Multinet Gas
Network Asset Management Plan
2012/13 to 2017/18

CONFIDENTIAL

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Multinet Gas Network Asset Management Plan 2012/13-2017/18

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1 Executive summary

1.1 Introduction

The Asset Management Plan (AMP) details Multinet Gas"s approach to managing the Multinet Gas network assets, to achieve the long term objectives; primarily maintaining asset integrity, levels of service and safety at the lowest life cycle cost.

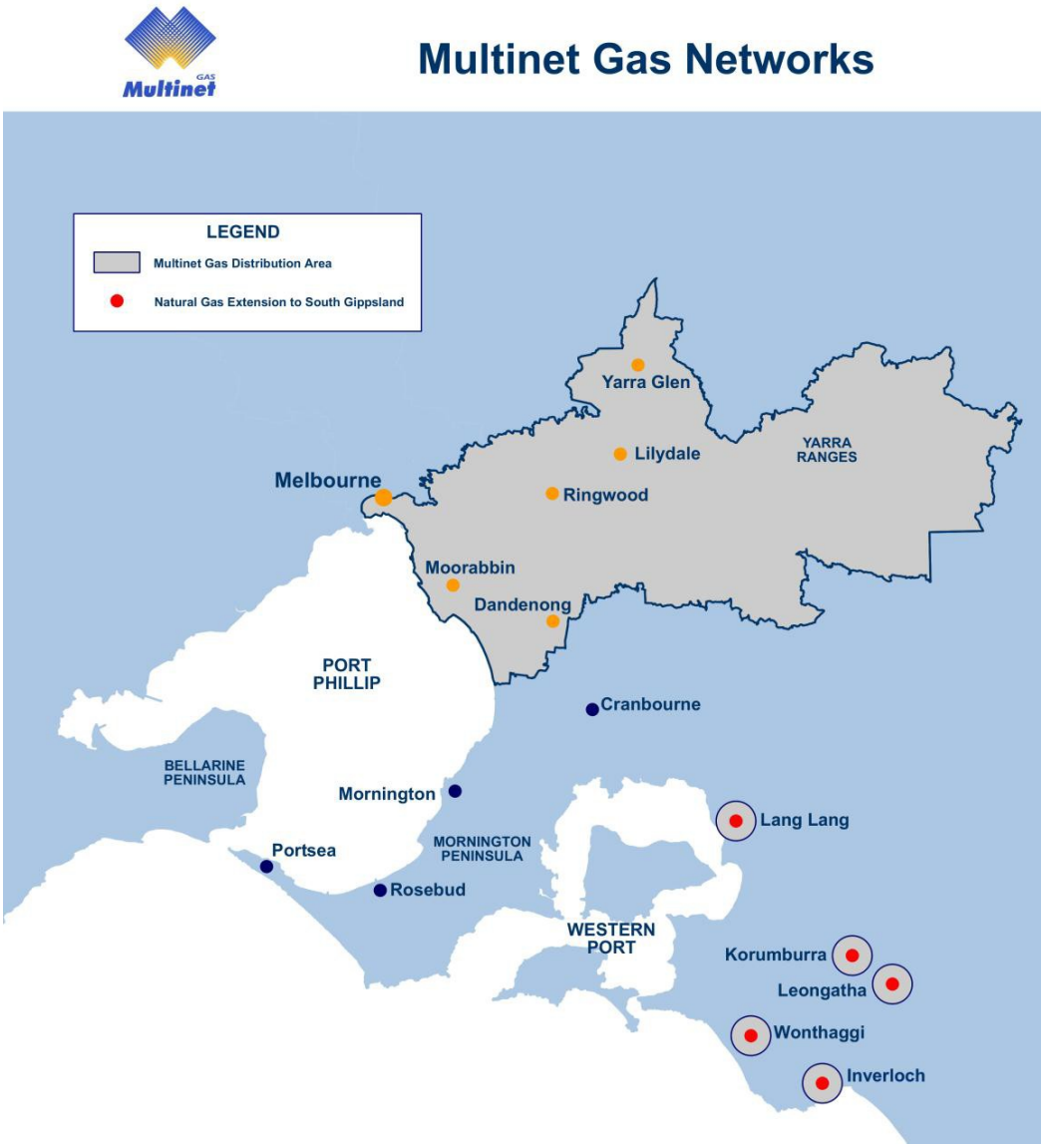
The AMP is a six-year plan incorporating Multinet Gas"s asset management strategies and operational plans. The AMP details Multinet Gas"s intentions relating to managing network reliability, capacity and security of supply, technical compliance and operational risk. Multinet Gas recognises the importance of good asset management in ensuring delivery of services that meet the needs of end users and stakeholders. System planning, maintenance and asset replacement are vital components of asset management with effective asset management having a profound impact on customer service.

1.2 Multinet Gas in Profile

A reliable gas supply is important to the continued growth and prosperity of south eastern Melbourne. Multinet Gas distributes gas in Melbourne"s south and east covering an area of 1,790 km2 as well as a non-contiguous network in South Gippsland. At the end of December 2010, Multinet Gas network assets primarily consist of 165 km of Licensed Transmission Pipeline and 9,815 km of Distribution Mains, supplying 665,314 customers (active consumer billing meters) situated throughout the south and east areas of Melbourne, Yarra Ranges and South Gippsland towns. Other significant Multinet Gas network assets include: five City Gate stations and 279 Supply Regulator sites that facilitate the reduction of gas pressure throughout the network.

The majority of Multinet Gas"s service territory is urban and fully developed, including many predominantly residential suburbs. Dandenong is recognised as the capital of the south east and is Victoria"s manufacturing heartland. Multinet Gas"s territory encompasses the Yarra Ranges parts of which present environmental challenges in terms of meeting stakeholder expectations for new construction, even within existing road reserves.

Figure 1-1: Multinet Gas Network Territory



1.3 The Purpose of the Plan

The AMP seeks to achieve the long term asset management objectives to maintain reliability, safety and customer service standards and to retain Multinet Gas"s good reputation in the minds of the community, regulators and key stakeholders.

The Plan is driving increasing levels of spending, particularly in asset replacement. For the six-year plan period, Multinet Gas anticipates the capital investment for its gas network will be around $388M.

The investment is in response to the need to meet customer growth, renew ageing elements of the network, manage and reduce the levels of risk associated with some aged gas infrastructure, develop infrastructure appropriate to the needs of a growing community, and support the continued economic growth and prosperity of south eastern Melbourne.

The Asset Management Plan is not, in itself, an approved program for specific work, but summarizes the general programs and specific projects which Multinet Gas considers necessary. Inevitably, actual projects and programs will differ from this plan, particularly where they are driven by specific customer requirements. The Asset Management Plan does not represent an authorization to commit expenditure, nor does it represent a commitment to proceed with any of the specific projects or programs. Authorization will result from approval of the annual budget and from specific project approvals within the plan period.

Although the planning process normally covers five years (six years in this plan), experience has shown that the most efficient outcome for capital projects is obtained by an annual planning process at which the five year plan is reviewed in the light of the latest performance information, load forecasts and failure history.

1.4 Historical and current Network Reliability Performance

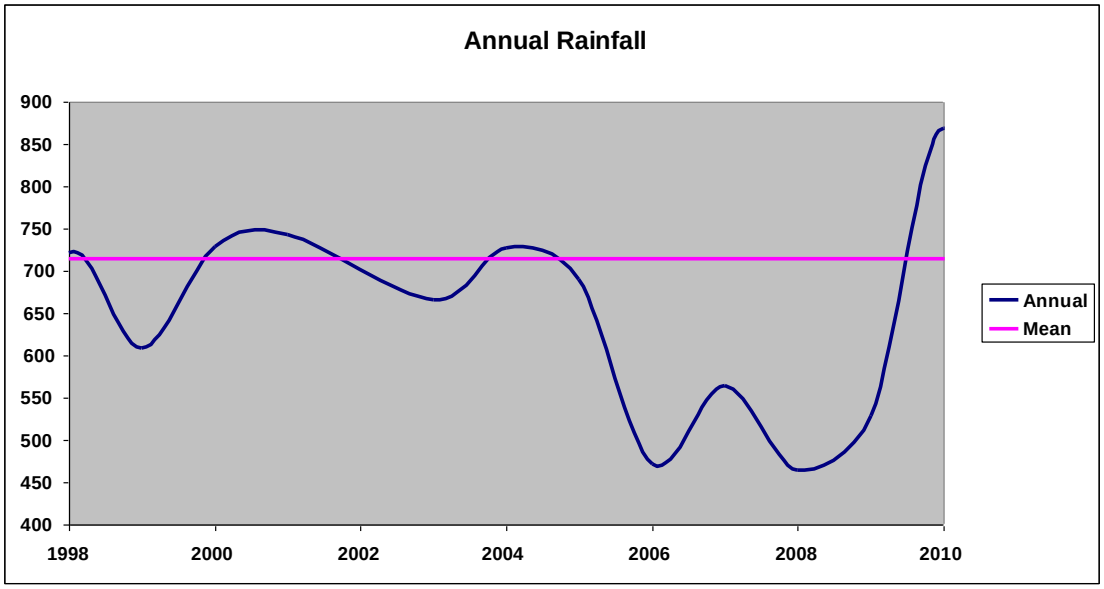
Table 1-1: The unplanned reliability performance since 2003

	2003	2004	2005	2006	2007	2008	2009	2010	2011
SAIDI Unplanned	1.9	2.1	2.5	2.1	2.1	1.5	1.4	2.5	3
SAIFI Unplanned	0.0079	0.0084	0.0097	0.0087	0.0104	0.0071	0.0064	0.0101	0.01

The engineering standards of the Victorian Gas Industry (from around 1970) together with the inherent reliability of underground, meshed gas distribution networks has delivered a reliable supply of gas from Multinet Gas"s network. Even older materials in poor condition mostly exhibit good reliability because the most common failure modes (leaks) do not generally result in an interruption to supply unless combined with water ingress.

The underlying level of average interruption (SAIFI and SAIDI) is low and it is not cost effective or even practical to seek to improve reliability significantly for the majority of customers. This is why the focus for Multinet Gas is on maintaining current performance levels and on targeting the more-poorly served customers who experience significantly worse than average interruption levels (such as customers frequently affected by water in parts of the low-pressure networks). Water in low pressure networks has been a significant focus through 2010 and 2011 due to the return of at least average rainfall conditions after more than 10 years of drought.

Figure 1-2: Annual Rainfall



The above graph illustrates the rapid change in rainfall quantity in 2010 with respect to the 60 year mean rainfall for Moorabbin Airport. The first six months of 2011 has recorded 77% of the annual mean, more than the entire amount for 2008 & 2009.

The graph also shows that 2010 was the wettest year for over 10 years.

These conditions through winter/spring have resulted in much higher than acceptable levels of multiple interruptions and complaints in specific locations/streets/suburbs. In many areas, the soils are reactive ie shrink and move in drought and expand and move when saturated. This has stressed or in some cases sheered joints in the low pressure network exacerbating water ingress.

Water ingress to the low pressure system is being dealt with by a combination of targeted pipe replacement (Pipeworks) and maintenance (tracing water, syphoning and leak repair). The use of a new insertion camera has been beneficial in improving the efficiency of tracing water ingress.

1.4.1 Security of Supply

The immediate major threats to reliability are incidents upstream of Multinet Gas"s distribution network (transmission pipe interruption) and third party damage on Multinet Gas assets. Upstream supply diversification in recent years has reduced (but not eliminated) the risk of insufficient supply to the Multinet Gas Network.

Over the medium term, lack of capacity within Multinet Gas networks could impact levels of service unless adequate and timely investments in reinforcements and upgrading are made at the appropriate time as determined by network analysis.

At this point in time, a major project is underway to construct a strategic pipeline link from the APA GasNet Australia"s outer ring main to the Multinet Gas Croydon to Lilydale pipeline. This link will bolster gas supply to the supply-constrained Lilydale area as well as providing long term security of supply to most of the Multinet Gas inner ring main. This major project delivers a major increase to security of supply of the Multinet Gas network and provides a superior long term solution to the prior commercial arrangement through the Templestowe valve.

1.5 Historical Asset Utilisation

Distribution network capacity constraints are generally related to pipe and or facility capacity during peak loading in winter. On high pressure networks, capacity can be increased in winter by boosting supply pressures from normal operating levels up to the MAOP of the networks. The ability to do this on low-pressure networks, is severely constrained by the lack of pressure containment integrity of the network. Increasing pressure on low-pressure networks generates increases in leakage from existing leaks as well as creating new leaks at a rate proportional to the increase in pressure. It is also limited in its effectiveness because the pressure losses along the length of the main are high.

In most cases, high and medium pressure network capacity constraints can be dealt with by relatively small, incremental augmentations. The average annual budget for such augmentations is around $4M. Load (demand) growth on the Multinet Gas network is modest, averaging around 1% per year. The profile of expenditure for this category of capital is generally smooth because there are few extremely high cost network elements to be constructed once a capacity constraint has been reached. An exception is when constraint is reached in Multinet Gas"s transmission pipeline system and a significant new transmission pressure pipeline is required to be constructed to eliminate a capacity constraint (such as the Lilydale pipeline).

Low-pressure capacity constraints are often dealt with by upgrading sections of the low-pressure network to high-pressure by pipe replacement (Pipeworks). This has the added benefit of dealing with maintenance and customer service problems usually inherent in the low-pressure network at the same time and enhancing the capacity of the adjacent low-pressure areas as a result of offloading.

A significant network capacity increase has been achieved by uprating elements of the “sub-transmission” loop known as the 700 kPa system. This system has been uprated to 840 kPa. This project has the effect of providing a boost to the inlet pressures to a number of key field regulators thereby increasing their capacity at a small fraction of the cost of a field regulator upgrade. There are however, technical regulatory barriers to further pressure increases and unless they can be overcome, significant additional network reinforcement costs will be incurred in future.

1.6 Asset Age and Condition

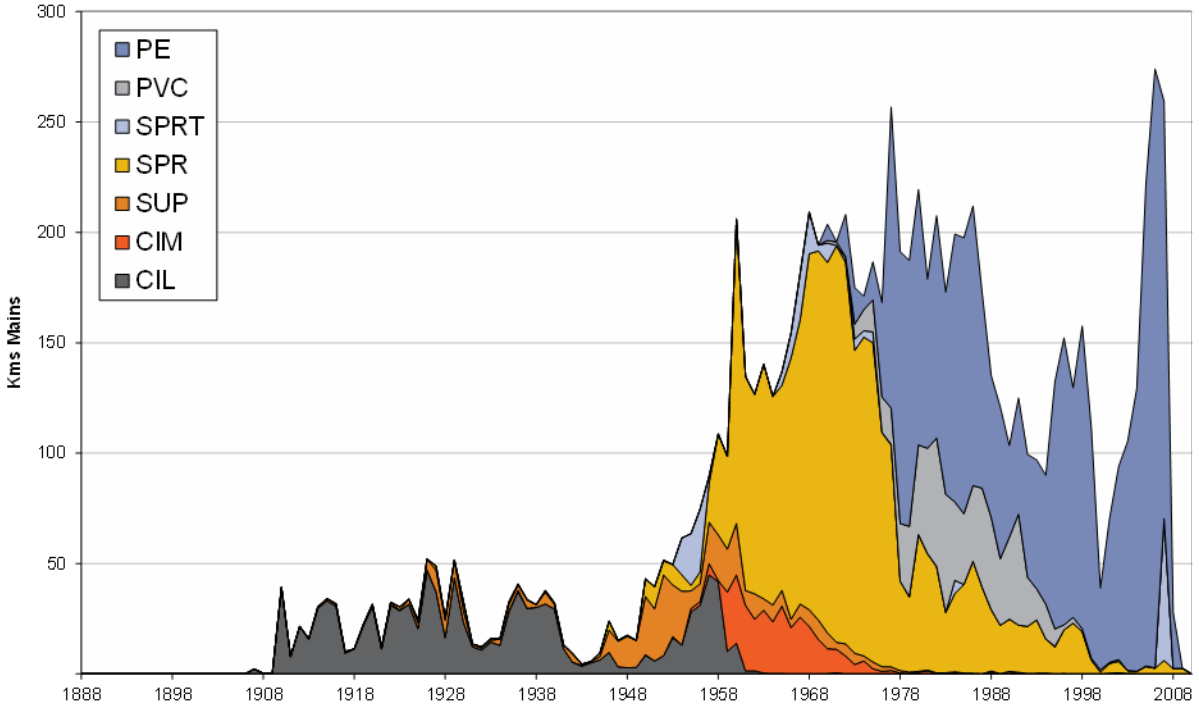
The major expansion of the gas network that occurred after the introduction of natural gas in the late 1960"s was mostly carried out using modern materials with lifespans well beyond the timeframe of this plan. Hence the focus for aged assets is generally in the area of pre-natural gas assets which are in some ways unsuited to natural gas and which are also subject to significant environmental deterioration.

The concept of weighted average age of existing assets is not considered useful because materials such as PE and cathodically protected steel do not generally exhibit a useful life and may be considered to have an indefinite life if well-constructed and maintained. Replacement programs are therefore focused on particular elements of the network.

The major elements of the gas network subject to a rehabilitation requirement over the foreseeable future are the low-pressure network, medium-pressure cast iron or unprotected steel mains and gas meters.

In terms of the low-pressure network, the material types CIL, CIM, SUP & PVC on the chart below represent the target materials for replacement. The Cast Iron materials exhibit failure modes (brittle fracture or collapse) which can present both an OH&S hazard to maintenance crews and the public at large.

Figure 1-3: Existing Mains Age Profile by Material



Of the total distribution mains, 211 km is made from large diameter cast iron or unprotected steel operating at pressures up to 80kPa with an average age of 75 years. The cost to replace these mains on a like-for-like basis is high and not considered appropriate because the large diameter mains will be significantly under-utilised when ultimately operating at high pressure. However these mains are likely to be the last to be decommissioned because they are critical to the operation of the remaining low and medium pressure networks. The cost of failure of many of these mains would be high because they are usually situated in major arterial roads. The ability to repair mains of this size and age is becoming more difficult and significant downstream outages would occur. Public risk is known to be much higher for this type of pipe operating at medium pressure when compared to similar pipes at low pressure. The maintenance and replacement strategy for large diameter Cast Iron mains is an attempt to address this issue for some known poor condition mains, however, due to the amount of large diameter Cast Iron supply mains in service and the high cost, like-for-like replacement is not achievable for all mains in this classification. Alternatively, pipe lining or similar technology will need to be employed to extend the life of the existing backbone mains. To date pipe lining has not been used on gas networks in Victoria and its usage will require trials and development of new procedures prior to routine implementation.

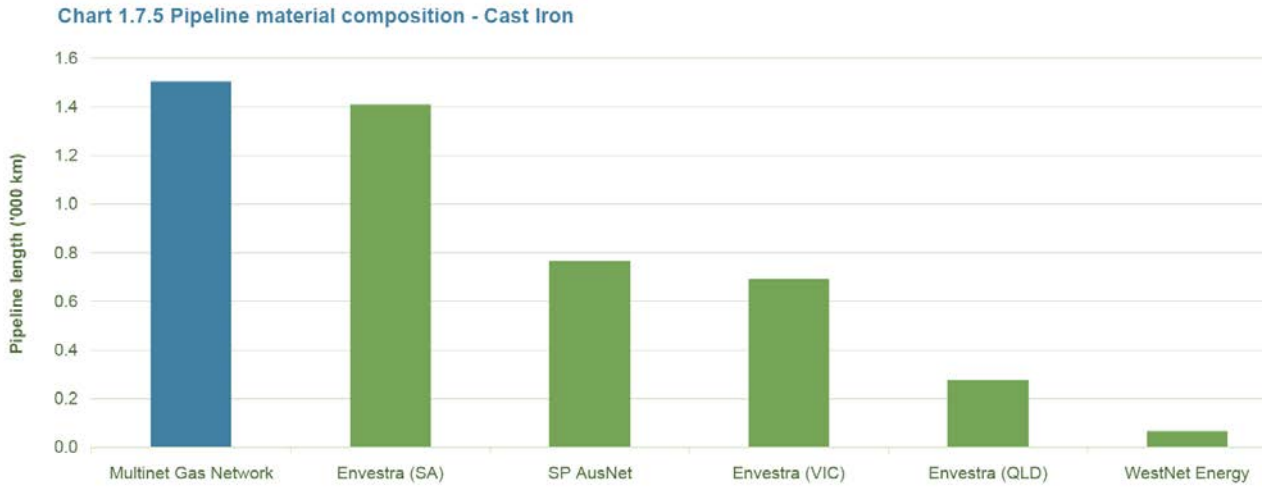
The below table outlines the length of Multinet Gas Distribution Mains, by material type.

Table 1-2 Asset Materials – Distribution Mains (including Sth Gippsland Towns)

Material Type	PVC	Steel	Cast Iron	Polyethylene
Length	698	3,737	1,445	3,924

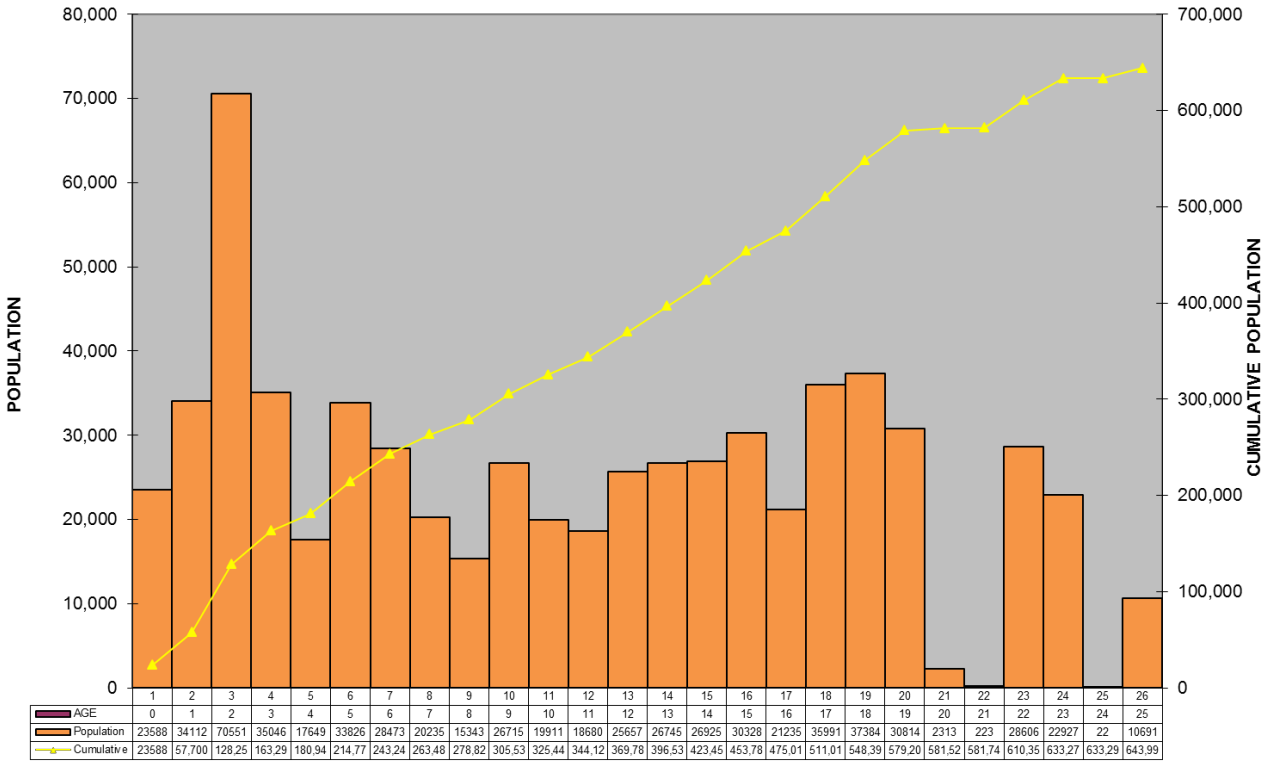
The below graph illustrates that Multinet Gas has the largest amount of cast iron mains compared to other gas distributors in Australia. (ESAA 2008).

Figure 1-4: Distribution Business Comparison – Cast Iron Pipe Length



Meter replacement is to some extent driven by age due to the nature of the accuracy testing regime in place which requires sample testing within the initial 15 year life. Due to the practice of progressively extending meter family life beyond 15 years, a bow wave of meter replacements has built up over recent years resulting in the risk of large meter replacement programs being required in any one year of the plan period, depending on the results of field life extension testing in a particular year. A program of 70,000 meter replacements was required in 2009 compared to a normal year of 20,000. The chart below shows that around 190,000 meters are of an age exceeding 15 years and so potentially subject to refurbishment/replacement within a five-year period.

Figure 1-5: Age Profile – Domestic Meters



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
AGE	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Population	23588	34112	70551	35046	17649	33826	28473	20235	15343	26715	19911	18680	25657	26745	26925	30328	21235	35991	37384	30814	2313	223	28606	22927	22	10691
Cumulative	23588	57,700	128,25	163,29	180,94	214,77	243,24	263,48	278,82	305,53	325,44	344,12	369,78	396,53	423,45	453,78	475,01	511,01	548,39	579,20	581,52	581,74	610,35	633,27	633,29	643,99

1.7 Challenges for 2012-2018

Replacing Ageing Assets in Sensitive Urban Areas

One of the challenges for Multinet Gas will be managing the replacement of several large diameter low-pressure supply mains that run through major arterial roads and high profile strip shopping centers within the plan period. These projects are costly, complex, have high local community impact, require significant traffic management planning and coordination with other service authorities. There is high potential for community disruption, claims and outrage if the projects are not well planned and executed.

The requirement to replace or rehabilitate this type of network backbone asset will increase in the period beyond the plan. A challenge for Multinet Gas within this plan period is to identify and trial new technologies to assist the smooth implementation of such projects and to ramp up the required planning, resourcing and skills required for implementation of a higher number of complex projects in future.

Construction and Alteration of Licensed Pipelines in Urban Areas

The plan contains a third-party-funded pipeline alteration (Highett) and provision for alterations to other licensed pipelines to facilitate intelligent pigging. Depending on the nature of the individual project, stakeholder consultation, environmental, cultural heritage and even biodiversity impacts must be assessed and managed and associated State and possibly Commonwealth regulatory approvals obtained. Managing the specialist nature, complexity, timeframe and costs associated with such projects is a challenge for Multinet Gas given that few projects of this type have been required in previous periods.

Implementation of New Approach to Mains Replacement

This plan includes a change in strategy towards low pressure replacement. There is a second approach to certain Low Pressure zones where the focus on replacement will be like-for-like, as opposed to block upgrade to high pressure in the remainder of the low pressure networks.

This approach (as detailed in Section 5) presents challenges for large diameter pipe laying in older areas of Melbourne and the opportunity to reduce costs of service replacement and meter relocations by adopting like-for-like mains renewal. These challenges will require the development of engineering solutions (such as pipe relining) that are not currently implemented during pressure upgrades (Pipeworks).

