assessment, AusNet Services acknowledges that existing controls are well designed and implemented, and that the exposed risk level is acceptable.

Mitigation and improvement initiatives are initiated for RCE scores of 'Substantially Effective', 'Partially Effective', 'Largely Ineffective', and 'None or Totally Ineffective'. Current risk mitigation efforts are summarised in Appendix B.

2.2 Workshops

To ensure that the best available experience was applied to the task, gas-related risks were assessed in a number of workshop sessions involving technical staff with expertise across a range of disciplines.

Key personnel have been trained in AusNet Services Risk Management Methodology which is a structured approach to risk assessment based on AS/NZS ISO 31000. The AusNet Services Risk Management framework is outlined in Section 2 above and can be found in further detail under the Policies and Procedures – Risk Management Framework section of in AusNet Services intranet.

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2.3 Workshop Assessments

System description

Through the workshops the following high-level Asset Groups, each with numerous asset / risk elements, were defined:

- ACCESS CONTROL
- ALPINE RESORT
- ASSET MANAGEMENT
- DATA
- DESIGN TO OPERATION
- DESPATCHING FUNCTION
- DOWNSTREAM
- FORECASTING
- GAS QUALITY & ODOURISATION
- GAS-SPECIFIC EQUIPMENT
- INTERFACES
- MONITORING SYSTEMS
- ORGANISATIONS
- PRESSURE REGULATION
- RISK MITIGATION SYSTEMS
- TRANSPORTATION

Each risk element is then risk-assessed and recorded in accordance with AusNet Services Risk Management Framework. Ranking of risk is undertaken in accordance with the outcomes of individual risk ratings.

2.4 Outcomes

The detailed overall asset-wide risk ratings, established, are given in Appendix A.

In general terms, the preconditions, mechanisms, outcomes and consequences for the gas network were mapped as follows on the basis that in every case the 'event' is a 'gas incident' where control over flow of gas has been lost or nearly lost.

Preconditions	Mechanisms	Events	Outcomes	Consequences
Design Commissioning Inspection Maintenance Operation Environment Training Management	Third-party damage. Asset failure Unauthorised access Unintended electrical contact. Vandalism	gas incident	Gas escape. Ignition. Near-miss.	Nil Fatality Injury Property damage Loss of corporate image. Compensation. Fines.

Control measures for design, commissioning, inspection, maintenance, operation, environment, training and management are embedded in the mature systems based on the ISO9001, ISO14001 and AS 4801 standards as procedures, internal standards and manuals.

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3 RISK REVIEW

AusNet Services routinely, or whenever a system change occurs, conduct a risk review to establish the extent of any change in perceived network risks outlined in the FSA to maintain risk at a level as low as reasonably practicable.

4 TECHNOLOGY, ASSISTANCE AND FUTURE DEVELOPMENT

AusNet Services recognises the importance of effective risk management and is committed to improving its risk management processes and capabilities throughout its business. Risk management is about recognising uncertainty and making sure the risks are aligned with corporate and local objectives. AusNet Services risk management process enables enhanced decision making, supports effective change management and provides an environment of continuous improvement.

AusNet Services has implemented a Risk Management Information System (RMIS) to maintain and capture risks managed throughout the business. The RMIS enables risks to be assessed, categorised, monitored, reviewed and reported in a systematic and consistent manner. The RMIS also enables:

- Risks to be prioritised against each other and provides a better basis to facilitate decision-making with respect to resource allocation and risk treatment;
- Controls and treatment plans to be recorded, monitored and reports produced;
- Internal Audit to develop the Internal Audit Plan with consideration of AusNet Services risks;
- The development of strategic plans, divisional business plans, asset management, statutory and regulatory obligations and insurance renewal strategies with consideration of the business risks; and

Gas Networks – Service Delivery have implemented RMIS to the FSA risk management processes. Microsoft excel is currently used to record and monitor FSA risks.

5 APPENDICES

Appendix A – Risk identification and management

Appendix B – Risk mitigation summary

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Appendix A – Risk identification and management

Refer separate document “GSC 10-02-01 Risk Identification and Management”.

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Appendix B – Risk mitigation summary

Risk Control Effectiveness (RCE): Improvement initiatives for Controls.

The RCE is an indicator as to whether AusNet Services is doing all that it could or should to manage each risk element. It is an assessment of the actual level of control that is currently present and effective compared with that reasonably achievable for the particular risk.

AusNet Services 2014 Formal Safety Assessment did not identify any additional risks requiring consideration; with the total number of risk elements identified remaining at sixty five (65). Additionally, while some risk 'proposed controls' have been implemented, it was deemed that no material change to the resultant risk has occurred. Hence, the number of risks assessed that are only 'Substantially Effective' has remained at six (6). Each of these SE risks' has proposed risk treatments that are actively being pursued in departmental work plans and continual improvement initiatives in order to address them.

AusNet Services Risk Management Framework provides the guidelines for the RCE assessment and classifies 'Substantially Effective' as "Most controls are designed correctly and are in place and effective (i.e. partially effective). Some work to be done to improve operating effectiveness or management has doubts about effectiveness and reliability".

The indicators for 'Substantially Effective' are:

- Designed appropriately to meet its objectives
- Operating as anticipated the majority of the time
- Documented and accessible
- Communicated to and understood by relevant persons
- Reviewed on a regular basis (at least annually) but may not be updated when necessary
- Approved by the relevant committee
- Reviewed as part of the IA process and only low rated issues were identified.

For those risks achieving a 'Fully Effective' classification for the RCE, AusNet Services acknowledges that existing controls are well designed and implemented, and that the exposed risk level is acceptable.

Risks achieving a score of three (III) within the corporate Risk matrix suggest action plans be prepared and implemented normally within one (1) year. The FSA currently has two (2) risk elements within this category, both of which are recorded as 'Substantially Effective' with proposed risk treatments.

Four (4) additional risk elements with a score of four (IV) are also identified as Substantially Effective despite their low resultant risk.

Mitigation and improvement initiatives for 'SE' classified risks are summarised in the following table.

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Asset Group	Asset Element	Risk	Risk Matrix Priority	Control Effect.	RISK TREATMENT (Current Controls)	RISK TREATMENT (Future/ Proposed Controls)
GAS-SPECIFIC EQUIPMENT	Availability of equipment for emergency	Delayed or inadequate emergency response due to inability to access correct emergency equipment.	III	SE	Principle Service Provider control equipment listing, service and calibration intervals by means of Management Services Plan. Noted Principle Service Provider now owns gas specific equip., therefore control effectiveness should improve. Revetti equipment and Poly Stop available if required for planned works. SP has acquired temp by pass hoses and temp district reg setups.	Purchase of appropriate isolation equipment is part of the new Principle Service Provider contract. No change to risk until equipment is purchased.
DESIGN TO OPERATION	Site access	Site lock security compromised	III	SE	Control of keys, keys are security pattern with ordering restricted to listed personnel	Introduce implementation of key ownership register with new key system.
MONITORING SYSTEMS	Charts	Not as informed system modelling decisions may be made impacting Network Planning	IV	SE	Chart runs, incidental observations, work methods, calibration schedule, trial of electronic recorders.	Introduction of digital recording technology to replace existing pressure chart recorders.
INTERFACES	Retailers	Retailers fail to pass on pertinent information (load information) leading to miss-sized installations.	IV	SE	Representatives, Constant meetings / liaison, Legal obligations, Internal Processes.	Retailers not recording signed contracted MHQ's. Meter loads and disconnection notices and communication requires improvement. Copy of customer load contracts is required. Process is under review. Shippers to be rejected if no MHQ present.

