Gas Transmission Security and Reliability

A Gas Industry Co Issues Paper – April 2016

GAS INDUSTRY COMPANY LIMITED

Executive Summary

Consumers seek a secure and reliable gas supply at a reasonable cost. All links in the physical supply chain contribute to this, and a recent study has found that the New Zealand gas supply system 'has a high degree of resilience and existing industry operating standards and market structures pose no undue threat to security of supply'[1].

It is more than four years since the last significant interruption to transmission services (the October 2011 interruption to the Maui Pipeline; the longest in the Pipeline's 36-year life). Nevertheless, the S&R of transmission pipelines is a matter of importance to gas users, given that transmission outages have the potential to cause significant supply interruptions.

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At the time of writing, the Maui Pipeline is owned by Maui Development Limited (MDL), and the Vector Transmission System is owned by Vector Gas Limited (Vector). However, conditional sales of both systems to First State Investments (FSI) were announced in late 2015. In this Issues Paper, we analyse issues, draw conclusions and suggest actions in the context of current arrangements. Some of these issues arise from MDL and Vector having different opinions, and these will be resolved under single ownership. But other issues will remain, and we expect the new owner to have a pivotal role in proactively addressing them.

In earlier years, information about transmission S&R has generally been private to the Gas Transmission Businesses (GTBs), and the arrangements supporting S&R were not generally well known or understood. Recent legislative changes, including the introduction of a price-quality regime and associated information disclosure requirements under the Commerce Act, have changed this. In particular, the publication by GTBs of their Asset Management Plans (AMPs) has greatly improved transparency. However, some stakeholder concerns remain, so it is timely to review the new landscape.

In this Issues Paper:

- Chapter 1 introduces key gas transmission S&R concepts;
- Chapter 2 reviews available S&R information for each transmission system, and makes some observations;
- Chapter 3 discusses current commercial and regulatory arrangements for gas transmission that support S&R;
- Chapter 4 analyses what is required to achieve effective gas transmission S&R, and considers whether all of those elements are present in current New Zealand arrangements; and
- Chapter 5 draws some conclusions from the preceding analysis, suggests action points, and sets out next steps.

[1] *Gas Disruption Study, Report on the Potential Impacts on the NZ Gas Market* , Worley Parsons January 2014, http://www.mbie.govt.nz/info-services/sectors-industries/energy/gas-market/documents-image-library/gas-disruption-study.pdf

In considering transmission system S&R stakeholders should keep in mind that each GTB offers transmission services in accordance with open access codes, currently the Maui Pipeline Operating Code (MPOC) and the Vector Transmission Code (VTC), and in Vector's case also in accordance with non-standard agreements, in which each GTB commits to act as a reasonable and prudent operator (RPO) in performing its code functions.

In addition, since in the long run end-users generally have other fuel alternatives, and any interruption to transmission service will affect confidence in gas as a secure energy source, interruptions will ultimately impact on the GTB's reputation and business. We therefore believe each GTB is strongly incentivised to uphold S&R and to operate to an RPO standard in all matters related to the provision of transmission services. In particular, we expect the RPO standard to apply when a GTB:

- designs, builds, operates, maintains and renews its assets;
- determines the amount of transmission capacity it can sell;
- complies with applicable technical standards;
- develops and follows its operating procedures;
- develops and follows its AMP; and
- communicates with stakeholders on the above matters, including explaining how standards will be supported through operational policies and maintenance, renewal, and capital upgrade plans that are consistent with long term forecasts of supply and demand.

Aside from the strong incentive on the GTB to uphold S&R by acting as RPO, three agencies have responsibilities for different aspects of transmission pipeline S&R that effectively build on the code service requirements:

- WorkSafe NZ2 is responsible for the Health and Safety in Employment (Pipelines) Regulations 1999 (HSE Pipeline Regulations)3, which requires a Certificate of Fitness for each gas and petroleum pipeline and all equipment necessary for the safe operation of that pipeline.
- The Commerce Commission sets allowable notional revenue and quality standards under Part 4 of the Commerce Act 1986 (Part 4), and requires disclosure of related information, such as asset management plans.
- Gas Industry Co administers the Gas Governance (Critical Contingency Management) Regulations 2008, and has powers to recommend regulation of terms and conditions of access and pipeline investments or physical expansions, upgrades or service quality improvements.

Accordingly, there are strong reputational, contractual and legislative drivers for each GTB to achieve effective S&R.

For stakeholders who want more assurance, the newly disclosed AMPs under Part 4 of the Commerce Act provide a wealth of S&R information. Significantly, they tell us that:

[2] Within WorkSafe NZ it is the High Hazards Unit that is responsible for transmission pipelines, and the Energy Safety team who is responsible for distribution pipelines.
[3] These Regulations are pursuant to section 21 of the Health and Safety in Employment Act 1992. That Act is now superseded by the Health and Safety at Work Act 2015. The HSE Pipeline Regulations are one set of around 20 regulations that will be looked as part of a review of health and safety legislation being conducted by the Ministry of Business, Innovation and Employment (MBIE). We understand that MBIE will determine the priority for looking at these various regulations over the next few months.

- there have been no emergencies since the commencement of control, on 1 July 2013, so no 'response time to emergencies' have been reported (currently the only quality measure in the price-quality regime); and
- there have only been four unplanned interruptions on the transmission systems in the last five years.

However, it can be misleading to consider such numbers in isolation. The absence of past failures does not assure future reliability. A more holistic analysis and presentation of all the data is required. Our view is that the GTBs have not fully provided this. Following the October 2011 Maui Pipeline outage the (then) Minister of Energy and Resources asked the pipeline owner to make a presentation to stakeholders. That was done in 2012 and provided considerable assurance. However, the presentation was not subsequently published and has not been repeated. In association with this Issues Paper, Gas Industry Co has invited the GTBs to provide a similar presentation aimed at providing updated information and assurance to stakeholders.

S&R covers a broad range of industry arrangements, so the conclusions we reach in this paper are similarly diverse. Stakeholders have asked appropriate questions about whether current arrangements are right to deliver effective S&R, and whether the information made available by the GTBs is adequate.

Based on the analysis in this Issues Paper, we conclude:

From Chapter 3:

1. The primary responsibility for transmission S&R lies with the GTBs, operating within a regulatory framework defined principally by the Health and Safety at Work Act, the Commerce Act, and the Gas Act.
2. The regulatory agencies – WorkSafe NZ, the Commerce Commission and Gas Industry Co – have well defined roles with very little overlap.
3. The GTB's have strong incentives – reputational, commercial and statutory – to deliver effective S&R.

From Chapter 4:

1. All the necessary arrangements to deliver effective S&R are in place, although some arrangements are untested, and compliance with others could be improved. In particular, despite the disclosure of substantial AMPs, some stakeholders are unsure if GTBs consider the system to be adequately secure and reliable, or what the major risks are, or how those risks are being addressed[4].
2. While we find that all the information or arrangements needed to deliver effective S&R are provided for, we note that:
   (a) some arrangements affecting S&R have never been tested, in particular:
      (i) the Customised price-quality path (CPP) arrangements, designed to allow the Commerce Commission to set a price path better suited to a GTB's circumstances, such as the need to make a major investment; and
      (ii) s43F(2)(d) of the Gas Act, which provides a path for Gas Industry Co to investigate and to make recommendations to address any rare case of under-investment;
   (b) some arrangements affecting S&R are under Gas Industry Co review, in particular:

[4] Although we note that since work on this Issues Paper began, MDL issued its December 2015 AMP, in which a number of improvements have been made, including a new section entitled Major Risks.

(i) capacity allocation arrangements, which the Panel of Expert of Advisers (PEA) found to be inefficient; and

(ii) physical pipeline management arrangements, including balancing arrangements, which have recently been changed;

(c) some information needed to assess S&R can be improved, in particular:

(i) stakeholders are unsure whether GTBs are providing sufficient information for interested persons to assess whether:

- assets are being managed for the long term;
- the required level of performance is being delivered; and
- costs are efficient and performance efficiencies are being achieved.

Accordingly, we suggest the following action points:

1. The new GTB:
   (a) address the capacity allocation issues identified by the PEA;
   (b) work with stakeholders (including end-users, Gas Industry Co and the Commerce Commission) to ensure future AMPs and other disclosures provide a more assessable presentation of the GTB's interpretation of the data, identification of issues, and means of addressing those issues (however, as discussed in section 4.4, we do not favour mandatory security standards such as N-1 and, as discussed in section 4.5, we do not favour disclosure of the PIMP); and
   (c) work with any individual end-user who wishes to assess the S&R of deliveries to its individual site (given that this will be affected by a possibly unique set of risks along its gas transmission route).
2. Gas Industry Co:
   (a) consider whether new balancing arrangements are contributing to more stable linepack management; and
   (b) continue to work with the Commerce Commission to ensure that there is no duplication of function.
3. Gas Industry Co and stakeholders:
   (a) work with the Commerce Commission during its Input Methodologies Review and through the consultation on the 2017 reset of the GTB default price paths to ensure that the price-quality regime is providing appropriate constraints/incentives on investment, including major new investments.

This Issues Paper will be presented by Gas Industry Co at a workshop on **Tuesday 24 May 2016**. Gas Industry Co will invite pipeline owners to make a presentation at the same workshop. The workshop will be followed by a discussion on suitable quality measures for the price-quality reset by the Commerce Commission. Full event details are available on our website.

Gas Industry Co invites submissions on this Issues Paper **by 5pm on Friday 10 June 2016**.

Contents

1. Introduction

Consumers want a secure and reliable gas supply. All links in the physical supply chain – production, treatment, transmission, distribution, metering, and end-use appliances – contribute to this. One significant recent study considering the long term national impact of supply disruptions found that the New Zealand gas supply system 'has a high degree of resilience and existing industry operating standards and market structures pose no undue threat to security of supply'[5] .

However, this Issues Paper relates only to the gas transmission link of the supply chain, and has emerged from:

- industry discussions and concerns about pipeline security and reliability (S&R); and
- a Commerce Commission review of information disclosure and quality parameters relating to price-quality regulation of the gas transmission system.

It is more than four years since the last significant interruption to transmission services. In October 2011 a land slip near Pukearuhe in northern Taranaki caused a critical contingency on the Maui Pipeline. The associated outage of approximately five and a half days was the longest experienced since gas first flowed through the pipeline 36 years ago. The event was estimated to have cost the New Zealand economy around $200 million. It caused pipeline owners and operators to re-assess risks, increase monitoring, and invest in additional preventative maintenance at high risk sites. Also, in line with post-incident reviews and recommendations, the Gas Governance (Critical Contingency Management) Regulations 2008 (Critical Contingency Regulations) were reviewed and revised.[6]

Given the potential for a transmission pipeline failure to cause widespread and lengthy supply disruptions, it is understandable that gas users continue to seek assurance about their S&R.

Information about S&R on the transmission pipelines, and arrangements influencing S&R can be difficult to bring together and interpret. This Issues Paper gives an overview of publicly available S&R information, describes the arrangements that promote S&R, identifies issues, draws conclusions, and suggests action points.

In this Introduction we give an overview of common terminology and concepts used in this Issues Paper, and describe how the paper is set out.

[5] *Gas Disruption Study, Report on the Potential Impacts on the NZ Gas Market* , Worley Parsons January 2014, http://www.mbie.govt.nz/info-services/sectors-industries/energy/gas-market/documents-image-library/gas-disruption-study.pdf

[6] In relation to the 2011 outage, the Ministry of Business, Innovation and Employment (MBIE) noted that its *Review of the Maui Pipeline Outage of October 2011* (October 2012), that: 'The Maui gas transmission pipeline failed in October 2011 due to overload caused by landslide movement at the Pukearuhe site. This was the first significant outage of the pipeline since construction in 1977. While the repaired section of the pipeline remains within the landslide, improved mitigation measures have been implemented aimed at preventing failure in the short- to medium-term. A long-term solution is also being developed. Other landslide risks are being managed along the pipeline with eleven areas identified as "high-risk".'