1.8 Levels of Investment

Levels of capital expenditure proposed for the period 2012/13-2017/18 have increased with the major differences relating to changes in Customer Initiated Capital, Asset Replacement, Performance and Pipeworks. The lower Pipeworks expenditure for the 2008 to 2012 years (reflected in Calendar year below) reflects reduced funding post the 2008 Access Arrangement decision.

The table below outlines the overall category variance between the current GAAR period and the next GAAR period in Calendar Years.

Table 1-3: Comparison of 2008 to 2012 Actual/Forecast Expenditure to 2013 to 2017 Forecast (Calendar Year)

2011 $(K) Category	2008 to 2012 (Actual/Forecast)	2013 to 2017 Forecast	Variance
Customer Initiated	65,936	104,295	38,359
Metering	12,707	14,195	1,488
Demand	36,327	35,579	-748
Asset Replacement	6,375	40,924	34,549
Pipeworks	48,503	96,979	48,476
Other (Non Network & Performance)	14,522	19,891	5,369
Incremental Capex (ie. New Towns, Highett)	20,643	14,541	-6,102
Total	**205,013**	**326,403**	**121,390**

1.9 Reasons for Capital Expenditure Change

Customer Initiated

Customer Initiated Capital expenditure is forecast to increase by $38.4M. This category is expected to increase from 2013/14 onwards partly due to increases in customer connections forecast by NIEIR and due to an increase in market tendered unit rates. Tendered unit rates are higher than the relevant unit rates under Multinet Gas"s existing service provider contract, whilst the remainder of the increase is driven by a forecast 1.5% increase in residential connection volumes.

NIEIR analysis has determined an increase in service connections over the forecast period. Previous period forecasts indicated new connections of 8,300 per annum on average. This has increased to approximately 8,400 new connections per annum on average. Between 2012/13 and 2013/14 there is expected to be a 1.5% increase in new connections followed by a return to historic growth rates.

The tendered prices for Customer Initiated Capital, confirms our view that the current benchmark rates provided by our existing service provider are unsustainable. The unsustainability of existing rates has been known to MG by way of numerous requests and claims by our service provider for cost relief over the last three years.

Overall for the CIC category there was a 9% average increase over historical annual budgets due to volume increases and an additional 47% average increase over the forecast annual average budget due to unit rate increases.

An increase of approximately $8M on average per annum from 2012/13 costs is forecast post July 2013 as a result of unit rate increases across the CIC category.

Metering

Metering is forecasted to increase slightly for the 2013 to 2017 period due to an increase in meter replacement numbers in the early years of the plan. Meter replacement is driven by the outcomes of annual sampling. The metering expenditure profile in the 2013 to 2017 period is forecast to be stable in the outer years, however some variability can be expected in this category within the five year period. When compared to the current GAAR period, Metering is forecast to be $1.5M higher in the forthcoming GAAR period.

Demand

No significant change.

Performance

The increase in performance capital is primarily due to the inclusion for pipeline alterations to allow intelligent pigging. A successful intelligent pigging operation was carried out on the inner ring main in 2009. The additional funding in the plan is to allow modification of other licensed pipelines to extend the intelligent pigging program (which is considered necessary to be operating in accordance with good industry practice). The modifications are required to allow launching and receiving of pigs and potentially removal of bends, valves and obstructions because the pipelines were not designed to be pigged.

Also included is siphon removal for the de-licensed pipelines. This work is required to minimize risk and to potentially pave the way for an increase in pressure from 840kPa to 1050kPa.

A marginal increase for telemetered Cathodic Protection Units is also included.

Performance expenditure is set to increase in the outer years of the plan period resulting in a variance to the current GAAR period of $5.4M.

Replacement

The primary driver for Asset Replacement relates to an increase in expenditure associated with aged large and small diameter cast iron mains which require replacement due to deterioration, maintenance and risk. These projects are non-Pipeworks projects due to the fact that they are not Low Pressure to High Pressure replacement projects and in most cases are "like for like" asset replacement. In recent times a number of these assets have created concern with regards to high risk location, level of deterioration and leakage into other utility assets (eg. Telstra/Sewer).

The need for such replacements are determined by actual pipe failure, reported public escapes and leakage survey results and the increase is derived by known sites through the aforementioned determinants. There are 16 large diameter pipe replacement projects equating to $19.3M over the six-year program and 26 small diameter pipe replacement projects equating to $4.7M over the six-year program. The remainder of expenditure in this category relates to facilities replacement and service replacements.

The increase in expenditure for this category is forecast to be $34.5M for the 2013 to 2017 GAAR period when compared to the current GAAR period.

Pipeworks

The primary driver for an increase in the level of PipeWorks is in order to increase the program and return to volumes in line with a 30-year program in the next regulatory period. This will result in a return to a program of renewal of approximately 85 km per annum. Pipeworks expenditure is forecast to increase by $48M in the 2013 to 2017 period when compared to the current GAAR period.

The below table outlines Multinet Gas's proposed Six-Year Capital Expenditure Forecast in Financial Year format.

Table 1-4: Multinet Gas Financial Year Capex Summary – July-June Year ($'000)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Customer Initiated	14,268	21,119	22,009	22,264	21,950	22,463
Metering	3,994	4,010	2,670	2,233	2,462	2,440
Non Network	120	97	10	21	0	10
Demand	7,532	7,455	6,374	6,054	7,279	7,370
Performance	1,225	2,667	2,769	5,448	7,267	2,057
Replacement	7,795	9,120	6,976	6,201	10,285	8,219
Pipeworks	20,954	17,122	18,567	16,782	15,458	20,953
Base Capex	**55,888**	**61,590**	**59,375**	**59,003**	**64,701**	**63,512**
Tariff D Augmentation	529	529	529	529	529	529
Highett Asset Relocation	8,090	5,000				
Total Capex	**64,507**	**67,119**	**59,904**	**59,532**	**65,230**	**64,041**

Note: 2011 Real Dollars

2 Introduction

2.1 Background

Multinet Gas was established in July 1997 when the Victorian Government created (from the former Gas and Fuel Corporation) three independent, competitive retail businesses each stapled to a distribution business, but with different franchise areas. In March 1999, the „stapled" distributor/retailer pair companies, namely Multinet Gas and Ikon Energy, were purchased by Energy Partnership Pty. Ltd. and managed by United Energy Ltd. through a management agreement. The retail company was moved to a joint venture with Shell and Woodside in September 2000 and re-badged as Pulse Energy. Pulse was subsequently sold to AGL in July 2002. In July 2003 the ownership of Multinet Gas was restructured to facilitate the sale of the Aquila interest. Multinet Gas was then owned by DUET and Alinta. Alinta was purchased by a consortium of Babcock and Brown and Singapore Power International (SPI) and then split into WestNet and Jemena. SPI was and remains the owner of Jemena and Multinet Gas was owned by DUET and Babcock and Brown Infrastructure (BBI). BBI"s interest in Multinet Gas was included in a portfolio of assets known as Australian Energy Transmission and Distribution (AET&D). As part of the November 2009 recapitalisation of BBI (now Prime Infrastructure), Brookfield Asset Management has taken over management of the AET&D assets. Since then DUET has purchased the remaining 20.1% of Multinet Gas from AET&D to be the only shareholder at 100% ownership.

2.2 Purpose

The Long Term Asset Management objectives of Multinet Gas are to:

- Maintain and develop the assets in Multinet Gas"s best interests
- Ensure that the assets are managed in accordance with all applicable Australian and International Standards and that this can be demonstrated.
- Ensure that capital investment is efficient and is consistent with Multinet Gas"s financial capacity.
- Manage to any specific capital constraint of Multinet Gas.
- Ensure the assets are managed in accordance with good industry practice
- Ensure that these assets are managed in accordance with all applicable laws
- Ensure that the assets and their operation are managed in accordance with the approved Gas Safety Case
- Ensure all assets owned by Multinet Gas are capable of separate identification and tracked on an ongoing basis
- Ensure that assets are managed to reflect all risks and opportunities arising from changing external circumstances
- Minimise the costs and risks associated with any future separation of Multinet Gas"s assets.
- Address risks and opportunities arising from:
    - the impact of anticipated climate changes on the performance of the network and its design
    - The impact of severe weather events on the electricity industry and potential lessons in relation to management of major events.
    - Changing end user and Regulator expectations

  - Technology developments
  - Operational/works practices changes
  - Leverages the knowledge of industry peers to optimize the Asset Management Plan.
- Maintain reliability, safety and customer service to ensure Multinet Gas retains a good reputation in the minds of the community, regulators and key stakeholders
- Maintain and develop the network to avoid deterioration of the assets
- Plan and develop the capacity of the network on a risk basis so that forecast peak demands can be catered for within a defined risk envelope and to standards of reliability consistent with regulatory and community expectations
- Adopt asset maintenance and replacement policies and standards that are of a standard no less than those that existed on 23 July 2003
- Establish high standards of health and safety management, and employee focus
- Ensure that knowledge generated by the organisation is captured and recorded to support a learning organisation.
- Proactively manage health and safety issues and seek to eliminate work place accidents.
- Compliance with all regulatory safety authorities and minimise network incidents through proactive management of recurring root causes.

2.3 Relationship with other Planning Documents

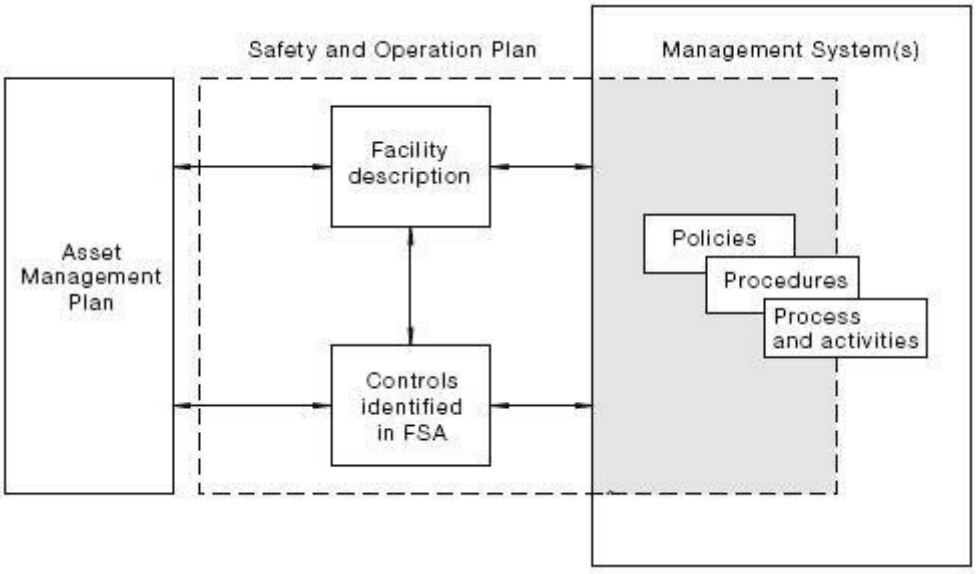
Multinet Gas maintains an extensive matrix of internal asset-related documents that collectively translate the company"s understanding of its stakeholder requirements into action plans. These are updated regularly as required to reflect changing stakeholder requirements or other externalities.

These documents include:

- Asset Maintenance and Replacement Strategies
- Capital Growth Plan
- Standard Procedures
- Engineering Standards
- Asset specific maintenance manuals
- Policies
- Operating Procedures
- Management systems
  - Quality
  - Environmental
  - Gas Safety Case

The above documents are not strictly aligned in a hierarchy. The processes followed in the production of the Asset Management Plan may result in change to Engineering Standards and thus the Standard Procedures may also change.

Figure 2-1: Document Relationships



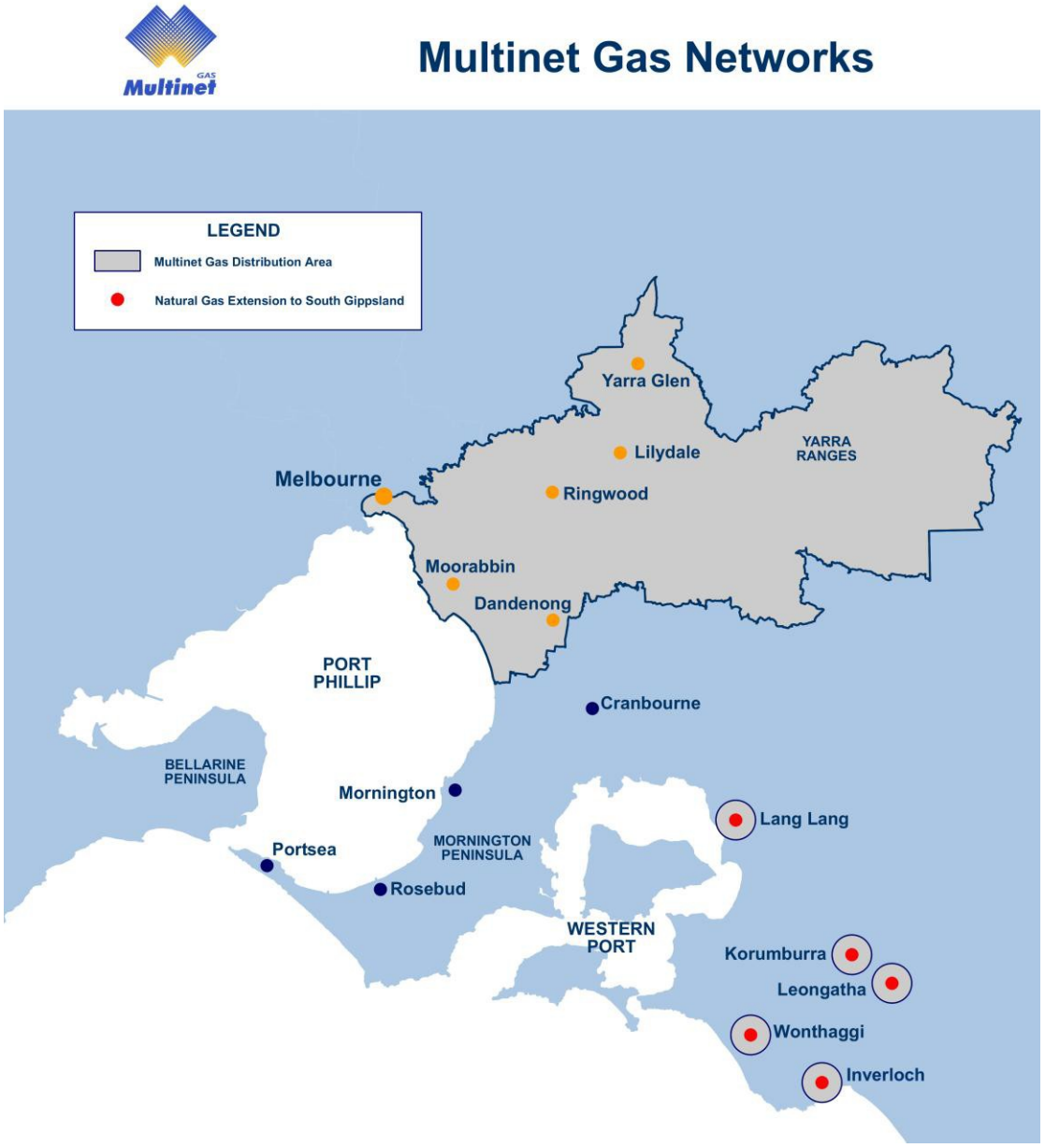
The above diagram illustrates the relationship between the Safety and Operation Plan and the management system with respect to the AMP.

Documents are not necessarily reviewed when a related document is changed unless a material conflict will be created.

2.4 Infrastructure Asset Summary

The below map illustrates the geographical coverage of Multinet Gas network assets.

Figure 2-2: Multinet Gas Network Territory



The following table lists existing salient network assets as of December 2010, unless otherwise stated.

Table 2-1: Asset Summary

Parameter	Metro (Including Yarra Ranges)		South Gippsland Towns	
Geographic Area (approx. sq km)	1,790		70	
Total Energy Withdrawn in 2010 financial year (PJ)	58.1			
Consumer Billing Meters	665,314			
District Regulator Sites	149		-	
Field Regulator Sites	121		-	
City Gate Regulator Sites	3		2	
Transmission Pipeline (km)	97.5		66	
Supply/Distribution Mains (km)	9,741		253	
Supply/Distribution Pressure Mains - Material Breakdown				
High Pressure Mains (140-515 kPa) km	Total: Steel: PE:	6,220 2,625 3,595	Total: Steel: PE:	253 2 251
Medium Pressure Mains (60-210 kPa) km	Total: CI: PE: Steel:	956 46 304 605		-
Low Pressure Mains (up to 7 kPa) km	Total: CI: Steel: PVC: PE:	2,564 1,404 432 698 29		-

Notes:

1. Medium Pressure network reclaim to High Pressure occurring at time of writing. Total Transmission and Distribution Mains correct
2. Transmission Pipeline does not include the former licensed pipelines

2.5 Key Stakeholders

This plan recognises the following key stakeholders:

Multinet Gas: Multinet Gas requires secure return on investments and assurances that the operational capability of the network is maintained.

Retailers: Multinet Gas customers are gas retailers AGL, Origin and other first and second tier retailers. The gas retailers" domestic, commercial and industrial customers are in turn the „gas users". Gas retailers require satisfaction of gas users" requirements and efficient processes for dealing with Multinet Gas assets.

Gas Users: Gas users demand economical, reliable and safe energy supply.

Regulators: Regulatory requirements relate to efficiency gains that can be shared with consumers through real price reductions, service standards, safety of supply and environmental protection.

Other Parties: State and Local Governments, community, gas producers, employees, contractors and third parties require safety of operation.

2.6 Plan Structure

This plan is structured around two main categories of expenditure:

- Network Replacement expenditure
- Network Growth expenditure due to new connections and “native” growth in energy use.

The Network Replacement plan is structured around these asset groups:

- Transmission Pipelines and Valves
- Distribution Mains and Valves
- Distribution Service Connections
- Consumer Supply Installations
- Network Pressure Regulating Stations and Water Bath Heaters
- Equipment Enclosures
- Corrosion Protection Assets
- SCADA and Communications

The Network Growth plan is structured around two broad areas of expenditure:

1. Customer Initiated Growth due to new customer connections
2. Demand Growth due to “native” energy growth from existing customers

2.7 Plan Framework

This Asset Management Plan (AMP) is based on the "International Infrastructure Management Manual - Version 3.0, 2006". The AMP is structured about the contributing documents that set out the strategies and plans within the key areas of the distribution business which are:

- Life Cycle Management (Maintenance and Replacement Strategies)
- Future Demand (Growth Capital Plan)
- Levels of Service (Network Performance Improvement)
- Risk Management (based on AS/NZS 31000)
- Environment (based on ISO14001)
- Network Safety (based on Multinet Gas"s Gas Safety Case)

The Life Cycle Management Plan deals with the maintenance and replacement policy development. Life Cycle Management planning ensures the balanced, efficient and effective maintenance and replacement of the network assets. It focuses on ensuring effectiveness and efficiency in maintenance and replacement, and considers issues of safety, cost, risk and reliability.

The Future Demand Plan sets out the capital expenditure and plans to ensure forecast connection and demand growth are accommodated.

The Risk Management Plan sets out the risk management processes for the identification, ranking and control of the major risks to the network business based on Risk Management Standard AS/NZS 31000.

The Environment Plan sets out the processes and plans to lessen environmental impacts which are based on an Environmental Management System certified to ISO14001 and Environmental Improvement Plans.

2.8 Asset Management Framework

One of the main purposes of asset management planning is to ensure an optimal balancing of capital and recurrent expenditure, so that maintenance, replacement and augmentation of the gas distribution network delivers the required level of services at the lowest possible life cycle cost. Gas distribution is capital intensive, requiring the application of rigorous and efficient capital budgeting and asset management processes to deliver the services.

The company"s approach to capital budgeting and asset management recognises the need to:

- Ensure efficient asset management and investment decisions are robust through:
    - Producing asset management strategies, plans and budgets consistent with stakeholder requirements
    - Ensuring management review and monitoring of asset management process Key Performance Indicators
    - Reviewing and maintaining key processes; continual review of asset management strategies and programs based on the analysis of asset data.
    - Ensure efficient works programming so that appropriate resources are allocated efficiently and any resource conflicts are resolved
- Ensure efficient works execution through:

- Efficient construction, maintenance and operation of network assets in accordance with the asset strategies, asset management plan and budget
- Ensure effective management of programs (inspections, etc) and
- Effective capturing, management and diagnosis of asset condition and performance data

2.9 Approach to Efficient Works Programming

An efficient works program balances resource constraints with the needs of the network and customers over a cycle of one to two years. The works program for business case production, project planning, tendering and field construction is based on prioritised budgets.

Projects and programs are targeted for completion to deliver the best outcomes for the business and its customers. Drivers for works programming include the timely construction of performance improvement projects to achieve maximum customer value for the initiatives. Programmed asset replacement projects are performed before failure and demand projects are completed to ensure that sufficient network capacity is in place to meet forecast loads immediately prior to the critical winter loading period.

2.9.1 Efficient Works Execution

Having established efficient investment and asset management plans, the company must execute these plans in the most cost-effective manner to maximise overall value.

The key elements to the efficient procurement and creation of assets include:

- Competitive tendering for capital work activities
- Use of approved materials schedules to deliver streamlined purchasing practices
- Use of larger long term contracts for works involving ongoing programs of a repetitive nature

2.9.2 Projects to Tender

One of the main drivers of works programming is to package up projects to enable the opportunity to obtain benefits by tendering significant sized projects to be achieved.

Projects that are suitable to be tendered as turn-key projects are identified at the concept stage. A detailed scope of works is prepared as the basis for public tender documents.

2.9.3 Approved Materials Schedules

Multinet Gas has developed and maintains schedules of materials approved for installation on the network with which all contractors must comply as part of its Health, Safety and Environment systems. This ensures that the integrity of the network assets is maintained and that purchasing and stockholding procedures are streamlined.

2.10 Approach to Efficient Asset Management and Investment Decisions

The key principles of asset management and investment decision making processes revolve around these three key factors:

Stakeholder requirements:	Analysis and understanding of stakeholder requirements is essential.
Technical requirements:	Performance improvement and asset maintenance and replacement programs are driven by analysis of fault/performance/cost data.
	Maintenance and replacement schedules to ensure safe operation of the network and facilities.
	Capacity planning is based on network analysis.
	Scheduled maintenance and replacement programs are based on Reliability Centred Maintenance analysis.
	Risk analysis is performed to AS/NZS 31000 for significant asset risks.
Economic requirements:	All projects are subject to an appropriate level of economic analysis in accordance with regulatory requirements and prudent investment tests.

Multinet Gas employs several integrated business systems to manage the activities on the Network. These range from SAP-based works management and costing systems to business cycle preparation of plans and budgets and GIS-based asset information systems.

Improvement of asset management practices is achieved through a commitment to conducting internal and external audits, and comprehensive gap analysis of all facets of asset management activity. Performance indicators are reviewed monthly by all senior management and all significant gaps between actual performance and target performance are analysed objectively so that alternative strategies and improvement plans can be identified. Internal and external benchmarking is used in establishing performance targets.

2.11 Budget Inputs and Prioritisation

2.11.1 Strategies

All strategies and policies are updated taking into account factors such as recent load growth, equipment performance and reliability of supply. These strategies include:

- Demand planning for augmentation requirements
- Asset replacement & maintenance strategies
- Performance improvement strategies
- Environmental strategies
- Safety Case driven strategies
- Any regulatory provisions that may be required

2.11.2 Customer Initiated Capital Requirements

The Customer Initiated Capital (CIC) forecast is updated with revised NIEIR forecasts and the forecast refined based on previous year"s expenditure and actual growth figures. Local input assists forecasting of large CIC from;

- Planned commercial developments
- State Government plans

2.11.3 Prioritisation

A budget model is produced and prioritised into the categories noted below. This plan contains only Mandatory and Good Industry Practice projects.

2.11.4 Definitions of Priorities

2.11.4.1 Mandatory

This category is considered as non-discretionary. It covers all work that the business is explicitly obligated to complete under Regulation or Law. ie:

- Customer connections
- Regulatory and statutory requirements
- Some work that is driven by maintenance strategies

This category will generally make up a significant portion of the required capital expenditure. The customer growth categories will be offset by some level of customer contributions, especially for “recoverable works”, which are generally 100% customer funded.

2.11.4.2 Good Industry Practice

This category relates to all work that is necessary to operate the network to meet objectives, manage known risks and to maintain service levels. This includes projects such as:

- “High” corporate risk category
- System growth and asset replacement capital with high risks attached
- High value Reliability improvement projects
- Public Health and Safety projects
- High PVR projects

3 Level of Service

3.1 Background

The engineering standards of the Victorian gas industry practised since around 1970 together with the inherent reliability of underground, meshed gas supply networks has delivered a reliable supply. The immediate major threats to reliability are either upstream of Multinet Gas"s network or third party damages over which there is no direct control.

Challenges to levels of service in terms of safety and environmental performance exist as a result of Multinet Gas"s large Low Pressure network that contains a high percentage of ageing cast iron pipe. These pipes are not designed for natural gas distribution (having been originally installed to transport manufactured gas) and are inherently more prone to leakage than modern materials.

The main consumer service impact of the Low Pressure network is the tendency for water to collect in pockets of the network and block Mains and Services leading to outages. This typically causes a small number of consumers to repeatedly lose gas supply during wet weather. Once a problem area arises, it tends to persist in the same area, hence leading to complaints, GSL payments and ombudsman"s letters. The solution to this problem is often a combination of syphon pumping during wet weather, searching for the source(s) of water ingress and as a last resort Mains replacement.

The other major threat to reliability of supply is the impact of third party damage. Third party damage (often combined with damage to a co-located water Main or service) can cause extensive loss of supply. Multinet Gas engages in proactive measures to prevent third party damage and also maintains high standards for response times to attempt to ameliorate any issues when damage does occur.

There is a risk of some deterioration in the levels of service due to asset failures over this plan period arising from the short term reduction in the asset replacement program (Pipeworks). However the current levels of service are very high and any changes are not expected to be significant in this plan period.

The most significant factor causing most outages is water ingress of the Low Pressure network from rainfall. Winter of 2010 was an average winter, however Spring was above average for rainfall. Compared to the previous 10 years of drought, 2010 had a high amount of rainfall and thus a higher number of outages and complaints than previous years. This trend continued into summer and winter of 2011, with a wet month of May and more complaints than ever before.

The rise in rainfall has increased the quantity and frequency of outages, this has led to an increase in complaints. The year to date complaints for 2011 up to the end of April are double that of the same time in 2010. The total complaints for 2010 were 74% higher than 2009. Thus the complaints due to outages are enormously higher in 2011 compared to 2009.

3.2 Customer Research and Expectations

A key objective of this Asset Management Plan is to match the level of service provided by the asset with the expectations of customers. This requires a clear understanding of customer needs and preferences. Achieving compliance with regulatory requirements is also a key objective.

3.2.1 Background and Customer Research Undertaken

The target levels of service for gas network services reflect current industry standards and are based on:

Strategic and Corporate Goals: Provide guidelines for the scope of current and future services offered, the manner of service delivery and define specific levels of service which the organisation wishes to achieve over and above legislative minimums.