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Asset Group	Asset Element	Risk	Risk Matrix Priority	Control Effect.	RISK TREATMENT (Current Controls)	RISK TREATMENT (Future/ Proposed Controls)
DATA	Data integrity (Q4, AMFM etc.)	Compromised asset planning and management (maintenance, capital works etc.), caused by questionable data.	IV	SE	SCMC forum and awareness-raising, integrity auditing, change request system	New generation asset databases (EAM implementation). Data quality audits and cleansing being undertaken as part of EAM project. Field mobility units for recording, GPS etc.
FORECASTING	Asset data integrity (Winter Testing)	Inaccurate data (Resulting in limited forecasting / modelling and compromise of network integrity).	IV	SE	Robust, user-friendly system, Winter Testing program in place	Introduction of digital recording technology to replace pressure recorders.

RISK IDENTIFICATION								CURRENT RISK (RESIDUAL)						TARGET RISK			Same as 2013		
Asset Group	Severity / Impact Range Asset Element	Risk (of incident)	Cause (of incident)	Severity / Impact				RISK TREATMENT (Current Controls)	Main Control Reference Documents	ANALYSIS					RISK TREATMENT (Future/ Proposed Controls)	ANALYSIS			Comments from Review (11/11/14)
				Most Likely Consequence	Worst Case Consequence	Ratings Basis (Most Likely)	Consequence Criteria Used			Consequence	Likelihood	Overall Num. Score	Risk Matrix Priority	Control effect.		Consequence	Likelihood	Risk Matrix Priority	
PRESSURE REGULATION	City gate	Loss of pressure control. (Over / Under Pressure)	Equipment failure, physical damage (impacts, terrorism), incorrect setup/settings, system growth outstrips system capacity	Control room intervention, Call out Likely least cost: \$500	Loss of supply (300- 70,000 consumers). Damage to City Gate and/or downstream assets. Loss of revenue. Corporate image affected. Likely worst cost: \$100,000-\$900,000	Loss of supply to average single feed city gate. Years to Decade Event. Loss of 100 to 500 customers	Environment & Community	Design, inspection, maintenance, admin., work methods training, contingency plans, emergency response, information system, over/under pressure protection systems, system redundancy, SCADA monitoring, security and protection (e.g. signage, bollards). CPS, heaters. DBYD, winter testing.	AMP 30-02 Gas Maintenance Plan QMS 21-14-H Gas Design Compliance TS4098 Design of Pressure Regulating Installations with Inlet Pressures Between 7kPa and 10 000 kPa TS4149 Quality Assurance Process for Designated Materials 30-4011: System Operations Maintenance & Operations Manual SOP 25-50: Gas Construction and Maintenance Competency SPIRACS TS4346: Signage for Gas Installations SP4163 SCADA - RTU Scheduled Maintenance TS2315 Cathodic Protection - Transmission System TS2314 Cathodic Protection - Distribution System TS0506 Dial Before You Dig Protocol and Procedure AMS 30-14 Gas network planning - Winter testing AMS 30-51 Network Regulator Strategy	1	B	0.3	IV	FE	Program for additional heater installations at City Gates.	1	B	IV	Ballarat, Bendigo heaters are being installed.
PRESSURE REGULATION	Field regulator	Loss of pressure control. (Over / Under Pressure)	Equipment failure, physical damage (impacts, terrorism), incorrect setup/settings, system growth outstrips system capacity	Control room intervention, Call out Likely least cost: \$500	Loss of supply (300- 10,000 consumers). Damage to field regulator and/or downstream customer assets. Corporate image affected. Injury and/or loss of life. Likely worst cost: \$100,000.	Supply problems to limited customers 1 in 5 years. Unlikely - No heaters required.	Environment & Community	Design, inspection, maintenance, admin., work methods, training, emergency response, monitoring, over/under pressure protection systems, system redundancy, SCADA monitoring, security and protection (e.g. signage, bollards), CPS, heaters, DBYD, winter testing, back feed regulators.	AMP 30-02 Gas Maintenance Plan QMS 21-14-H Gas Design Compliance TS4098 Design of Pressure Regulating Installations with Inlet Pressures Between 7kPa and 10 000 kPa TS4149 Quality Assurance Process for Designated Materials 30-4011: System Operations Maintenance & Operations Manual SOP 25-50: Gas Construction and Maintenance Competency SPIRACS TS4346: Signage for Gas Installations SP4163 SCADA - RTU Scheduled Maintenance TS2315 Cathodic Protection - Transmission System TS2314 Cathodic Protection - Distribution System TS0506 Dial Before You Dig Protocol and Procedure AMS 30-14 Gas network planning - Winter testing AMS 30-51 Network Regulator Strategy	1	B	0.3	IV	FE					
PRESSURE REGULATION	District regulator	Loss of pressure control. (Over / Under Pressure)	Equipment failure, physical damage, system growth outstrips system capacity	Attention to equipment on site required Likely least: \$500	Loss of Supply (30-500 consumers), damage to district regulator, damage to downstream assets, corporate Image, loss of revenue. Likely worst: \$50,000	Unlikely based on historical data	Environment & Community	Design, inspection, maintenance, admin., work methods training, contingency plans, emergency response, information system, over/under protection systems, schedules, winter testing, mains reinforcement program, system redundancy, back-feed regulators, DBYD, scheduled chart recordings.	AMP 30-02 Gas Maintenance Plan QMS 21-14-H Gas Design Compliance TS4098 Design of Pressure Regulating Installations with Inlet Pressures Between 7kPa and 10 000 kPa TS4149 Quality Assurance Process for Designated Materials 30-4011: System Operations Maintenance & Operations Manual SOP 25-50: Gas Construction and Maintenance Competency SPIRACS TS4346: Signage for Gas Installations SP4163 SCADA - RTU Scheduled Maintenance TS2315 Cathodic Protection - Transmission System TS2314 Cathodic Protection - Distribution System TS0506 Dial Before You Dig Protocol and Procedure AMS 30-14 Gas network planning - Winter testing AMS 30-51 Network Regulator Strategy	1	B	0.3	IV	FE					