1.1 Security and Reliability

Security and Reliability (S&R) is generally considered by pipeline engineers to be components of 'pipeline integrity'. Depending on the degree of definition required, pipeline integrity can be viewed as:

> '… ensuring a pipeline is safe and secure. It involves all aspects of a pipeline's design, inspection, management and maintenance.'
>
> Training Engineers in pipeline integrity, P Hopkins, 2002, Penspen Integrity Virtual Library (http://www.penspen.com/wp-content/uploads/2014/09/training-engineers.pdf)

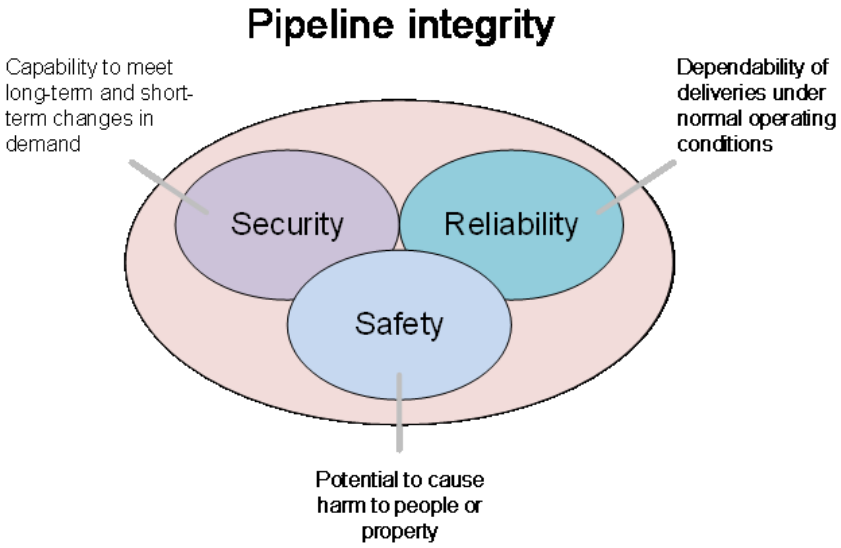
> '… providing safe and reliable delivery of natural gas to [pipeline] customers without adverse effects on employees, the public, customers, or the environment.'

S1.3, Managing System Integrity of Gas Pipelines, ASME Code for Pressure Piping, 831, Supplement to ASME 831.8 (https://law.resource.org/pub/us/cfr/ibr/002/asme.b31.8s.2004.pdf)

> '…a set of safety management, analytical, operations, and maintenance processes that are implemented in an integrated and rigorous manner [and]:
>
> - Identifying all locations where a pipeline failure might impact on High Consequence Areas.
> - Developing a risk-based plan (known as the Baseline Assessment Plan) to conduct integrity assessments on those portions of the pipeline. Integrity assessments are performed by in-line inspection (also referred to as "smart pigging"), hydrostatic pressure testing, direct assessment or other technology that the operator demonstrates can provide an equivalent understanding of the condition of the line pipe.
> - Integrating the assessment results with other relevant information to improve the understanding of the pipe's condition.
> - Repairing pipeline defects identified through the integrated analysis of the assessment results.
> - Conducting a risk analysis to identify the most significant pipeline threats in segments that can affect HCAs. Examples of pipeline threats include corrosion, excavation-induced damage, material defects, and operator errors.
> - Identifying additional measures to address the most significant pipeline threats. These measures include actions to prevent and mitigate releases that go beyond repairing the defects discovered through integrity assessment.
> - Regularly evaluating all information about the pipeline and its location-specific integrity threats to determine when future assessments should be performed and what methods should be selected to conduct those assessments.
> - Periodically evaluating the effectiveness of the integrity management program and identifying improvements to enhance the level of protection.'

Briefing: Integrity Management, U.S. Department of Transportation Pipeline & Hazardous Materials Safety Administration (PHMSA) (https://primis.phmsa.dot.gov/comm/Im.htm)

In this Issues Paper we will continue to refer to use the S&R terminology used in industry discussions to date, where 'security' means the capability of the pipeline to meet long-term and short-term changes in demand, and 'reliability' means the dependability of deliveries under normal operating conditions. This is summarised in the diagram below:



For readers more familiar with the electricity industry, we note that common usage in that sector is somewhat different. There, 'reliability' encompasses 'adequacy' and 'security', where 'adequacy' is the ability of the system to supply aggregate electrical demand at all times, and 'security' is the ability of the system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements. But these are broadly analogous to the reliability and security definitions we adopt.

Since a great deal of S&R information related to the open access gas transmission pipelines is made available through the information disclosure requirements of the Commerce Act price-quality regime, we adopt the associated terminology – Gas Transmission Business (GTB) – to refer to the transmission businesses of Maui Development Limited (MDL) and Vector Gas Limited (Vector), subject to conditional sales to FSI.

1.2 Price Quality Regulation

Each GTB is subject to price-quality regulation under the Commerce Act. The current regulations are the Gas Transmission Services Default Price Quality Path Determination 2013, NZCC 6, as amended from time to time (Price-Quality Determination).

1.3 Information Disclosure

Each GTB is subject to information disclosure regulation under the Commerce Act. The current regulations are the Gas Transmission Services Information Disclosure Determination 2012, NZCC 24, and the 2015 amendments to these, NZCC 8, as consolidated in 2015 (Information Disclosure Determination).

1.4 Asset Management Plans

We briefly introduce Asset Management Plans (AMPs) here since they are the primary documents where a GTB provides public information on S&R. Part 4 of the Commerce Act (Part 4) provides

that a GTB may be required to publish an AMP, and the subsequent Information Disclosure Determination specifies what information must be disclosed.[7]

Generally, an AMP explains how S&R will be supported by operational policies, and maintenance, renewal and capital upgrade plans that are consistent with long term forecasts of supply and demand. More specifically, we (and other stakeholders) look to the AMP to understand the GTB's:

(a) governance practices;

(b) asset management practices;

(c) standards for the design, operation and maintenance of the pipeline and associated infrastructure;

(d) asset inventory;

(e) asset condition;

(f) historical asset performance;

(g) service level objectives (including any service standard specified in the Price-Quality Determination);

(h) approach to determining stakeholder requirements;

(i) method for determining the capacity of the system;

(j) forecasts of supply and demand; and

(k) maintenance and capital spending plans.

We expect the AMPs to present this information in an easily digestible format, in plain English, allowing users with a reasonable level of technical literacy to quickly obtain the information they need.

Also, AMPs should tell the S&R story about:

(a) how the system is performing;

(b) what factors are really important to S&R; and

(c) how the GTB is managing these factors.

We consider how well the current AMPs contribute to effective S&R in chapter 4.

1.5 Security standards

In industry discussions, 'security standards' are commonly talked about in relation to S&R, so it is useful to introduce the term here. Unlike AMPs, gas transmission security standards are not specifically required by New Zealand regulation or a code of practice. However, some end-users consider the concept helpful and Vector has chosen to provide a security standard as part of its AMP[8]. It is based on '… Vector's best understanding of customer requirements and the price/quality trade-off'.

Vector's security standard relates to three elements:

- Physical System Capacity – the pressure and capacity ratings of pipelines and their components are not to be exceeded;

[7] Since MDL has not previously been required to disclose an AMP, the Information Disclosure Determination permits it to provide a transitional AMP during the first five year regulatory period. Although somewhat abbreviated, a transitional AMP includes most of the key features of a full AMP.
[8] Vector Gas Transmission Asset Management Plan 2015 – 2025, s5.2

- Minimum Transmission System Pressure – the minimum operating gas pressure on any part of the transmission system shall not fall below set levels; and
- Component Redundancy Levels – the minimum redundancy levels of pipelines and their components are specified.

The third element essentially determines whether components have 'N' or 'N-1' levels of redundancy[9], where:

> '[a]n N redundancy level means that no redundancy is built into the system and that a single component outage can compromise the ability of a pipeline system to deliver its required output. An N-1 redundancy level means that a failure on any single component will not affect the ability of the system to deliver its required output.'
>
> Vector's Gas Transmission: System Security Standard (14 Sep 2012) at 6

While Vector's pipelines operate at N redundancy, its rotating equipment (such as high demand compressors and odorant pumps), and pressure regulation streams (at delivery points of peak capacity >= 20GJ per day) operate at N-1 redundancy[10]. When Vector's security standard was first developed in 2012, it was reviewed for Vector by the consultancy GL Noble Denton which found it to be appropriate and in line with operating strategies applied by other gas transmission system operators internationally.[11]

Although MDL does not have a 'security standard' per se, its 2015 AMP contains elements similar to Vector's security standard. For example, it notes that two compressors are installed at Mokau Compressor Station to provide N-1 redundancy, and that the SCADA master station has dual server functionality to address internal redundancy with additional off-site replicated hardware to support disaster recovery.

We discuss security standards further in chapter 4.

1.6 Issues Paper layout

Chapter 2 reviews each GTB's key disclosures related to S&R.

Chapter 3 discusses the drivers to achieve effective S&R; reputational, commercial and regulatory.

Chapter 4 describes what is required to deliver effective S&R, and performs a gap analysis to see whether current information and arrangements satisfy those requirements, and discusses stakeholder concerns in light of the analysis.

Chapter 5 draws conclusions on the quality of the available S&R information and arrangements (noting that some of these arrangements are yet to be tested), suggests action points, and sets out the next steps, including a call for submissions on the Issues Paper.

[9] Confusingly, in the wider industry, N-1 security is sometimes referred to as N-1 redundancy, and sometimes as N+1 security or N+1 redundancy!

[10] Vector Gas Transmission Asset Management Plan 2015 – 2025, s5, p75

[11] https://vector.co.nz/documents/101943/102716/Technical+Note+_++Review+of+Vector+Security+Standard+V1+0.pdf/9470ff1c-00c1-4837-9b45-426f1c03f24f

2. Disclosed S&R metrics

Information disclosed in a GTB's AMP provides assurance that the GTB has complied with the legal and technical standards relating to S&R – for example that it has a Certificate of Fitness allowing it to operate; a pipeline integrity management plan (PIMP), including an up to date risk register; and that it undertakes training exercises, including participation in Critical Contingency exercises, etc. This is all valuable information. However, this chapter focuses solely on the numerical disclosures related to S&R – the 'metrics'.

2.1 Gas Transmission Business (GTB) S&R related disclosures

A GTB sets it S&R service targets in its AMP. These targets will include those required by the Commerce Commission under the Price-Quality Determination, and include metrics required to be disclosed by the Information Disclosure Determination.

The Information Disclosure Determination disclosures most directly related to S&R are:

- Network Reliability and Interruptions (Sch 10a), including:
  - Interruptions and Reliability (Sch 10a(i))
  - Compressor Availability (Sch 10a(ii))
- Network Integrity (Sch 10b), including
  - Number of incidents relating to pressure
  - Number of incidents relating to gas specification
  - Number of incidents relating to odorisation
  - Proportion of emergencies responded to within 3 hours
  - Average call response time (hours)
  - Number of emergencies
  - Number of confirmed public reported gas escapes per 1000 km of pipeline
  - Number of confirmed gas leaks caused by a third party per 1000 km of pipeline
  - Number of gas leaks detected by the GTB
  - Number of gas leaks that did not result in disruption to supply
- Explanatory notes (Sch 14), which may provide further explanation of the above metrics

We provide each GTB's most recent disclosures of this information in Appendix A. However, in this chapter we discuss the more extensive data provided in each GTB's AMP disclosures. The AMP puts the information in the context of business targets, past performance, and related GTB policies and procedures, so they offer much richer information.

2.2 Response time to emergencies (RTE)

This is currently the only quality standard set under s9 of the Price-Quality Determination. Each GTB is required to respond to an Emergency[12] on its pipeline within 3 hours, and this is the service standard each GTB has adopted in its AMP.

Past Performance

Each GTB's AMP notes that the declaration of an Emergency is a rare event, and that prior to 2012, systems were not set up to record a verifiable response time. MDL records no emergencies in the regulatory period, and Vector only a few previous occurrences.