Legislative Requirements: Environmental standards, Regulations, and Acts that impact on the way assets are managed (i.e. gas regulations, health and safety legislation). These requirements set the mandatory minimum level of service that must be provided.

Customer Expectations: Information gained from current and potential gas customers on expected quality and price of services is gathered from Multinet Gas"s Stakeholder Relations Customer Satisfaction Survey.

Access Arrangement Outcomes: Economic regulators can mandate or otherwise provide incentives and penalties in relation to minimum levels of customer service. To some extent the Economic Regulator acts as a proxy for the customer in determining required service levels and associated willingness to pay.

The most recent results from Customer Satisfaction Surveys show on average overall satisfaction levels continuing to meet target requirements.

The Customer Satisfaction Survey is a targeted survey, only customers that have been in contact with Multinet Gas"s call centre within the last quarter are asked to perform the survey. This approach creates a high value survey that permits conclusive assessments of the quality of service. However this survey is not representative of the reliability of supply received by the worst served end users.

3.2.2 Customer Research and Key Objectives

Customer research indicates the performance of Multinet Gas"s delivery of the key objectives. The following points are other benefits and activities (carried out to the extent relevant in the regulatory environment) to improve customer satisfaction.

- Inform customers of the proposed type and level of service to be offered
- Focus Asset Management strategies to deliver required service levels
- Measure the effectiveness of this Asset Management plan
- Identify the costs and benefits of the services offered
- Enable customers to assess suitability, affordability and equity of the services offered

3.3 Strategic and Corporate Goals

The operation and development of Multinet Gas"s network assets is directed to achieving the Long Term Objectives of the business.

- Maintain and develop the assets in Multinet Gas"s best interests
- Manage to any specific capital constraint of Multinet Gas.
- Ensure the assets are managed in accordance with good industry practice
- Ensure that the assets are managed in accordance with all applicable Australian and International Standards and that this can be demonstrated.
- Ensure that capital investment is efficient and is consistent with Multinet Gas"s financial capacity.
- Ensure that these assets are managed in accordance with all applicable laws

- Ensure all assets owned by Multinet Gas are capable of separate identification and tracked on an ongoing basis
- Ensure that assets are managed to reflect all risks and opportunities arising from changing external circumstances
- Minimise the costs and risks associated with any future separation of Multinet Gas"s assets.
- Address risks and opportunities arising from:
    - the impact of anticipated climate changes on the performance of the network and its design
    - The impact of severe weather events on the electricity industry and potential lessons in relation to management of major events.
    - Changing end user and Regulator expectations
    - Technology developments
    - Operational/works practices changes
    - Leveraging the knowledge of related parties to optimize the Asset Management Plan.
- Maintain reliability, safety and customer service to ensure Multinet Gas has a good reputation in the minds of the community, regulators and key stakeholders
- Maintain and develop the network to avoid deterioration of the assets,
- Plan and develop the capacity of the network so peak demands can be catered for with standards of reliability consistent with regulatory and community standards
- Adopt asset maintenance and replacement policies and standards that are of a standard no less than those that existed on 23 July 2003
- Establish high standards of health and safety management, and employee focus
- Ensure that knowledge generated by the organisation is captured and recorded to support a learning organisation.
- Proactively manage health and safety issues and seek to eliminate work place accidents.
- Compliance with all regulatory safety authorities and minimise network incidents through proactive management of recurring root causes.

3.4 Legislative Requirements

3.4.1 Key legislation and codes:

- Gas Industry Act 2001
- Gas Distribution System Code (Version 9) 2009
- Gas Safety Act 1997
- Gas Safety Regulations 2007/2008
- Victorian Access Code

- Declared Wholesale Gas Market Rules
- National Measurement Act 1960
- Pipelines Act 2005
- Pipeline regulations 2007
- National Third Party Access Code
- Roads Management Act 2004
- Road Safety (Traffic Management) Regulations 2009
- Trade Measurement Regulations 2007
- National Greenhouse and Energy Reporting (NGER) Act 2007
- Various Australian Standards

3.4.2 Changes in legislation and codes

In recent years a number of significant legislative and standards changes have occurred. The full cost impact of such changes has taken several years to come through.

Road Safety (Traffic Management) Regulations 2009 implemented through the Traffic Management Code of Practice have a significant impact compliance costs associated with pre-notification of works, permit applications, restrictions on times of work in arterial road reserves, resources, training and traffic control signage and equipment.

The revised AS 4645-2008 Network Management Standard covers requirements for the formal safety assessment process and approval process for changes to existing assets.

The Gas Safety (Safety Case) Regulations 2008 require the submission of the Asset Management Plan as part of the Safety Case and quarterly KPI reporting on the integrity of the transmission pipelines system.

The National Greenhouse and Energy Reporting Act 2007, the Regulations under the Act and the National Greenhouse and Energy Reporting (Measurement) Determination 2008 establish the legislative framework for a national green house and energy reporting system.

The Australian Standards for Confined Spaces and Hazardous Areas have been and are continuing to change to align with international (IEC) standards.

The Australian Standard for Transmission Pipelines is currently being reviewed and part three-operations and maintenance is in draft form.

All changes to Australian Standards are noted and reviewed. In some cases, Multinet Gas representatives are members of review committees.

3.4.3 Compliance with legislation and codes

Multinet Gas"s compliance group is responsible for maintaining and auditing the various management systems in place to ensure compliance, e.g. Environmental, Safety Case, Quality, etc. The ISO 9000 accredited Quality System Improvement Process is used to record and monitor non-conformance and improvement projects across various systems. There are a small number of areas where Multinet Gas assets are not compliant with current Australian Standards. A brief description and explanation of such instances is provided below:

3.4.3.1 PE Squeeze Off

The options available to maintain compliance with AS4645 in relation to the requirement to repair „squeezed off" polyethylene pipe are limited or non-existent for large diameter PE mains and services. A repair clamp that can be applied to the gas main in service is available for 63mm & 50mm NB PE but fittings for small imperial sized pipe of suitable performance are no longer manufactured. The acquisition of the large diameter polyethylene stopple equipment removes the need for „squeeze off" for the larger pipe sizes (see 9.2) in many cases.

3.4.3.2 Pressure Regulation and Meter Locations

District Regulators

Of the 149 district regulators 24 have unregulated bypasses. These are not to current Multinet Gas standards and the supply regulator strategy details the actions planned to rectify these installations.

Domestic Regulators

A model of domestic regulator installed on the medium pressure networks was found to be non-compliant with the maximum relief pressure requirements of AS5601 when inlet pressure was greater than 60kPa. This issue is common to all Victorian Distributors. Risk assessments conducted in the early 1990"s indicated this to be a low risk. See section 5.7.4 for the replacement strategy.

Meters

Meter location standards have developed and improved over time. The standards for appliance locations has also changed and with the surge in telecommunication services the quantity of non-compliant meter installations has increased despite the rectification works during Pipeworks. The risk posed is the increased chance of a fire or explosion during a meter escape or normal operation of a regulator venting. The strategy to mitigate or reduce this risk is detailed in section 13.

3.4.3.3 Pressure Testing

AS4645 requires pressure testing at 40% above the MAOP of the pipeline when increasing the MAOP of a length of pipe. This process reduces the feasibility of pressure uprating (reclaiming) as a means of improving network performance in many situations within an existing network. Multinet Gas performs risk assessments driven by its own engineering standard to ensure that potential hazards to operating at higher pressures are mitigated appropriately.

3.4.3.4 Sub-standard cover of mains and services

The Australian Standard for network management (AS4645) demands a depth of cover that is deeper than Multinet Gas"s standards. The particulars of Multinet Gas standards defining depth of cover have not changed since 1996 and possibly not before that for some-time. Obtaining the optimum depth of cover is becoming increasingly difficult for renewal in older areas of Melbourne where other utilities have laid their assets first, making the standard for cover less applicable.

There are known locations of sub-standard cover over mains within Multinet Gas. These locations are typically in the oldest areas where standards for cover were either not implemented or did not exist at the time of installation. Road widening and construction, and erosion can also contribute to the chance of cover being reduced.

Services that are discovered to have sub-standard cover are replaced once found.

3.4.3.5 Sub-standard separation of mains and services

Separation standards from other assets are not always maintained. Other utilities may have different separation standards than Multinet Gas and the gas industry. The rapid roll out of telecommunication infrastructure, the undergrounding of electricity distribution and directional boring has resulted in less than ideal separation standards from underground assets, this has continued in recent times and remains a problem for the utility industry.

3.4.3.6 Electrical Installations and Hazardous Areas

Multinet Gas has a variety of electrical installations from cathodic protection impressed current units, SCADA facilities and data loggers. Some of these installations are within hazardous areas (gas likely to be present) and therefore the electrical components need to be intrinsically safe to Zone 1.

The Jordan rotary actuator is an electric motor with feedback loop utilised with the SCADA system to adjust pressure control of certain supply regulators. These actuators are not certified intrinsically safe by a system that the ESV recognises. To mitigate this issue an application was made for the ESV to recognise the Canadian standard that the actuator is compliant to and provides similar levels of protection. The Letter of Acceptance from the ESV permits the Jordan Rotary Actuator to remain in use indefinitely within Multinet Gas however new actuators of this type cannot be installed and old actuators cannot be moved.

Electrical installations within hazardous areas are considered Prescribed Electrical work and require a Hazardous Area Dossier and an inspection by a licensed H class electrical inspector. Typical areas are SCADA cabinets and supply regulator kiosks, buildings and pits. Recently the Australian Standard for hazardous areas changed. Multinet Gas has allocated a portion of the supply regulator budget for continuous updating of the hundreds of hazardous area dossiers and utilises a specialist contractor for this unique task.

3.4.3.7 Confined Spaces

Confined spaces vary in their characteristics however many attributes remain the same; limited exit availability, possibility of a decreased oxygen environment or unacceptable levels of other gases to name a few. Only qualified staff can enter a confined space whilst using appropriate equipment, supervision and procedures. Recently the Australian Standard for confined spaces has changed, however the Code of Compliance remains the same and is considered more vigilant. Multinet Gas has 249 confined spaces and its contractors likely to enter or work in the vicinity of a confined space are compliant with the code and undergo refresher training every 12 months which is in excess of the code advice.

3.4.3.8 Compliance with Transmission Licenses and Standards

Multinet Gas has multiple licenses to operate transmission pipelines and the Australian Standard for transmission pipelines is AS2885. There are no known material non-compliances with AS 2885 on Multinet Gas assets. AS2885 requires a five yearly MAOP review and a five yearly qualitative risk assessment. Multinet Gas and its contractors perform the risk assessments for each pipeline simultaneously and the next assessment is due in 2016 and next MAOP review in 2014. The most recent review was conducted in 2011 and all recommendations are in the process of implementation (see Transmission Pipeline strategy for further details). A large portion of the preventative maintenance performed by Multinet Gas and its contractors on Transmission assets are the risk mitigation measures required to reduce the residual risk of hazards to and acceptable level. These include patrolling, valves, facilities, vegetation, coating and leakage surveys, and subsequent repairs.

3.5 Current Levels of Service

3.5.1 External Audit Compliance

The energy safety regulator, Energy Safe Victoria; audit Multinet Gas and its contractors twice per year. The scope of each audit is usually defined within boundaries of;

- Work practises during construction and maintenance
- Safety Case implementation

The audits generally compare standard procedures and engineering standards to Australian Standards and work actually completed.

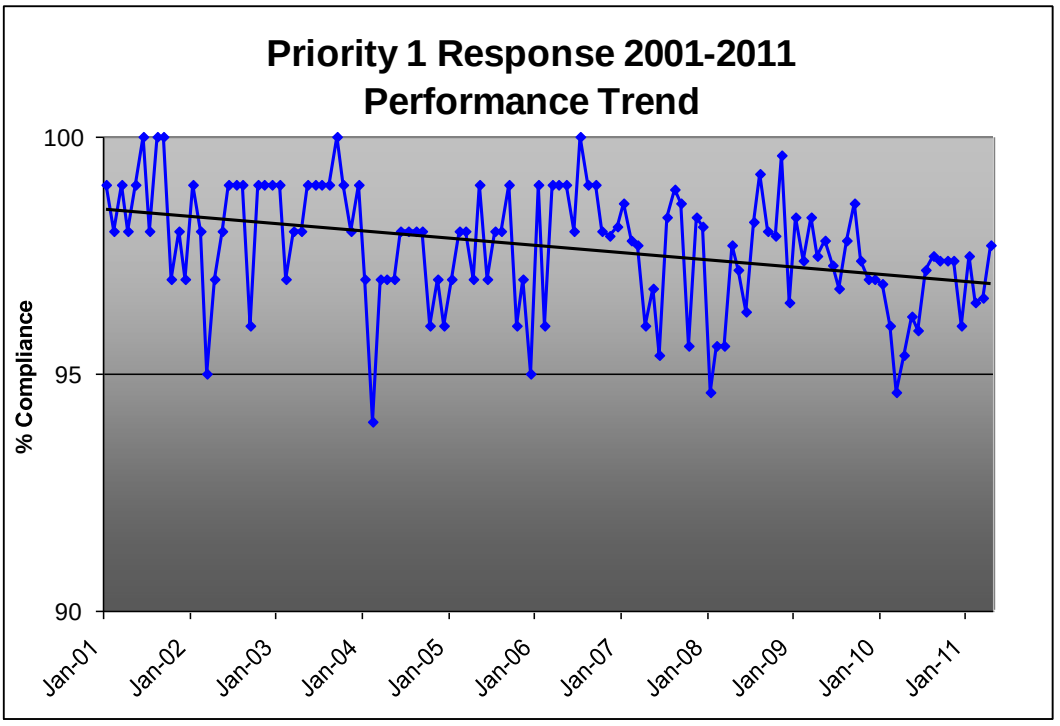
Overall the audit performance for 2011 in relation to work practises is good, with the auditors being satisfied with the level of adherence to standards and professionalism of contractors and supervisors.

A total of 19 Observations, one recommendation with no non-conformances reported by the ESV during their most recent audit.

3.5.2 Targets

Multinet Gas consistently meets the ESV target of reaching 95% of Priority A jobs within one hour although the trend performance has been reducing slightly. The target of 95% will remain in place for this Asset Management Plan period.

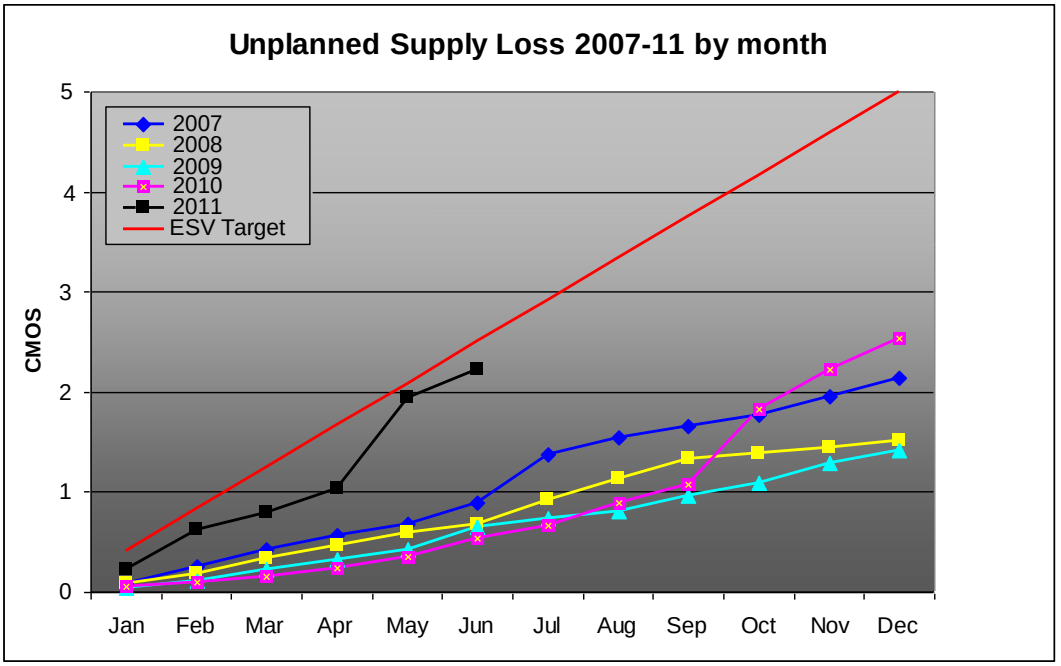
Figure 3-1: Priority 1 Response 2001-2011 Performance Trend



Multinet Gas"s performance against the Consumer Minutes Off Supply Measure has been favourable to target over recent years during drier than average conditions. A return to average annual rainfall in late 2010 and into 2011

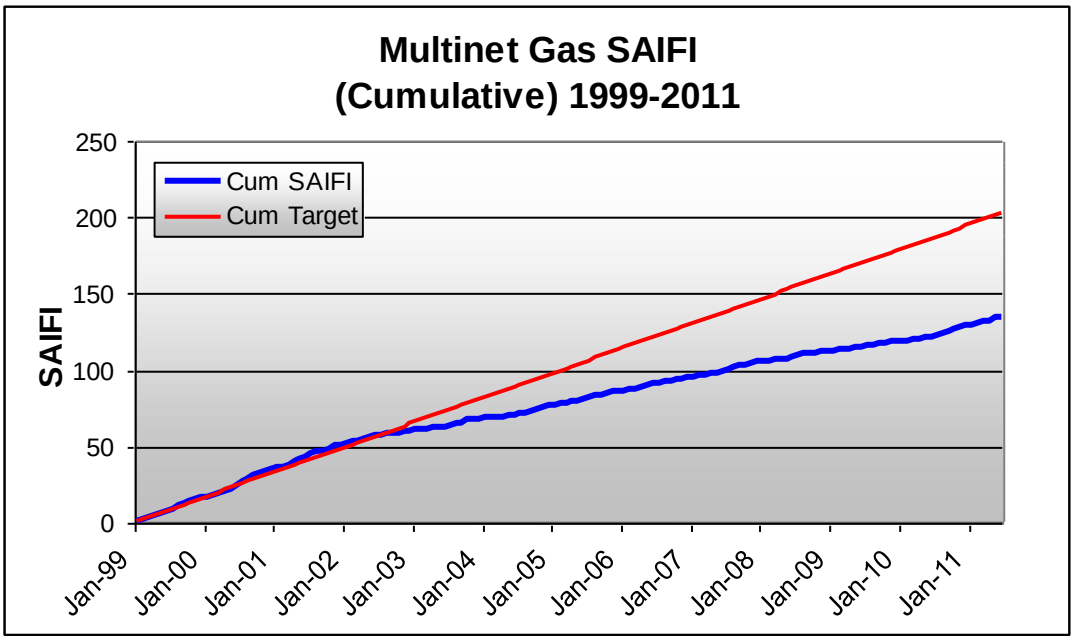
has resulted in increased unplanned supply loss in that time but the ESV target of five minutes per year will remain in place for this Asset Management Plan period. The unplanned supply loss for the first six months of 2011 is greater than any period of recent years.

Figure 3-2: Unplanned Supply Loss 2007-2011 by Month



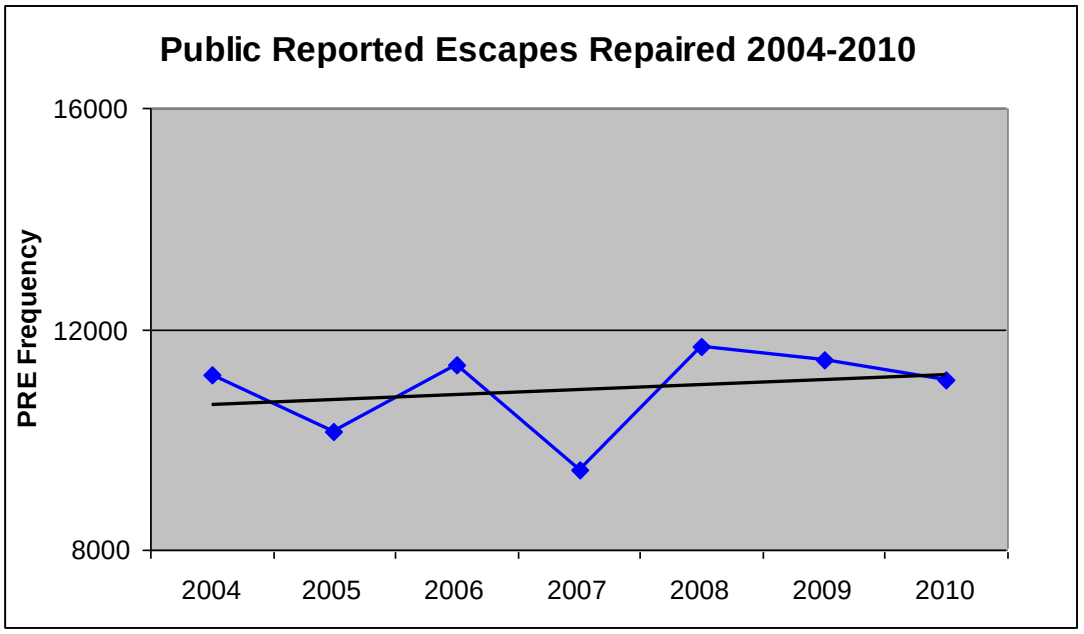
SAIFI performance has been consistently close or favourable to target with significant improvements since mid-2002 primarily the result of drought. The SAIFI target of 16 per 1,000 customers will remain in place for this Asset Management Plan period.

Figure 3-3: Multinet Gas SAIFI (Cumulative) 1999-2011



Below is a graph of publicly reported escapes by year for seven years. This graph illustrates a reasonably flat profile with minimal variance. Over the period shown the majority (55%) of the confirmed escapes are meter escapes.

Figure 3-4: Public Reported Escapes Repaired 2004-2010



3.6 Desired Level of Service

Multinet Gas's focus is to maintain the current levels of service. The ageing Multinet Gas assets, in particular gas Mains and Services constructed before the advent of plastic pipe and cathodic protection on steel pipe, will always result in a risk of deteriorating service. The "Pipeworks Project" aims to replace the Low Pressure network and is the prime mitigation against this risk. Due to the normally low average levels of consumer interruption any single incident has the potential to exceed annual targets. For example one event in June 2001 affecting approximately 1000 consumers immediately took the "Consumer Minutes Off Supply" measure over the year-end target.

4 Future Demand

4.1 Background

The obligations under the Distribution System Code dictate that specified minimum pressures shall be maintained at all supply points in the Multinet Gas network. The network has a pronounced winter peak due to the high proportion of domestic heating load. The degree of "peakiness" is forecast to increase due to the increased penetration of central heating and instantaneous appliances such as hot water services and boilers.

Approximately 35% of all new connections in the Multinet Gas territory occur on the Low Pressure system. Small diameter pipes, limited interconnection of networks and the inability of the pipe materials to hold higher pressures, limit the long-term capacity of this system. "Pipeworks" (Mains upgrading to High Pressure) is focussed in areas of known capacity deficiency that enables continued regulatory compliance.

The recent change in State government has reintroduced the Natural Gas Extension Program (NGEP) to regional towns. One of the towns listed for natural gas reticulation is Warburton, on the fringe of the Multinet Gas network which finishes in the nearest town; Millgrove. An opportunity may arise to expand the Multinet Gas network.

4.1.1 Recent High Demand Occurrences

Multinet Gas owns a remotely operable line valve at the inter-Distribution Business boundary with Envestra at Templestowe. No agreement currently exists with Envestra over the use of the valve for either importation or export of gas to the neighbouring distribution business.

The fully utilised condition of the Inner Ring Main is being addressed by the construction of the "Lilydale Pipeline". The pipeline will consist of 7.5 km of class 600, 300 mm pipe and 2.5 km of class 300, 300 mm pipe. The pipeline is expected to be in operation for winter 2012. (Construction pictured at right).

In the absence of the Line Valve Operation Agreement with Envestra a program of progressive load transfer away from the Inner Ring Main via strategic high pressure reinforcements has been undertaken over several years. These works were primarily necessary for the high pressure distribution network capacity augmentation but also served to enable a deferment of the "Lilydale Pipeline"

4.2 Methodology

The Planning Strategies upon which the Gas Capital Growth Plan is based are:

- Provide adequate capacity for consumers" growth requirements
- Minimize loss of supply due to lack of capacity
- Ensure that system security standards and reliability of supply are not adversely affected by growth in peak loads
- Provide for future upgrading of all distribution Mains to High Pressure standard
- Ensure compliance with relevant requirements of Government Codes and Regulations

Adequate capacity in the gas network and all its components is defined as the capacity to meet peak hour loads that occur for a weather probability of 1 in 2 years when operating at normal pressures. Short term additional system capacity may be available in High Pressure networks when higher pressures are used, but this capacity is

reserved for colder days (i.e. greater than 1 in 2 year peak hour loads), system emergencies and when upgrade projects cannot be economically justified.

The timeframe for delivery of the plan has been advanced such that the first draft of the plan is required in December each year. The modelling used for analysing the impact of demand growth requires the input of actual winter load information for the current year. Because of the staggered two monthly billing cycle, the load information is not updated into the models until at least two months after the winter period of the current year. This leaves insufficient time to validate, analyse, model and identify system reinforcements in time for a December submission of the plan.

As a result winter data from the prior year is used and adjusted for estimated growth. As 2011 winter modelling data becomes available it will be compared to the assumptions used to ensure that reinforcements being recommended are relevant.

4.3 Growth Forecasts

Forecast peak hour gas loads in each year, based on a weather probability of 1 in 2 years, have been used as the basis for determining requirements for Demand Growth Projects. These loads have traditionally been estimated, based on forecast peak day loads prepared by the National Institute for Economic and Industry Research (NIEIR) using econometric modelling for different economic growth rate scenarios. The NIEIR forecasts for 2012/13 and beyond have been included in this plan.

The program of Demand Growth Projects has been developed for an economic growth scenario with no provision to supply additional gas for embedded electric power generation. Although there has been a recent increase in interest in cogeneration and several small projects have proceeded or are proceeding (NAB Wantirna and Crown Casino) it is very difficult to forecast the size, location, uptake and extent of network reinforcement required for such projects over the period of this plan. For example Multinet Gas received an enquiry in 2009 for a 2PJ/Annum cogeneration load in Port Melbourne. This project has not proceeded and no further information is available from the Retailer. For this reason no forecast has been included for new cogeneration load.

Similarly no provision has been included for distributed generation or natural gas vehicles (NGV) in the current forecast. Although it is understood that at least one manufacturer claims to be close to commercialising a fuel cell and one NGV filling station has been connected, it is considered unlikely that the uptake of such technology will be rapid enough to make a material impact on gas demand within the current planning period. This situation could change if, for example, Government introduced significant initiatives to sponsor or subsidise such installations on a broad scale. For this reason it is important to keep a watching brief on this technology.

The program of Customer Initiated Growth Projects has been developed from NIEIR"s forecast of consumer meter and service numbers, also for the medium economic growth scenario.

The limited and reducing amount of land available for new subdivision in Multinet Gas"s Melbourne metropolitan area means that an increasing proportion of new housing is redevelopment of existing sites. Government policy to restrict Melbourne"s urban sprawl also contributes to more redevelopment of existing sites. For the above reasons the trend for increasing housing density with less mains extension per unit number of services is likely to continue.