PRESSURE REGULATION	Industrial/commercial meter/regulator	Regulator failure	Third-party damage, loss of supply, equipment failure, under/over pressurisation of downstream installation.	Likely least: OPSO / Relief trips. Reset regulator (maintenance repair \$500)	Likely worst: loss of production and product. Installation and workforce affected: \$100,000	Unlikely based on historical data.	Financial Impact EBIT	Design, inspection, maintenance, admin, work methods training, contingency plans, emergency response, information systems over/under pressure protection systems, system redundancy, monitoring, OPSO	TS4351 Selecting and Specifying Single Run Regulator Units TS4350 Guide for Selecting and Specifying Standard Dual-Run Regulator Units TS4356 Metering Rooms AMS 30-53 Consumer Regulator Strategy SP4135 Construction of Industrial Commercial Meter / Regulator Installations – LP/MP/HP 1 and HP 2 Inlet Pressures TS4349 Site Selection - Industrial and Commercial Metering Stations TS1308 Construction of Site Works for Industrial & Commercial Metering/Regulating Installations - LP/MP/HP Inlet Pressures	1	B	0.3	IV	FE					
PRESSURE REGULATION	Domestic regulator	Regulator failure	Third-party damage, material defect – regulator, leaks, tampering, meter location, contaminant blockage.	Replacement of one regulator unit.; \$200 per failure;	Likely worst; property damage due to fire (1 in 10 years; \$90,000) and damage to corporate reputation.	10,000 change-over regulators p/a = 10,000/600,000 customers = 2/100 yr.	Environment & Community	AS5601, AusNet Services Technical Standard. (Standards on location, venting, pressure equipment standard etc.). Personnel competencies and training.	AMP 30-02 Gas Maintenance Plan SOP 25-50 Gas Construction and Maintenance Competency AS5601 Gas Installations TS4351 Selecting and Specifying Single Run Regulator Units TS4352 Gas Meter Location - Single Occupancy Domestic Premises TS4355 Metering Pressure for Domestic Billing Meter AMS 30-54 Meter Management Strategy	1	B	0.3	IV	FE	Recording of regulator installation and locations. Enabling monitoring of regulator failure tracking.	1	B	IV	
PRESSURE REGULATION	Meter Room	Non compliant meter room.	Changes to construction of room without the knowledge or authority of AusNet Services.	Non sealed, or fire rated penetrations, or fittings into the room.	Non fire rated ceiling or incorrect venting of regulators.	Inspections have shown most likely scenario is non compliant fire or electrical ratings.	Financial Impact EBIT	Existing sites have been visited and reviewed. New rooms are built and inspected for compliance to standard. new procedure captures and records relevant certificates. Yearly visits to check compliance	AS5601 Gas Installations TS4356 Metering Rooms 30-2544 Process for Gas Meter Room Installations	1	C	1	III	FE	Existing non compliant rooms are being dealt with (corrected) on a priority basis.	1	B	IV	Frequency of identified issues likely to drop with yearly inspections and corrective works.
PRESSURE REGULATION	Restoration of supply	Injury to consumer or damage to consumer's property	Faulty reinstatement of supply.	Plumber required to relight appliances. <\$500	Appliance damage. <\$10,000	Unlikely 1 per 10 year	Financial Impact EBIT	Policies and procedures. Competent staff and contractors	GFP 2.12 Emergency Outage Procedure	1	B	0.3	IV	FE					
TRANSPORTATION	Pipeline (licensed)	Pipeline incident	Third party damage, escape, corrosion, electrical surge (lightning), coating damage, blockage, fittings (failure, creating restrictions), pipe material, age of pipe, ground conditions, construction and repair techniques, ground vibration, gas quality	Near Miss / minor damage requiring dig up, investigation and coating repair. (1 in 10 yr. event of minor damage) (5x year event for near miss with no contact). (\$5000)	Metal gouge. Pipeline repair in the order of \$500,000. Extreme scenario is breach of containment (\$?). Loss of 50,000 customers. (1 in 100 year event - maybe).	Consequence of most concern is pipeline breach. This ratings approach is more conservative than the "most likely impact" recommended.	Financial Impact EBIT	Design, inspection, maintenance, admin., work methods training, contingency plans, emergency response, information system, DBYD, leakage survey, corrosion protection, pipeline markers, SCADA, easements, pressure charts, contractor / public awareness programs, gas quality survey, pipeline patrols processes in place to detect unauthorised works within TP easement (3m either side of mains). Permit to work system. Audit of pipeline patrol service provider which include physical walks of sample pipelines. SMS pipeline reviews are conducted every 5 years. Approved pipeline integrity strategy.	TS2607 Conditions for works near Gas Transmission Pipelines and Mains TS4346 Signage for Gas Installations SP4161 Transmission Pipeline Patrol CPS 2308 Protection from Electrical Surges and Induced Voltages on Gas Pipelines TS7962 Procedure for Permission / Rejection of Works within 3 metres of an AusNet Services Licensed Transmission Pipeline TS4156 Vegetation and Planting of Trees near Gas Mains, Compounds & Licensed Transmission Pipelines TS4078 Management of Transmission Pipeline Easements TS4164 Transmission Pipeline Inspection AMS 30-50 Transmission Pipeline Strategy AMS 30-03 Transmission Pipeline Integrity Management Plan	3	A	1	III	FE					
TRANSPORTATION	Distribution mains (unlicensed)	Loss of containment	Third party damage, escape, corrosion, electrical surge (lightning), coating damage, blockage, fittings (failure, creating restrictions), pipe material, age of pipe, ground conditions, construction and repair techniques.	Likely least; Escape due to leak: no customers lost (\$1000).	Likely worst; Loss of supply to ≤ 2000 customers (\$100,000). Or ignition from gas escape (injury or fatality).	approx. 1000 escapes p.a. over 10,000 km Most leaks due to material type. I.e., Cast and unprotected steel on the lp and MP networks.	Financial Impact EBIT	Design, inspection, maintenance, admin., work methods training, contingency plans, emergency response, information system, DBYD, leakage survey, customer reports, corrosion protection, mains renewal program (LP), winter testing, syphon pumping, pipeline markers, SCADA, easements, pressure charts. Risk based mains renewal is per mains and service strategy AMS 30-52. Valves as per policy TS4004	TS2607 Conditions for works near Gas Transmission Pipelines and Mains TS4346 Signage for Gas Installations SP1600 Construction of Gas Pipework TS5201 Leakage Management AMS 30-52 Mains and Service Strategy	1	E	10	III	FE		1	E	III	
TRANSPORTATION	DB mains (unlicensed) - Squash Off	Long term PE mains damage	Damage to long-term integrity of PE pipe (>110mm) if squashed-off using dedicated hydraulic jacks	Likely least; Near Miss / minor damage (\$5000)	Likely worst; Pipeline repair in the order of \$50, 000	No quantitative evidence available at this time, however risk review team see potential for PE failure where pipe has been 'crimped'	Financial Impact EBIT	Poly stop-off gear is used for planned works. Squash off procedure. Following unplanned – Emergency – work. SP insist on section replacement by planned work. Use of squash off resistant PE100.	GFP 5.19 Squash off Small Diameter Mains GFP 5.17 Squash-off and repair of large diameter PE mains SP4164 Squash off Jacks - Small Diameter Main	1	A	0.1	IV	FE					