Table 1 - Emergencies (MDL AMP s5.4, Vector AMP s4.1.1)

Year	2008	2009	2010	2011	2012	2013	2014
MDL			0	1	0	0	0
Vector	1*	0	0	1*	1**	0	0

* No verifiable record of response time.
** Vector staff working on site.

2.3 Unplanned interruptions

An unplanned transmission service interruption is a reduction or termination of gas flow arising, for example, from a failure of pipeline equipment, compressors or the pipeline itself. MDL has set its target level of unplanned interruptions at zero. Vector's target is one per year.

Past Performance

Table 2 – Unplanned interruptions (MDL AMP s5.5, Vector AMP s4.2.2)

Year	2008	2009	2010	2011	2012	2013	2014
MDL	0	0	0	1(138hrs)*	0	0	0
Vector	0	0	0	1	1	1(6hrs)**	0

* The Maui pipeline failed due to landslide movement at Pukearuhe.
** Failure of the regulators at Southdown.

2.4 Incidents and emergencies

'Incidents' are events that occur on or in the near vicinity of the pipeline such as leaks, third party damage, near-miss incidents, equipment failure, and overpressure.[13]

'Emergencies' basically include all incidents that warrant the immediate attention of the GTB.

MDL includes lost time injuries in its incident and emergency targets, which are:

- Number of Lost Time Injuries = 0
- Number of Emergencies = 0
- Number of Pipeline Unauthorised Activity events <=3 (Rolling annual Average)

Vector's incident and emergency performance targets are:

[12] 'Emergencies' are defined at length in the Price-Quality Determination, but basically they include all incidents that occur on or near the pipeline, including leaks, third party damage, near-miss incidents, equipment failure, overpressure, etc, and warrant the immediate attention of the GTB.
[13] As defined in the Ministry of Business, Innovation and Employment (then Department of Labour) document *Guidelines for a Certificate of Fitness for High-Pressure Gas and Liquids Transmission Pipelines, 2002.*

- Ratio of non-significant events to significant events > 30:1
- Ratio of non-significant events to emergencies > 220:1

Past Performance

Table 3 – Frequency of Incidents and Emergencies (MDL AMP s5.6, Vector AMP s4.2.3)

Year	2008	2009	2010	2011	2012	2013	2014
MDL							
Lost time injuries			n/a	0	0	0	0
Number of Pipeline Unauthorised activity events			2	2	5	9	2
Number of Emergencies			0	1	0	0	0
Vector							
Number of Incidents		135	182	240	234	138	122
Number of Significant Events		5	7	8	7	0	0
Maximum Monthly Availability by Gas Year		99.4%*	97.6%	99.9%	98.3%	99.2%	96.7%
Ratio of Non-significant Events to Significant Events		26:1	25:1	29:1	32:1	-	-
Number of Emergencies		0	0	1	1	0	0
Ratio of Non-significant Events to emergencies		-	-	232:1	227:1	-	-

2.5 Public Reported Escapes (PRE)

PRE is a measure indicating pipeline integrity.

MDL has only recorded PREs from 2013 onwards. It targets 'zero uncontrolled Gas Leaks in any year, excluding leaks caused by unauthorised access to the pipeline. These statistics exclude releases made for operational reasons.'

Vector's target is determined by a combination of historical performance and previous internal performance targets. Its target is no more than 13 confirmed public reported escapes per 1000 km per year.

Past Performance

For brevity, only the summary information against each GTB's performance targets is presented below.

Table 4 – Public Reported Escapes (MDL AMP s5.8, Vector AMP s4.2.5)

Year	2008	2009	2011	2011	2012	2013	2014
MDL							
Number of Uncontrolled Gas Leaks, excluding leaks from unauthorized access						1*	0

Year	2008	2009	2011	2011	2012	2013	2014
Vector							
Number of confirmed public reported gas escapes **		12	29	29	26	12	18
Number of confirmed public reported gas escapes per 1000 km of pipeline		5.2	12.6	12.6	11.3	5.4	8.1
Number of Gas Vents ***		9	16	14	17	8	18
Number of Gas Leaks		3	13	15	9	17	8
Number of Gas Leaks that did not disrupt supply		3	13	15	9	17	8
Number of Gas Leaks Detected by Vector		3	11	12	5	10	2
Number of Confirmed Gas Leaks caused by Third Parties		0	0	0	0	0	0

* The incident occurred on 29/10/2013 when an instrument technician was isolating a pressure transmitter at the Frankley Road interchange.

** Prior to 2012 this is the sum of the number of gas vents and gas leaks in the year. From 2013 onwards this is only the count of confirmed PRE. Some gas vents and gas leaks are detected by Vector and not included in PRE.

*** A Gas Vent is a controlled release of gas from the Vector Gas Transmission System.

2.6 Compressor availability

Each GTB applies N-1 redundancy[14] to compressors.

MDL operates two compressors at Mokau, each capable of meeting the downstream demand. MDL performance targets are:

- Number of hours compressor available for service (per year): >=8700
- Number of instances compressor was required but unavailable for service: <=1
- Number of instances compressor failed to start: <= 2

Vector operates seventeen compressors. Its performance targets are:

- Reliability[15] (excl. planned outages) >= 97%
- Availability[16] (incl. planned outages) >= 95%

The Information Disclosure Determination, Schedule 10a requires disclosure of the number of hours each compressor ran, the number of hours it was available for service and the number of instances where it failed to start.

[14] See section 1.5 for a description of the N-1 standard.
[15] Percentage of hours that the compressor fleet was unaffected by unplanned outages. This is a measure of the effect of breakdowns and the resulting unexpected maintenance.
[16] Percentage of hours that the compressor fleet was unaffected by unplanned and planned outages. This measure also includes planned maintenance and is the overall measure of fleet management effectiveness.

Past Performance

For brevity, only the summary information against each GTB's performance targets is presented below.

Table 5 – Compressor availability (MDL AMP s5.7, Vector AMP s4.2.4)

Year	2008	2009	2011	2011	2012	2013	2014
MDL							
Hours compressor available for service						#1: 8485 #2: 8718	#1: 8550 #2: 8567
Number of Instances compressor was required but unavailable for service						#1: 0 #2: 0	#1: 0 #2: 0
Number of instances compressor failed to start						#1: 1 #2: 3	#1: 4 #2: 6
Vector							
Annual Total Availability		94.8%*	91.7%	95.7%	93.3%	92.5%	84.0%
Minimum Monthly Availability by Gas Year		82.1%*	82.4%	90.3%	85.7%	88.7%	68.9%
Maximum Monthly Availability by Gas Year		99.4%*	97.6%	99.9%	98.3%	99.2%	96.7%

* Based on 9 months of data recorded for year 2009

2.7 What the current S&R disclosures show

From the above information, we can see how each pipeline performed against its S&R targets. In particular:

- Each GTB reports on its S&R metrics in its AMP.
- The metrics most closely related to S&R are:
  - RTEs;
  - Unplanned Interruptions;
  - Incidents and Emergencies;
  - PREs; and
  - Compressor Availability.
- In relation to RTE's, we note that Emergencies are rare, and there have been no Emergencies since the commencement of the current regulatory period, on 1 July 2013, so no RTEs have been reported.
- In relation to Unplanned Interruptions, we note that:
  - this is probably the metric that relates most closely to S&R; and
  - Unplanned Interruptions are uncommon - only four in the last five years.

  However, the significance of this metric is hard to assess without some indication of the effect of the Unplanned Interruptions – for example, the 138 hr interruption at

Pukearuhe affected the whole of the upper North Island, so it was much more significant than 6 hr interruption at Southdown that affected only one user.

- In relation to Incidents and Emergencies, we note that:
  - this is a leading indicator of S&R - the more incidents there are the more likely a future supply interruption will be;
  - each GTB has somewhat different targets and reporting style; and
  - Incidents are common (over 100 a year), but rarely significant (although a description of what Vector views as 'significant' could not be found, Vector's target is for less than one in 30 incidents to be significant, and no significant incidents are reported for the last two years).
- In relation to PREs, we note that:
  - this is also expected to be a leading indicator of S&R - PREs generally relate to equipment failures which can result in supply interruptions; and
  - PREs are encouraged (since they can point to a failure or potential failure), but are not common – typically less than 10 per 1000km of pipeline.

However, PREs do not tell the full story, since employees may also observe unplanned escapes.

- In relation to Compressor Availability, we note that:
  - each GTB has somewhat different targets and reporting style;
  - occasionally compressors fail to start (e.g. MDL targets no more than two failures a year); and
  - each GTB has N-1 redundancies on major compressors (ie there is another compressor of comparable capacity available if one fails to start).

2.8 Preliminary views on current S&R related metrics

Overall, these disclosed metrics provide useful status and trend indicators showing S&R performance is generally good. However, we agree with stakeholders who say that the metrics are difficult to interpret without the benefit of an informed analysis. It would be a great help to stakeholders if the metrics could be summarised and displayed in a 'dashboard' format, accompanied by the GTB's interpretation of what they tell us. Such a dashboard could highlight the metrics addressing the highest risks (ie the risks that are most likely to lead to a supply interruption, such as corrosion or mechanical damage).

We note that each current GTB has a somewhat different approach to setting targets and presenting the data. We expect this to be ironed out when the pipelines come under a single owner.

We also note that some metrics are of keen interest to pipeline users (such as the number of Unplanned Interruptions) whereas others are less meaningful (such as PREs). We expect the new owner to discuss this with stakeholders so that in future the metrics can be presented, and their meaning distilled, and added to where GTBs can give greater assurance, in the most helpful way.

Q1: Do you agree that the current disclosed metrics provide useful status and trend indications? If not, what information do you think is redundant or missing?

Q2: Do you agree that the metrics could usefully be summarised and displayed in a 'dashboard' format, accompanied by the GTB's interpretation? Are there other improvements you would suggest?

3. Arrangements influencing S&R

Interruptions to transmission service affect the reputation and business of the GTB, and confidence more widely in gas as a secure energy source. For much of the market, gas is a fuel of choice and all aspects of its supply arrangements will be reflected in the end-user's product experience. We believe each GTB is sensitive to the long-term effects supply interruptions and poor quality service will have on the image of gas and ultimately on its own business. So it will be strongly incentivised to uphold S&R.

In addition, gas transmission services are subject to commercial and regulatory arrangements, many features of which also promote S&R. It is the key S&R related features of these arrangements that are discussed in this chapter.

3.1 Contracts

Each GTB offers transmission services in accordance with open access code arrangements, currently the Maui Pipeline Operating Code (MPOC) and the Vector Transmission Code (VTC), and in Vector's case in accordance with non-standard agreements. These set out general commercial and operating terms and conditions for access to the transmission systems. Parties wishing to obtain transmission services (referred to as 'shippers') enter Transmission Service Agreements with the relevant GTB.

Shippers bundle transmission services, distribution services, metering services, and gas supply to sell a delivered gas product to end-users. Such end-users have an interest in the S&R of the transmission services.

The MPOC and the VTC each commit the respective GTBs to act as a reasonable and prudent operators (RPO) in performing their code functions. Although the boundaries of this obligation have never been tested in court, each GTB has obligations (of significance to S&R) in respect of:

(a) allocating capacity (by means of confirming nominations and reservations);

(b) managing the pipeline pressure; and

(c) managing service interruptions and curtailments.

The codes also lay out liabilities and indemnities. Together these should deliver a reasonable set of incentives for MDL, Vector, and their successor(s) to operate the pipelines in a reliable manner.

In addition, the codes provide that, during a force majeure situation (such as a pipeline rupture), where shippers do not receive transmission service, the GTB will not be required to provide transmission services but will also not be paid. This provides a powerful commercial incentive for the GTB to avoid such situations. Although we acknowledge that, depending on its design, this incentive may be reduced if a pure revenue cap is introduced.