Notwithstanding the increase in new connections in 2009 and 2010, the net growth rate in new connections is of the order of 1%.

Forecasting peak Tariff D growth on an annual basis is difficult as growth is typically “lumpy” either through connection of individual large loads or loss of such loads. There is an annual provision of approximately $530k for Tariff D driven augmentation.

The following charts illustrate the forecast network loading in terms of growth in; Number of Meters, total volume of gas transported through the network annually (AQ) and Maximum Daily Quantity (MDQ) of tariff V consumers. The graphs illustrate an incremental increase in total throughput.

Figure 4-1: 2012-2018 Tariff V Meters

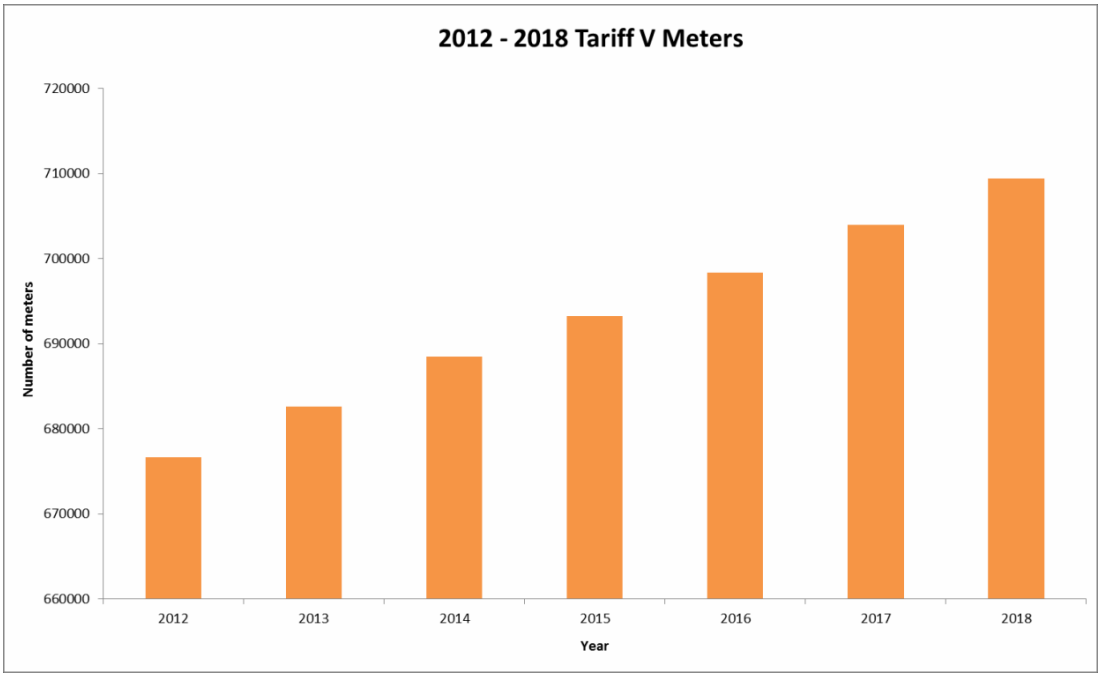


Figure 4-2: 2012-2018 Tariff V MDQ

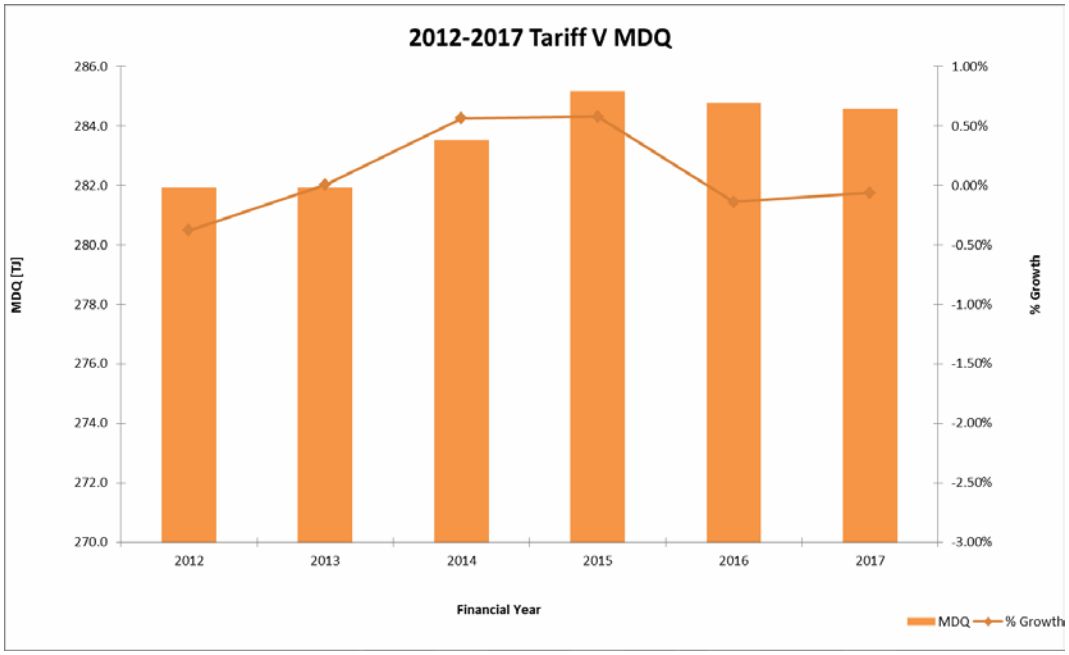
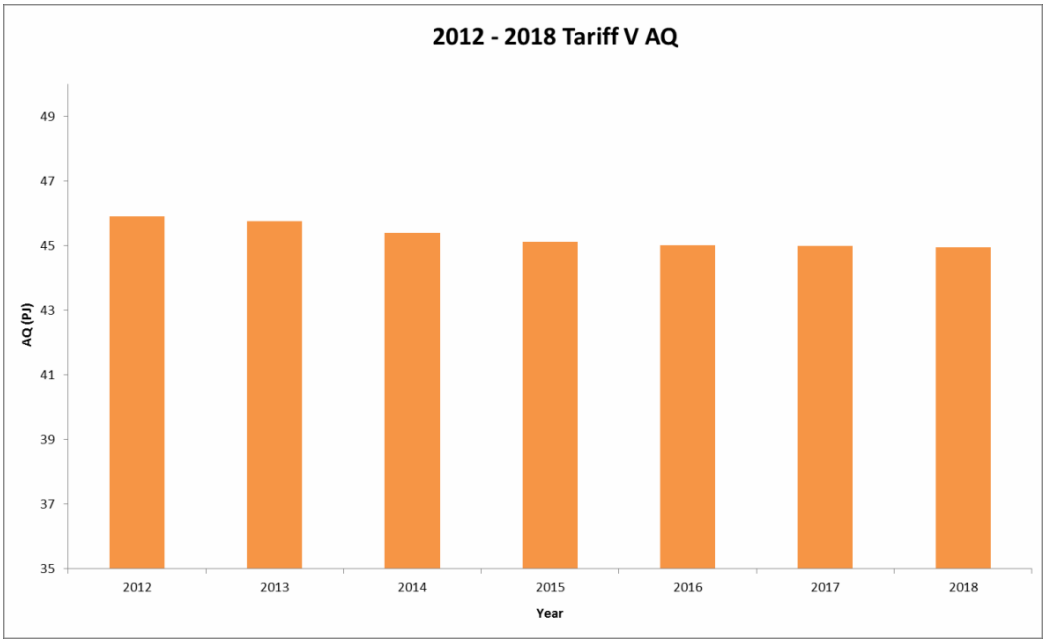


Figure 4-3: 2012-2018 Tariff V Annual Quantity



Above data derived from Jan 2012 NIEIR Forecast.

The following charts illustrate the forecast network loading in terms of decline in growth in total Tariff D meters and Tariff D Annual Quantity (AQ) of gas transported through the network.

Figure 4-4: Tariff D Meters

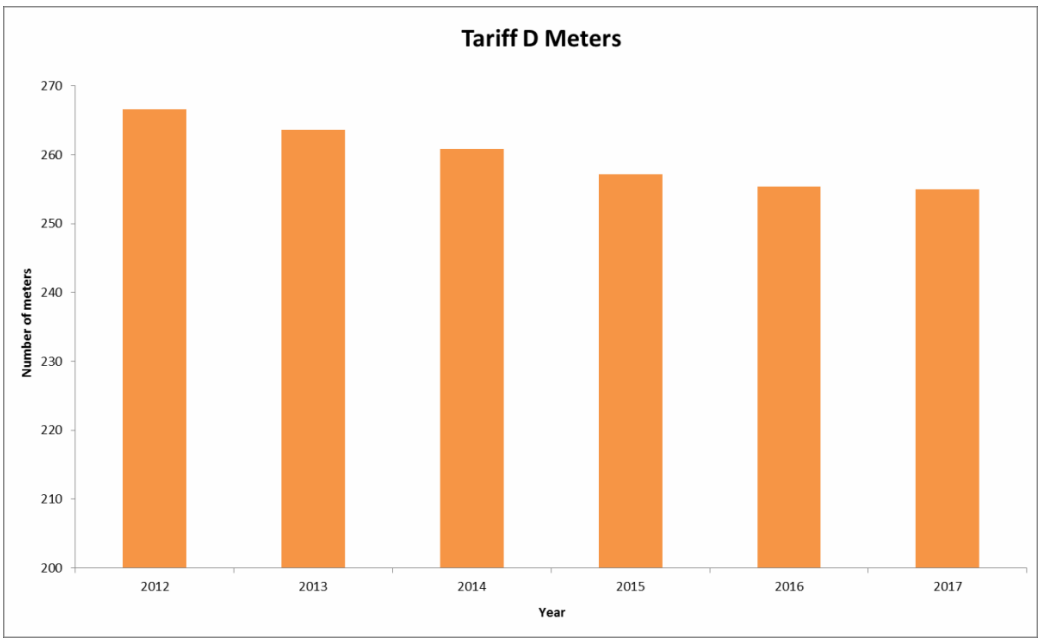
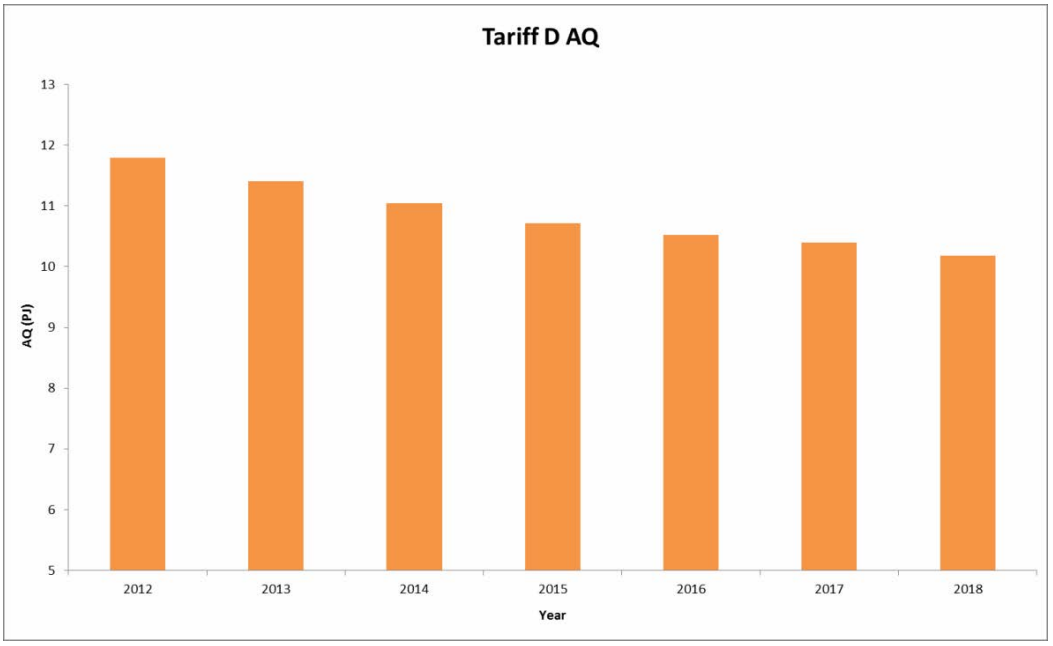


Figure 4-5: 2012 – 2018 Tariff D Annual Quantity



Above data based on NIEIR projections for residential, commercial and Tariff D consumption volumes - Jan 2012 (Includes South Gippsland Towns)

4.4 New Customer Connections

The following table represents the forecast net annual new connection growth rates based on the NIEIR Residential Customer Numbers.

Table 4-1: Net Annual New Connections

New Residential Customers - Multinet Gas						
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Net New Connections (billing meters)	5,744	5,949	5,437	4,948	5,291	5,502

4.5 Utilisation

Winter testing provides detailed data as to network fringe pressures during a one in two year winter peak event. Conclusions can be drawn as to the current level of non-utilised network capacity during such peak times. Demand reinforcement capital decisions heavily rely on winter test data.

Winter testing for 2010 has been conducted, the following principal areas (in addition to Low Pressure networks being addressed by Pipeworks) are known to require reinforcement in the foreseeable future (in order of priority):

- Eastern HP (Sherbrooke Network): Cockatoo 3781, Emerald 3782.

- Eastern HP (Knox Network): Mount Waverley 3149.
- Tooronga P
- Mulgrave HP
- Moorabbin HP

Section 13 of this plan has further justification for each project. All project ties into the longer term strategy for either replacement of the low pressure system or decommissioning of cast iron medium pressure mains.

4.6 Connection Planning

In order to meet service level objectives, there is a recommendation to increase capacity at four custody transfer stations in the short term.

The custody transfer stations are the injection points into the Multinet Gas network. Augmenting upstream supply via upgrading regulators and/or outlet pipe work enlargement is the most efficient method of increasing capacity of the downstream transmission or distribution assets.

Custody transfer stations targeted for capacity upgrade are tabled below:

Table 4-2: Custody Transfer Stations Requiring Augmentation

Custody Transfer Station	Year of Upgrade
Lang Lang Heater	2012/13
DTS – Lurgi M005	2012/13
Malvern M018 (Ewart St)	2012/13
Noble Park M015	2012/13
Clayton M016	2012/13

4.7 Alternative Strategies

Investigations to address supply constraints include alternative strategies to upgrading to high pressure by mains renewals that, at times, prove most cost effective. Since these alternatives less frequently prove to be optimal, they are less often adopted compared with upgrading to High Pressure, or augmentation through the construction of additional Mains at the given operating pressure.

In cases where Low or Medium Pressure areas cannot be economically upgraded to High Pressure, or augmented Mains would not be of significant value when operated at High Pressure in the future, consideration is always given to the following options:

- Raising operating pressure
- The redistribution of supply to areas
- Redistribution of supply can be achieved by:
- Supply pressure biasing
- Introduction of network isolation valves
- Permanent sectioning of an area from one network to another

- Transfer of specific larger consumers to alternative existing or extended Mains
- Introduction of a new source or better interconnection of existing Mains

The most cost effective manner of increasing network capacity is to increase operating pressure to the Maximum Allowable Operating Pressure. The formerly licensed 690 kPa network was risk assessed to establish the feasibility of progressively increasing the operating pressure to 1050 kPa. This has been shown to be feasible although ESV has directed that the network not be operated beyond 840 kPa.

Similarly for constrained High Pressure networks, unutilised delivery capacity of neighbouring networks is always considered within the greater context of future network development governed by load growth, geographical expansion, and operational control needs.

In specific cases, some networks with a “System Minimum Pressure” above the “Normal System Minimum Pressure” for a given pressure category network are required to be maintained due to specific consumer regulator installation being unable to maintain the approved consumers metering pressures during “Normal System Minimum Pressure”. The replacement of the consumer regulator with alternative equipment capable of providing the same capacity with a lower inlet pressure is undertaken to satisfy consumer requirements during “Normal System Minimum Pressure,” thus releasing otherwise captive network capacity.

4.7.1 Demand Side Management

Strategies to minimize the requirement for new assets to overcome capacity limitations are discussed below. Generally these are expected to have minimal effect on the need for such assets in the short to medium term.

The driver of peak demand is the „winter heating load" which makes up approximately 70% of the domestic load, 35% of the commercial and 10% of the industrial load. To be effective in reducing the demand on the Low Pressure networks, any demand management scheme would have to reduce domestic heating load on the coldest winter days.

Some (weak) price signals have been built into domestic distribution tariffs with higher winter tariffs. These tariffs are not well targeted in terms of demand management because they apply across the whole of winter and not solely to peak load days when the demand management response is required. There is no compulsion for Retailers to reflect these tariff structures in the retail tariff. Price signals are built into tariffs for large users via the Maximum Hourly Quantity component of the tariff. There are no other proposals under consideration for Demand Side Management in the gas industry generally in Victoria that Multinet Gas is aware of.

4.7.2 Bypass

Previous studies have shown by-pass of Multinet Gas"s distribution system to be very unlikely. Because of the low distribution tariff for large users and the high costs of Transmission connection and main laying, the only credible by-pass scenario is for very large loads located practically next to existing APA GasNet Australia pipelines. Even in this scenario the potential loss of revenue to Multinet Gas is small. There have been no instances of by-pass on Multinet Gas"s system.

5 Lifecycle Management Planning

5.1 Background

Multinet Gas's current lifecycle management planning and asset maintenance practices are to a large extent derived from the former Gas and Fuel Corporation. These practices are extensively documented and controlled within Multinet Gas. Superior to these are regulatory requirements or compliance with Australian Standards that drives many maintenance practices. Recent changes to Australian Standards for gas networks have taken a risk based approach to lifecycle management. Over time the expectation that this philosophy will become more prevalent in Multinet Gas and some of the former Gas and Fuel maintenance strategies will be optimised towards either condition monitoring, or risk and economically driven maintenance practises. Multinet Gas is committed to continuing to meet all regulatory requirements and will continue to base practices and programs on Australian Standards.

Multinet Gas is required to adopt "good industry practice" by the Distribution System Code in relation to minimising the duration of supply interruptions. This is reached by the continuous development of lifecycle management strategies to achieve the "good industry practise".

Multinet Gas has a review process for its maintenance practices to ensure that they remain appropriate to the environment. Reviews are conducted and change managed in accordance with change management procedures and risk assessment guidelines.

This maintenance and replacement plan concentrates on strategic maintenance policy identifying what maintenance and replacement should be undertaken rather than how it is undertaken. Detailed asset strategies are contained with the Maintenance and Replacement Strategy Documents.

Aspects of operating, inspections and maintenance are covered elsewhere in Engineering Standards, Standard Procedure Manuals and System Operation Manuals.

Expenditure projections are based on a combination of both known issues and anticipated increases in expenditure as the network ages. Expectation of asset failures is derived from either statistical analysis of condition inspection data or documented industry practice.

Public/personnel and environmental safety goals are zero-based targets of no fatalities or events. Progress to this goal is achieved through the risk management methods outlined within this document.

5.2 Purpose

This plan sets out the goals, methods and plans to achieve an optimised balance of efficient and effective maintenance on and replacement of the network assets.

The plan demonstrates consideration for the required risk, safety, cost and reliability outcomes. Maintenance approaches are outlined and maintenance plans and summary budgets are set out.

This plan also communicates the maintenance and replacement strategies, which set the path to appropriate future outcomes for the network.

Goals set for the maintenance and replacement plans arise from:

- The present and future asset requirements based on current condition, performance and risk
- Legislative requirements
- Ensuring public/personnel and environmental safety

- Customer expectations of reliability, measured on duration and frequency of outages
- ESC targets for network reliability
- Internal and external benchmarks

5.3 Maintenance and Replacement Strategies

The Maintenance and Replacement Strategies detail what is necessary to maintain the asset at the required levels of service, while optimizing life cycle costs, for each of the following asset groups:

- Transmission Pipelines
- Distribution Mains, Valves & Services
- Large Consumer Installations
- Small Consumer Installations
- Supply Regulators and water bath heaters
- Equipment Enclosures
- Corrosion Protection
- SCADA and Communications

5.4 Transmission Pipelines

5.4.1 Background

Including South Gippsland Towns, Multinet Gas"s gas supply network assets consist of 238 kilometres of pipelines which are categorised into three groups:

- Licensed Transmission Pipelines operating above 1,050 kPa (Metro; 97.5 km, SG; 26km)
- Licensed Transmission Pipelines operating below 1,050 kPa (T25 South Melbourne 1.4 km, and 40km of SG)
- De-licensed (former Transmission) pipelines operating up to 1,050 kPa (72.9 km)
- Licensed Transmission Pipelines yet to be commissioned; (Lilydale Pipeline: Class 600, 7km and Class 300, 3km)

All of the licensed transmission pipelines in the metropolitan area are class 300. A rural section of the Lilydale Pipeline is Class 600 and the South Gippsland pipeline is Class 600. There are additional controls for Class 600 pipelines. Further detail is available in the Transmission Pipeline Maintenance and Replacement Strategy. However most of the proactive and reactive maintenance and the compliance requirements are the same. For clarity of this document, all pipelines laid to Class 300 are assumed to be in the metropolitan area, all Class 600 pipelines are not.

The metropolitan pipelines were constructed within a 30-year period between 1954 and 1984 and transport gas from APA GasNet Australia"s gas Transmission system to Multinet Gas"s network via 17 custody transfer metering (CTM) stations, where physical interfaces exist between Multinet Gas and APA GasNet Australia. Most of the CTM sites are provided and maintained by APA GasNet Australia and facility charges with respect to these sites are levied against Multinet Gas annually.

Of the 17 CTM stations owned by APA GasNet Australia, 16 are managed by AEMO and one managed through an agreement between Multinet Gas and BOC Gases. Multinet Gas is capable of receiving gas from the Envestra distribution system through a CTM station at Templestowe that is owned by Multinet Gas, however this is valve is usually closed. Refer to 5.4.2.

APA GasNet Australia also owns and operates all CTM associated field equipment including the SCADA (Supervisory Control and Data Acquisition) system for the metropolitan area.

The CTM stations in South Gippsland are wholly owned and operated by Multinet Gas.

A MAOP review and qualitative risk assessment for each pipeline is updated each five years in accordance with Australian Standard, AS2885 (see section 3.4.3). In addition pipeline licence files are maintained for those licensed pipelines with a Maximum Allowable Operating Pressure (MAOP) exceeding 1050 kPa in accordance with regulatory requirements.

Previously licensed pipelines with an MAOP < 1050 kPa have been de-licensed (except T25). Prior to being de-licensed a risk assessment was applied to determine the most appropriate standard to which these Mains would be operated and maintained once de-licensed. Sections of AS 2885 and AS 1697 (now 4645.2) have been adopted to operate and maintain de-licensed pipelines.

5.4.2 Templestowe Line Valve

Multinet Gas owns a valve/metering station located in the 450 mm diameter Transmission Pipeline connecting Multinet Gas and Envestra distribution systems, located at the Yarra River boundary, in Fitzsimmons Lane, Templestowe. Refer to 4.1.1 for more information.

5.4.3 Coverage and Objective

Applies to Multinet Gas Transmission assets operating at pressures above 515 kPa.

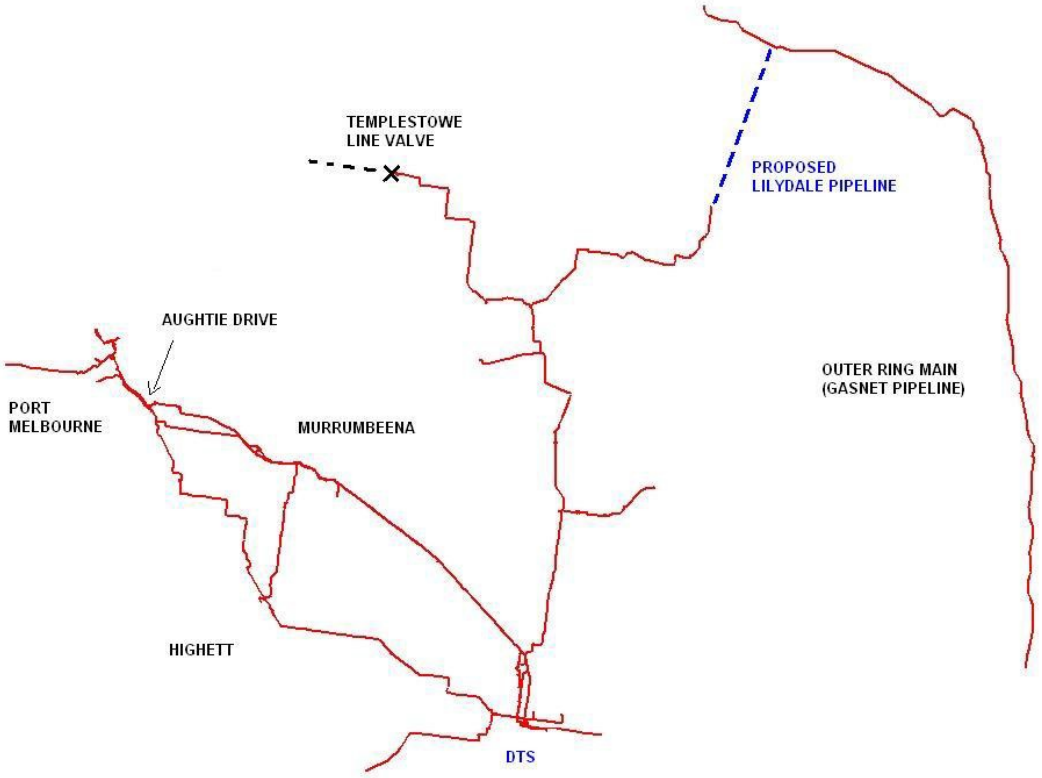
Objectives:

- Ensure security of supply and maintain asset integrity
- Mitigate safety risks to personnel and public
- Increase availability of pipeline condition data
- Ensure the availability of reliable and comprehensive pipeline location documentation

5.4.4 Transmission Pipeline Overview

The below represents on overview of the extent of the existing Multinet Gas Transmission Pipelines (Licensed and De-licensed) with respect to the Outer Ring Main.

Figure 5-1: Overview of Multinet Gas's Gas Transmission Pipelines



Note 1: Dashed blue line indicates the Lilydale Pipeline (will be under construction when this document is drafted).

Note 2: South Gippsland not shown.

5.4.5 Pipeline Valves

There are 169 (not including Lilydale pipeline) line and bypass valves in the Transmission system. These valves provide the facility to isolate sections of the pipeline. Valve installations are maintained to ensure they are kept in a safe and fit state of operation and repair.

Valves also exist at physical interfaces between Multinet Gas and APA GasNet Australia close to custody transfer meter locations.

5.4.6 Pipeline Integrity

The Transmission Pipeline system is assessed as being in good condition. Having been developed by a single authority, a consistent design philosophy has generally been applied across all Transmission Pipelines. Typically the design factor applied to the 2800 kPa pipelines is 0.4 (Lilydale is 0.3), which provides for a sound and conservative system.