TRANSPORTATION	DB mains (unlicensed)	Damage to HP2 main	Poor HP2 management, / implementation / monitoring.	Likely least; Near Miss / minor damage. 1000 customer. (\$50,000)	Likely worst; gouge, Pipeline repair in the order of \$50, 000, breach of containment - major escape. 5,000 customers.	No 3rd party incidents since introduction of HP2 mains (1970's). -Near miss or escape repair	Financial Impact EBIT	HP2 mains currently only used as supply mains, and feature no tapping's. (at <1,050kPa). HP2 Standard. Inspected annually, and report on. They re laid with additional protection (slab, deeper cover, etc.), however additional control may be required re isolation of these mains when responding to damages, etc.	TS4163 Inspection of HP2 Distribution Mains SP1600 Construction of Gas Pipework GFP 5.18 HP2 Squash Off Procedure	2	A	0.3	IV	FE	HP2 limitation policy to be developed. (I.e. HP2 in steel only. No consumers tapping's).				
TRANSPORTATION	Services	Service damage	Third party damage, escape, corrosion, electrical surge (lightning), blockage, fittings, pipe material, age of pipe, ground conditions, construction and repair techniques, water from mains (LP only), tree roots, vermin.	First / third party damage Domestic - \$500, - Industrial \$2500 – Frequency: 1250 per year (1-customer affected)	First / third party damage Industrial - <\$100,000	3rd Party Domestic Gas escapes Approx. 1,250 in 600,000	Financial Impact EBIT	Design, inspection, maintenance, admin., work methods training, contingency plans, emergency response, information system, leakage survey, public reporting, corrosion protection, syphon pumping of mains, mains renewal program. Introducing public awareness campaign to prevent issues. Policy mandates services greater than 40mm for HP are recorded. (greater than 100 for LP / MP),	SP4164 Squash off Jacks - Small Diameter Main GFP 1.02 General Information for Service Laying GFP 3.XX Service Laying Section TS4354 Guide for Selecting and Specifying Service Regulator Pits (Black Box) TS4147 Location of Underground Services AMS 30-52 Mains and Services Strategy	1	E	10	III	FE	Risk Treatments Considered: Recording of services schematically, meters at boundary.				
TRANSPORTATION	Valves	Inability of PSP to operate valves	Inability of PSP to operate valve, leak, not locatable, not accessible, valve selection, maintenance, TP Valves / Critical Valves inoperable	Likely least consequence - not being able to locate or operate valve; \$500	Likely worst - Emergency response (shutting off gas) seriously affected, causing escalation of escape or fire. (Lost revenue (gas loss), loss of corporate image, evacuations & power shut-offs (loss to business, additional cost of applying Williamson gear, replacement of valve: \$100,000)	Based on field data. 1 in 10 yr. Unlikely	Financial Impact EBIT	Internal standards. - District Plans - Mains Details - AM/FM - Isolation equipment - availability of crews - maintenance equipment - valve maintenance - Mains renewals Critical valves are identified and recorded according to policy and maintained. Squash off / other isolation available. New PSP contract mandates appropriate stop off gear is available.	AMP 30-02 Gas Maintenance Plan TS4004 Policy on Valves in Systems operating at <1050KPa TS7900 Policy on Valves in a TP System SP4038 Valves - Online Inspection TS4063 Policy on Valve Security TS4073 Colour Code for Valve and Syphon Covers GFP 8.01 Guidelines for locating underground assets TS4066 Field Recording of Assets TS2613 Recording of Pipelines & Mains Information on Record Plans	1	B	0.3	IV	FE					
TRANSPORTATION	Syphons	Customer issue from mains blockage.	Third party damage, Incorrect records / locations, Inability to use syphon.	Likely Least: Pressure loss through restriction or leakage; \$2000	Likely Worst: Loss of supply and damage to appliances up to 500 customers; \$50,000 likely 1 per 10 years	20/1,700 Rare	Financial Impact EBIT	All of the above, leakage survey, upgrading where possible, syphon pumping. Mains renewals program (LP-HP) Increasing rate of syphon removal. Recorded in GIS, Scheduled visits for critical syphons.	AMP 30-02 Gas Maintenance Plan TS5201 Leakage Management AMS 30-16 Leakage Survey – Trigger Survey SP1600 Construction of Gas Pipework AMS 30-52 Mains and Service Strategy	1	A	0.1	IV	FE					
MONITORING SYSTEMS	SCADA	SCADA failure (loss of control / monitoring)	Control room evacuation, loss of Host Computer, Loss of RTU, loss of Communications line, Physical damage (Impacts, terrorism, vandalism), Fire, Water, equipment failure, power surge, lightning. Human error is most likely cause.	Communications supply lost. Inability to provide timely response.	System control set too high or low.	Most likely consequence.	Financial Impact EBIT	Design, Maintenance, Work methods, training. SCADA Host System redundancy, security and protection (e.g.. security cards, signage, bollards). Set lower and top limits at field installations. CEOT contingency planning. 48hr SCADA Battery UPS.	AMP 30-02 Gas Maintenance Plan SP4163 SCADA - RTU Scheduled Maintenance QMS 21-14-F SCADA Electrical Equipment Installation Compliance AMS 30-57 SCADA Strategy	1	B	0.3	IV	FE					
MONITORING SYSTEMS	Charts	Questionable system modelling decisions.	Questionable chart results resulting in downstream supply issues from inaccurate modelling.	Additional chart readings, modelling and augmentation to correct system issues.	Unidentified augmentation resulting in loss of supply during future winter peak.	Frequent chart issues. Resulting in rework.	Financial Impact EBIT	Chart runs, incidental observations, work methods, calibration schedule, trial of electronic recorders.	AMS 30-17 Network Capacity Strategy AMS 30-14 Gas Network Planning	1	B	0.3	IV	SE	Introduction of digital recording technology to replace pressure recorders.	1	A	IV	
RISK MITIGATION SYSTEMS	Corrosion prevention systems	Loss of corrosion protection	Equipment failure (impressed current, galvanic, stray current), over protection, under protection, loss of network electrical integrity, loss of power, third-party damage, vandalism, lightning strike / power surge, corrosion of cabinet.	Equipment failure (up to \$1,000)	Damage to anode bed, requiring replacement (\$50,000)	100 per year - failure of CP system Unlikely	Financial Impact EBIT	Design, inspection, maintenance, admin., work methods training, contingency plans, emergency response, information system, routine monitoring of CP system, coating defect surveys, electromagnetic coil surveys. Noted that issue re regenerative tram and train braking is less of an issue in 2008.	AMP 30-02 Gas Maintenance Plan CPS 2308 Protection from Electrical Surges and Induced Voltages on Gas Pipelines TS2315 Cathodic Protection - Transmission System TS2314 Cathodic Protection - Distribution System AMS 30-56 Cathodic Protection Strategy	1	B	0.3	IV	FE					
RISK MITIGATION SYSTEMS	Leakage strategy	Poor leakage mitigation - Failure to detect significant leak	Leaks on mains, services, failure of assets. 3rd party damage, non reported / detected leaks. Poor design (relief location).	Negative public perception of gas safety, est. \$2,000 per repair	Explosion resulting in injury / death, property damage, Significant deterioration of pipe, incurring high repair/replacement cost; est. \$50,000 per repair	Rare that major leaks are undetected / not reported.	Financial Impact EBIT	Risk-based leakage survey. (All high risk areas Hospitals etc.). Work practices. Odourisation of gas. Increased frequency of survey for High risk areas. Trigger survey: public reported leaks trigger survey of all CI and unprotected steel in postcode.	TS5201 Leakage Management AMS 30-16 Leakage Survey – Trigger Survey	1	B	0.3	IV	FE	Leakage strategy to be reviewed.				
RISK MITIGATION SYSTEMS	Easement patrol (Transmission)	Poor easement access	Unable to gain access to assets, no maintenance, no identification, no awareness, encroachment of easement.	Near miss, \$20,000	Cost: \$500,000 (damage repair and loss of supply).	Unlikely, based on historical data	Financial Impact EBIT	DBYD, TP patrol contract, standards, pipeline markers. Pipeline patrol. Planning permit system	SP4161 Transmission Pipeline Patrol TS4346 Signage for Gas Installations TS2607 Conditions for works near Gas Transmission Pipelines and Mains TS0506 Dial Before You Dig Protocol and Procedure	1	B	0.3	IV	FE	Easement vegetation assessment being conducted.				
RISK MITIGATION SYSTEMS	Easement patrol (Distribution)	Poor easement access	Not patrolled (DB), no maintenance, no identification, no awareness, encroachment of easement.	Near miss, \$2000	Cost: \$150,000 (damage repair and loss of supply).	Unlikely, based on historical data	Financial Impact EBIT	DBYD, standards, supply main markers, Planning permit system	TS4346 Signage for Gas Installations TS2607 Conditions for works near Gas Transmission Pipelines and Mains TS0506 Dial Before You Dig Protocol and Procedure	1	B	0.3	IV	FE					