3.2 Regulation

A range of general regulation (e.g. environmental, hazardous substances and health & safety) apply to the GTBs, but three Acts particularly relevant to S&R are:

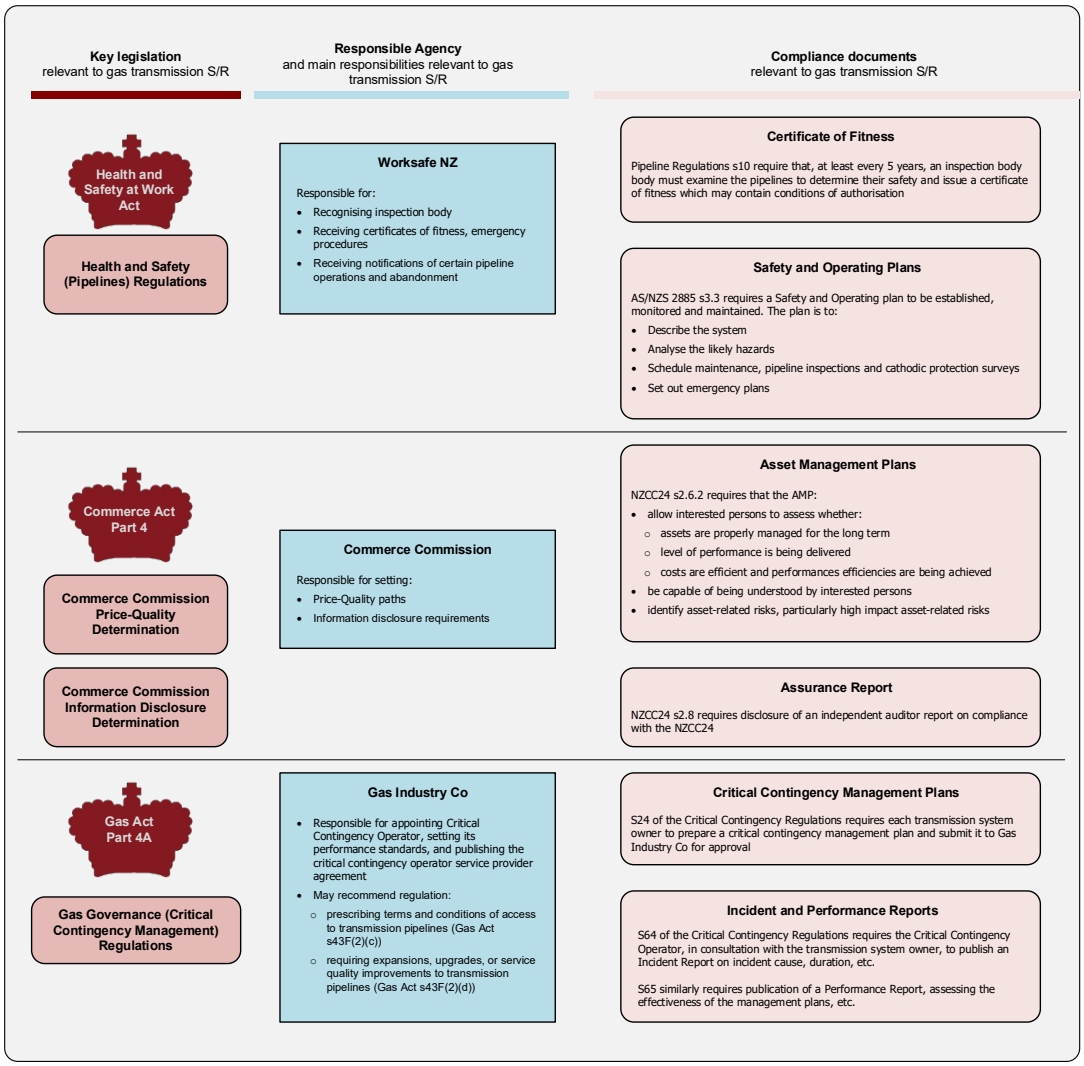
- the Health and Safety at Work Act (HSW Act);
- the Commerce Act; and

- the Gas Act.

And three agencies have associated responsibilities:

- WorkSafe NZ is responsible for the Health and Safety in Employment (Pipelines) Regulations 1999 (HSE Pipeline Regulations), which requires a Certificate of Fitness for each gas and petroleum pipelines and all equipment necessary for the safe operation of that pipeline. The certificate will confirm compliance with the relevant codes of practice. Certificates of Fitness can only be issued by an inspection body recognised by WorkSafe NZ.
- The Commerce Commission sets maximum allowable revenues and associated quality standards under Part 4, and associated AMP and other disclosure requirements. As set out in section 2 above, aspects of these arrangements also address S&R.
- Gas Industry Co appoints the Critical Contingency Operator under the Gas Governance (Critical Contingency Management) Regulations 2008 (Critical Contingency Regulations), and under the Gas Act may recommend regulation prescribing terms and conditions of access to transmission pipelines (Gas Act s43F(2)(c)) and requiring expansions, upgrades, or service quality improvements to transmission pipelines (Gas Act s43F(2)(d)).

The legislation, responsible agency roles, and main compliance documents are illustrated below. The influence of the key pieces of legislation on S&R is then discussed.



3.3 Health and Safety in Employment (Pipelines) Regulations 1999

The HSE Pipeline Regulations are pursuant to section 21 of the Health and Safety in Employment Act 1992. That Act is now superseded by the Health and Safety at Work Act 2015. The HSE Pipeline Regulations are one set of around 20 regulations that will be looked as part of a review of health and safety legislation being conducted by the Ministry of Business, Innovation and Employment (MBIE). We understand that MBIE will determine the priority for looking at these various regulations over the next few months.

When considering the requirements of the HSE Pipeline Regulations it should be borne in mind that they establish a third-party certification regime. It is an Inspection Body (a body 'recognised' by WorkSafe NZ) who is responsible for issuing a Certificate of Fitness certifying that a pipeline has been designed, constructed, operated, and maintained according to industry practice and relevant codes.

The HSE Pipeline Regulations are designed to impose duties on those who control places of work, relating to the health or safety of employees and others.[17] Of particular relevance to S&R is a requirement not to operate a pipeline that does not have a current Certificate of Fitness in respect of both the pipeline and all equipment necessary for its safe operation.[18]

The pipeline or equipment will not comply with the Certificate of Fitness if it:

- sustains damage; or
- shows signs of deterioration that could affect the integrity of the pipeline or equipment; or
- is structurally modified or replaced.[19]

Guidelines published in relation to the HSE Pipeline Regulations (Guidelines) record that the purpose of a Certificate of Fitness is to confirm that a pipeline is 'designed, constructed, operated, maintained and/or abandoned (as the case may be) in accordance with a recognised Code or Standard; or if parts are not covered by a Code or Standard, in accordance with generally accepted and appropriate industry practice.'[20] The Guidelines list different international standards and codes that may be applied to gas pipelines in New Zealand.[21] For New Zealand's gas transmission pipelines, standard NZS/AS 2885 is required for certification; it requires GTBs to ensure and demonstrate that:

- each threat to the pipeline and each risk from loss of integrity of a pipeline is systematically identified and evaluated;
- actions to reduce threats and risks from loss of integrity are implemented;
- risks are reduced to as low as reasonably practicable;
- a procedure is established to ensure that the identification of threats and risks from loss of integrity, and their evaluation, is an on-going process over the life of the pipeline, at intervals of no less than five years; and

[17] Health and Safety in Employment Act 1992, s 21(1)(a)
[18] HSE Pipeline Regulations, s 11(1)
[19] HSE Pipeline Regulations, s 11(4)
[20] Department of Labour, *Guidelines for a Certificate of Fitness for High-Pressure Gas and Liquids Transmission Pipelines*, p 6 (February 2002)
[21] The relevant gas pipeline standards and codes include US Minimum Federal Safety Standards for Gas Lines – Part 192; ASME B31.8 *Gas Transmission and Distribution Systems*; *Institute of Petroleum Pipeline Safety Code*; NZS 5223; and NZS/AS 2885. Both Vector and Maui pipelines are certified to the NZS/AS 2885 standard.

- competent and experienced personnel carry out the assessment and management of risks.[22]

NZS/AS 2885 requires each TSO to have a PIMP, which sets out the pipeline monitoring and maintenance activities undertaken each year.[23]

TSOs must also prepare a safety management study, under NZS/AS 2885.1, that consists of 'an extensive study of pipeline threats and their possible impact on the pipeline. It is a systematic review of the pipeline completed by a suitably qualified team.'[24] The process is described as:

> *The pipeline is reviewed metre by metre to identify the impact of threats and to evaluate the impact of a pipeline failure on adjacent properties.*[25]

NZS/AS 2885 also provides for periodic inline inspections of the pipeline.[26]

It should be borne in mind that the primary objective of the HSE Pipeline Regulations is health and safety. Nonetheless, compliance with the HSE Pipeline Regulations and associated codes of practice will provide much of the asset management requirements imposed on a GTB under Part 4 of the Commerce Act, which are central to S&R, and are considered next.

3.4 Part 4 of the Commerce Act

Price Quality Regulation

Under Part 4 the Commerce Commission (Commission) regulates the price and quality of goods and services in markets where there is little or no competition and little prospect of future competition, including gas transmission and distribution. Part 4 aims to get the right balance in the long-term between providing incentives for regulated businesses to invest and ensuring that household and business gas consumers are charged prices that align with the efficient cost of providing the goods or services they receive at a quality they want.[27]

Part 4 creates an implicit link between price and quality. In other words, in setting a price the Commission does so in relation to the costs of providing a particular level of quality expected by consumers. The Commission's price determination gives pipeline owners the expectation of a normal profit. A pipeline owner may not increase profits at the expense of quality; the only way of increasing profits is to deliver the specified quality levels more efficiently.

During a 'Regulatory Period' (the current one being from 1 July 2013 to 30 September 2017), each GTB must comply with the default price-quality path, which consists of both:

(a) a specified price path; and

(b) specified quality standards.

[22] Ministry of Business, Innovation & Employment *Review of the Maui Pipeline Outage of October 2011* (Oct 2012) at 28
[23] Ibid at 29
[24] Ibid
[25] Ibid
[26] NZS/AS 2885.3 s6.6.1 requires that: 'As specified in the PIMP, periodic inspections shall be carried out to identify actual or potential factors that could affect the integrity of the pipeline. The Licensee shall consider the use of an inline inspection tool capable of detecting the flaws that may exist in the pipeline. Any decision not to use an inline inspection tool shall be consistent with the safety management study and PIMP, and shall be documented. Where a pipeline (or section of a pipeline) is not capable of being inspected by an inline tool, the Licensee shall consider whether the pipeline needs to be modified to permit inspection by an inline inspection tool. Any decision not to undertake modifications for this purpose shall be consistent with the safety management study and PIMP, and shall be documented.'
[27] The Part 4 provisions aim to provide incentives for efficient investment. Where the GTB wishes to make large investments, Part 4 provides for a CPP option.

There is currently only one quality standard set under s9 of the Price-Quality Determination: each GTB is required to respond to an Emergency[28] on its pipeline within 3 hours. If a GTB breaches this quality standard, it may face sanctions.

Information disclosure

The information disclosure regime administered by the Commission is specifically designed to disclose financial and operating performance to show the link between price, profit, and quality, thereby reassuring 'interested persons'[29] that the infrastructure will perform as required and at a reasonable cost.

There are three levels of disclosure that are relevant to the S&R of gas pipelines:

- the AMP;
- a set of annual non-financial data relating to the performance of transmission assets relative to the objectives set in the AMP; and
- disclosure of how much the GTB spends to achieve the outcomes it sets out in the AMP and the quality of service achieved through the spend.

Together these disclosures are intended to enable interested persons to link the long-term plan to the short-term performance of the GTB. As short-term data is accumulated, trends can be observed and interested persons can assess whether the GTB is making good plans in its AMPs and that they are delivered over time at an acceptable cost and quality.

The AMPs should take a 10-year forward look at consumer needs and present the asset management strategy and high level tactics to address short and long term consumer needs, which include level of reliability, security of supply and the cost of providing these to meet forecast demand. The AMP is a forward-looking document based on uncertain information, which should be – and is required to be – updated and disclosed on a regular basis. In writing its AMP the GTB should consult its consumers[30], and consumers should participate, when determining forecast supply and demand and in considering the options to meet the forecasts.