Most Multinet Gas Transmission pipelines operate at less than 30% SMYS (Specified Minimum Yield Stress) at MAOP and hence are automatically exempt from the new no-rupture provisions in AS2885.1. The inner ring main is the primary exception to this and operates at about 39% SMYS at MAOP. Multinet Gas had an independent expert review the inner ring main in relation to the new no-rupture provisions in AS2885.1 and found that the pipeline complies with the exemption requirements for critical defect length, hence no action is required. The SGP

and the Lilydale pipeline has a MAOP that exceeds 30% SMYS, however these pipelines are in a location class that exempts them from the no-rupture provision.

The metro pipelines comply with the Australian Standard that was current at the time of design. Prior to the publication of the first Australian Standard in 1972, the pipelines were designed to comply with the then current version of ANSI B31.8 (renamed to ANSI/GPC Z380.1:2009).

Australian Standard AS 2885 introduced the concept of design life for a pipeline in the early 1990"s. This required an engineering assessment of the pipeline to be undertaken at the end of its design life as a basis for continued operation and a new design life. AS 2885-1997 strengthened this by requiring a risk assessment to be undertaken along the pipeline length each five years, and as part of any engineering assessment. The risk assessments were performed in 2011.

Under the Pipelines Act 2005, pipeline licenses now have an indefinite period.

All Multinet Gas Transmission Pipelines are cathodically protected. Cathodic protection was applied to all Transmission Pipelines by early 1970s.

Inline inspections (pigging), dig-up information at coating faults and other opportunistic points has shown no material metal loss corrosion.

Metal loss investigation was conducted in 1991 using intelligent pigging inspection tools on the Dandenong to West Melbourne (Templestowe) (T18) pipeline. No significant metal loss indications were revealed. Intelligent pigging was performed again in November 2009 on the Inner Ring Main. Data indicates the pipeline to be in excellent condition for its age. The most outstanding defects are located in extremely difficult locations and have not yet been visually assessed.

5.4.7 Key Issues

The most pronounced technical and asset management related issues in regards to Multinet Gas"s pipelines currently and in the future are;

- Continue information gathering and recording pertaining to Transmission Pipeline condition
- Development of risk management processes for integrity management and threat mitigation
- Controlling risk mitigation measures to ensure ALARP (As Low As Reasonably Practical) assessment remains accurate
- Assessment and supervision of third party construction works within easements or road reserves that create new or temporary hazards in the vicinity of the pipeline
- Maintaining existing procedural controls to ensure their effectiveness
- Preparation for intelligent pigging of the remaining pipelines
- Land owner liaison
- Erosion, subsidence, road development and other causes of reduction in cover
- Managing various pipelines operating at the same MAOP in close proximity with different design factors
- Implementing recommendations from the 2011 Safety Management Study
- Obsolete syphons removal on de-licensed pipelines

- Oil in pipelines

Oil in pipelines - Due to the lack of dry seals on APA GasNet Australia compressors (and possibly Longford Processing Plant) as well as the possible injection of condensates by gas producers, there is an unknown quantity of oil distributed throughout the APA GasNet Australia Transmission system. Until recently the oil has generally remained within the APA GasNet Australia system. In recent years, quantities of oil have migrated into the SP AusNet distribution systems in Ballarat and Geelong. APA GasNet Australia has formed an industry group and is looking at both procedural and physical means of preventing migration of oil into the Distribution systems. Multinet Gas has a representative on this committee.

The recent intelligent pigging of the inner ring main produced negligible quantities of liquids. This is a positive indication that oil in pipelines is not likely to be a significant issue for Multinet Gas.

The main area of concern for Multinet Gas was the known injection of significant quantities of oil from the Bass Gas processing plant into the Sales Gas pipeline from which the South Gippsland Towns are supplied. However no oil has been found in the South Gippsland system despite an average of 40 litres per day being previously removed from the filter at the metering station at Pakenham. The subsequent installation of a filter at the Bass Gas processing plant has reduced the oil removed from Pakenham to 40 litres per month making the deposition of oil into the South Gippsland System even less credible.

5.4.8 Preventative Maintenance

The majority of maintenance conducted on Transmission Pipelines relates to asset integrity and asset security and is routine in nature.

Preventative cyclic maintenance schedules are implemented and reviewed for the following facilities based on requirements of the equipment and risk, further details are in the Transmission Pipeline strategy;

- Valves
- TP Industrial Regulator and Meter Installations
- Regulator Stations and City Gates
- SCADA
- Cathodic Protection Structures and Equipment
- Inspections
- Landowner liaison

5.4.9 Inspections

Inspection activities are preventative maintenance activities (Section 5.4.8) on the pipeline itself and are undertaken as part of the threat mitigation and integrity management systems. These activities include;

- Pipeline Surveillance
- Annual Leakage Survey
- Special Leakage Surveys
- Bridge Crossing Inspections
- Exposed Pipeline Inspections

- Coating Defect and Potential Surveys
- Pipeline Condition Reporting
- Pipeline Internal Inspection (Pigging)
- Electrolysis Testing
- Marker Surveillance

There is a provision for the rectification of three pipelines to permit a pipeline internal inspection gauge (PIG). This is expensive and complex work that requires design and detailed planning.

5.4.10 Reactive Maintenance – Faults and Defects

- Coating Faults – Sampling, Repair and Rectification
- Valve Leaks/ Failure
- Cathodic Protection Structures and Equipment
- Third Party Damages
- Sign replacement
- Vegetation management
- Easement management

5.4.11 Refurbishment / Upgrade

- Custody Transfer Station Upgrades, as required primarily capacity related.

5.4.12 Records, Documentation, Drawings & Plans

- Records and Documentation are retained in the ECMS document management system
- Drawings and Plans are planned for conversion to electronic format for the GIS system

5.4.13 Renewal / Replacement Plan

Coating fault rates are high on some pipelines. The reason for high rates of coating defects generally relates to the coating type used on some of the older pipelines. Coal tar enamel is particularly susceptible to coating faults and some pipelines have several hundred faults. Improvements in pipeline coating technology from the late 1960"s have resulted in significant improvements to the longevity of pipeline coating.

Dig-ups performed on representative coating defects on pipelines with high numbers of coating faults have indicated minimal or no evidence of metal loss indicating that the pipeline CP systems are providing good protection despite the high number of small coating defects. Given these results there are no planned pipeline replacements within the term of this asset management plan although further dig ups and monitoring will continue.

There are no indications that any of the Multinet Gas"s Transmission Pipelines will require replacement in the foreseeable future.

5.5 Distribution Mains, Services and Valves

5.5.1 Background

There is approximately 9,800 km of distribution Mains located throughout the Multinet Gas distribution network. These Mains and associated services and valves operate at three distinct pressure ranges as detailed below:

Table 5-1: Distribution Mains Operating Pressure Ranges

System	Typical Operating Range (kPa)
High Pressure (HP)	140-515
Medium Pressure (MP)	15 to 35, 60, 80, 110
Low Pressure (LP)	Up to 3.5

High Pressure system comprises of coated steel or polyethylene (PE) pipes. Both pipe types have welded joints (steel to PE transition is via flanged/mechanical joints). The PE pipes have a Standard Dimension Ratio (SDR - Ratio of outside diameter to wall thickness) of 9.9 to 11.

Medium Pressure system comprises of coated steel, bare steel, galvanised iron (GI) and PE pipes (some cast iron pipes exist at the lower and middle ranges of pressure). The steel and GI pipes have welded or mechanical (screwed or sealing) joints. In general the PE pipes have a SDR of 17.6 and fusion welded joints.

Low Pressure system comprises of cast iron (CI), poly vinyl chloride (PVC), and bare steel and GI pipe. The CI pipes have either lead/hemp joints or mechanical/O-ring compression joints. The galvanised iron pipes have mechanical/sealing-ring joints at transition to CI, bare steel and PVC pipe and the PVC pipe has glued joints and some ABS bodied rubber ring compression joints.

Multinet Gas has the largest remaining network of low-pressure cast iron pipes in Australia. Multinet Gas"s cast iron system is approximately equal in size to the other two Victorian gas distributors cast iron systems combined.

In comparison to replacement rates of other Distributors with cast-iron systems, Multinet Gas should have the highest replacement rate due to the size of the network and the additional risk associated with having the highest end-user density on the system.

5.5.2 Coverage and Objective

Applies to Multinet Gas distribution Mains, services and valves located throughout the Multinet Gas distribution network and encompasses Mains operating at pressures up to 515 kPa.

Objectives:

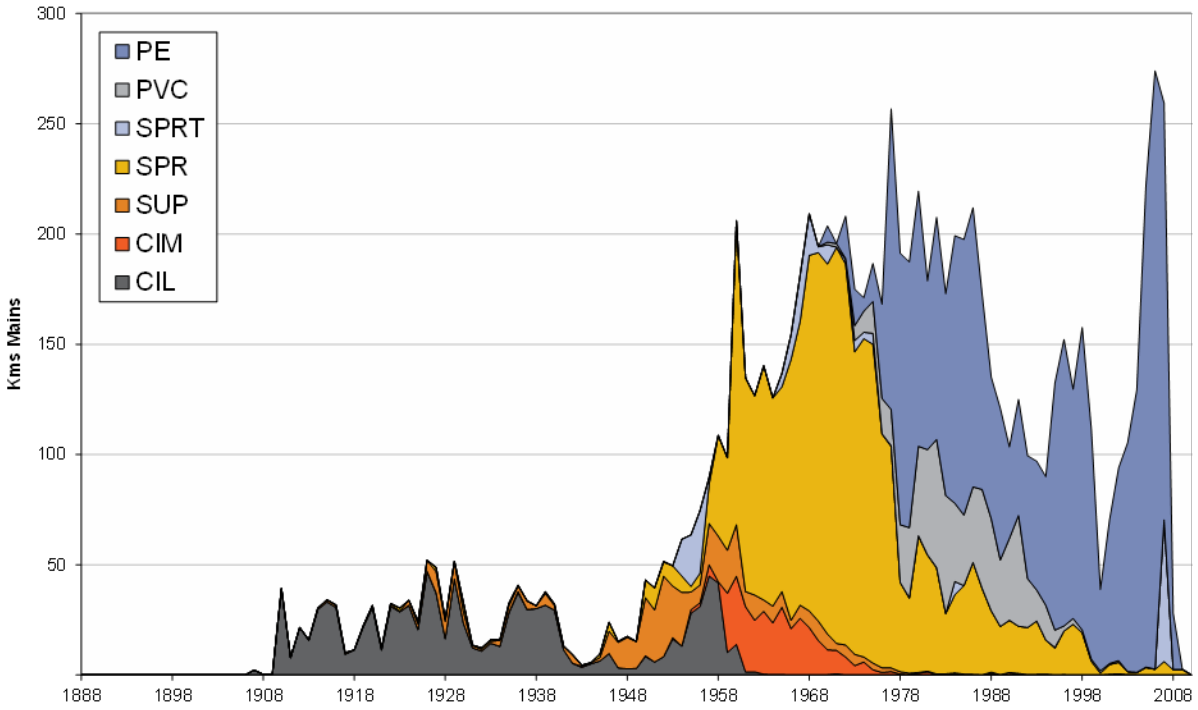
- Increase reliability and quality of supply
- Mitigate safety risk to personnel and public
- Identify long term replacement expenditure

Note: By definition under the current Australian Standards Mains operating up 1050 kPa are deemed distribution Mains. For the purposes of maintenance and replacement the previously licensed "<1,050 kPa system" shall be covered by the Transmission Strategy.

5.5.3 Mains

The Distribution Main age profile encompasses a broad time-span, with some of the older Mains dating back to the late 1880"s. Cast iron was prominent from the inception of the distribution network up until the late 1960"s. Steel, both protected and unprotected, took over in the early 1950"s with protected steel still used today. PVC and polyethylene made their debut in the early 1970"s with PVC usage declining in the early 1990"s. Polyethylene is now the prominent material with over 95% of new Mains constructed from polyethylene in the last 10 years.

Figure 5-2: Existing Mains Age Profile by Material



PE=Polyethylene PVC=Polyvinyl Chloride SPRT=Steel Protected Transmission SPR= Steel Protected SUP=Steel Unprotected CIM=Cast Iron Mechanical Jointed CIL=Cast Iron Lead Jointed

Table 5-2 Asset Materials – Distribution Mains (including Sth Gippsland Towns)

Material Type	PVC	Steel	Cast Iron	Polyethylene
Length	698	3,737	1,445	3,924

Figure 5-3: Multinet Gas Mains Dissection - Material

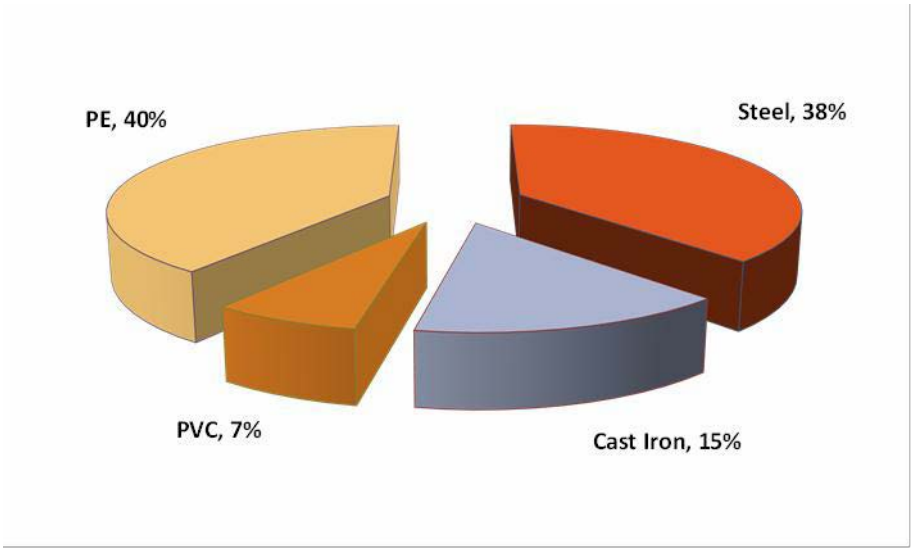


Figure 5-4: Multinet Gas Network Dissection - Pressure

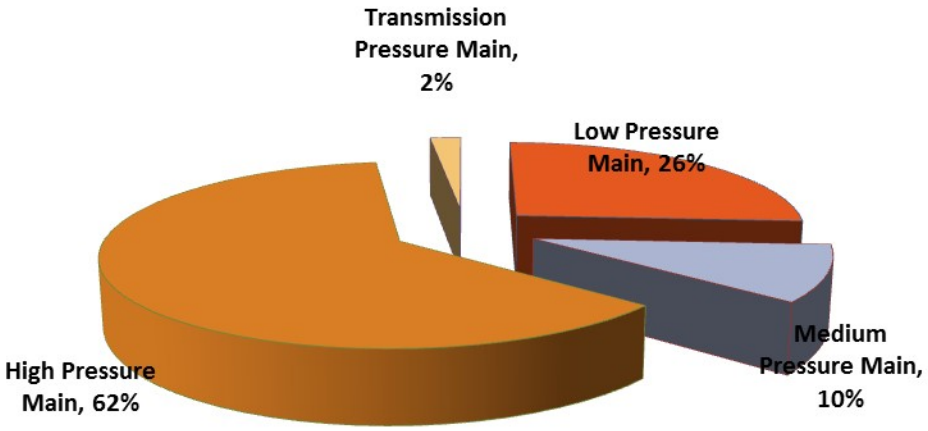
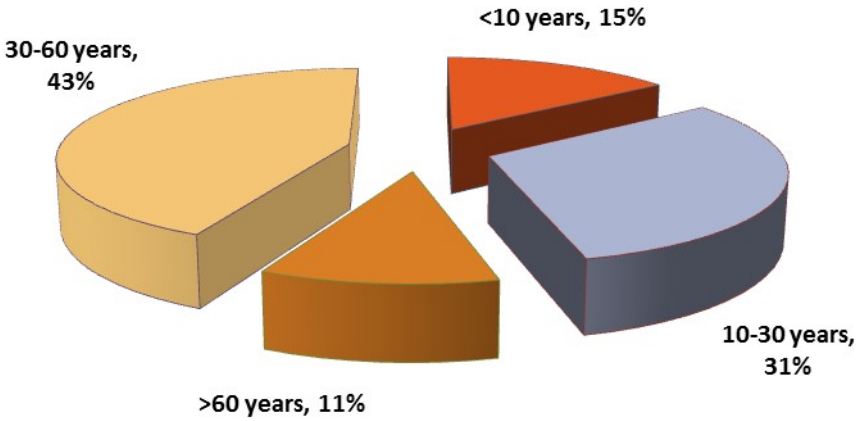


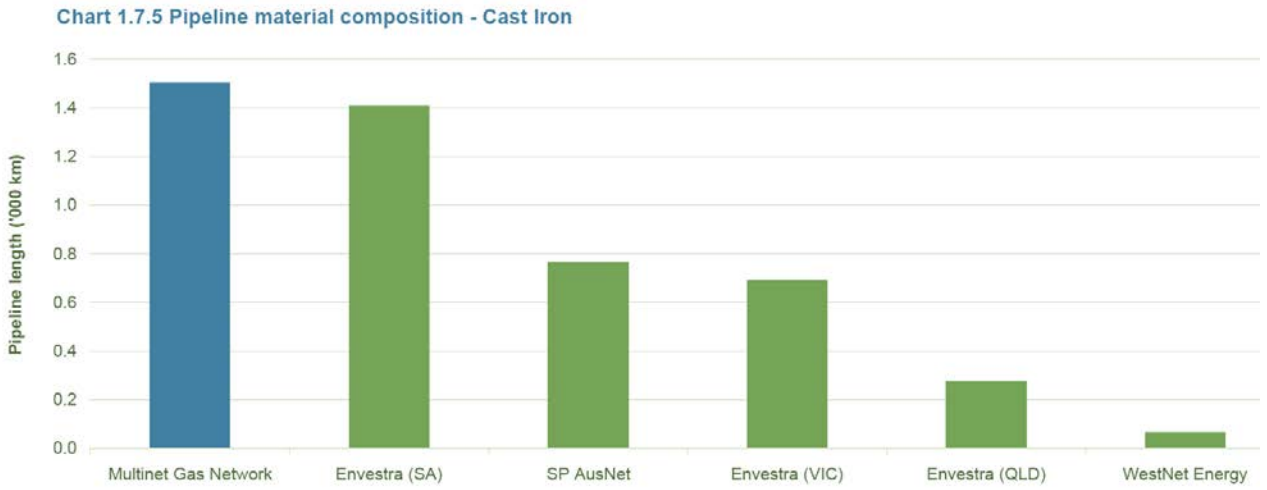
Figure 5-5: Multinet Gas Distribution Network Breakdown by Age



The above graphs have not changed significantly in the last few years. The last graph shows that 11% of the network or 1,050km is at least 60 years old. The implications are developed in section 5.5.10

The below graph illustrates that Multinet Gas has the largest amount of cast iron mains compared to other gas distributors in Australia. (ESAA 2008).

Figure 5-6: Distribution Business Comparison – Cast Iron Pipe Length



5.5.4 Services

Due to the lack of information on service age and material type no direct asset age profile is available. Given that the services are laid at approximately the same time as the Main excluding one-off replacements it can be assumed that the age profile of the Distribution Services will have a similar profile to that of the Distribution Mains.

Services generally have lower asset lives than Mains, particularly the original services associated with the Low Pressure Mains that tended to be unprotected steel. These services have an estimated life of 30 years.

Service renewal is an ongoing activity. Old unprotected steel services are generally replaced whenever a leak on the service is detected, or when alterations to the service are made. This is driven by high cost of service repairs relative to replacement and the fact that once one corrosion leak on a steel service has occurred, many more will follow rendering repairs uneconomic in comparison to replacement.

Services must be insulated from the consumers fitting line for cathodic protection reasons. This is achieved by use of an insulating device in the service regulator / meter set up.

5.5.5 Distribution Valves

This section applies to valves located throughout the Multinet Gas Distribution System and encompasses valves operating at pressures up to 1050 kPa (Class 125 and 150).

Distribution Valves facilitate safe, reliable and flexible gas network operations. Valves are categorised to reflect their use and importance assisting in optimal gas flow management and to provide either or both of pressure control or network isolation in response to adverse supply incidents.

A Distribution Valve List managed by Multinet Gas"s System Planning Group constitutes the complete list of significant valves (Generically referred to as "critical valves"). The status of a valve at any given time is managed and communicated by the Operations Group to System Planning and the Coordination Centre (COC).

Valve Categories:

SCADA Network Isolation Valve (SNIV) – a means of deliberate isolation. A valve between networks in which one or both networks is either SCADA monitored at regulators and/or network fringes, or SCADA controlled. These valves are assumed to be closed.

Network Isolation Valve (NIV) – a means of deliberate isolation. A valve within "normally integrated" pipe work or between networks operating at different fixed pressures where neither network is SCADA monitored at regulators and/or network fringes, or SCADA controlled.

Isolation Valves – Buried or above ground City Gate, Field and District Regulator Inlet Valves used for the purposes of isolating Pressure Regulating Stations (PRSs) from a safe distance.

Steel to Large Diameter Polyethylene Valves – These valve where installed as a means to isolate PE in the case of Rapid Crack Propagation (RCP) or third party damage. Approx. 25m of Steel was placed between the valve and PE. This practice has been modified. Refer to Engineering Standard 4102.

Additional Service Isolation Valves (ASIV) – Primarily for industrial/commercial service isolation.

System/Station Valves (SV) – This name is applied to a selection of more "significant" valves in or around Custody Transfer Stations downstream of the ownership demarcation point between Multinet Gas and APA GasNet, Outstations, Enclosures or pits for complex valve arrangements and to other valves considered to be significant associated with PRSs.

5.5.6 Current Condition Assessment

Mains:

All Mains constructed of modern materials are assessed to be in good condition or better. Mains constructed of cast iron and uncoated, unprotected steel are in varying states of degradation ranging from good to poor. These

materials are the focus of maintenance and replacement programs. Condition varies depending on ground conditions (propensity for corrosion, ground movement).

Services:

Similarly for services, all those constructed of modern material are assessed to be in good condition or better. Maintenance on these items is primarily driven by third party damage. Services constructed from cast iron, bare steel and other obsolete materials are generally in poor condition. Ad-hoc replacement is required for failed services in the absence of Mains in the area being programmed for replacement.

Valves:

Valve condition varies and in many cases is unknown due to the lack of previous maintenance programs.

5.5.7 Key Issues

Mains and Services:

Issues that have arisen during the preparation of this document and that of the previous version are:

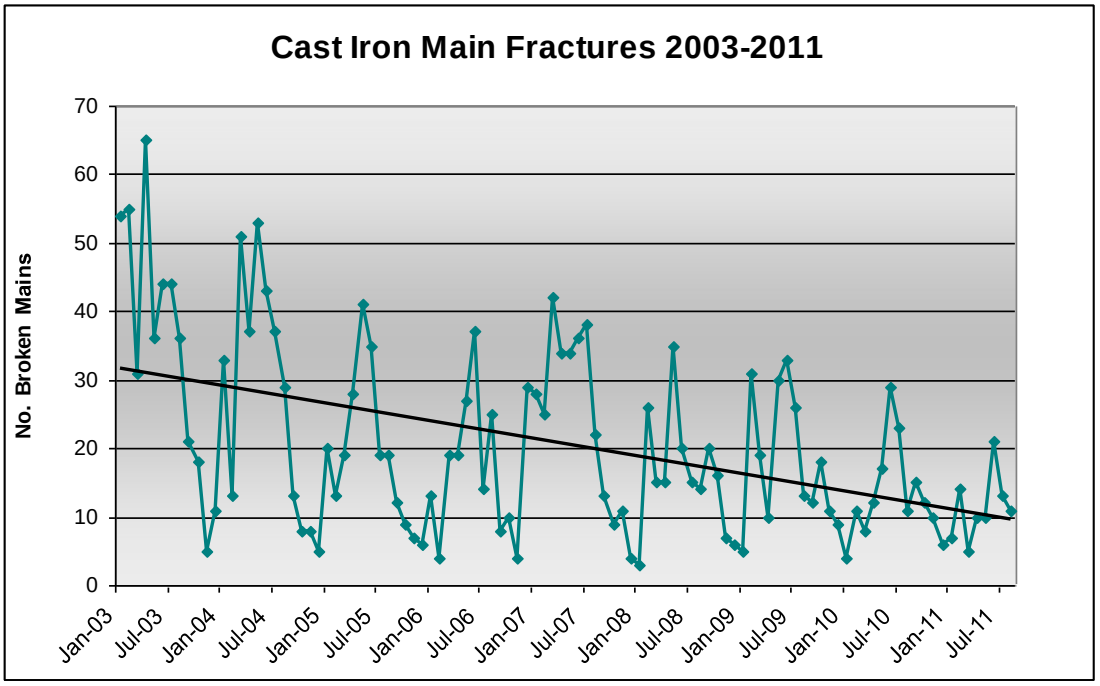
- Mains replacement volume and prioritisation
- Water ingress to the low-pressure network and associated multiple supply outages
- Maintenance data quality
- Gas leakage into third party assets

The recent increase in rainfall (see Section 3.1) has increased the frequency of outages across the Low Pressure network. This indicates that the dry winters experienced in previous years have shielded the true condition of the Low Pressure network from typical methods of data collection. The rainfall from 2009 to 2010 increased by 64% and thus supply interruption caused by water in mains increased significantly, as the mains had reduced capacity to compensate for minor water ingress. This trend has continued in 2011 as the number of complaints from water ingress exceeds the rate of additional rainfall.

When gas leaks from underground mains the opportunity arises for the gas to migrate into third party conduits. This usually occurs into non-pressurised conduit, for instance telecommunication and sewers. An incident in Kew, where gas was detected by the water authority highlighted the dangers and difficulty of tracing the leak. Since then, a number of other incidents of gas in sewers have been reported by water authorities. Multinet Gas inspections have also revealed gas leaking from large diameter cast iron mains into stormwater and telecommunications pits in Punt Road, South Yarra and complaints have highlighted gas leaking into buildings in Burwood Road Hawthorn and Park Street South Melbourne. Large diameter cast iron mains in Toorak Road, Kooyong are also providing high numbers of leak indications. All such incidents are indications that the renewal program should be increased and focus needs to move to the larger diameter gas mains in higher density areas. These incidents indicate increasing risks associated with maintaining cast iron gas distribution systems in these areas.

Aside from reactively dealing with issues of immediate concern such as those mentioned above, the safety risk areas are determined by analysing cast iron Mains fracture history and high risk blocks are determined by modelling the previous fracture history of all cast iron Mains. Mains fractures generally involve catastrophic failure (full circumferential splitting) of the pipe wall resulting in a full bore gas escape. This failure mode causes instantaneous release of significant volumes of gas and is the highest risk failure mode for this class of assets. Targeting Mains for replacement on this basis has been successful in substantially reducing the number of cast iron Mains fractures over the past five years. Refer to 5.5.10. Although this program has been successful in reducing the overall number of mains fractures across the network and thus reducing overall risk, it has not addressed the risk associated with the large diameter cast iron (both low and medium pressure) supply mains.