RISK MITIGATION SYSTEMS	Compounds	Unauthorised access to assets causing non network integrity issues.	Inadequate security, vandalism, signage, third-party damage to fencing, maintenance, human error (not securing site).	Corporate image. Injury. Likely least cost: \$5,000	Corporate image. Loss of revenue. Litigation. Likely worst: \$100,000	Vandalism or theft: 1 events p.a. =1/60 Unlikely	Financial Impact EBIT	Standards, proven design, inspection, maintenance, security patrol, signage (contact details). All sites visited on a minimum 6 month basis (including perimeter). All fenced and coded locks. Fencing programs.	TS4346 Signage for Gas Installations SP4161 Transmission Pipeline Patrol AMS 30-18 Strategy on Security, Noise, Vegetation and Separation Safety for Gas Regulating Stations TS6601 Security Fencing (Inner High Security) TS6600 Security Fencing (General Security) TS4063 Policy on Valve Security	1	B	0.3	IV	FE				
RISK MITIGATION SYSTEMS	Markers	Insufficient marker signage	Vandalism, incorrect information, obscured marker, third-party damage (to marker), incorrect location, weather.	Third-party damage to marker: \$2,000 Monthly occurrence	First or third-party damage to asset: \$25,000 1 event p.a.	Pipeline patrol data. =12/2,000 markers Rare	Financial Impact EBIT	Pipeline patrols, risk assessments, incidental observations, ESV, CPS, location standards. Noted markers have faded prematurely since AusNet Services rebranding. Replacement program in place. Engineering report contains details of signage monitoring and replacements resulting from inspection and patrols	SP4161 Transmission Pipeline Patrol TS4346 Signage for Gas Installations	1	A	0.1	IV	FE				
DESPATCHING FUNCTION	Control room	Control room monitoring / dispatch failure	Malfunction: i.e. from overtaxed to total breakdown	Lost Priority A call; emergency not attended in time.	Escalation of incident; fire, explosion	KPI for response is 95% metro / 90% country Rare	Environment & Community	Procedures, training, equipment, software. Cross skilling of dispatch personal and controllers. Dedicated management of Gas Control room.	AMS 30-57 SCADA Strategy SP4163 SCADA - RTU Scheduled Maintenance GOC 33-2201 Dispatching Trouble Orders in Gas PowerOn GOC 33-2220 Gas Manual Dispatch Process GOC 33-2217 Dispatching Gas Faults to Field Resources (via Two-way Radio / Phone)	1	B	0.3	IV	FE				
DESPATCHING FUNCTION	Relationship with PSP	PSP (service truck) dispatch failure.	Degraded relationship with PSP, communications breakdown.	KPI's. Employee relationship between dispatch / radio room and CEOT is degraded.	Prosecution of AusNet Services under s32 of Gas Safety Act through unsafe practice (1500 Penalty Units), PSP Financial concerns, Potential Litigation	Rare, historical relationship.	Legal & Compliance	Procedures, SCMC, training, effective communication between AusNet Services and PSP, effective emergency response (AusNet Services/PSP), incident debriefs (and corrective actions), PSP contract now set for 5+ years.	PSP Contract GOC 33-2201 Dispatching Trouble Orders in Gas PowerOn GOC 33-2220 Gas Manual Dispatch Process GOC 33-2217 Dispatching Gas Faults to Field Resources (via Two-way Radio / Phone)	1	A	0.1	IV	FE				
INTERFACES	Relationship with Regulators	Regulator reverts to compliance based approach rather than risk based approach (GSC).	Challenging relationship with ESV, AER, DSDBI, ignoring of ESV audits / warnings / questions etc.	Lack of tolerance from Regulator for quality or timeliness of reports etc. Severity measured in terms of inconvenience to AusNet Services to meet inflexible requirements. Likely least: Min. penalty for omission of report etc. \$10,000;	Lack of tolerance from Regulator for quality or timeliness of reports etc. Severity measured in terms of inconvenience to AusNet Services to meet inflexible requirements. Likely worst: Max. penalty for omission of report etc. \$150,000.	Unlikely	Regulation	Concerted effort to develop and maintain meaningful and open relationship with Regulators.	Gas Safety Case Regulations Gas Safety Act	2	B	0.9	III	FE				
INTERFACES	AEMO	AEMO fail to pass on pertinent information	AEMO fail to deliver required pressures and fail to communicate this. Deteriorating AEMO relationship.	Network not impacted.	Loss of customers	System designed to cope with minor excursions. Occurs infrequently Unlikely	Reputation	SCADA monitoring and warning. Annual AEMO-run industry meetings. Ad hoc meeting with AEMO at operational levels.	Access Arrangement	1	B	0.3	IV	FE				
INTERFACES	APA	APA fail to pass on pertinent information	GasNet operations and maintenance affects supply of gas to AusNet Services. Deteriorating GasNet relationship.	Consultations with GasNet (\$5k), Corporate image affected	Loss of City Gate(s) from un-notified works or operations, Corporate Image affected	Maintenance conducted competently Unlikely	Reputation	SCADA, procedures, notifications, Meetings held with AusNet Services and other DB's	APA CTM Agreement APA Supply Agreement	1	B	0.3	IV	FE				
INTERFACES	Gas Pipelines Victoria	GPV fail to pass on pertinent information	Lack of communication from Victorian Pipelines on maintenance issues. Deteriorating GPV relationship.	Consultations (\$5k), Corporate image affected	Loss of supply downstream (3,500 consumers for 1 week). (\$50,000 for loss of DuOS, public safety awareness and relighting).	Unlikely based on historical dealings	Regulation	Availability of GPV Emergency Management Manual Provision of joint emergency response facilities	GPV Supply Agreement	1	B	0.3	IV	FE	Agreement to be reviewed as part of new town Avoca connection.			
INTERFACES	Government & Other Authorities	Council fails to pass on pertinent information.	Loss of effective liaison with councils. Road bill amendments.	Costs associated with compliance with illegal council directives.	Costs associated with compliance with illegal council directives	Such council 'directives' occur monthly or more frequently =12/3,000 jobs Rare	Reputation	Contractors / Service Delivery deal with day-to-day interactions, Road Management Act, Legal obligations, Internal Processes		1	A	0.1	IV	FE				
INTERFACES	Emergency services	Emergency services / AusNet Services fail to communicate pertinent information.	Call received from '000' not directed to NRC or NRC misdirects call or response from NRC not timely. Deteriorating emergency service relationship.	Emergency service remains but AusNet Services response delayed (nil cost)	Emergency service remains, AusNet Services response delayed and ignition occurs causing damage to property (up to \$100,000)	Unlikely to happen with well-established processes in place.	Reputation	Very effective control: Industry protocol in place with NRC including contract with regulator, and skill operators.		1	B	0.3	IV	FE				
INTERFACES	Relationship with Specialist service provider	Lack of timely availability of specialist services	Such as emergency fittings, repairs from TDW and Gasnet, material testing, odorant testing or total loss of any such service through liquidation of the provider. Caused by deteriorating relationship with service providers.	Delay in service/repair – Minor - \$10,000	Delay in service/repair – Minor - \$100,000	Time delays in notifying appropriate personnel to arrange deployment of services. Unlikely	Reputation	Contracts and service provisions have been established with specialist service providers. Contract approval process in place	PSP Contract APA 009 Emergency Stores Contract	1	B	0.3	IV	FE	Test 009 stores in emergency exercise			