> '2.6.2 The purposes of AMP disclosure referred to in subclause 2.6.1(1)(b) are that the AMP—
>
> (1) Must provide sufficient information for interested persons to assess whether-
>
> (a) assets are being managed for the long term;
>
> (b) the required level of performance is being delivered; and
>
> (c) costs are efficient and performance efficiencies are being achieved;
>
> (2) Must be capable of being understood by interested persons with a reasonable understanding of the management of infrastructure assets;
>
> (3) Should provide a sound basis for the ongoing assessment of asset-related risks, particularly high impact asset-related risks.'
>
> S2.6.2 of the Information Disclosure Determination

[28] 'Emergencies' are defined at length in the Price-Quality Determination, but basically they include all incidents that occur on or near the pipeline, including leaks, third party damage, near-miss incidents, equipment failure, overpressure, etc, and warrant the immediate attention of the GTB.

[29] "Interested persons" is broadly defined by the Commission as consumers, government and regulators. The Commission sees itself as a key interested person as regulator acting in the long-term interests of consumers.

[30] Note that the Information Disclosure Determination defines 'consumer' as a person that consumes or acquires gas transmission services, whereas in the Gas Act a 'consumer' means (a) any person who is supplied, or who applies to be supplied, with gas; but
(b) does not include any gas producer or any gas distributor or gas retailer, except where the gas producer or, as the case may be, the gas distributor or gas retailer is supplied, or applies to be supplied, with gas for its own consumption and not for the purposes of resupply to any other person.

The AMP is a long-term plan and does not detail individual projects required to create the outcomes stated in the AMP unless the project is vital for the performance of the system. To assist interested persons determine if the gas transmission pipeline owner is actively pursuing the outcomes it describes in the AMP, the Commerce Commission requires annual disclosure of non-financial information relating to network assets.[31]

The non-financial information on network assets reliability includes:

(a) annual information on network assets and reliability, including asset age profiles, number of interruptions and time to remedy and a report on network integrity; and

(b) disclosure of information on the physical use of the system, including peak flows and efficiency of the use of gas pipeline capacity.

Finally, the Price Quality Path Annual Compliance Statement[32] must include the number of emergencies and the response time to resolve them.

3.5 Preliminary views on arrangements influencing S&R

There are strong reputational, contractual and legislative drivers for a GTB to achieve effective S&R.

A GTB will wish to maintain a reputation as being competent and professional by operating to an RPO standard in all matters related to the provision of transmission service, even though these matters may not strictly be 'code obligations'. In particular, we expect the RPO standard to apply when a GTB:

- designs, builds, operates, maintains and renews its assets;
- determines the amount of transmission capacity it can sell on a firm basis;
- complies with applicable technical standards;
- develops and follows its operating procedures;
- develops and follows its AMP; and
- communicates with stakeholders on the above matters, including explaining how standards will be supported through operational policies and maintenance, renewal, and capital upgrade plans that are consistent with long term forecasts of supply and demand).

Q3: Do you agree that there are strong reputational, contractual and legislative drivers for a GTB to achieve effective S&R? If not, what else do you think is needed?

[31] Commerce Commission, Gas Transmission Information Disclosure Determination 2012 – (consolidated in 2015), 2.5
[32] http://www.comcom.govt.nz/regulated-industries/gas-pipelines/gas-default-price-quality-path/gas-default-price-quality-path-compliance/

4. Analysis: requirements for effective S&R

The previous chapters looked at the information and arrangements that are currently in place. In this chapter we step back to consider what is necessary to achieve effective S&R. We then conduct a gap analysis to see whether the information and arrangements currently in place meet those S&R requirements.

4.1 Information and arrangements required to provide effective S&R

In order to assess whether the S&R of transmission systems is comprehensively addressed by current information and arrangements, we must first establish the requirements for effective S&R. The essential objectives of S&R are:

- Security – the capability to meet short-term and long-term changes in demand:

  Security has two time dimensions that must be considered separately. In the short-term, arrangements are needed to allocate available capacity efficiently. In the long-term, arrangements are needed to allow for efficient maintenance of existing capacity and investment in new capacity.

- Reliability – the dependability of deliveries under normal operating conditions:

  Reliability requires technical standards, operating procedures, and maintenance regimes to ensure physical equipment achieves the desired operability.

4.2 What requirements are needed to meet S&R objectives?

In Gas Industry Co's view, based on our knowledge of the New Zealand industry and other jurisdictions, the requirements to achieve S&R objectives in relation to gas transmission systems are:

1. Requirements for short-term security (ie to meet short-term changes in demand)
   (a) Open access arrangements that provide for the efficient allocation of available capacity, and re-allocation when constraints are encountered.
   (b) Operating arrangements for managing pipeline pressures ('residual pipeline balancing arrangements').
   (c) Critical contingency management arrangements to manage extreme pipeline conditions.
2. Requirements for long-term security (ie to meet long-term changes in demand)
   (a) Design and build standards.
   (b) Operational policies and maintenance, renewal and capital upgrade plans that are consistent with long term forecasts of supply and demand.
   (c) Legislation that allows for efficient system expansion.
3. Requirements for reliability (ie the dependability of deliveries)
   (a) Testing and maintenance standards.
   (b) Active management of pipeline operations ('gas control').
   (c) Pipeline operating procedures (eg a balancing gas operating procedure).

(d) Maintenance regimes to ensure availability and reliability of equipment.

4. Requirements to permit enhanced S&R (ie to meet the special needs of individual users and unusual investments)

   (a) Openness for GTB to negotiate bespoke S&R arrangements where an end-user is willing to meet the cost.[33]

   (b) Means of allowing an independent consideration of one-off situations from an overall efficiency perspective, and requiring further investment where justified.

Most of these requirements are self-evident, but item 4 – Requirements to permit enhanced S&R – requires further explanation. We believe that in most situations a GTB will have incentives to invest in appropriate levels of S&R (as discussed in section 3.1). However, certain end-users have a very high value of lost load (VoLL) which will drive them to invest in back up energy facilities or in improving the S&R of existing supply chain facilities. Where an individual end-user has specific S&R requirements that exceed the standard service on offer, there should be an opportunity for that end-user and the GTB to explore enhanced S&R options and contract for special arrangements, where it is efficient to do so.[34]

The second aspect of enhanced S&R is to have a means of allowing one-off investments that the GTB is not willing to make, to be considered. Such investments may not meet the GTB's investment criteria, but may nonetheless be efficient from an overall gas market perspective. (We discuss this in relation to Whitecliffs in the next chapter.)

Q4: Do you think we have correctly identified the requirements to achieve the S&R objectives? If not, what requirements are unnecessary, or missing?

4.3 Gap analysis

The following table provides a checklist of whether the information and arrangements needed to meet these S&R requirements are currently present.

[33] The arrangement between Vector and Refining NZ, announced on 18 December 2015, could be regarded as an example of this. Whereas the current arrangements to transport gas to the refinery is regularly interrupted to maintain pressure at the extremities of the Northland pipeline, the new arrangements provides for Vector to build additional compression, underwritten (we assume) by Refining NZ, which will provide the refinery with enhanced security, and the ability to double its gas take.

[34] This allows for the possibility that achieving enhanced transmission reliability might be cheaper than a backup or alternative fuel solution for certain businesses.

Requirement	Satisfied by:
Short-term security (efficient allocation of available capacity)	
Efficient capacity allocation arrangements, and re-allocation when constraints are encountered	Capacity is allocated by means of: • MDL's 'flow on nominations' regime; and • Vector's 'capacity reservation' regime. However, the 2011 Panel of Expert Advisors (PEA) identified certain efficiency concerns with these arrangements. These are the subject of Gas Industry Co's on-going transmission access work.[35] We anticipate that progress on this work should accelerate when the pipelines come under common ownership.
Pipeline pressure management	Pipeline pressures are influenced by primary and secondary balancing. Primary balancing is where pipeline users try to maintain balanced gas flows. The incentives for primary balancing were strengthened when Market-Based Balancing (MBB) arrangements were introduced by MDL on 1 October 2015. These will be reviewed by Gas Industry Co later in 2016. Secondary balancing (also known as 'residual balancing') is where the GTB takes action when pipeline pressures become too high or too low, or when step changes in demand mean there is too much or too little gas in the pipeline at the beginning of the day to transport nominated quantities. This is managed by each GTB according to its own operating procedures: • Maui pipeline linepack/pressures are actively managed in accordance with MDL's *'Maui Pipeline System Operator Standing Operating Procedures, Maui Balancing Gas Instruction, Including Critical Contingency Procedures, September 2015'*; and • Vector's pipeline pressures are passively managed, essentially being controlled to pressure set points at compressor stations. We understand that MDL believes that since the introduction of MBB its pipeline conditions are more stable. That will be considered as part of Gas Industry Co's forthcoming MBB review.
Critical contingency management arrangements	Critical contingencies are defined and managed according to:

[35] http://www.gasindustry.co.nz/work-programmes/gas-transmission-investment-programme/gtip-foundation-and-governance/

Requirement	Satisfied by:
	• the Critical Contingency Regulations. The arrangements in place under these regulations have been tested through several contingency events. As a result improvements have been made. These are fully documented in Critical Contingency Operator and Gas Industry Co reports.[36]
Long-term security (efficient investment in new capacity)	
Design and build standards	When new capacity is built, it will be designed and built to standards permitted by: • The HSE Pipeline Regulations. Each GTB has elected to use AS/NZS 2885 as its standard of compliance. The pipelines can only be operated if they have a valid Certificate of Fitness complying with the regulations. The Certificate of Fitness provides assurance that pipelines are being constructed and operated in accordance with the HSE Pipeline Regulations and associated standards. Some stakeholders believe there is a need for a security standard providing, for example, N-1 redundancy. We do not agree, for the reasons discussed in section 4.4 below.
Operational policies and maintenance, renewal and capital upgrade plans that are consistent with long-term forecasts of supply and demand.	This information is contained in AMPs, as is required by the Information Disclosure Determination, and AS/NZS 2885: • each GTB publishes an AMP; and • each pipeline has a PIMP (as required by AS/NZS 2885), although these are not published. The Commerce Commission has recently reviewed the AMPs (from a compliance viewpoint) and found them to be generally satisfactory, but some improvements are suggested. This is discussed in section 4.5 below. Some stakeholders do not think that the AMPs give them the level of understanding or assurance of transmission S&R that they require. We discuss this in section 4.5 below. Some stakeholders consider that they need to see the full detail in the PIMPs to assess whether the GTB's operational policies are adequate. We do not believe that this is necessary, for the reasons discussed in 4.6 below.
Legislation that allows for efficient	Investment is addressed in two Acts:

[36] See 'Critical Contingency Management' under http://www.gasindustry.co.nz/work-programmes/

Requirement	Satisfied by:
system expansion	• The primary arrangements are provided in Part 4. They are designed to ensure that suppliers of regulated goods or services, including GTBs, have incentives to innovate and to invest, including in replacing or upgrading assets. They allow for a Customised Price Path (CPP) to be set, upon application by a supplier. MDL has considered applying for a CPP in order to be able to recover costs associated with its planned pipeline relocation work at Whitecliffs; however continued monitoring has demonstrated that the project can be safely deferred. We understand that the Commerce Commission has been made aware or perceived issues with the current CPP application process and associated costs and risks, and that it is open to further discussion on how improvements can be made. • Section 43F(2)(d) of the Gas Act allows for Gas Industry Co to recommend regulations to the Minister of Energy and Resources to '*require expansions, upgrades, or service quality improvements to gas transmission pipelines including specifying how these will be paid for.'* In other words, where Gas Industry Co has evidence to support the need for reliability upgrades that were not being undertaken, it could direct gas transmission owners to build, fix, or increase reliability of transmission pipelines that have long-term benefits for consumers. This provision has not yet been used, but its possible application is discussed in section 4.7 below.
Reliability (dependable deliveries under normal operating conditions)	
Testing and maintenance standards	Testing and maintenance standards are established in: • the HSE Pipelines Regulations; • the MPOC and VTC; and • as specified in associated standards AS/NZS 2885, NZS 5259, NZS 5442 etc. The Certificate of Fitness process allows for consideration of whether these standards are fit for purpose, and are being complied with.