Figure 5-7: Cast Iron Main Fractures 2003-2011



No replacement is assumed for High Pressure Mains over the next five years because the pipe materials all have lives that extend beyond this period.

At a high level, forecast replacement is based on replacement of the Low Pressure network over a 30-year period from 2003. The 30-year period for replacement had been established by modelling industry accepted asset lives against individual asset installed dates. The rate of replacement in previous plans had been reduced consistent with capital constraints. However, the intention in the 2013-2017 is to accelerate replacement rates to realign with the 30 year replacement program. Other Australian utilities have replaced cast iron systems or are replacing them at a faster rate than Multinet Gas.

Historical costs are a good guide to future unit rate costs for replacement provided the mix of difficult areas is taken into account. Projects in inner suburban areas with high reinstatement, high incidence of multiple unit developments, traffic management, and multistorey units typically incur unit rates of triple the standard outer suburban nature strip areas. This problem has prompted a strategy change. There are low pressure areas that cannot be economically upgraded to high pressure in large volumes. In these areas, the low pressure mains are expected to exist for longer than 30 years and like for like replacement of individual mains will be the preferred method of maintaining safety and supply.

This strategy is not unique and has been implemented in the Gas and Fuel era and currently in the United Kingdom. Upgrades of low pressure mains in large blocks will continue, however not in certain designated zones planned for long term low pressure.

Sections of the Medium Pressure system are considered for replacement where the pipe materials are cast iron, ductile iron, unprotected steel or other materials with inferior safety performance. Large diameter Medium Pressure Mains comprised of these materials are considered a higher risk in relation to safety. To mitigate this risk all large diameter cast iron mains operating at Medium Pressure are leakage surveyed annually.

Large diameter Low Pressure Mains are subject to condition based replacement on a like for like basis. These Mains are unable to be upgraded to High Pressure easily due to the need to shed downstream load from them.

Nor can all these Mains be left to the back end of the High Pressure upgrading program due to their age and in some cases extremely poor condition. See Section 5.5.12 for Large Diameter cast iron replacement.

5.5.8 Key Issues

Valves:

- Field identification of the existing valves (many have been paved over)
- Determine the operable state of the identified valves
- Identification of required isolation points and hence any new valves
- Violation of Regulator Inlet Isolation Valves by Mains connections
- Identification of single feed areas containing greater than 10,000 consumers
- Strategy to deal with cast iron body valves in High Pressure system

5.5.9 Maintenance

Mains and Services:

Mains and services maintenance is mostly reactive (Unplanned):

- Multinet Gas responds to public reports of gas leaks, damages and stoppages (usually due to water ingress) according to defined and measured timeframes
- Unprotected steel services are replaced as a matter of course when leaking due to corrosion
- PE and PVC services will generally be repaired if damaged or leaking
- Inspection / Corrective Maintenance (Planned) is conducted based on Proactive leakage survey which is carried out in accordance with Australian Standards and internal Engineering Standards
- Repairs are generated by Leakage Survey and Public Reports
- Preventive Maintenance is conducted primarily on a planned basis and includes:
- Cathodic protection of Mains and services
- Service corrosion repairs and investigations / provings
- Syphon maintenance and pumping
- Maintenance of Mains on bridges
- Mains investigation and proving, often for Other Authorities

The majority of preventive maintenance is undertaken on the steel network which since the mid 1970"s has incorporated a cathodic protection system. This system is designed to prevent corrosion and mitigate stray currents from the steel network, which are induced by ground conditions, electricity utilities and traction systems. The performance of the cathodic protection system is detailed in the Cathodic Protection Strategy and section 5.10.

A significant maintenance task undertaken with respect to preventing outages on the network is syphon pumping / maintenance. This is both a planned and unplanned activity. Syphon pumping is in the majority of cases restricted to the Low Pressure network.

Physical inspection of a sample of large diameter cast iron Mains is carried out based on feedback from field personnel and maintenance history. This inspection comprises a magnetic flux examination of sample sites to determine the degree of material degradation and the probability of „through wall corrosion" occurring somewhere within the Mains unit under assessment.

5.5.10 Leakage Survey

Leakage survey involves the surveying of distribution Mains and other assets (valves, kiosks etc) on a systematic basis, which is dependent on risk to public and property. There are four different categories of surveying, three of which are location dependant and detailed in the below table.

Table 5-3: Leakage Survey Schedule

Category No.	Description	Schedule
1	Annualised Leakage Survey (TP)	1 Year
2	Special leakage Survey (including trigger based survey)	Ad hoc (once off)
3	Inspection Leakage Survey	Variable (according to strategy)

Surveying is carried out by mobile detection units. Leakage survey is generally performed by postcode areas. Upon completion of the surveyed area any leaks are assigned a leak ticket. The leak tickets are passed onto the pin pointing crew, which attempt to locate the leak. Once located a repair crew is sent to repair the escape such that upon rectification of the leak no gas is present within 200m of the leak repair. This type of programmed maintenance based on leak detection gives an indication as to the condition of the Main / joints and forms a basis for ongoing maintenance costs on the network.

5.5.11 Valves:

Suitably located valves are to be maintained once per year to ensure their operability and accessibility. Records of the valve position and valve details are kept within the SAP asset recording system. Fundamental maintenance components include:

- Inspection of location annually
- Corrective Maintenance - Faults and Defects as reported from inspections to be corrected
- Refurbishment of valve when proven necessary

5.5.12 Renewal / Replacement

The renewal and replacement strategies to be undertaken by Multinet Gas in the period covered by this plan are those considered prudent, tolerable and the minimum acceptable in a period when capital investment is constrained. All assets have an economic life, which is determined by the cost to maintain the asset verses the cost to replace the asset prior to complete failure of the asset. In case of gas distribution Mains it is the corrective and preventive maintenance, which ultimately determines the life of that asset. An example of this is in the case of cast iron Mains. It is the joints that make up 90% of the maintenance cost of the Main; therefore the life of that pipe is determined by the ability of the joints to withstand leakage. These factors must therefore be taken into consideration when establishing the life of assets.

Documentation on pipe lives in particular the report by D.J.Bartlett provides expected pipe lives for cast iron and steel Mains. This report is also cited by the ODRC Asset Valuation Review for Technical Lives used in the evaluation of the Victorian Gas Distribution Assets.

Lives for both Polyethylene and PVC are prescribed from a Gas Technology Report and the ODRC report.

Based on several reports on gas distribution Mains, the Technical Lives Table was created. These lives for modelling purposes were broken into 6 main pipe types, Cast Iron (Lead Jointed), Cast Iron (Mechanical Jointed), Un-protected Steel, Protected Steel, PVC and PE.

Of the lives used two changes were made, the life of cast iron lead joint Thin and Medium. This type of Main makes up the majority of replacement required. Based on historical data that these Mains are not expiring at the predicted rate it is acceptable to increase the lives of these Mains by a small amount. In the case of CILJ Thin, by 10 years and by 10 years to the pessimistic life of the Medium CILJ.

Table 5-4: Pipe Technical Lives:

Material Type	Wall Thickness	Diameter	Pessimistic Life	Optimistic Life	Reference
Cast Iron	Thin	0 – 150	60 (70)*	90 (100)*	SSL Report
Lead Joints	Medium	175 – 450	70 (80)*	140	Table 2
	Thick	500 – 750	90	140	Gascor Estimate
Cast Iron	Thin	0 – 150	40	60	SSL Report
Mechanical	Medium	175 – 450	50	90	Table 2
Joints	Thick	500 – 750	60	90	Gascor Estimate
Steel -	Thin	25 – 40	40	90	SSL Report
Coated	Medium	50 – 80	40	90	Table 3
No CP	Thick	≥ 100	40	90	Gascor Estimate
Steel -	Pre 1930		70	140	
Coated	1930 - 49		90	180	SSL Report
With CP	1950 - 69		100	220	Table 5
	1970 - 79		100	240	Author"s Estimate
	1980 - on		115	250	
PVC			37	72	Distribution Spread
PE			50	100	

Note – An extra 10 years has been added to the life based on field experience.

The assumption is that the economic life of a Service would be that of the Main that it is connected to. This combined with the lack of information on service material types and location requires that services be replaced:

- In line with the Mains replacement program given that the service has not previously been replaced with polyethylene
- On an assessment basis, this is required when the service is not fit for purpose due to leakage and the failure of a pressure test irrespective of material type

- If due to a leakage report or outage were the service is steel and corrosion has contributed to the leakage or outage. These replacements are estimated at 525 per year based on previous replacement data.

Long Term Strategy:

The Asset Replacement Model will determine the overall volume of replacements.

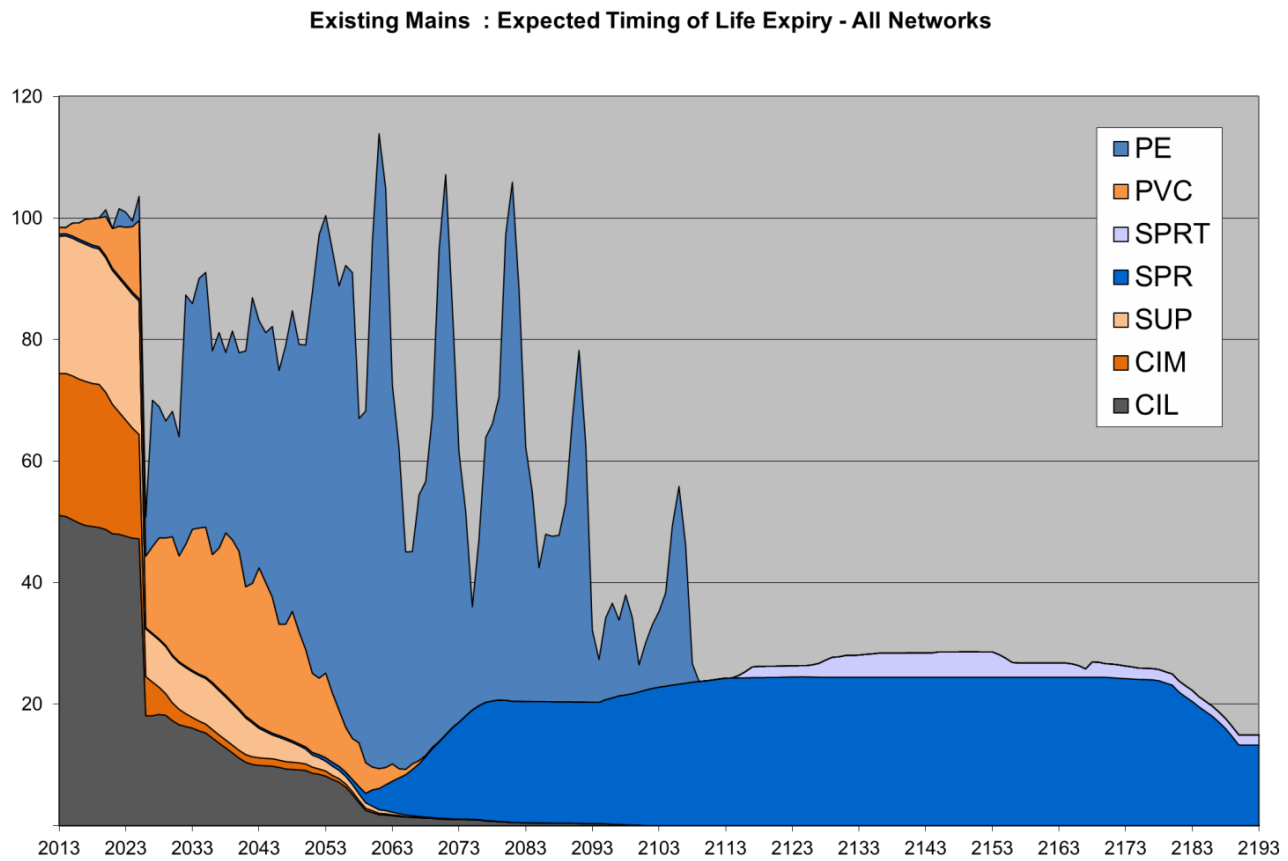
The Model is based on industry accepted asset lives of pipes as indicated in the above table and uses a uniform distribution between the Pessimistic and Optimistic life

The Model uses existing age profile information obtained from SAP

Provides a high level overall average rate

Failure to maintain average replacement rate over a long period will result in forced increases in rate of replacement as shown in the graph below.

Figure 5-8: Existing Mains – Expected Timing of Life Expiry – All Networks



The above graph illustrates the amount of mains replacement necessary from today and in the future. This graph includes the backlog of un-replaced mains that have passed their technical life.

The graph assumes the technical life from the above table and schedules the replacement year with respect to the date laid for each mains unit.

Mains that have exceeded their technical life have been allocated a 13 year period for replacement, for they cannot all be replaced in one year.

The graph shows that up to 100km per year of mains are needed to be replaced for the next 13 years until the rate can be reduced.

Under this model, the replacement rate of 100km per year assumes that each individual main can be replaced at the time of its life expiry. In practice, with high pressure upgrading of blocks, this is not possible. This means that over time life expired pipe will build up even if replacement rates are maintained at 100km per year. Hence this model only provides a lower bound estimate of the required replacement rate. A replacement rate of approximately 85km per year has been adopted for the next GAAR period to ensure a smooth works program and staged ramp up to the 100km per year requirement.

Deferment of that level of mains replacement will only compound the problem as the PVC (dark blue) approaches its end of life and will then need to be replaced.

The volatility of the rates of replacement from 2050-2100 will be smoothed with appreciation of the actual technical life of polyethylene and future mains replacement strategies.

Annual Program:

Given that the Asset Replacement Model determines replacement based on life expiry and does not take into consideration location and pressure requirements, an annual program is required to determine exact replacements.

The drivers to determine these replacements in order of priority are:

1. Replacement based on GTL Risk Model – Public Safety via avoidance of Cast Iron Mains fracture is the driver.
   - Run GTL Model annually (Fracture failures are recorded and the breakage zone model is updated annually)
   - Model produces highest risk candidates for further evaluation
   - Site based risk assessment of all high risk Mains units

- Decision based on local conditions, could result in;
  - Upgrade to High Pressure
  - Like for like replacement
  - No action (if locational factors are low risk)

2. Consider the extent that demand related issues can be resolved by replacement projects.
3. Consider the extent that customer service related issues can be resolved by replacement projects.
4. Consider the extent that maintenance issues can be resolved by replacement projects.

The fracture plot in Section 13 illustrates the location of cast iron fractures over the past 12 months.

The following plan indicates single supply stoppages in the month of May 2011.

Figure 5-9: Single Supply Stoppages May 2011

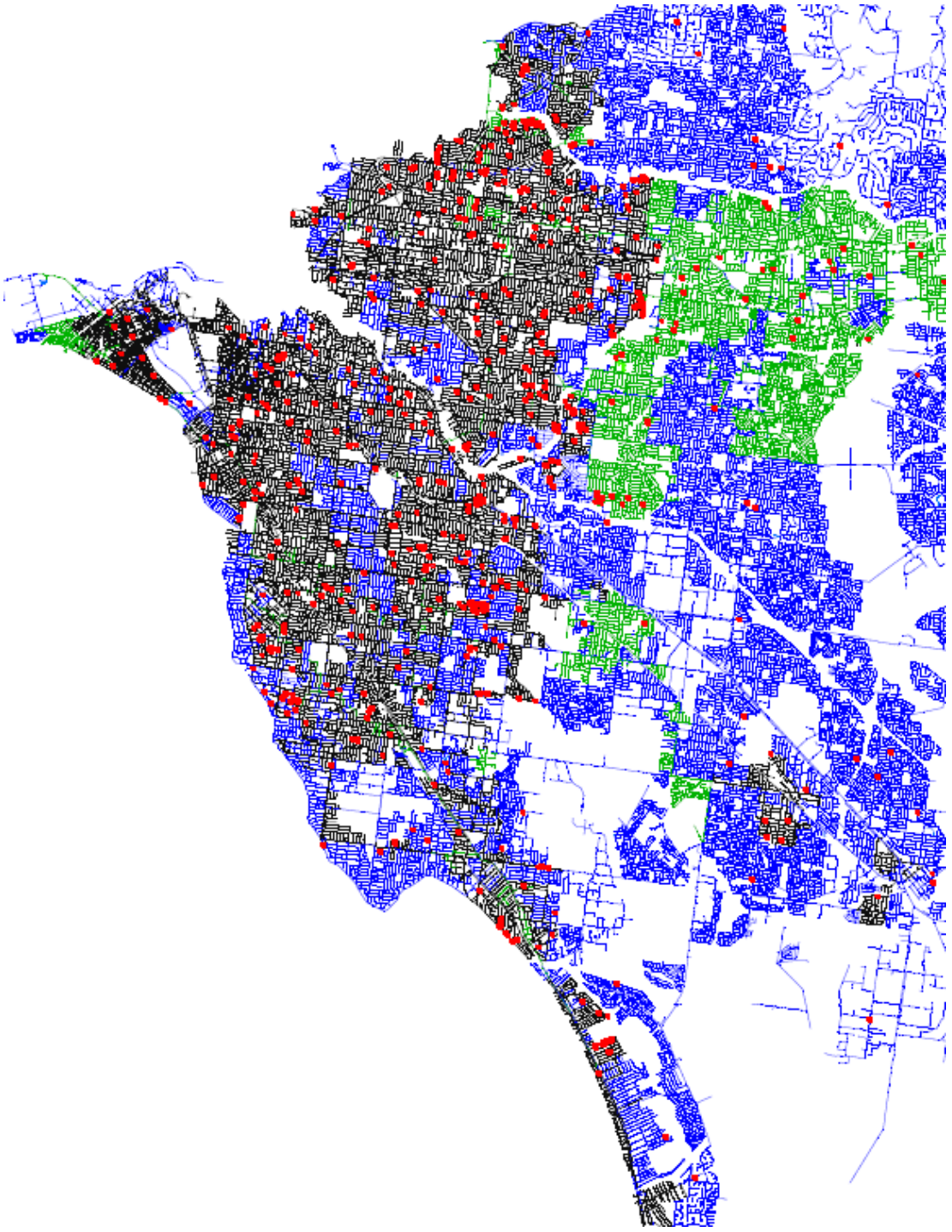
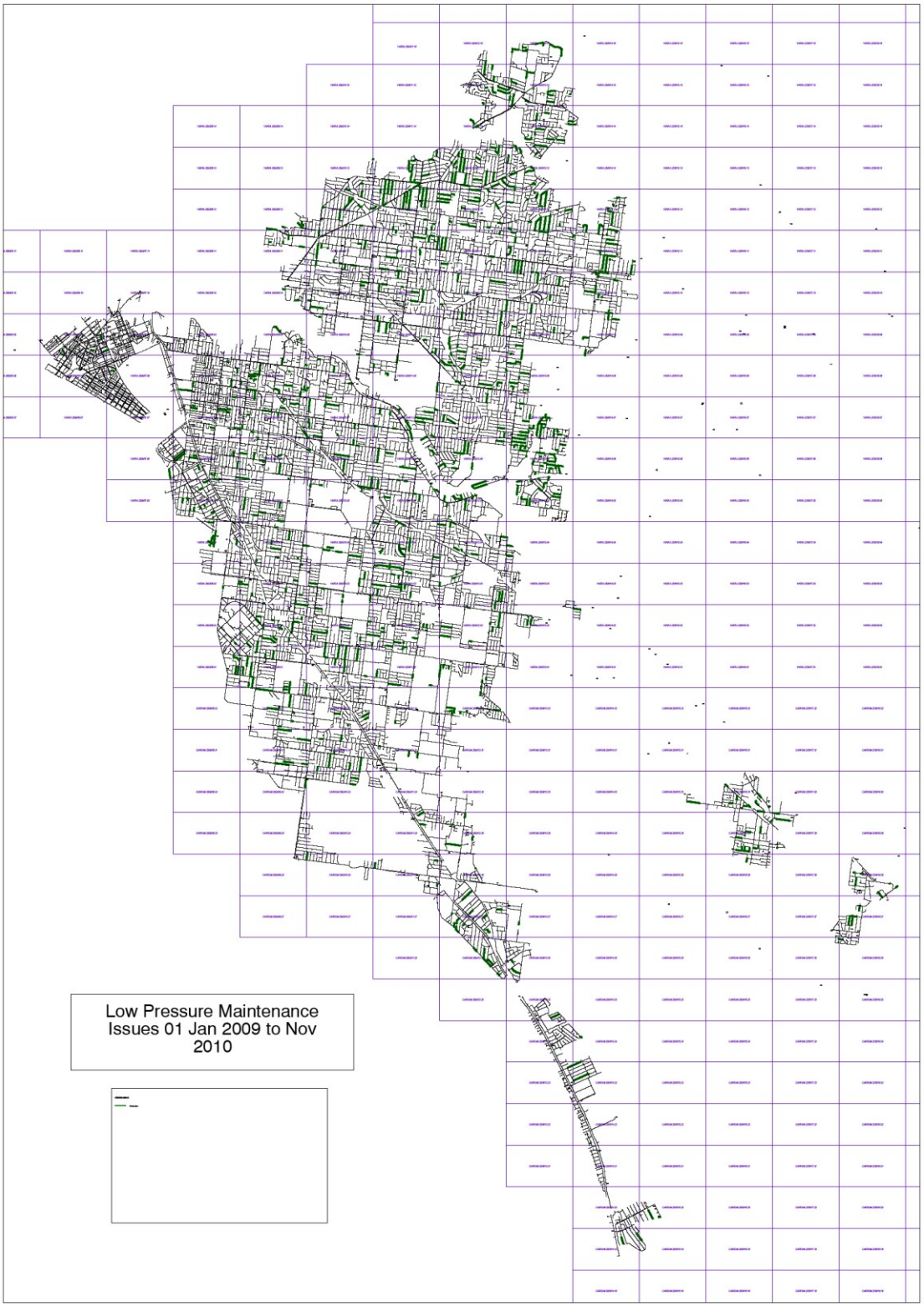


Figure 5-10: Fracture Plot



From the plots it can be seen that both mains fractures and water related stoppages are far more common in the northern part of the network, particularly around the Balwyn Nth, Bulleen and Templestowe areas. There is also an area in Mordialloc/Sandringham which is of concern. The replacement program in the immediate future term is focussed in these areas.

Based on analysis the following plan represents the medium-term upgrade program:

Figure 5-11: Medium Term Upgrade Program (North)

Northern Area

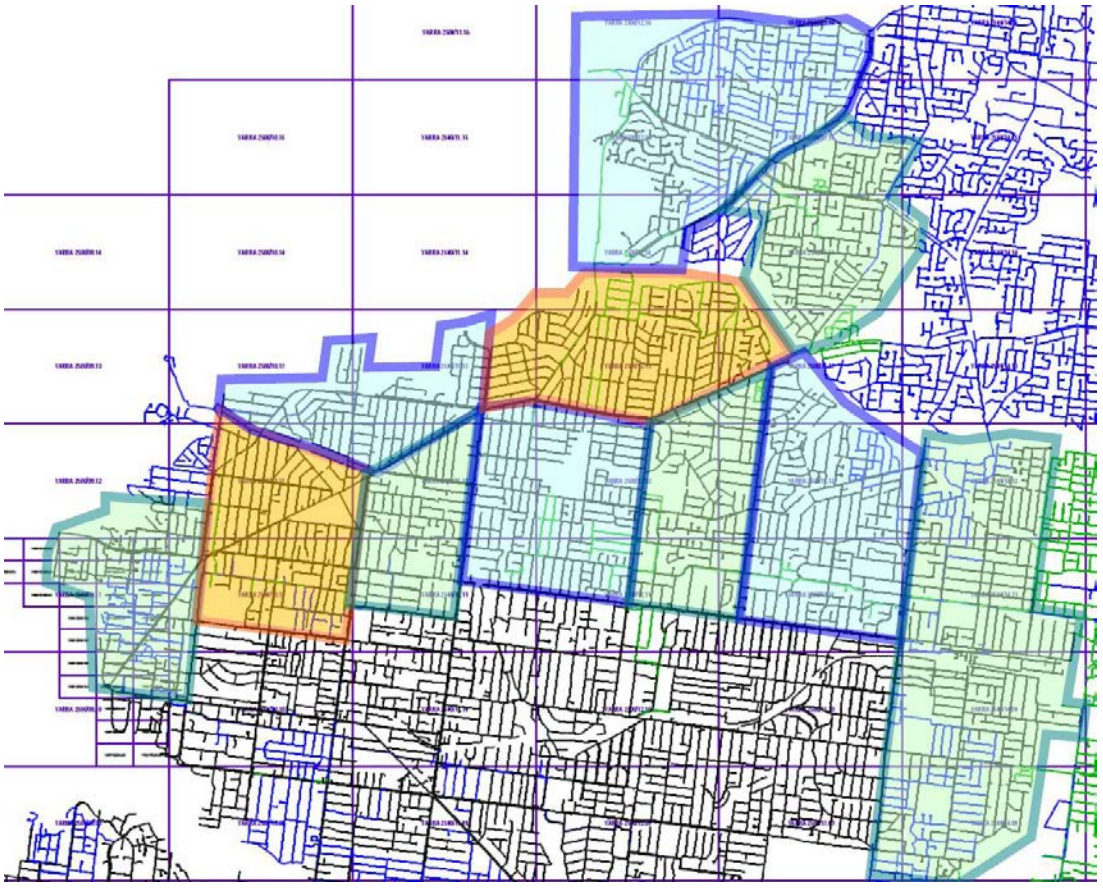
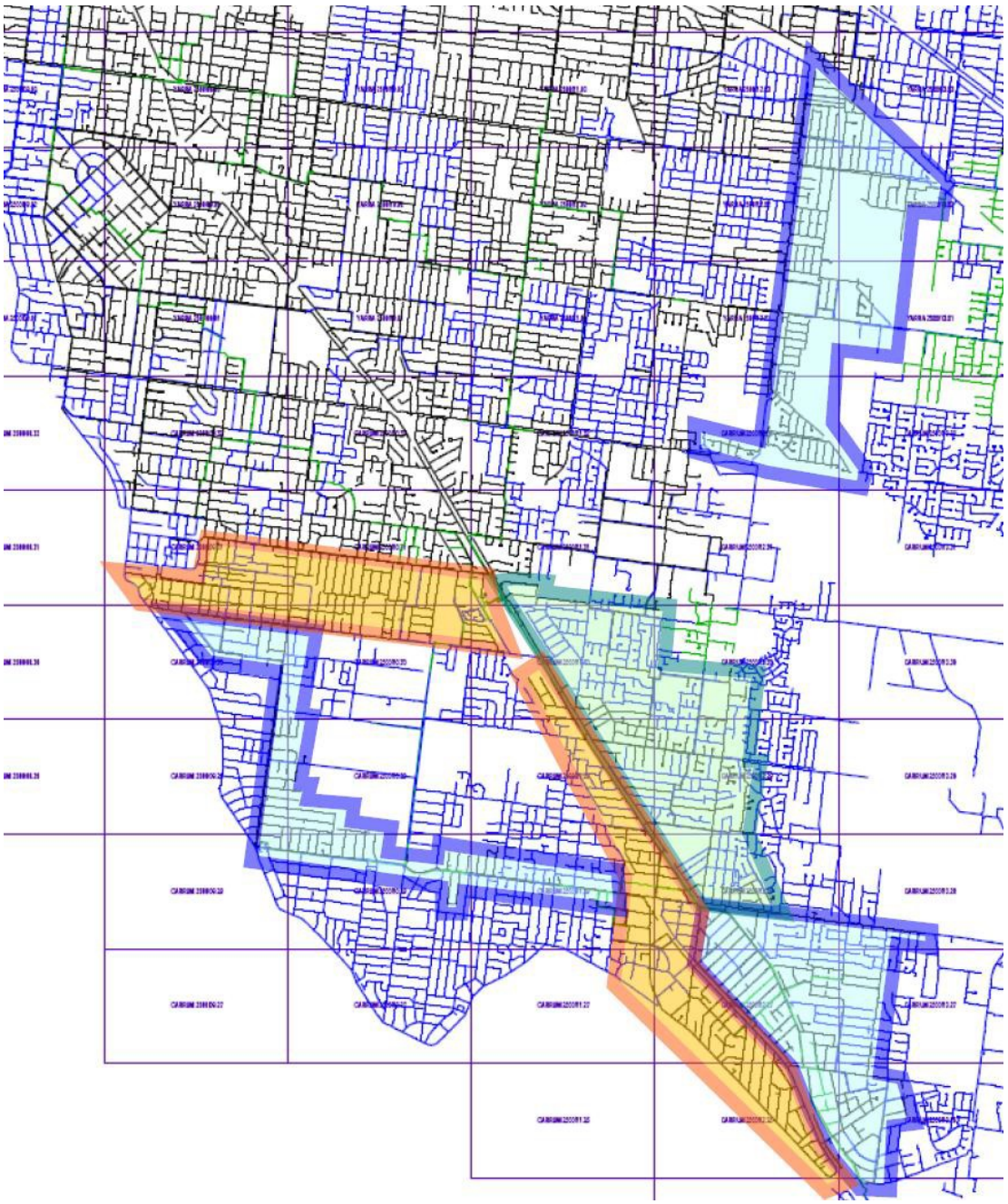


Figure 5-12: Medium Term Upgrade Program (South)

Southern Area



5.5.13 Enforced Replacements

Enforced replacements are Mains that require lowering or alterations. These are mainly due to road works which may reduce the cover of the asset or underground works which require the Main to be lowered or moved due to other asset (sewer, water, power, above ground structures etc) that will intersect or reduce clearance on the existing gas asset.