INTERFACES	Internal relationships	Critical projects not delivered on time.	Misunderstanding between departments of objectives, not knowing what each business unit is achieving, differences in core values and business objectives across businesses (i.e. AusNet Services, PSP)	Duplication of effort - \$1,000	Total miss-understanding of each department's business objectives and drivers - \$100,000 (breach of regulations)	Historical records Unlikely	Financial Impact EBIT	Department structures, clarification of corporate and group goals and objectives through group meetings, quarterly management updates, role accountabilities.	TS4067 Management of Major Transmission and Distribution Projects	1	B	0.3	IV	FE				
INTERFACES	Retailers	Retailers fail to pass on pertinent information (load information) leading to miss-sized installations.	Loss of effective liaison with retailers.	Costs associated with compliance, complaint resolution, corporate image affected	Costs associated with compliance, complaints	Unlikely based on data	Legal & Compliance	Representatives, Constant meetings / liaison, Legal obligations, Internal Processes.	Access Arrangement	1	B	0.3	IV	SE	Retailers not recording signed contracted MHQ's. Meter loads and disconnection notices and communication requires improvement. Copy of customer load contracts is required. Process is under review. Shippers to be rejected if no MHQ present.			
INTERFACES	Customers	Escalating unresolved customer complaint (ombudsman etc.).	Loss of effective liaison with customers	Costs associated with compliance, complaint resolution, corporate image affected	Costs associated with compliance, complaints	Unlikely based on data	Legal & Compliance	Trained representatives, Legal obligations, Internal Processes	QMS 21-03 Complaint Handling 10-2208 Customer GSL compensation	1	C	1	III	FE	Customer communication is being overhauled to try and address customer complaints.			
ORGANISATIONS	Resources and competencies	Insufficient resources or skills affecting safety of assets.	Failure to respond adequately due to insufficient resources	Appropriate skills but insufficient resources. Delay in decision making, resulting in inconvenience or labour hours lost: say \$10,000.	Appropriate skills but insufficient resources. Decisions are not made autonomously, but by teams of skilled professionals (AusNet Services and PSP). However, may lead to overwork and inefficient decision-making, resulting in need for rework, inconvenience or labour hours lost: say \$50,000.	Ongoing	Financial Impact EBIT	Staff selection process, PSP contract, training (AusNet Services / PSP) and 'cross skilling', Graduate Programs. Recruitment incentives incorporated into PSP contracts.	PSP Contract AMS 30-01 Asset Management Strategy	1	B	0.3	IV	FE				
ASSET MANAGEMENT	Asset Management Plan	Asset failure from poor asset management planning	Poor long-term planning affecting asset life or safety. Maintenance activity not correctly identified. Maintenance regime inappropriate. Maintenance not conducted as per plan	Likely least: Under-estimated renewal program (small-scale: \$10,000) Asset failure causing emergency response	Likely worst: Under-estimated renewal program (large-scale: \$50,000). Suggest frequency 1 in 10 years. Asset failure causing significant damage to property, or large scale loss of supply	Decisions are not made autonomously, but by teams of skilled professionals (AusNet Services and PSP) and scrutinised by Management. The A-to-P process acts as a further safeguard for authorising works. Also any errors found are quickly corrected - not left to wreak havoc. Accordingly the risk of significant error affecting asset life or public safety is considered very small. Unlikely	Financial Impact EBIT	Team decision-making, management scrutiny, A-to-P process for works to commence. Very good contract management and computerised maintenance management system. ISO 55000 accreditation asset management committee asset management strategies and plans	AMS 30-01 Asset Management Strategy AMS 30-05 Gas System Contingency Plan AMS 30-17 Network Capacity Strategy AMS 30-14 Gas network planning - Winter testing AMS 30-50 Transmission Pipeline Strategy AMS 30-51 Regulating Facilities - Network Strategy AMS 30-52 Mains and Services Strategy AMS 30-53 Regulating Facilities - Consumer Strategy AMS 30-54 Meter Management Strategy AMS 30-56 Cathodic Protection Strategy AMS 30-57 SCADA Strategy AMS 30-58 Mt Baw Baw LPG Reticulation Network Strategy	1	B	0.3	IV	FE				
ASSET MANAGEMENT	Performance monitoring	Incorrect gas network monitoring	The business monitoring of the gas network is inefficient or inadequate, leading to an unacceptable risk to public or property.	Informal or ad hoc monitoring - data integrity understood (minimal; even long-term).	Ad hoc monitoring - data integrity not known (less than \$10,000).	Some form of monitoring will always take place; if for no other reason than for KPI monitoring and measurement imposed by regulators. It is a stable industry where the most contentious issue may be data integrity. Unlikely	Financial Impact EBIT	Both from business operational and regulatory scrutiny perspectives, there will never be a situation of no monitoring. Professional, skilled and experienced staff both in AusNet Services and the Alliance will ensure that monitoring takes place in some form. A risk in monitoring is more concerned with the proficiency and adequacy of monitoring.	AMS 30-57 SCADA Strategy GOC 20-01 Gas Network Control and Monitoring	1	B	0.3	IV	FE				
ASSET MANAGEMENT	Third-party damage	Third Party Damage	Damage to AusNet Services gas assets incurred by a third-party (i.e. not AusNet Services or AusNet Services-contracted party).	Damage typically to a service and/or distribution main per annum causing escapes, requiring crew and occasionally TDW response (\$1,000-\$5,000 in damage restoration and corporate image).	Damage to TP (ring main). Requires outside services (e.g. GasNet) to repair. Excluding litigation costs as those will be passed on to the 3rd party. Cost of repair \$250,000 in damage restoration and corporate image. Unlikely	Historical records. Ave mains damage rate: 0.6 hits / 1000 km (6 per month) Unlikely	Financial Impact EBIT	Faster Electronic DBYD process, leaflet advertising of DBYD, district plans, pipeline patrol, marker plates, ESV public awareness campaign, 'No Go' Zone campaign	TS0506 Dial Before You Dig Protocol and Procedure SP4161 Transmission Pipeline Patrol TS4346 Signage for Gas Installations SP1600 Construction of Gas Pipework	1	B	0.3	IV	FE				Move to electronic dbyd system has not materially reduced likelihood of event. Rating unchanged.
ALPINE RESORT	Emergency response	LPG supply emergency	Response lag from LPG company in the case of ignition of significant escape from LPG provider's bulk storage facility.	Peak season (Winter); fire does not spread beyond facility and is able to be contained by local personnel until emergency response arrives (cold weather). Damage to facility; but no supply interruption. Precautionary reduction in power generation for 1 day. Some loss of business to ARMB (say \$1000).	Off season (Summer); potential fires. Minor damage to resort	On basis of good maintenance of facility by LPG provider; once in 20 years. Unlikely	Reputation	Design, Inspection, Maintenance, Administration, Work methods, Training etc. Contingency plans, Emergency response, Info system, Appropriate regulator selection. Visited annually. Frequent ESV audits.	GOC 21-04 Notification of Incident - Mt Baw Baw	1	B	0.3	IV	FE				