Requirement	Satisfied by:
Active management of pipeline operations	Each transmission system is actively monitored and controlled by: • Vector providing System Operator services based at its Gas Control centre in New Plymouth. As discussed in chapter 3, each GTB has a strong incentive to act to a reasonable and prudent operator standard.
Pipeline operating procedures	Each GTB has operating procedures setting out its standard practices for operating its pipelines. Some of these are public: • for example, MDL publishes Operating Procedures for capacity, balancing and curtailment on OATIS. Vector does not publish its operating procedures, but there are many references to them in its AMP); and • both pipelines have PIMPs, although these are not public. The Certificate of Fitness process allows for these operating procedures, and compliance with them, to be assessed. We are not convinced that publishing all of the operating procedures is required, as discussed in section 4.6.
Maintenance regimes	Effective maintenance regimes preserve component reliability: • in issuing a Certificate of Fitness, the inspection body will have considered whether the maintenance regime is fit for purpose, and compliant with the relevant standards; and • the maintenance regime is also described in each GTB's AMP (although not to the level of detail that would be contained in a PIMP). Providing the AMP meets its purpose (see section 3.4 above), we are not convinced that publishing the PIMP is necessary, as discussed in section 4.6 below.
Enhanced S&R (for individual user requirements and special investments)	
An option for each end-user to discuss the (possibly unique) S&R risks affecting its gas deliveries.	We are not aware of any individual user who has been unable to obtain information from a GTB about its S&R risks.
Option to negotiate bespoke S&R	For customers who require greater security than is provided

Requirement	Satisfied by:
arrangements	by a GTB in its standard service offering: • The VTC expressly provides for Supplementary Agreements addressing matters particular to an individual shipper, this could include enhanced S&R arrangements; and • Although the MPOC does not provide an equivalent to Supplementary Agreements, and although we are not aware of specific examples to date, we assume that MDL would not refuse to negotiate bespoke arrangements, providing they did not disadvantage existing users. We are not aware of any individual user who has been unable to negotiate special requirements.
Means of allowing an independent consideration of one-off situations from an overall efficiency perspective, and requiring further investment where justified.	Where Gas Act objectives would be furthered by a transmission investment, but the GTB does not propose to make the investment, s43F(2)(d) of the Act provides that Gas Industry Co may recommend that regulations be introduced to enable the investment to be made. This provision has not yet been used, but its possible application is discussed in section 4.7 below.

Q5: Do you think the gap analysis is adequate? If not, what gaps have not been identified?

4.4 Are security standards (component redundancies) needed?

Security standards such as 'N' or 'N-1 redundancy' are often used by stakeholders as a shorthand way or expressing views about S&R. For example, the Maui Pipeline is shadowed by a smaller Vector pipeline for some of its route, and some users say that this provides N-1 redundancy for part of the Market north of Huntly (Critical Contingency Regulation curtailment bands 3, 4 & 5). Some stakeholders consider that maintaining such a standard should be mandatory.

In section 1.5 we noted that Vector's AMP contains its security standards including its standard of N redundancy on pipelines and N-1 on rotating equipment. Also, although MDL does not have an express security standard, we noted that it also operates N-1 redundancy on compressors and critical IT.

However, while the 'N-1' concept is apparently simple, and a useful shorthand way to express S&R ideas, it is a slippery concept and can easily lead to misunderstandings. For example, each GTB provides N-1 redundancy on compressors, meaning that a compressor at a transmission compressor station can fail without loss of supply, because a stand-by machine is available. However, it does not follow that the overall station has N-1 redundancy. Another component within the station could fail (for example, a filter could become blocked), and cause a supply interruption. So we need to be cautious about which components or systems we are referring to

when we apply the term 'N-1 redundancy'. This potential for ambiguity may explain why N-1 is rarely referred to in legislation or standards.[37]

Components are more likely to have N-1 redundancy where they are frequently required to be taken out of service for maintenance, and/or where the probabilities or consequences of failure are high. This is why transmission pipeline companies typically have N-1 redundancy for compressors but not for pipelines (since pipelines are inherently reliable and, as NZ history indicates, rarely fail to the extent that they affect vulnerable customers). It may also explain why N-1 redundancy is more common on electricity grids, where failure of transformers, transmission circuits, earth connectors etc, are not un-common, and may pose a greater threat to life and wellbeing.

We consider that security standards are a helpful guideline, but not a particularly good indicator of the overall S&R. Also, the industry should be cautious about establishing industry-wide standards that can be used to avoid a fulsome consideration of costs and benefits. By any reasonable judgement, it would be uneconomic to impose an N-1 standard on most transmission pipelines. There may be occasional instances where the benefits of enhanced S&R will justify the duplication of a pipeline, but they should certainly be considered on a case by case basis.

For these reasons we do not favour mandatory requirements in relation to security standards.

Q6: Do you think we agree that it is not necessary to mandate any security standards?

4.5 Are the AMP disclosures adequate?

Information collection and interpretation is central to effective S&R. However, not all S&R related information available to a GTB is made public. Rather, Part 4 of the Commerce Act requires that:

> '… sufficient information is readily available to interested persons to assess whether the purpose of this Part is being met.'
>
> S53A, Commerce Act

Where the purpose is:

> '… to promote the long-term benefit of consumers… by promoting outcomes that are consistent with outcomes produced in competitive markets…'

In relation to the AMPs specifically, the Information Disclosure Determination specifies[38] that they must present the information necessary for interested persons to assess whether the assets are being efficiently managed for the long term. We believe this lines up well with the approach taken in the US where it is recognised that the GTB is best placed to gather and analyse pipeline integrity information:

> Information integration is a key component for managing system integrity. A key element of the integrity management framework is the integration of all pertinent information when performing risk assessments. Information that can impact an operator's understanding of the important risks to a pipeline system comes from a variety of sources. The operator is in the best position to gather and analyze this information. By analysing all of the pertinent information, the operator can determine where the risks of an incident are the greatest, and make prudent decisions to assess and reduce those risks.

[37] A notable exception is the EU Security of Gas Supply Regulation, which was modified in 2010 to introduce the concept of an N-1 indicator. In that instance, the Regulation sets out how each state is to define its largest infrastructure (which could, for example, be a gas production station or pipeline), and that state will to be responsible for ensuring that vulnerable loads (residential market, hospitals etc.) can remain supplied for at least 30 days during a disruption to that infrastructure.

[38] Commerce Commission, Gas Transmission Information Disclosure Determination 2012 – (consolidated in 2015), 2.6.2

> S1.3, Managing System Integrity of Gas Pipelines, ASME Code for Pressure Piping, 831, Supplement to ASME 831.8

The AMPs are the 'go to' source of information on S&R. While the Commerce Commission publishes a set of consolidated spreadsheets summarising GTB disclosures[39], it is the AMPs that give the information context, life and meaning.

Overall, our views on the current AMPs align with those of the detailed analysis recently provided in the MWH review of gas pipeline business AMPs commissioned by the Commerce Commission (MWH Review)[40], which found that:

> All AMP's demonstrated overall good compliance with the requirements… and should be commended. Overall scores assessed are as follows:
>
> **Transitional AMPs**
>
> Maui Development Transmission AMP 2.5/3.0 …
>
> **Full AMPs**
>
> Vector Transmission AMP 2.9/3.0 …
>
> … However, the AMPs were not necessarily easy to understand or enabled the reader to determine if what was described as being done was achieving the desired results. The purpose of the AMP is to ensure that sufficient information is readily available to interested persons to assess whether the Part 4 purpose is being met. However products while compliant, are much too complicated to be able to achieve the purpose and some of the information needed to do so is presented in other disclosure documents.

We note that in December 2015, after the MWH review was published, MDL released the 2015 version of its AMP, which was much improved. Certainly these initial AMPs are a heroic first step, delivering a raft of previously unseen information. But we agree with stakeholders who find them difficult to interpret. As noted earlier, the GTB is best placed to analyse pipeline integrity information, and should not shy away from doing so. It needs to 'tell the story' that is captured in the data. If the GTB cannot do this then there must be full disclosure of all information necessary to allow interested parties to do so – such as full disclosure of the PIMP (an option we do not favour for the present, as explained in section 4.6).

Q7: Do you agree that the current AMPs are generally adequate, but missing a layer of GTB interpretation?

4.6 Should the full details of A GTB's Pipeline Integrity Management Plan (PIMP) be disclosed?

The HSE Pipeline Regulations require that a GTB hold a valid Certificate of Fitness for the pipelines it operates. The PIMP (a requirement of AS/NZS 2885) is a key component underlying both the AMP and Certificate of Fitness. However, there is no requirement for a GTB to disclose its PIMP, and some stakeholders think that there should be.

We accept that there is a level of operational detail that remains hidden from stakeholders. As discussed in section 3.3 above, a PIMP will systematically identify each threat to the pipeline and each risk from loss of integrity of a pipeline, and the actions needed to reduce those threats and risks to as low as reasonably practicable. This is a substantial amount of detailed and valuable technical information. However, we would not expect that the public should have access to all of the information held by a GTB. In respect of the PIMP, for example, it may be enough that the

[39] Insert reference
[40] Review of Gas Pipeline Businesses Asset Management Plans, prepared for New Zealand Commerce Commission, 16 October 2015

public is confident that the inspecting authority who issued the Certificate of Fitness has reviewed the PIMP and considered it to be adequate. And, in any case, the essential outputs from the PIMP such as the risks identified are required to be disclosed in the AMP.[41]

As we noted in section 1.3 above, the GTB is best placed to gather and analyse pipeline integrity information (as is the case in the US). Providing that the disclosed AMPs meet their purpose (as set out in s2.6.2 of the Information Disclosure Determination, quoted in section 3.4 above), there should be no need to disclose the further level of detail contained in the PIMPs.

Disclosure comes at a cost, and the need for it should be assessed in the overall context of reputational, contractual and legislative obligations on a business. For a GTB, we consider that these drivers are already strong, and the disclosure burdens are already high.

Q8: Do you agree that it is unnecessary for a GTB's PIMP to be disclosed?

4.7 Is the risk of GTB under-investment provided for?

Major gas users have expressed concern that each GTB may select the optimal solutions for its own business but not recognise externalities, such as the benefits a particular investment may bring to end-users. This concern is exemplified by long-discussed improvements to address erosion that may affect both transmission systems at Whitecliffs in Taranaki.

Each GTB attends to the S&R of its own system and the obligations it has under its own transmission services agreements, and there is no requirement on either GTB to consider the joint S&R across the two systems.