5.5.14 Large Diameter Cast-Iron Replacement Program

Large diameter cast-iron Mains may be subject to condition based replacement on a „like for like" basis. For some of these Mains it is impractical for them to be upgraded to High Pressure due to the need to shed large amounts of downstream load from them. This means many kilometres of downstream mains must be replaced before the target large diameter main can be decommissioned. Nor can these Mains be left to the back end of the High Pressure upgrading program due to their age and in some cases extremely poor condition.

Physical inspection of a sample of large diameter cast iron Mains is carried out based on feedback from field personnel and maintenance history. This inspection comprises a Magnetic Flux examination of sample sites to determine the degree of material degradation and the probability of through wall corrosion occurring somewhere within the Mains unit under assessment. These defects drastically increase the risk of mains fracture due to bending and crushing loads. Reports have been compiled for Pickles St, Nepean Hwy, Auburn Rd and Reserve Rd Mains showing a requirement to replace these Mains in the short term.

There are several contributing factors including exposure to high levels of traffic loading due to positioning in roadways. This in conjunction with a lack of open ground (nature strips) in front of high density dwellings increases the likelihood for escaped gas to find its way into underground pits and basements where a potentially explosive incident can occur.

This program has been developed and further detail is in the Large Diameter Cast Iron Mains Strategy (ASS-MNG-ST-4101). The Mains that are programmed for renewal over the next five years detailed here are not able to be decommissioned by low pressure to high pressure upgrading in a timely fashion to prevent the risks of these mains exceeding an allowable level. A focus on areas not likely to be upgraded for some time has commenced and is likely to increase the rate of large diameter cast iron replacement. The change in strategy has also resulted in a provision for short lengths of mains for ad-hoc replacement. The recent forced replacement of Park St, South Melbourne is an example of the need to have a mechanism for short length replacement of large diameter mains.

Table 5-5: Program Overview

Project	Length (Dia)	Unit Cost	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Provision for ad-hoc replacement in LPDZ	200m	$/m	XX	XX	XX	XX	XX	XX
Aughtie Dr to Nepean Hwy St Kilda	2,000m (450-600mm)	$ district regulator	XX	XX				
Summerhill Rd Glen Iris (Downgrade)	3,100m (225mm)	$/m			XX			
The Esplanade St Kilda	3,300m (225mm)	$/m						XX
Riversdale Rd Hawthorn (Downgrade)	800m (225mm)	$/m					XX	
Auburn Rd, Hawthorn	3800m (Various)	$/m					XX	
Wellington Rd Kew	2,500m (225mm)	$/m				XX		

5.6 Large Consumer Installations

5.6.1 Background

For the purposes of this plan, a Large Consumer Installation is defined as a consumer installation that contains a meter with a capacity greater than 10 Standard cubic metres per hour (Sm^3/h). Approximately 22,300 installations fit this description and include Industrial/Commercial applications as well as non-standard domestic meter applications.

There are three main elements to a large customer connection;

Meters: (5.6.3)

Almost all (97%) of these meters are of diaphragm type construction with an average technical life of approximately 40 years. The older style tin-case diaphragm meters will all be removed by the end of 2011 (Large only). The remainder consists of positive displacement rotary meters and high capacity turbine meters.

Regulators: (5.6.4)

Large Consumer Installations with a fixed outlet pressure require single or multiple gas pressure regulating devices (commonly know as the „regulator") to facilitate Fixed Factor Metering. Large Consumer Regulators are defined as regulators installed to supply a pressure greater than 1.1/2.75 kPa.

Data loggers and Flow computers: (5.6.5)

All Interval meters (<15% of large consumers) have a data logger or flow computer connected to the meter. The devices record Volume/Pressure/Temperature passing through the meter in hourly intervals. Installation is driven by the regulatory requirements in the Gas Distribution System Code; any customer using or proposing to use more than 10TJ of gas per year must have an Interval metering installation.

5.6.2 Coverage and Objective

Applies to all Consumer Installations with a meter capacity greater than 10 Sm^3/h (located on the consumers" premises) and covers components from the gas service riser valve to the point of connection to the consumers" fitting line.

Objective:

The objective is to achieve a high level of reliability and personnel/public safety through inspection, preventive and corrective maintenance as well as asset replacement.

To retain meters in the field by performing regular maintenance until such time they are required by regulation to be removed for repair or disposal.

The performance objective is to maintain all large consumer meters within the limits prescribed in the Gas Distribution Code and replace them all by the end of their initial life or extend the AL425 and AL1000 families of meters in accordance with Multinet Gas"s sampling plan allowing an extension of initial life. The AER are expected to make a final decision to approve Multinet Gas"s sampling plan in 2011.

5.6.3 Meters

The number of new large consumer meters purchased each year is dependent on growth; the number of meters repaired each year as well as the accuracy criteria specified in the Distribution System Code. Other than the AL425 and AL1000 families of meters the number of Industrial meters is small compared to the domestic meters and there is no sample testing done on meter types with this category of meters. Unlike small consumer meters

(<10 Sm^3/h); large consumer meters do not conveniently fall into families of meters because of the way they are purchased and installed in such small numbers throughout any calendar year.

The large meters are repaired at regular intervals of 10 or 15 years depending on the capacity of the meter. Meters with a capacity greater than 100 Sm^3/h are removed and repaired at 10 years while meters less than this capacity are removed and repaired at 15 year intervals. These 100 Sm^3/h meters are used on the higher consumption consumer so it is important to all participants that the meters are maintained within the correct accuracy limits.

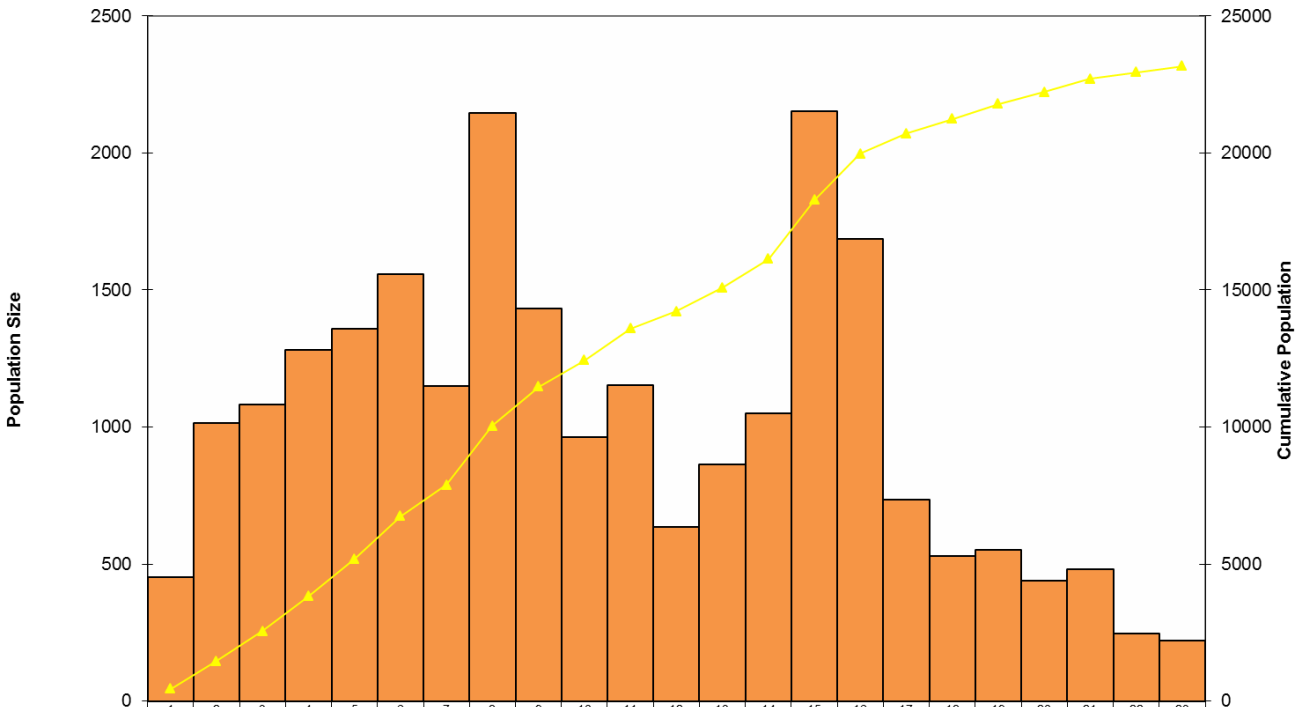
There are two large consumer meter types that are excluded from the rules above. The AL1000 and AL425 meters have sufficient numbers to be treated as a family and have been included in Multinet Gas"s annual sampling plan.

Large consumer meters are repaired on a fee for service basis. Unit prices for repairs are obtained from the Repairers and generally are awarded for repair according to the most competitive price. Large consumer meters are of robust design and can go through one or more repair cycles before disposal depending on availability of replacement parts.

Replacement of Large Consumer meters is determined on an annual basis by removal of the meters at the end of their initial life. Capital expenditure encompasses the replacement cost for non-repairable meters withdrawn from service.

The below chart illustrates age of meters with respect to population size.

Figure 5-13: Population Age – Large Consumer Meters



AGE	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Population	452	1013	1082	1280	1357	1559	1151	2145	1433	962	1153	635	865	1050	2151	1685	734	528	552	438	482	245	220	
Cumulative	452	1,465	2,547	3,827	5,184	6,743	7,894	10,039	11,472	12,434	13,587	14,222	15,087	16,137	18,288	19,973	20,707	21,235	21,787	22,225	22,707	22,952	23,172	

5.6.4 Regulators

Large Consumer Regulators are generally classified into two groups, differentiated by the regulator"s control system as follows:

Table 5-6: Regulator Type

Regulator Group	Description
Pilot Operated	Regulator with Pilot Control
Direct Operated	Regulator without Pilot Control
Total number of installed regulators	5496

Regulators do not tend to exhibit a useful life span or end-of-life failures. Their replacement is typically driven by their inability to be serviced due to critical spare parts not being available or specific operational requirements.

The current condition of Large Consumer Regulator installations is predominantly good with the following exceptions and comments:

A number of the older installations (30+ years old) display aged coatings that require repair and or re-coating. Repair and re-coating is costly as the older coatings contain lead and need to be conducted by suitably qualified contractors.

A number of installations, predominantly installed during the early 1980"s, are suffering from corrosion due to steel fittings and fasteners purchased in the past being of an inferior quality and thus corrode easily due to their high sulphur content.

Small proportions of sites are suffering from aged coatings due to the effects of environmental fall-out and lack of coating maintenance in the past.

The above stated issues are monitored during each maintenance activity at each installation. A reactive policy has been implemented to maintain a steady rate of replacement or specialised maintenance services.

5.6.5 Data Loggers and Flow Computers

Currently there are 322 interval meter consumers and the types of data logging facilities are detailed in the following table.

Table 5-7: Interval Metering - Number and Type

Description	Number of Interval Metering installations
Flow corrector with Communications	110
Flow corrector only	21
Data logger with Communications	25
Data logger only	166
TOTAL Interval Metering Sites	322

5.6.6 Key Issues

Meters:

In the near future National Measurement Institute (NMI) and or the Australian Energy Regulator (AER) may alter the present regime of compliance and Type testing of large consumer meters.

From 2008 the AER formerly ESC has determined that AS/NZS 4944 will be the Standard required for sample testing meters which differs from the previous sampling plan by including 20% flow accuracy testing results, leak tests and index registration test in the new sampling plan.

The AER is yet to approve the sampling plan provided by Multinet Gas for several years. Multinet Gas has been following the plan with the assumption that it will be accepted.

5.6.7 Routine Maintenance

Preventive Maintenance is required for the larger Industrial/Commercial rotary and turbine meters, which require periodic changing of lubrication oil contained in the gear housing.

Large Regulator installations are monitored and maintained to ensure that they are in a safe state of operation and repair. Operation and maintenance processes, including documented procedures, are in place. The technical standards applied to the ongoing monitoring and maintenance of these regulator installations are designed to ensure reliability and reduce identified risks to as low as reasonable practical.

Data loggers and flow correctors are maintained and checked for calibration and batteries checked at least once per year.

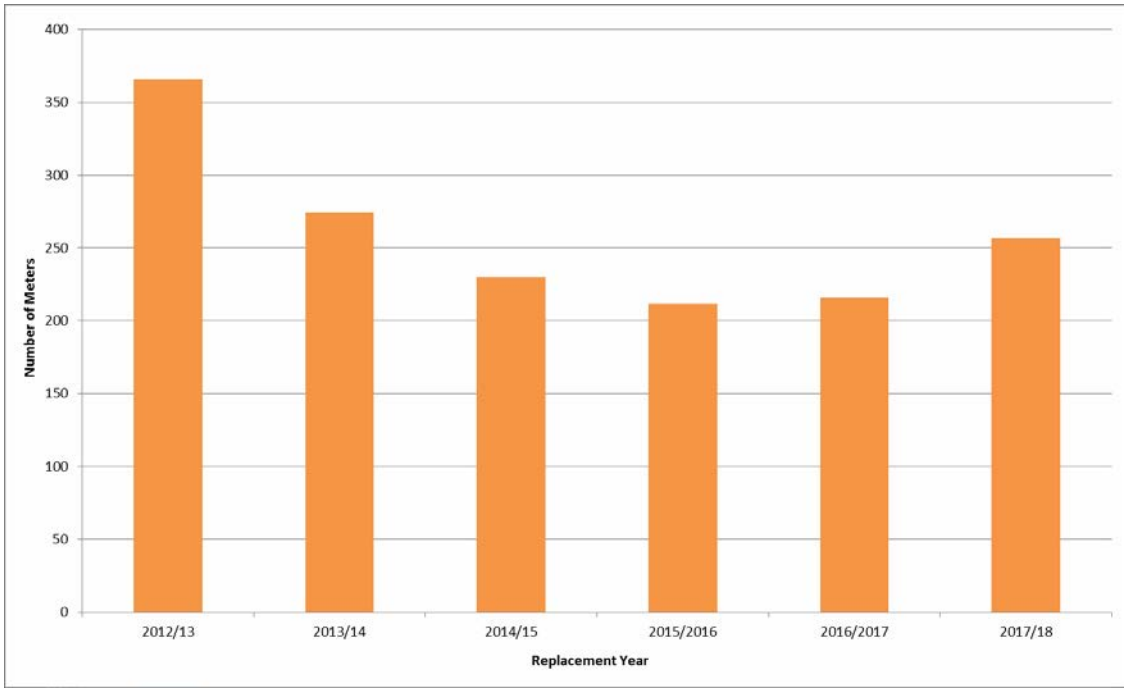
5.6.8 Renewal/Replacement

Meters:

Meters are generally replaced at the end of their regulated life or if they are the AL1000 and AL425 meters because of their wider usage, are sampled tested in line with AS/NZS 4944. A small percentage of meters are replaced due to defects such as corrosion, impact damage etc. Meters removed from the field are refurbished if practical up to the limit of the meter age (generally determined by the longevity of the diaphragm material). Tin case meters are not refurbished due to a history of leakage and cost of repair. New meters are purchased when necessary.

Below chart indicates meter replacement quantities with respect to year of removal.

Figure 5-14: Large Consumer Meter Replacement Quantities



Quantity reduced from previous AMP due to inclusion of AL425 and AL1000 meters in sample testing plan

Regulators:

Replacement of regulators is typically dictated by a change in the consumer"s operational/load requirement that is outside of the range of the installed unit.

The replacement of particular families of regulators has occurred in the past and is implemented when associated spare parts are not commercially available.

The basis of Regulator family replacement will be on the forecast availability of spares and the current level of Regulator family exposure.

Data loggers and Flow Correctors:

The number of flow correctors or data loggers purchased each year is dependent on demand. The older version of the Inline series of data logger and flow computers are obsolete and cannot be repaired. These are replaced upon failure.

5.7 Small Consumer Installations

5.7.1 Background

For the purposes of this plan, a Small Consumer Installation is defined as a consumer billing installation that contains a meter with a capacity equal to or less than 10 Standard cubic metres per hour (Sm^3/h). At the 1st of September 2010, Multinet Gas had approximately 640,000 active meters installed in these installations. Each meter is coupled to a single-stage regulator.

Meters:

All small consumer meters (approx 640,000) are of „diaphragm" type construction with an effective technical life of approximately 35 to 40 years. During this life each meter family will be subject to at least one refurbishment.

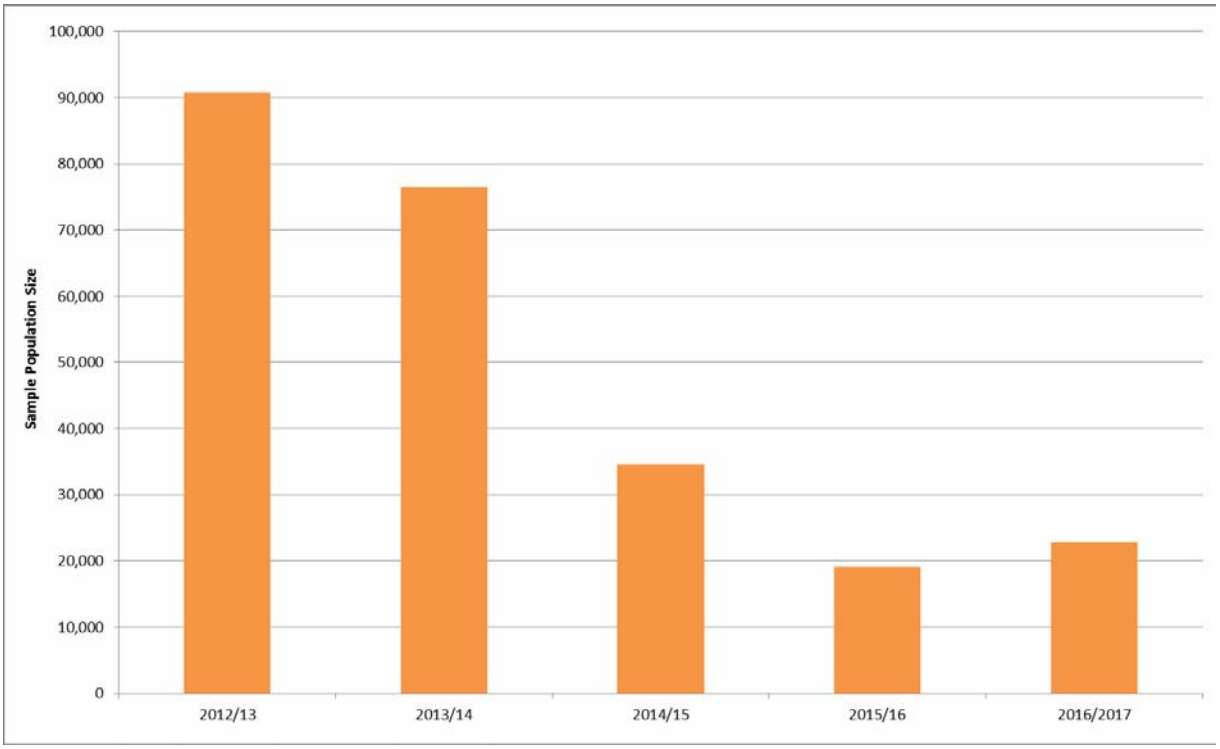
The meter renewal/replacement program is driven by the regulatory requirements in the Gas Distribution System Code and the need to sample test each family of meters at least once in their initial life as per AS/NZS 4944 “Gas meters – In service compliance testing”. To retain a family of meters in the field after their initial life requires the sampled meters to pass stringent accuracy acceptance criterion. The number of years the meter family can be extended is dependent on the sample meter test results as defined in AS/NZS 4944. After this extension period the family is again re tested to determine whether it can be further extended or requires removal from the field in the following calendar year. Multinet Gas"s experience is that most meter families will fail accuracy testing by the time the meter family has been installed approximately 20 years.

From 2008 ESC has determined AS/NZS 4944 “Gas meters – In service compliance testing” will be the sampling procedure used for sample testing. The AER are expected to make a final decision to approve Multinet Gas"s sampling plan in 2011, this decision has been deferred on several occasions.

In calendar year 2012 Multinet Gas has 6 families of meters requiring sample testing, this represents a total population of 68,000 domestic meters subject to Field Life Extension testing.

The below graph shows the quantity of meter families requiring sample testing in the future;

Figure 5-15: Sample Testing Requirements – Small Consumer Meters



When a family fails the acceptance criterion; the family is removed in the next calendar year. These meters are returned to an authorised repairer for refurbishment and re-testing before being returned and installed again. Each meter generally should go through at least one refurbishment process before disposal. „Tincase" meters which are non-repairable are replaced with new meters. Meter families may also be deemed non-repairable due to an excessive number of sample test meters exhibiting leaks or other faults which make the refurbishment process uneconomic compared to purchasing new meters. Where meter families are non-repairable the entire family is replaced by purchasing new meters.

For meter families that are deemed repairable, generally up to 90% of the meters removed from the field are able to be refurbished with the remaining 10% being purchased as new.

Regulators:

All installed small consumer regulators (approx 640,000) are of industry standard „lever type" or „direct acting" construction. They are categorised into three distinct groups that align with the applied supply pressure (i.e. Low, Medium or High Pressure).

Small Consumer Regulator performance requires:

- The regulator assembly to pass a required flow rate of natural gas whilst maintaining a set regulator outlet pressure
- The regulator must prevent fitting line over-pressurisation through a „lock-up" mechanism
- The regulator must achieve full capacity relief during slow operation or failure of the „lock-up" mechanism (Medium/High Pressure networks only)
- The Regulator Assembly (encompassing pipes, fittings and regulator) does not leak and that the regulator relief mechanism correctly re-seats after an incidence of full capacity relief

Where sites are found to be non-compliant against one or more of these conditions, the appropriate contractor shall rectify substandard infrastructure.

The condition for the majority of small consumer regulators across the Multinet Gas Distribution System is considered to be good. Regulators in poor condition requiring maintenance or replacement constitute approximately 0.5% of small consumer regulators in the distribution network each year. Information pertaining to the age and type of small regulators in the field was not recorded until 2003. This does not create a risk to the business since the extensive operational history of small consumer regulators indicates that field life is more dependent on location and design than age.

Regulators exposed to the elements and those connected off wrought/cast iron Mains have a higher risk of failure due to corrosion damage or particle contamination from disintegrating Mains. An established fault database continuously monitors the model types that fail and areas in which regulators are failing. A regulator family is not considered as a safety concern until an unexpected or premature mode of failure is identified through reactive maintenance or asset replacement.

5.7.2 Coverage and Objective

Applies to all Small Consumer Installations which are located throughout the Multinet Gas distribution system with a capacity up to and including 10 m^3/hr.

Objective:

To achieve a high level of asset performance, reliability and personnel/public safety, through inspection and reactive maintenance as well as asset replacement.

To retain meter families in the field until such time sample testing indicates that the Regulatory test criteria is exceeded and the meters have to be removed and replaced with either a new or repaired meter.

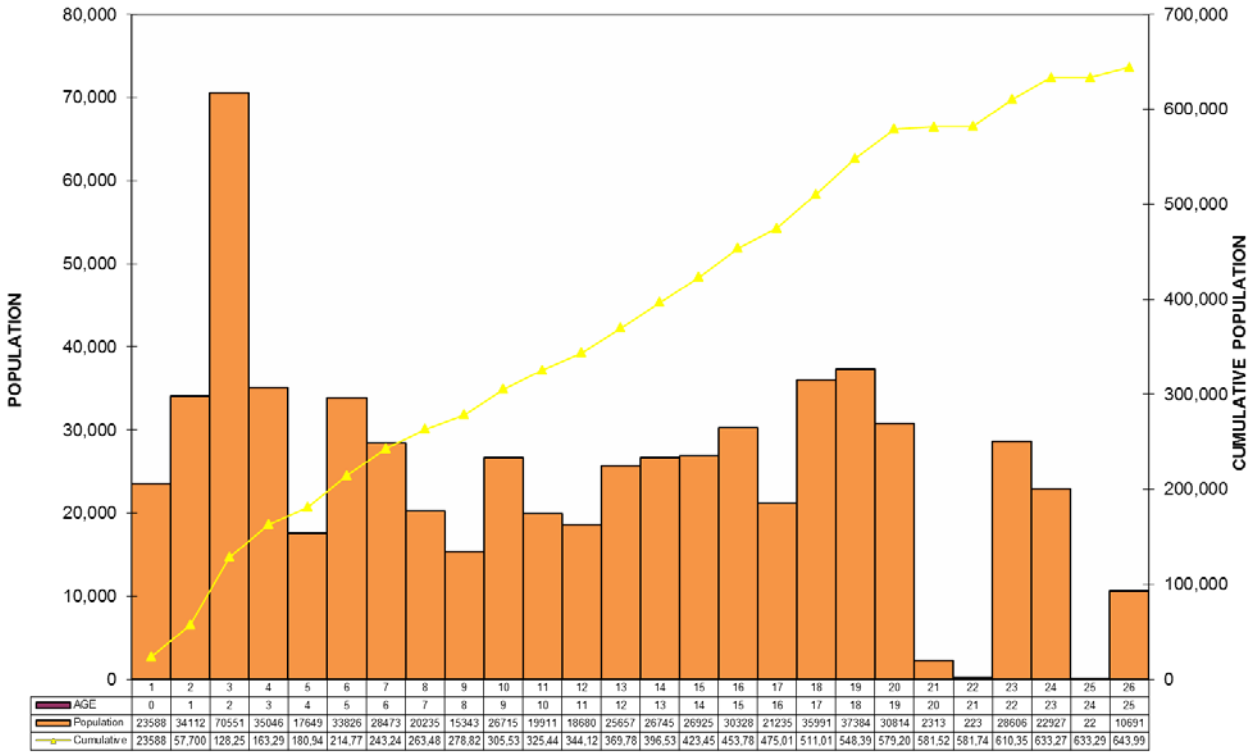
The performance objective is to maintain all meters within the limits prescribed in the Gas Distribution System Code. An additional performance objective is to provide three months notice to the Regulator prior to extending the life of a meter family for a further ongoing in-service compliance period or removing the family (common model and test year) in the following calendar year.