ALPINE RESORT	Emergency isolation	Non-timely emergency isolation of Mt Baw Baw LPG system.	Effective process not in place at Mt Baw Baw resort for emergency isolation of LPG vapour supply from the network.	Ad hoc process in place for people to respond to a need to isolate supply. Inefficient/delayed response to an emergency, extending escape of LPG (heavier-than-air gas) or fire. Bearing in mind 'line pack' in the network, effect will not be immediate. No effect.	No process in place with appropriate delegations leading to lack of awareness of means point of supply isolation, allowing a fire to propagate unchecked until pipe exposed and squashed off (\$30,000)	Isolation at supply vessel is a last-resort action for a large un-checked escape or fire and would, in most cases therefore, have little or no meaningful effect. Rare	Reputation	A process, managed by the ARMB, is in place and emergency exercise held once per year. Appropriate regulator selection	GOC 21-04 Notification of Incident – Mt Baw Baw	2	A	0.3	IV	FE				
ALPINE RESORT	LPG (Heavier-than-air gas)	Dangerous LPG containment breach	Ignition of LPG after 'pooling' (in snow or internally) or spilling as a heavier-than-air gas after third-party damage.	Leak on meter installation - \$10,000	Third party damage to main supply line - \$100,000	'Concerning' as pooling likely to occur at or near point of delivery or use (because of connections) and therefore ignition likely to be in or in vicinity of a cabin. Escapes from third-party damage 'roll down' slopes and endanger persons or structures. Minor leaks have been detected on metering installations. Unknown location of existing services Unlikely	Financial Impact EBIT	Annual Leakage Survey to main gas line and at customer installations Emergency Response Plans in place DBYD process in place Emergency equipment held on Mountain Mountain Board has procedures in place for the control of excavations. Regulator Selection (OPSO)	TS5201 Leakage Management AMS 30-58 Mt Baw Baw LPG Reticulation Network Strategy	1	B	0.3	IV	FE	Blower to be housed on site for gas dispersion purposes. Additional markers.			
ALPINE RESORT	Environmental Conditions & Effect on network/ equipment	Access to or integrity of assets is impaired.	Weather conditions affect the integrity of the asset, hinder access to asset	Nuisance value	Equipment operability affected by weather, potential for more call outs	Equipment designed to counter the affect of weather, Failure unlikely based on historical data	Reputation	Design, Regulator selection, work practices	AMS 30-58 Mt Baw Baw LPG Reticulation Network Strategy	1	A	0.1	IV	FE				
DATA	Data integrity (O4, GIS etc.)	Compromised asset planning and management (maintenance, capital works etc.), caused by incorrect data.	Loss, corruption of existing data. Inaccurate entry of new data.	Incomplete asset historical data (i.e. for installation or maintenance)	Significant impairment of network modelling capability (refer Forecasting PRA) - under-design (insufficient capacity). 3rd party damage from incorrect plans, Legal action from customer; loss of customer; corporate image - <\$100,000	Recording and inputting errors. =5,000/90,000 records estimated A lot of mirrs unrecorded. Unlikely	Financial Impact EBIT	Scheduled maintenance meetings and awareness-raising, integrity auditing (back office auditing), change request system		1	B	0.3	IV	SE	New generation asset databases (EAM implementation). Data quality audits and cleansing being undertaken as part of EAM project. Field mobility units for recording, GPS etc.	1	B	IV
FORECASTING	Modelling tools	Unable to model due to software licence expiry.	Tool in question: "Synergie" produced by Advantica. Risk: Licence expires. Modelling tool is considered by the users as reliable.	Customer requests unable to met. Short-term (2-3 days) loss of modelling capability	Misjudgement on the capability of the network leading to poor asset selection, re workings, complaints.	Event may occur approx. 1/500 jobs; =Rare	Reputation	Timely annual fee payment.		1	A	0.1	IV	FE				
FORECASTING	Asset data integrity (Winter Testing)	Inaccurate data (Resulting in limited forecasting / modelling and comprise of network integrity).	Poor recording of data (field, pressure recordings etc.) possibly by poor workmanship or equipment error. Inaccurate 3rd party data).	Inconvenience, repetition of tasks ensuring longer hours spent on tasks	Under-design (insufficient capacity): Legal action from customer; loss of customer; corporate image - \$50,000	Trained network modellers experienced in spotting data integrity issues. Unlikely	Reputation	Robust, user-friendly system, Winter Testing program in place	30-2508 Winter Network Analysis AMS 30-14 Gas network planning - Winter testing	1	B	0.3	IV	SE	Introduction of digital recording technology. To be implemented over the current GAAR period.	1	A	IV
FORECASTING	External performance data integrity	Incorrect gas network modelling / forecasting	Inaccurate externally-provided data, used for modelling, sourced from pressure recorders, revenue forecasting, historical BoM records, SCADA monitored information, customer load information (tariff 'D') from AEMO.	Inconvenience, repetition of tasks ensuring longer hours spent on tasks	Under-design (insufficient capacity): Legal action from customer; loss of customer; corporate image - \$500,000	Mostly nil effect. = 10/500 jobs Unlikely	Reputation	In parts system is not robust; e.g. charts and revenue forecasting, but reasonably reliable and depends on intelligent/skilled interpretation. Fewer pressure recorders i.e. more RTU & SCADA monitoring locations	30-2508 Winter Network Analysis AMS 30-14 Gas network planning - Winter testing	1	B	0.3	IV	FE				
GAS-SPECIFIC EQUIPMENT	Availability of equipment for emergency	Delayed or inadequate emergency response due to inability to access correct emergency equipment.	Serviced and calibrated gas-specific equipment not available at time required.	Nuisance value; work delays	Squash-off or Wask Stop-off gear not available in a timely manner for an emergency, leading to prolonged escape and greater fire or explosion risk (\$100,000), injury to worker Loss of supply (city gate fail).	Unlikely to happen	Financial Impact EBIT	PSP control equipment listing, service and calibration intervals by means of Management Services Plan. Noted PSP now owns gas specific equip., therefore control effectiveness should improve. Ravetti equipment and Poly Stop available if required for planned works. SP has acquired temporary by pass hoses and temporary district reg setups.	PSP Contract	2	B	0.9	III	SE	PSP in process of purchase their own high pressure rated equipment to deal with isolation of HP mains upto 100mm. No change to risk until implemented.	2	A	IV

ACCESS CONTROL	Unauthorised access to assets	Unauthorised access to assets causing network integrity issues.	Unauthorised access to compounds for City Gates, terrorism, vandalism, etc.	Tampering, vandalism, damage incurred on parts of installation. (Un intentional)	Tampering, vandalism – serious damage incurred on installation; possible loss of supply control or supply loss. (Valve operation). (Intentional).	Isolated instances of break-in and theft. Unlikely		Some sites are SCADA security controlled, high security locks used on others sites, signs, regular monitoring by personnel for chart changes etc. critical valves locked, security patrols.	TS6601 Security Fencing (Inner High Security) TS6600 Security Fencing (General Security) TS4063 Policy on Valve Security	1	B	0.3	IV	FE	Installation of high security fencing is planned and underway for critical sites.
GAS QUALITY & ODOURISATION	Natural gas - Out of Spec	Out of specification gas in network	Out of specification gas fed into network by upstream suppliers.	Incorrect combustion through low or high Wobbe Index, H2S corrosion in copper consumer piping or loss of odorant – up to \$10,000 for production loss through incorrect heating value, clearing of corrosion product from system or re-colourisation.	Explosion in some industrial appliances if excursion of Wobbe Index is large enough - \$100,000.	Unlikely, based on gas quality records over >30 years. Rare	Financial Impact EBIT	Gas quality contract with external parties, monitoring of gas quality through GTS and notifications by AEMO.	TS4116 Natural Gas Odourisation ESV - Performance Indicators	1	A	0.1	IV	FE	
GAS QUALITY & ODOURISATION	Natural gas - Contamination	Contaminated Gas (e.g., Oil) in network cause supply problems.	Contaminated Gas (e.g., Oil) fed into network by third party suppliers.	Minor contamination of downstream consumer process. Asset Integrity (Regulators, Meters) affected Regulatory attention ESV (Energy Safe Victoria) \$10,000 pa	Loss of downstream consumer production. Legal implications due to consumer outage and damage to equipment, product, personnel. Regulatory penalty ESV (Energy Safe Victoria). \$1,000,000	Daily occurrences of downstream oil in small number of consumers fitting line. Unlikely to cause any major issue.	Financial Impact EBIT	Oil tap installations on high occurrence installations. Ongoing consumer liaison on high occurrence sites. Implementation of Coalescers, Oil Traps Appliance checks Involvement in Pigging risk workshops (GasNet). Additional samplers and Coalescers installed in 2007/2008. Improved monitoring program now in place. Control effectiveness improved in 2008. Amended from 3 to 2.		1	B	0.3	IV	FE	
GAS QUALITY & ODOURISATION	LPG	Out of specification gas	Out of specification gas supplied by ELGAS	Incorrect combustion through low or high Wobbe Index – up to \$10,000 for heat damage or replacement of appliances for high Wobbe	Explosion and fire in some appliances if excursion of Wobbe Index is large enough - \$100,000.	Unlikely; based on gas quality records over 5 years.	Financial Impact EBIT	Gas quality contract with external party.		1	A	0.1	IV	FE	
DOWNSTREAM	Connection to unsafe installation	Connection to unsafe installation causes incident.	Gas supply to unsafe installation, is either made, or not identified.	Likely least: Fire or explosion - no injury or property damage. Negative impact on Corporate image affecting gas sales (up to \$10,000).	Likely worst: Fire or explosion causing significant injury or property damage. Prosecution resulting from not having taken reasonable measures to ensure installation is safe (\$150,000).	1 per 10 years. Unlikely	Financial Impact EBIT	Procedure, response to calls from field identifying unsafe installation. COC and ESV approval Trained personnel, Procedures, Processes, Audits Identification and recording of non compliant locations (meter locations) for corrective works planning.		1	B	0.3	IV	FE	
DESIGN TO OPERATION	Design and review	Incorrectly designed system	Design or design review is not rigorous. Lack of clear specifications and standards for design. Lack of internal skills to scrutinise adequacy of design.	Delay in works, Design to be re-engineered	Design to be re-engineered, jeopardising network with poor design choices	Bellarine main laying alignment. ≈1/3,000 jobs Unlikely	Financial Impact EBIT	AusNet Services standards, specifications, contract management, approved design contractors		1	B	0.3	IV	FE	
DESIGN TO OPERATION	Construction, installation, commissioning, operation	Network safety jeopardised through operating asset not being fit-for-purpose or in degraded condition as a result of lack of adherence to any aspect of process.	Construction, installation, commissioning, operation error	Supply issues, repeated field visits.	Supply issues, repeated field visits, Field Procedures Manual not adhered to for main/service laying, may result in reduced life requiring premature replacement or repair (\$10,000).	Some aspect of non-compliance, e.g. where material or component selection does not comply with the Manual, may principally affect price, not integrity. Conversely, for likely worst, adherence to process for e.g. pipe handling, welding process and bedding will have direct impact on asset life. Unlikely	Financial Impact EBIT	Documented and out-worked procedures, processes, competencies and conduct of three levels of technical compliance auditing. CSMP reviews and approvals.	SOP 25-50 Gas Construction and Maintenance Competency	1	B	0.3	IV	FE	Gas Training Competency standard to be reviewed and updated with 2014 requirements.
DESIGN TO OPERATION	Data capture	Correct data not entered in management systems	New or altered asset design not captured in appropriate system database. Data incorrectly added and not identified.	Extension, or component changes not included in survey or maintenance schedules for a period of time before identified by audit. Maintenance behind schedule before correction, misinformed judgements made on data. Misleading DBYD data.	Damage incurred by third party through incorrect or incomplete DBYD information, especially when concerning TP	Historical data: <5% error rate Unlikely	Financial Impact EBIT	Auditing of data capture by PSP and AusNet Services (as appropriate). Processes. Noted that SD are focussing on improved the timeliness of receiving 'as-built' drawings in and SD will review the drawing. Part of SoW requirements. Objective		1	B	0.3	IV	FE	