In relation to possible pipeline realignments at Whitecliffs[42], the Maui 2015 AMP notes:

> The White Cliffs Realignment is a specific project to re-route a section of the Maui Pipeline prior to the pipeline being threatened by coastal erosion. Preliminary engineering studies and cost estimates for this project have been completed, providing development options which need to be evaluated. The erosion of the adjacent cliff is being closely monitored in order to predict the future timing of the developing threat to the pipeline. The now regular surveys and improved understanding of erosion mechanisms predicts that the earliest timing of erosion presenting an imminent risk to the pipeline is 2022. The eventual remedy will either involve horizontal directional drilling or trenching inland to move the pipeline away from the erosion zone for the remaining life of the pipeline. This will be a major engineering project requiring substantial capital expenditure.
>
> (Section 7.1, MDL 2015 AMP)

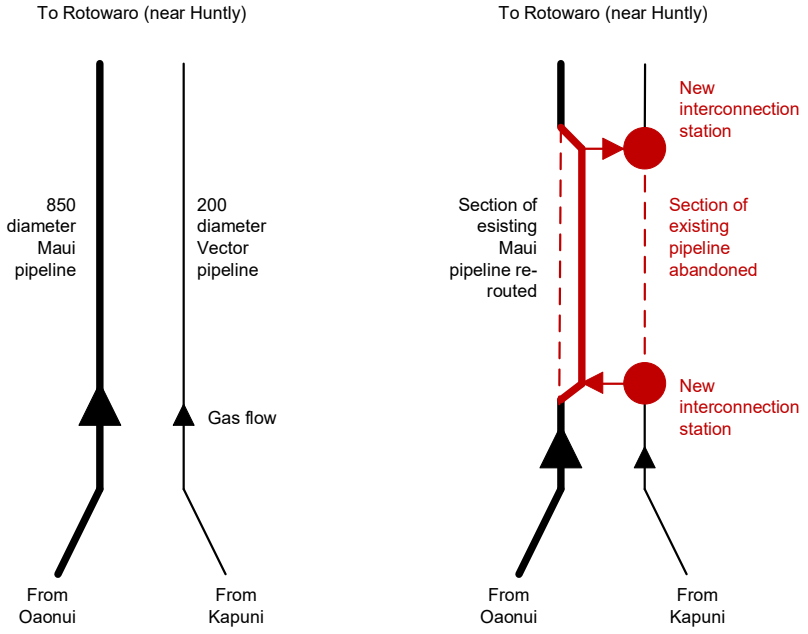
The Vector 2015 AMP leaves more room for speculation around what Vector proposes to do at Whitecliffs. It simply notes:

> Active erosion of the coastline adjacent to the Whitecliffs walkway at Tongaporutu has been occurring for a number of years and poses a risk to the ongoing integrity of the 200 Line. The erosion is occurring at two separate erosion zones at Mangapukatea and Mackenzie Cove. Expenditure for the relocation of the 200 Line has not been included in the forecast as, based on the most recent technical assessments, the need to relocate is outside the plan period.
>
> (Section 6, Vector 2015 AMP)

[41] S17 of the Information Disclosure Determinations requires that the "AMPs must provide details of risk policies, assessment, and mitigation, including methods, details and conclusions of risk analysis; strategies used to identify areas of the network that are vulnerable to high impact low probability events and a description of the resilience of the network and asset management systems to such events; and a description of the policies to mitigate or manage the risks…".

[42] The need for this realignment is coastal erosion rather than the landslip that occurred at nearby Pukearuhe. In the years 2016 through 2021, MDL's AMP allows for capital expenditures of $1m, $4m, $1.6m, $0.5m, $25.95m and $0.5m.The continued landslip risk at Pukearuhe is being managed by monitoring and extensive earthwork and drainage work. In the 2016 year, MDL's AMP allows for capital expenditures of $1.6m on this work.

In relation to the Vector pipeline, this leaves stakeholders to speculate on what the level of 'need' (or risk) is and what the possible outcomes may be. Some stakeholders speculate the final outcome will be that a section of the Vector pipeline will be abandoned and the remaining sections will be interconnected with the Maui pipeline, as illustrated below. If this happens, they believe that current overall S&R could be reduced since the abandoned section of Vector pipeline would no longer be able to 'back-up' the Maui pipeline.



Current configuration Possible future configuration

We note that the smaller Vector pipeline can only deliver a fraction of the gas that the Maui pipeline can. So there is not N-1 security for a Maui pipeline failure. Nonetheless the Vector pipeline provides some additional S&R for the Maui pipeline. The 2011 closure and repair of a section of the Maui pipeline involved curtailment of most commercial and industrial demand north of the incident, but the Vector pipeline remained operational and had sufficient capacity to secure supply to at least the high priority and residential sectors of the market.

The possible future configuration illustrated may not ultimately be shown to be economic. Interconnection stations and facilities are expensive to build and operate. Also, the Maui pipeline generally operates at about half the pressure of the Vector pipeline and does not contain odourised gas[43], as most Vector pipelines do. So it is likely that simply re-routing the Vector pipeline, or doing nothing, would be a cheaper and more practical solution.

Given that both transmission systems are shortly expected to be under common ownership, there need no longer be concern about un-coordinated investments. However, a potential concern remains that some system S&R will be lost if the (former) Vector pipeline is abandoned.

Policy issue arising

Firstly, it is important to reflect on the general context for transmission investment. Current AMPs disclose substantial capital investment intentions. These are principally focussed on maintaining the existing transmission pipelines, and there are no proposals for substantial duplications or for new pipelines. Supply/demand scenarios[44] suggest that no such investment is

[43] Where gas is used as a petrochemical feedstock rather than as a fuel, odorant can poison the catalyst. Since the Maui pipeline carries gas to the Methanex plants, it is not odorised. In the case of the Ammonia Urea plan, the feedstock is delivered by a dedicated pipeline from the Kapuni Gas Treatment Plant, and is also unodorised.

[44] *Long Term Gas Supply and Demand Scenarios Report*, Gas Industry Co, available at http://www.gasindustry.co.nz/dmsdocument/4771

likely to be required until a significant new gas find or a similar structural event (eg LNG import facilities) dictates.

The fact that stakeholders are speculating about the resolution of the Whitecliffs situation (or a potential similar future scenario), where significant risks have been identified, and potentially significant investment may be needed, implies at least a communication failure between the GTBs and the market. As reasonable and prudent operators, we consider that it is the responsibility of the GTBs to discuss their investment options with stakeholders (including end-users, Gas Industry Co, and the Commerce Commission)[45].

We believe that concerns about situations where decisions by one GTB that affect the joint S&R of both pipelines will no longer be an issue since the transmission systems are to be under common ownership. However, there may still be situations where it is proposed to abandon a pipeline where a parallel pipeline can meet the needs of the market. This may reduce overall S&R.

Such situations can be regarded as a special theoretical case of 'under-investment': ie situations where a pipeline owner does not find it commercially attractive to invest in, or maintain, a pipeline which would have economic benefit to the wider market. In such situations, the investment has a negative private net worth but a positive public net worth, because there are positive externalities. We consider that these situations would be extremely uncommon. Nevertheless, it is important that there is a route to investigate such situations, and, if necessary, a path to allow the investment to proceed.

Resolution of the policy issue

The Part 4 regime is directed mainly at ensuring efficient investment that is in the long-term interests of consumers. This includes providing incentives for appropriate levels of investment. Under-investment issues above can be addressed in two ways:

- First, ensure that proposals such as Whitecliffs that may require a CPP application pursuant to Part 4 can be determined in an efficient and timely fashion. The Commerce Commission has been working on its DPP and CPP processes; and
- Second, provide a means of addressing investments where stakeholders believe that there is a net public benefit, but the GTB does not wish to make the investment.

In relation to this second route, under Part 4A of the Gas Act 1992, Gas Industry Co has:

- a principal objective, including when recommending rules or regulations for transmission of gas, 'to ensure that gas is delivered to existing and new customers in [an]…efficient and reliable manner'; and
- objectives when making such recommendations include that 'incentives for investment in gas…transmission are maintained or enhanced' and that 'risks relating to security of supply, including transport arrangements, are properly and efficiently managed by all parties.

Gas Industry Co's powers include to recommend regulations 'prescribing reasonable terms and conditions of access to and use of transmission pipelines' or requiring expansions, upgrades, or service quality improvements to gas transmission pipelines, including specifying how these will be paid for'[46]. Gas Industry Co may also recommend information disclosure to settle particular issues that may themselves require regulation[47].

[45] To be clear, we do not think it is sufficient for a GTB to be silent on the matter. Even if the GTB has analysed the situation and concluded that nothing needs to be done, it still has a responsibility to keep stakeholders informed.
[46] Section 43F(2)(c) and (d) Gas Act 1992
[47] Section 43G(2)(l) Gas Act 1992 – cf the former Gas (Processing Facilities Information Disclosure) Rules 2008 http://gasindustry.co.nz/work-programmes/gas-processing-facilities-information-disclosure/operations/#overview

So there is a path for Gas Industry Co to investigate and to address any rare case of under-investment. However, care would be required, including to ensure that any intervention did not duplicate existing arrangements.

Q9: Do you agree that there are statutory arrangements to permit scrutiny of a GTB's decisions to invest, or not invest (albeit that these arrangements have not yet been tested)?

4.8 Results of gap analysis

The analysis shows that all of the contractual and legislative arrangements are in place to assure effective S&R. While we have not assessed the quality of particular provisions from either a legal or technical viewpoint, we assume that the contracts, legislation and codes are well drafted.

Summarising the results for each element of S&R:

- In relation to short-term security (efficient allocation of available capacity):
  - The requirement for efficient capacity allocation arrangements, and re-allocation when constraints are encountered, is still subject to on-going work under Gas Industry Co's Gas Transmission Access and Pricing project.
  - Pipeline pressure management arrangements will be reviewed under Gas Industry Co's review of MBB, which will occur later in 2016.
  - Critical contingency arrangements have been tested and improved, and we expect that evolution to continue.
- In relation to long-term security (efficient investment in new capacity):
  - Design and build standards are clear, and adherence is certified via a Certificate of Fitness. We do not think that additional security standards are required.
  - Operational policies and maintenance, renewal and capital upgrade plans that are consistent with long-term forecasts of supply and demand, are addressed in each GTBs disclosed AMP. While there is scope to improve the AMPs, we do not consider that disclosing more detail (such as the full PIMPs) is necessary.
  - Legislation aimed at providing efficient system expansion is present but to some extent untested, particularly the CPP and Gas Act s43F(2)(d) arrangements.
- In relation to reliability (dependability of deliveries under normal operating conditions):
  - Testing and maintenance standards are assured through the Certificate of Fitness.
  - Active management of pipeline operations is achieved by each GTB acting as a reasonable and prudent operator.
  - Pipeline operating procedures, and compliance with them is reviewed through the Certificate of Fitness process. We do not consider that disclosing the actual operating procedures is necessary.
  - Maintenance regimes are broadly described in AMPs. The detail of these regimes, as set out in the PIMPs is reviewed through the Certificate of Fitness process, and we do not consider that disclosing the full PIMPs is necessary.
- In relation to enhanced S&R (to meet the needs of individual users and for special investment):
  - The option for each end-user to discuss the (possibly unique) S&R risks affecting its gas deliveries.
  - Options to negotiate bespoke S&R arrangements are possible.

- Independent consideration of special investments can be provided through s43F(2)(d) of the Gas Act.

For clarity, we tag the above analysis with a few caveats:

- we have not investigated the adequacy of the technical standards, GTB operating procedures, GTB maintenance regimes, or compliance with them. We assume these are matters addressed when a GTB's Certificate of Fitness is reviewed; and
- we have not assessed Vector's performance as System Operator, but assume that it is to the standard of a reasonable and prudent operator.

Q10: Are there any aspects of the gap analysis that you do not agree with?

5. Conclusions, suggested action points and next steps

In relation to delivering effective S&R:

- Chapter 2 reviewed the available information;
- Chapter 3 reviewed the current arrangements providing the commercial and regulatory drivers for GTBs to deliver effective S&R; and
- Chapter 4 teased out the requirements for delivering effective S&R and performed a gap analysis to see whether all the requirements are met.

In this chapter we draw conclusions on the quality of the available S&R information, suggest action points, and invite submissions on this Issues Paper.

5.1 Conclusions

Stakeholders have asked appropriate questions about whether current arrangements are right to deliver effective S&R, and whether the information made available by the GTBs is adequate. Based on the analysis in this Issues Paper, our conclusions are:

From Chapter 3:

1. The primary responsibility for transmission S&R lies with the GTBs, operating within a regulatory framework defined principally by the Health and Safety at Work Act, the Commerce Act, and the Gas Act.
2. The regulatory agencies – WorkSafe NZ, the Commerce Commission and Gas Industry Co – have well defined roles with very little overlap.
3. The GTB's have strong incentives – reputational, commercial and statutory – to deliver effective S&R.

From Chapter 4:

1. All the necessary arrangements to deliver effective S&R are in place, although some arrangements are untested, and compliance with others could be improved. In particular, despite the disclosure of substantial AMPs, some stakeholders are unsure if GTBs consider the system to be adequately secure and reliable, or what the major risks are, or how those risks are being addressed[48].
2. While we find that all the information or arrangements needed to deliver effective S&R are provided for, we note that:
   (a) some arrangements affecting S&R have never been tested, in particular:
      (i) the Customised price-quality path (CPP) arrangements, designed to allow the Commerce Commission to set a price path better suited to a GTB's circumstances, such as the need to make a major investment; and
      (ii) s43F(2)(d) of the Gas Act, which provides a path for Gas Industry Co to investigate and to make recommendations to address any rare case of under-investment;

[48] Although we note that since work on this Issues Paper began, MDL issued its December 2015 AMP, in which a number of improvements have been made, including a new section entitled Major Risks.