DESIGN TO OPERATION	Trips & falls/ manual handling	Public and Personnel injury from trip or fall.	Inadequate barricading or signage, poor re-instatement, incorrect installation of pits, inappropriately installed assets, materials left on site.	Minor injury	Death / permanent disability (\$1.2 M)	No incidents last 5 years Unlikely	Health & Safety	Policy, procedures, induction, training, HSEQ committees, toolbox meetings, auditing competencies, Large diaphragm to rotary meter policy, site supervision, auditing, traffic management	SOP 25-50 Gas Construction and Maintenance Competency	1	B	0.3	IV	FE				
DESIGN TO OPERATION	Traffic control	Traffic incident	Poor site management, poor signage, inadequate understanding of consequences & requirements, insufficient training for gas contractors.	Minor injury	Death / permanent disability (\$1.2 M)	LTFI below target Unlikely	Health & Safety	Policy, procedures, induction, training, HSEQ committees, toolbox meetings, auditing competencies, Mission 0 training and rollout (through contractors too), contractor safety booklet. SWMS, JSEA, Project and Traffic Management Plans	SOP 25-50 Gas Construction and Maintenance Competency	2	B	0.9	III	FE				
DESIGN TO OPERATION	Confined spaces	Confined space incident	PSP Asphyxiation through lack of oxygen; toxic gases; venomous snakes or spiders.	Injury/ spider bites	Death, prosecution	No incidents Rare	Health & Safety	Policy, procedures, induction, training, HSEQ committees, toolbox meetings, auditing competencies, Work permit system. Odourisation of Gas, continuous 4 gasses detectors in use, daily bump testing	SOP 25-50 Gas Construction and Maintenance Competency	1	A	0.1	IV	FE				
DESIGN TO OPERATION	Hot tapping	Fault / failure during hot tapping	Inadequate Permit to Work system, equipment, lack of competencies.	Release of gas, injury, loss of supply.	Loss of supply, prosecution by Regulator, major loss of supply, extended repair time	Unlikely	Health & Safety	Policy, procedures, induction, training, HSEQ committees, toolbox meetings, auditing competencies, Work permit system	SOP 25-50 Gas Construction and Maintenance Competency	1	B	0.3	IV	FE				
DESIGN TO OPERATION	Information accuracy	Issue of inaccurate information.	Accuracy of info to customers; e.g. DBYD, time lag to update information (3 months), call centre information accuracy or adequacy obtained from the customer.	Damage to assets, damage to service, operating errors, Not requesting location information and thus potentially damaging asset as info unknown	Injury of contractor or public, loss of supply	Unlikely	Health & Safety	Document control, asset record management, drawings, procedures, training. KPI on the service provider to update GIS.	SOP 25-50 Gas Construction and Maintenance Competency TS0506 Dial Before You Dig Protocol and Procedure	1	B	0.3	IV	FE				
DESIGN TO OPERATION	Site access	Site lock security compromised	Limited control of keys to kiosks, pits or compounds.	Unauthorised access that affects the asset (valve operation). Loss of supply.	Damage, loss of supply, unauthorised access	Unlikely	Environment & Community	Control of keys, keys are security pattern with ordering restricted to listed personnel		2	B	0.9	III	SE	Introduce implementation of key ownership register with new key system.			
DESIGN TO OPERATION	Emergency response	Excessive emergency response time.	Inadequate resources, avail. roster, employee or contractor 'burn-out', lack of trained operators, process time to respond, employee awareness & training, business adherence to emergency reporting protocol, Emergency Mgt.	Extended loss of supply, damage to property, diminished business reputation (media & govt. attention)	Injury to public, customer claims, prosecution,	Unlikely	Reputation	Emergency response process, training, Duty Manager, collaboration with industry, mutual aid, emergency response exercises. (KPI requirement 2 p/a)	PSP Contract	1	B	0.3	IV	FE				
DESIGN TO OPERATION	Plant & equipment and tools of trade	Failure of specialist equipment	Failure of gas detectors, special tools and equipment, no maintenance plan.	Equipment requires replacement.	Injury to employees, public, loss of supply while equipment is being sourced.	Unlikely	Health & Safety	Asset Maintenance Plan, procedures, training, JSA's, Audits, Calibration		1	B	0.3	IV	FE				
DESIGN TO OPERATION	Dangerous goods	Incident from dangerous or hazardous goods	Portable gas bottles, chemicals for vegetation/weed control, asbestos, legislation compliance.	Injury	Burns, inhalation of toxic substance, serious injury	Unlikely	Health & Safety	HSEQ standards, training, register of hazardous materials, toolbox sessions, MSDS	SOP 25-50 Gas Construction and Maintenance Competency	1	B	0.3	IV	FE				
DESIGN TO OPERATION	Contractor management	Non conforming works by contractor management	Contractor plant and equipment, HSEQ (trips and falls etc.), traffic control, manual handling, information management, compliance with AusNet Services technical standards, bad workmanship, cost overrun.	Redo work.	Unable to supply gas. Injury, long-term integrity of asset.	LTFI-5 Unlikely	Environment & Community	Tendering process, contractor selection, approval, auditing, KPI's, performance review, financial management. Increased 'checks and balances', sub-contractor induction procedures, contractor safety booklet, PSP Tenix for 5+ years.		1	B	0.3	IV	FE				