(b) some arrangements affecting S&R are under Gas Industry Co review, in particular:

(i) capacity allocation arrangements, which the Panel of Expert of Advisers (PEA) found to be inefficient; and

(ii) physical pipeline management arrangements, including balancing arrangements, which have recently been changed;

(c) some information needed to assess S&R can be improved, in particular:

(i) stakeholders are unsure whether GTBs are providing sufficient information for interested persons to assess whether:

- assets are being managed for the long term;
- the required level of performance is being delivered; and
- costs are efficient and performance efficiencies are being achieved.

5.2 Suggested action points

We suggest that:

1. The new GTB:

(a) address the capacity allocation issues identified by the PEA;

(b) work with stakeholders (including end-users, Gas Industry Co and the Commerce Commission) to ensure future AMPs and other disclosures provide a more assessable presentation of the GTB's interpretation of the data, identification of issues, and means of addressing those issues (however, as discussed in section 4.4, we do not favour mandatory security standards such as N-1 and, as discussed in section 4.5, we do not favour disclosure of the PIMP); and

(c) work with any individual end-user who wishes to assess the S&R of deliveries to its individual site (given that this will be affected by a possibly unique set of risks along its gas transmission route).

2. Gas Industry Co:

(a) consider whether new balancing arrangements are contributing to more stable linepack management; and

(b) continue to work with the Commerce Commission to ensure that there is no duplication of function.

3. Gas Industry Co and stakeholders:

(a) work with the Commerce Commission during its Input Methodologies Review and through the consultation on the 2017 reset of the GTB default price paths to ensure that the price-quality regime is providing appropriate constraints/incentives on investment, including major new investments.

Q11: Do you agree with our suggested action points? Are there any other actions that you believe are necessary?

5.3 Next steps

This Issues Paper will be presented by Gas Industry Co at a workshop on **Tuesday 24 May 2016**. Gas Industry Co will invite pipeline owners to make a presentation at the same workshop. The workshop will be followed by a discussion on suitable quality measures for the price-quality reset by the Commerce Commission. Full event details are available on our website.

Gas Industry Co invites submissions on this Issues Paper **by 5pm on Friday 10 June 2016**.

Glossary

Balancing Gas	Gas purchased or sold by a GTB to manage linepack.
Certificate of Fitness	A certificate issued under the HSE Pipeline Regulations by an inspection body (recognised by WorkSafe NZ) certifying that a pipeline is designed, constructed, operated, and maintained etc., in accordance with generally accepted and appropriate industry practice (including any relevant NZ or international standards).
Critical Contingency Regulations	The Gas Governance (Critical Contingency Management) Regulations 2008
GTB	'Gas Transmission Business'
Information Disclosure Determination	The Commerce Commission's Gas Transmission Services Information Disclosure Determination 2012, NZCC 24, and the 2015 amendments to these, NZCC 8, as consolidated in 2015.
Input Methodologies	'means a description of any methodology, process, rule, or matter that includes any of the matters listed in section 52T and that is published by the Commission under section 52W; and, in relation to particular goods or services, means any input methodology, or all input methodologies, that relate to the supply, or to suppliers, of those goods or services', Commerce Act s52C
linepack	The inventory of gas in the pipeline.
MDL	'Maui Development Limited', the owner of the Maui pipeline.
MPOC	'Maui Pipeline Operating Code', setting out the multi-lateral terms of access to the Maui transmission pipeline.
OATIS	'Open Access Transmission Information System' is the IT system used to manage third party access to the Maui pipeline and Vector pipelines.
PEA	'Panel of Expert Advisers' set up by Gas Industry Co to assist in its Gas Transmission Investment Programme.
Price-Quality Determination	The Commerce Commission's Gas Transmission Services Default Price Quality Path Determination 2013, NZCC 6,

	as amended from time to time.
Reliability	The dependability of pipeline deliveries under normal operating conditions.
Security	The capability of a pipeline to meet short-term and long-term changes in demand.
Shipper	A pipeline user that has contracted with the GTB to transport gas on the GTB's pipeline.
VTC	'Vector Transmission Code', setting out the multi-lateral terms of access to the Vector transmission pipeline.

Appendix A Appendix A - Information Disclosure Determination Sch10a and Sch10b

Company Name	Vector - gas transmission business
For Year Ended	30 June 2014

SCHEDULE 10a: REPORT ON NETWORK RELIABILITY AND INTERRUPTIONS

This schedule requires a summary of the key measures of network reliability (interruptions, compressor availability) for the disclosure year
GTBs must provide explanatory comment on their network reliability for the disclosure year in Schedule 14 (Explanatory Notes to Templates).

sch ref

10a(i): Interruptions and Reliability

Total number of planned interruptions	-
Service incidents and emergencies	
Number of incidents	122

Unplanned interruptions in transmission systems

Description and cause of Interruption	Transmission systems affected	Date	Duration (hrs)
None			

**Add rows as necessary*

Number of interruption or curtailment events:

due to insufficient capacity	-
due to consumer flows exceeding approved quantities	-
caused by equipment failure	-
caused by third parties	32
Total	32

10a(ii): Compressor Availability

Compressor station code/name	Compressor unit ID	Number of hours the compressor ran	Number of hours compressor was available for service	Number of instances where the compressor failed to start	Number of instances where a compressor was required but unavailable for service
Henderson Compresor Station	Henderson 1	7	4,786	-	-
Kaitoke Compresor Station	Kaitoke 1	130	8,135	5	-
Kaitoke Compresor Station	Kaitoke 2	255	7,785	25	-
Kapuni Gas Treatment Plant Compressor Station	Kapuni 2	4,842	8,214	-	-
Kapuni Gas Treatment Plant Compressor Station	Kapuni 3	4,050	8,076	5	-
Kapuni Gas Treatment Plant Compressor Station	Kapuni 5	2,933	7,061	9	-
Kawerau Compressor Station	Kawerau 1	65	7,656	6	1
Kawerau Compressor Station	Kawerau 2	61	5,959	3	-
Mahoenui Compressor Station	Mahoenui 1	177	5,249	7	-
Mahoenui Compressor Station	Mahoenui 2	261	7,597	1	1
Mahoenui Compressor Station	Mahoenui 3	172	6,786	4	1
Pokuru Compressor Station	Pokuru 1	2,341	7,176	2	-
Pokuru Compressor Station	Pokuru 2	6,244	8,674	9	1
Rotowaro Compressor Station	Rotowaro 3	2,794	7,218	1	-
Rotowaro Compressor Station	Rotowaro 4	2,867	8,274	1	-
Rotowaro Compressor Station	Rotowaro 5	3,723	7,829	-	-
Rotowaro Compressor Station	Rotowaro 6	2,177	8,616	-	-

**Add rows as necessary*

	Company Name	**Vector - gas transmission business**
	For Year Ended	**30 June 2014**

SCHEDULE 10b: REPORT ON NETWORK INTEGRITY

This schedule requires a summary of the key measures of network integrity (product control, gas escapes, RTEs) for the disclosure year.

sch ref		
7	**Product control**	
8	Number of incidents relating to pressure	17
9	Number of incidents relating to gas specification	11
10	Number of incidents relating to odorisation	1
11		
12	**Response time to emergencies (RTE)**	
13	Proportion of emergencies responded to within 3 hours (%)	n/a
14	Average call response time (hours)	n/a
15	Number of emergencies	-
16		
17	**Gas leaks**	
18	Number of confirmed public reported gas escapes per 1000 km of pipeline	8
19	Number of confirmed gas leaks caused by a third party per 1000 km of pipeline	-
20	Number of gas leaks detected by the GTB	2
21	Number of gas leaks that did not result in disruption to supply	8

Company Name	**Maui Development Limited**
For Year Ended	**31 December 2014**

SCHEDULE 10a: REPORT ON NETWORK RELIABILITY AND INTERRUPTIONS

This schedule requires a summary of the key measures of network reliability (interruptions, compressor availability) for the disclosure year
GTBs must provide explanatory comment on their network reliability for the disclosure year in Schedule 14 (Explanatory Notes to Templates).

sch ref

10a(i): Interruptions and Reliability

Total number of planned interruptions	-
Service incidents and emergencies	
Number of incidents	51

Unplanned interruptions in transmission systems

Description and cause of Interruption	Transmission systems affected	Date	Duration (hrs)
N/A			

**Add rows as necessary*

Number of interruption or curtailment events:

due to insufficient capacity	
due to consumer flows exceeding approved quantities	
caused by equipment failure	
caused by third parties	18
Total	18

10a(ii): Compressor Availability

Compressor station code/name	Compressor unit ID	Number of hours the compressor ran	Number of hours compressor was available for service	Number of instances where the compressor failed to start	Number of instances where a compressor was required but unavailable for service
Mokau	Unit #1	1,661.40	8,578.69	4	-
Mokau	Unit #2	4,308.00	8,559.58	6	-

**Add rows as necessary*

	Company Name	**Maui Development Limited**
	For Year Ended	**31 December 2014**

SCHEDULE 10b: REPORT ON NETWORK INTEGRITY

This schedule requires a summary of the key measures of network integrity (product control, gas escapes, RTEs) for the disclosure year.

sch ref		
7	**Product control**	
8	Number of incidents relating to pressure	-
9	Number of incidents relating to gas specification	-
10	Number of incidents relating to odorisation	-
11		
12	**Response time to emergencies (RTE)**	
13	Proportion of emergencies responded to within 3 hours (%)	N/A
14	Average call response time (hours)	N/A
15	Number of emergencies	-
16		
17	**Gas leaks**	
18	Number of confirmed public reported gas escapes per system length (escapes/1000 km)	-
19	Number of confirmed gas leaks caused by a third party per system length (escapes/1000 km)	-
20	Number of gas leaks detected by the GTB	3
21	Number of gas leaks that did not result in disruption to supply	3

Appendix B Submission Template

QUESTION		COMMENT
Q1:	Do you agree that the current disclosed metrics provide useful status and trend indications? If not, what information do you think is redundant or missing?	
Q2:	Do you agree that the metrics could usefully be summarised and displayed in a 'dashboard' format, accompanied by the GTB's interpretation? Are there other improvements you would suggest?	
Q3:	Do you agree that there are strong reputational, contractual and legislative drivers for a GTB to achieve effective S&R? If not, what else do you think is needed?	
Q4:	Do you think we have correctly identified the requirements to achieve the S&R objectives? If not, what requirements are unnecessary, or missing?	
Q5:	Do you think the gap analysis is adequate? If not, what gaps have not been identified?	
Q6:	Do you think we agree that it is not necessary to mandate any security standards?	
Q7:	Do you agree that the current AMPs are generally adequate, but missing a layer of GTB interpretation?	
Q8:	Do you agree that it is unnecessary for a GTB's PIMP to be disclosed?	

QUESTION		COMMENT
Q9:	Do you agree that there are statutory arrangements to permit scrutiny of a GTB's decisions to invest, or not invest (albeit that these arrangements have not yet been tested)?	
Q10:	Are there any aspects of the gap analysis that you do not agree with?	
Q11:	Do you agree with our suggested action points? Are there any other actions that you believe are necessary?	

ABOUT GAS INDUSTRY CO.

Gas Industry Co is the gas industry body and co-regulator under the Gas Act. Its role is to:

- develop arrangements, including regulations where appropriate, which improve:
  - the operation of gas markets;
  - access to infrastructure; and
  - consumer outcomes;
- develop these arrangements with the principal objective to ensure that gas is delivered to existing and new customers in a safe, efficient, reliable, fair and environmentally sustainable manner; and
- oversee compliance with, and review such arrangements.

Gas Industry Co is required to have regard to the Government's policy objectives for the gas sector, and to report on the achievement of those objectives and on the state of the New Zealand gas industry.

Gas Industry Co's corporate strategy is to 'optimise the contribution of gas to New Zealand'.