5.7.3 Asset Age Profile

Both new meter families and previously refurbished meter families typically exhibit an age to replacement of between 15 years and 22 years. Twenty percent of the total population of small consumer meters have been installed between 15 and 23 years ago and are a mixture of aluminium alloy and „Tincase" construction. Some of the meter families have gone through one or two meter repairs in the past giving an asset life of between 35 and 40 years.

The chart below illustrates the age of meters families since last installation with respect to population size. A meter family that was installed new 30 years ago and refurbished at 15 years would show on this chart as being 15 years old.

Figure 5-16: Small Consumer Meter Age (from Install Date)



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
AGE	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Population	23588	34112	70551	35046	17649	33826	28473	20235	15343	26715	19911	18680	25657	26745	26925	30328	21235	35991	37384	30814	2313	223	28606	22927	22	10691
Cumulative	23588	57,700	128,25	163,29	180,94	214,77	243,24	263,48	278,82	305,53	325,44	344,12	369,78	396,53	423,45	453,78	475,01	511,01	548,39	579,20	581,52	581,74	610,35	633,27	633,29	643,99

5.7.4 Key Issues

Meters:

The number of new domestic meters purchased each year as a result of meter families failing the accuracy criteria, is dependent on the initial field life, the test criteria specified in the Distribution System Code and the number of meters that can be repaired when a meter family fails the test criteria. Any variation to the test criteria or initial field life will affect the number of new meters to be purchased each year. All forecast meter replacement numbers have been based on the current test criteria of testing meters at 100% and 20% flow rate, leakage test, dial registration test and past like family history of failure. Other sources of demand for new meter purchases include new connections and replacement of individual defective meters.

The number of meter families failing sample testing is expected to remain relatively constant for the forecast period. At the 100% capacity test criteria, meters are expected to last approximately 20 years on average before removal from the field. The business expectation assumes current meter families in the field life extension program will undergo repair twice, prior to disposal. Historical 10-year repair cycles have reduced the average total field life expected for these meter families to 35-40 years. The replacement of domestic meters is currently driven by Regulatory Code requirements. From 2008 replacement strategies have been subject to Australian Standard AS4944 requirements adopted by the Australian Energy Regulator. The changes involve type approval of all new meters models by the National Standards Commission and initial sample testing within 3 - 5 years of initial installation as well as testing at 20% flow rate, leak testing and dial registration testing of each meter. Existing meter models remain with a deemed initial life of 15 years.

In 2011 an additional 4 meter families were sample tested to assess and verify if they are suitable for an in-service compliance period in the field of 15 years. The L&G 750 and the EDMI U8 meter families both passed and satisfied criteria to be able to be left in-service for 15 years in the field, while 2 U6 meter families installed in 2000 and 2004 failed testing due to there being a common leaking problem. The Supplier has since admitted to there being a

design fault with these families. These 2 U6 meter families make up a total of 8,353 meters needed to be replaced. In addition to these 2 families, Multinet Gas have another 3 U6 meter families installed in 2005, 2006 and 2007 in the field making up a total of 11,852 meters. At present U6 meters are replaced for reasons due to “Leaking” on an ad-hoc basis via customer complaints. Due to the nature of this fault and safety aspects, it is suggested that all U6 meters be removed and replaced as soon as possible.

After carrying out the required sample testing for 2011 there is no plan to extend any meter families, as all 3 meter families that were tested failed to pass. These 3 meter families represent a total of 57,000 meters needed to be removed and replaced in calendar year 2012. With the addition of the 5 U6 meter families to be removed and replaced the number would change up to 77,205.

Tin Case Meters

Although in theory this family of meters is permitted to remain in place however the meters are well in excess of 40 years old, prone to leaks, have imperial indexes causing meter reading issues and are generally in poor physical condition.

There are approximately 5000 'Tincase' meters still to be removed. The 5000 'Tincase' meters are made up of a 1987 and a 1988 meter family and are due to be sample tested in 2012 and 2013 respectively. A decision will be made pending the result of the sample testing.

Figure 5-17: Tin Case Meter

Purchase of new 10 cubic metre meters

In recent years the number of domestic premises requiring a larger than standard meter has increased in line with changes in peak appliance load (instantaneous hot water services) and increasing affluence (pool and spa water heaters) in some suburbs. Until now there was an ample supply of MR8 meters coming out of the meter replacement program which were able to be economically upgraded to supply these higher loads. The available number of MR8 meters will reduce and tail off completely in the latter years of the forecast period. This means that new larger capacity meters must be purchased in lieu of repaired MR8s, increasing annual meter capital costs. New 10 cubic metre meters are approximately three times the cost of a standard 6 m^3/hr meter.

Regulators:

Approximately 60,000 Small Consumer Installations are supplied by Medium Pressure (MP) networks that experience above 65 kPa for significant periods of time. Of these, 40,000 (approx) contain regulators that are incapable of maintaining less than 7 kPa outlet pressure under full relief conditions in accordance with AS5601.

It is considered that a minimal risk of fitting line over-pressurisation exists, and the on-going opportunistic replacement program has been sufficient to manage this risk.

The purchase of new regulators is heavily controlled and 100% testing by the manufacturer is enforced in accordance with Multinet Gas purchase specifications to ensure accurate and safe operation over the long term.

Gas escapes at small meter installations is the most common point of publicly reported leak. There are many causes of the leaks; however leaking of the domestic regulator is one of the prime issues. An investigation has been conducted and most of the causes of domestic regulator leaks have been identified. A mitigation strategy is being developed to prevent the likelihood of this occurring in the future. Any strategy that involves a design change will take at least 10 years to take full effect, attending a meter escape costs almost as much as a regulator replacement, thus a time dependant solution is a priority.

5.7.5 Maintenance

Meters:

Domestic diaphragm meters are virtually maintenance free over their initial regulated field life. All meters purchased locally or from overseas are currently 100% acceptance tested in Australia before receipt and installation in Multinet Gas"s distribution area. The various meter types used for domestic purposes are further type tested by accelerated life tests using a specially constructed test bed and passing approximately 20 years of average consumption over an 18 month period. The results of these tests show that individual meter remain within the regulated accuracy limits of +3% to –3%, over their initial field life of 15 years.

Regulators:

Structured preventative maintenance plans for small consumer regulators and lead meter bends have not been implemented as they are considered a low risk, for which there is extensive operational history, justifying a reactive maintenance strategy. Few maintenance activities can be implemented and economically justified. Thus small regulator maintenance is reactive and initiation is from consumer call outs for poor supply or escape. Typically the only maintenance performed on the regulator is a filter clean or retightening of fittings, otherwise replacement is implemented.

5.7.6 Renewal/Replacement

Meters:

The life cycle for small, consumer meter families range between 15 to 25 years, with total field life of each meter dependent on environmental factors, usage and initial material construction. Small consumer meters are replaced when a family (year and model type) fails sample testing. Sample testing is performed at least once in the initial life (15 years) for the family of meters and if the family fails the meter population is replaced the following year.

Early replacement due to failure is rare and insignificant in proportion to the quantity of meters purchased each year. Warranties on new meters vary but can be up to seven years, thus reducing the cost of premature failures that were not caused by incorrect installation or third party damage.

Forecast Meter Families - Repairable Summary (Financial year numbers obtained by averaging corresponding calendar year numbers)

Table 5-8: Forecast Meter Families - Repairable Summary (Financial year numbers obtained by averaging corresponding calendar year numbers)

Proposed Removal Year	Population *
2012/13 Total	43,357
2013/14 Total	29,500
2014/15 Total	31,000
2015/16 Total	31,000
2016/17 Total	30,000
2017/18 Total	30,000

Represents the number of meters estimated to be removed from service

Regulators:

Replacement of Small Consumer Regulators occurs reactively under the following criteria:

- When the Regulator cannot pass the required/designed flow-rate whilst maintaining a set outlet pressure
- When the Regulator Lock-up mechanism is tested and fails to operate correctly
- When the Regulator is leaking or a fault is detected with the relief mechanism
- When the Regulator is deemed to be of very poor condition with failure imminent (Including but not limited to corrosion and casing damage)
- During upgrade of Low and Medium pressure networks to High pressure standard

5.8 Supply Regulators

5.8.1 Background

Gas Supply Regulators are located throughout the Multinet Gas distribution system and include District Regulators, Field Regulators and City Gate Regulators.

Supply Regulators are defined as follows:

Table 5-9: Supply Regulator Definition

Supply Regulator Description	Definition
District Regulator	Supplies a gas outlet pressure up to 7 kPa.
Field Regulator	Supplies a gas outlet pressure greater than 7 kPa and is not supplied from a Class 600 Pipeline.
City Gate Regulator	Supplies a gas outlet pressure greater than 7 kPa and is supplied from a Class 600 Pipeline.

Note: Supply Regulator enclosures, including pits, compounds and kiosks are covered by the Equipment Enclosures Strategy with SCADA related components covered by the SCADA and Communications Strategy.

Supply Regulator performance is measured using pressure set point and variance over time against original pressure setting. Regulator Performance is also measured using breakdown maintenance activities by type, frequency and equipment installed.

The regulating devices do not tend to exhibit a useful life span or have end of life failures, rather they become unable to be refurbished or maintained, as spares are no longer available. This is usually 10 to 25 years after the end of regulator manufacture.

Supply Regulators Currently Installed

Table 5-10: Supply Regulator Numbers

Supply Regulator Description	Number In-Service
District Regulator	149
Field Regulator	124
City Gate Regulator	5*
Total	278

* Lilydale Pipeline City Gate not included

5.8.2 Coverage and Objective

All Supply Regulators located throughout the Multinet Gas distribution system including District Regulators, Field Regulators and City Gate Regulators as well as components installed between the upstream and downstream site isolation valves.

Objective

To achieve a high level of performance, reliability and personnel/public safety through inspection, preventive and corrective maintenance, as well as asset replacement.

5.8.3 District Regulators

District Regulators are predominantly located in older areas as some of these were used in conjunction with manufactured gas and gasometers. The condition of District Regulators is predominantly good with ongoing (minor) surface coating issues addressed during scheduled maintenance activities.

5.8.4 Field Regulators

Field Regulators are located relatively evenly across the Multinet Gas distribution area, supplying District Regulators, Industrial/Commercial sites and Domestic consumers. The majority of Field Regulators are in good condition, with a small number requiring surface coating maintenance. Coating maintenance is an ongoing issue as pipework is continually damp during normal operation.

5.8.5 City Gate Regulators and Water Bath Heaters

The City Gate at Dandenong Terminal Station is the most significant supply facility for Multinet Gas. This facility supplies the Inner Ring Main (2800kPa) and the De-licensed (1050kPa) transmission pipelines which feed most of Multinet Gas

The City Gate Regulators at Seville East and Yarra Glen were installed and commissioned in 2005. These sites are above ground with the Seville East regulators housed within a masonry kiosk. The other City Gate, located at Gembrook was commissioned in 1974 and is housed in an above ground kiosk and has a Water Bath Heater. The Water Bath Heater (WBH) is primarily used to heat the gas (prior to pressure regulation) to prevent low equipment operating temperatures and to maintain ideal distribution gas temperature (15°C).

The water bath heater at Gembrook is in excess of 15 years old and has developed a number of performance and safety issues. The replacement of this WBH is occurring during time of writing this document. The Yarra Glen City Gate has experienced regulator freezing issues during winter which have affected the ability to control system pressure. The installation of a heater at this site in is occurring in summer of 2011/12.

The Lang Lang City Gate requires the installation of a heater and this is planned for 2012/13.

5.8.6 Key Issues

Above Ground Supply Regulator Sites

There are a number of existing above ground Supply Regulators sites that currently present a degree of risk (site dependant) to the business, predominately due to the exposed nature of the assets and inherent design, construction, operational and/or locational factors. The principal method of mitigating these risks is to relocate the Supply Regulators below ground; this usually results in complete asset replacement due to physically size constraints when positioning this type of equipment. The identified sites (refer below table) were originally commissioned several decades ago by the former Gas & Fuel Corporation and currently expose the business to risks relating to:

- Proximity to high density housing and/or public areas
- Vehicular impact & vandalism
- Prone to complaints from the public due to poor aesthetics, noise and smell
- Limited supply capacity (some sites unable to achieve projected loads)
- Limited redundancy and/or bypass capabilities

The table shows the highest priority sites and their year of scheduled replacement.

Table 5-11: High Priority Sites

Supply Regulator Site	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Albion St, Glen Iris Paschal	XX					
St , Bentleigh Graham St,		XX				
Sth Melbourne Vickery Rd,			XX			
Bentleigh E				XX		
Wheatley Rd, Bentleigh					XX	
Toorak Rd, Tooronga						XX

5.8.7 Routine Maintenance

Routine maintenance is based on programs including:

- Preventative maintenance based on defined tasks and defined schedules. This information is available for inspection in operating procedures.
- Inspection
- Corrective maintenance – faults and defects
- Refurbishment

5.8.8 Renewal / Replacement

The replacement of Supply Regulators and associated components is primarily driven by:

Availability of serviceable spare parts

As critical replacement parts become unavailable, regulators/components can no longer be maintained to the prescribed scheduled levels and as such must be replaced with suitable units with commercially available spare parts. The basis of regulator family replacement will be on the forecast availability of spares and the current level of Regulator family exposure.

Ability to meet capacity requirements

As gas load/volume changes occur within the distribution network so does the ability of the Supply Regulator to meet capacity requirements. As such, replacement is undertaken when a site"s component(s) rated capacity is forecast to be exceeded and is likely to cause an increased risk in gas supply outage.

Ability to meet operational, safety and regulatory requirements

Supply Regulators installed prior to the formation of the Gas and Fuel Corporation have limited or no regulated by-pass facilities. With the passage of time these sites no longer meet relevant standards and require re-work/replacement in order to meet current operation requirements. The Supply Regulator strategy lists these regulators and their intended replacement date.

5.9 Equipment Enclosures

5.9.1 Background

There are approximately 2,700 Equipment Enclosures located throughout the Multinet Gas distribution system, with the majority of these subject to regular inspection activity.

Equipment Enclosure performance is measured by the enclosure"s ability to:

- Prevent casual, felonious and malicious intrusion to site
- Provide safe access and egress from site
- Provide personnel and equipment safety at site
- Provide public and passer by safety
- Provide suitable asset protection and security

Small and Large Consumer Installation enclosures are the responsibility of the consumer to which gas is being supplied. Multinet Gas together with its contractors provides reports as to enclosure safety and adequacy from the above definition. Where sites are found to be deficient in some manner the enclosure owner/representative is requested to arrange for rectification of the enclosure, at the owner"s expense.

Major equipment enclosures have their performance measured using the same definition with most sites performing well over many years.

The current condition of enclosures across the Multinet Gas Distribution System is predominately good. Enclosures and components recently refurbished or replaced are in excellent condition with some of the older enclosures/components in various state of repair. Enclosures/components in sub-standard condition are generally replaced or repaired due to items creating public or employee safety concerns and/or having reached or exceeded their design life.

5.9.2 Coverage and Objective

Applies to Equipment Enclosures located throughout the Multinet Gas distribution system and includes, but is not limited to: masonry buildings and pits, chain-wire fences, steel kiosks and „Gatic" type covers.

Note: Equipment Enclosures for meter/regulator units supplying industrial and commercial consumers are the responsibility of the supplied consumer and as such are not considered as part of the Equipment Enclosures Strategy.

Objective:

To achieve a high level of performance, reliability and personnel/public safety through inspection, preventive and corrective maintenance, as well as asset replacement.

5.9.3 Key Issues

The Multinet Gas Critical Infrastructure Plan is currently in draft format. When finalised, this document will provide a framework for the management of Multinet Gas assets with respect to calculated security risks. The outcomes of this document may necessitate significant enclosure upgrading at particular sites.

5.9.4 Expenditure

The majority of capital expenditure for Equipment Enclosures is driven through the Supply Regulator strategy.

Operational expenditure is captured within the following strategies: Supply Regulators, Corrosion Protection, SCADA and Communications.

5.9.5 Routine Maintenance

Facilities are monitored and maintained to ensure that they are in a safe state of repair. Maintenance processes are in place to ensure assets are properly maintained through:

- Inspection
- Preventive Maintenance
- Corrective Maintenance – Faults and Defects
- Refurbishment
- Vegetation Management

5.9.6 Renewal / Replacement

Replacement of chain wire and paling fences occurs under the following criteria:

- When the fence fails to adequately prevent felonious and malicious intrusion to site
- When dangerous to the public, employees or contractors
- When unsightly

CPS cabinets are replaced on an as required basis. This is determined on a site-by-site basis as local conditions contribute greatly to cabinet condition.

5.10 Corrosion Protection

5.10.1 Background

All Multinet Gas Transmission, High and some Medium Pressure steel pipelines are cathodically protected (Approx 35% of entire network).

The majority of the metallic pipework within the Multinet Gas network area is subject to stray current corrosion from the D.C. railway / tramway traction systems, making an effective protection system and monitoring program essential to maintain its integrity.

The former Gas and Fuel Corporation of Victoria implemented a cathodic protection (CP) system on their licensed Transmission Pressure pipelines in the 1960"s. This successful method was then extended to the High Pressure system during the 1970"s and then in the 1990"s onto the Medium Pressure, extensive work was carried out to electrically isolate the cast iron, wrought iron and other uncoated pipework from the various distribution systems. The CP method applied utilizes impressed current cathodic protection (ICCP) and sacrificial galvanic anodes (GA), this method increases the negative potential on a steel structure to mitigate corrosion occurring.

The Gas and Fuel Corporation of Victoria had a specialist Corrosion Mitigation Group with responsibility for the design, installation, monitoring and maintenance of the cathodic protection systems and stray current drainage bonds. The pipeline operating divisions of the GFCV generally followed recommendations made by the Corrosion Mitigation Group. This group (later known as Corrosion Protection Services Group) in effect continued to provide these services throughout the organisational changes that took place until 2000 when corrosion mitigation responsibilities were handed over to a different contractor and in 2006 integrated into Multinet Gas. The same level of service has been maintained under these changes.

Independent investigation by safety and risk management consultants Worley Ltd. has shown that the corrosion protection system being employed across the network is both effective and reasonable. The system takes into account the differing soil and interference conditions and coating styles. The inspection and monitoring of the system has a proven record of being timely and reliable. Multinet Gas has a well-recorded history of system performance including any minor deficiencies encountered and remedial action taken.

The drought period in Melbourne for almost 10 years has dried the ground significantly at depths between 0.5m-3m. This has increased the resistivity of the ground across the Multinet Gas network. Increased resistance requires higher output of ICCP equipment to maintain protection. This has contributed to the increasing rates of anode bed depletion and CPU failures. The recent rainfall over the last year has had an incremental effect of improving soil resistivity.

5.10.2 Coverage and Objective

Applies to the Corrosion Protection assets and services as applied to the Transmission, High Pressure, Medium Pressure and Low Pressure systems located throughout the Multinet Gas distribution system and includes, but is not limited to: Corrosion Protection Units, Test Points, Anodes, & Ancillary Equipment.

Objective

To achieve a high level of performance, reliability and personnel/public safety, through inspection, preventive and corrective maintenance, as well as asset replacement.

5.10.3 Key Issues

Issues that have arisen during the preparation of this document are:

Age of some equipment dates back to late 1960s. Resulting in below the required potential target levels for mitigation against corrosion. This is caused by equipment failure or capability and anode bed expiry.

Expansion of facilities and services to cover new pipelines and to slowly augment the protection system. A total of 20 new CPU"s is planned over the next five years. See the Corrosion Protection strategy for further details.

Stray current electrolysis. The traction industry (trains & trams) have introduced carriages with regenerative braking capabilities. These vehicles generate electrical power under braking have changed the characteristics of stray current control and drainage within eastern Melbourne and have been picked up on potential survey data logging charts.

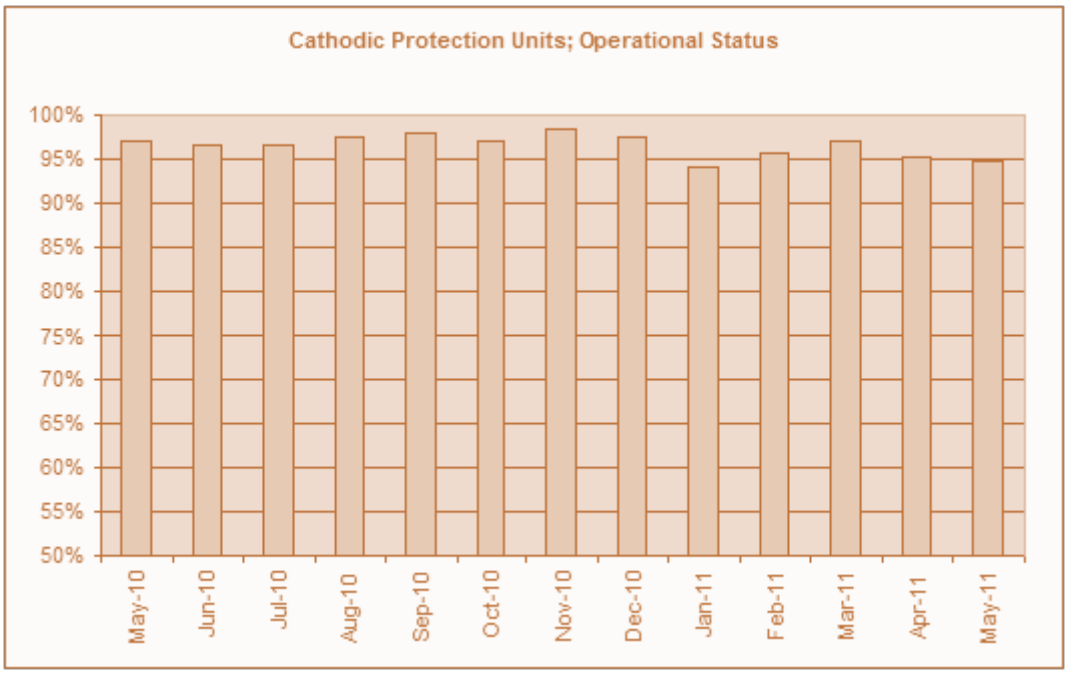
Surge protection of mains at regulator pits needs to be reviewed for ability to comply with required standards in relation to safe operation for operating personnel and the public.

5.10.4 Routine Maintenance

CP installations are monitored and maintained to ensure that they are operating efficiently and are in a safe state of repair. Operation and maintenance processes, including documented procedures, are in place to ensure these stations are properly maintained. The technical standards applied to the ongoing monitoring and maintenance of these installations is designed to ensure reliability and reduce identified risks by:

- Inspection / Corrective Maintenance (Planned)
- Reactive Maintenance (Unplanned)
- Preventative Maintenance

Figure 5-18: Cathodic Protection Units; Performance



During routine maintenance faults are detected. Faults can arise from third party damage, fuse failures and other causes. When a CPU has failed it will be detected on the monthly check. The below graph illustrates the high level of performance throughout 2010.

This graph however is not an ultimate reflection on the percentage of assets protected. Each CPU is protecting different lengths of pipeline. CPU"s are the most frequently inspected equipment in the Multinet Gas asset base (with the exception of daily pipeline patrols). The development of real-time alarm based monitoring is being investigated, see Section 9.2.

5.10.5 Renewal / Replacement

Replacement of corrosion protection equipment will be carried out when corrosion protection monitoring and testing results indicate the stipulated level of protection is no longer able to be provided by the existing installations. This will include items such as Impressed current cathodic protection units, anode beds and miscellaneous other equipment. Unfortunately a means of predicting this is inaccurate. Provision is made in the Corrosion Protection strategy for multiple replacements of each asset type per year.

5.11 SCADA and Communications

5.11.1 Background

As of December 2010 a total of 241 Remote Terminal Units (RTUs) at key Multinet Gas sites are actively and continuously managed by a Supervisory Control and Data Acquisition (SCADA) system. Each RTU directly supervises one or more critical assets across the distribution network including regulators, meters and fringe sites. Real time data gathered from these field RTUs are represented graphically on SCADA clients in the control room where the operators can, at a glance, assess the health of the distribution network.

The use of SCADA greatly reduces the operating cost and risks associated with running a distribution network however, for these efficiencies and mitigations to be continuously realised the RTUs, communications networks and SCADA systems need to be kept in effective working order.

Over time the population of installed RTUs are forecast to increase to provide more detailed coverage of the existing service area. Additionally Multinet Gas"s geographical boundaries are expected to grow with green field projects and / or acquisitions of a similar make-up. Any new service areas shall from the onset be monitored by RTUs or their equivalent (for example South Gippsland Gas Pipeline).

The below table lists salient assets related to the SCADA and Communications system.

Table 5-12: SCADA Asset Summary

Communications Device	Installed Units
RTU	241
Radio Communications	187
GPRS Communications	59
Pressure Transmitters	470
Ambient Temperature Transmitters	15

5.11.2 Key Issues

Site RTU Replacement Aged + Functionality:

The present population of 241 Remote Terminal Units (RTU) are aging and approaching end of life. The oldest of these RTUs are located at Multinet Gas"s most critical regulator sites as they were the first deployed. These RTUs have proven to be mostly reliable with a relatively low number of hardware failures during the installed life time. Some of these RTUs have exhibited less than optimal performance with intermittent or momentary faults which has in part been attributed to the age of the equipment and operating environment.

A project is proposed for 2011 for three years where the oldest and most critical sites RTUs to be upgraded and replaced with a modern new RTU. In particular the radio RTU"s will be upgraded from the D to E series, and the Kingfisher RTU"s upgraded (2013/14-2015/16) to the supported Kingfisher Plus unit. Secondary benefits of the replacement project would allow higher level functional programming tools to be deployed for those regulator stations allowing tighter local and remote control systems. Further projects in subsequent years allow for a gradual replacement of the remaining aging RTUs.

5.11.3 Routine Maintenance

Maintenance of SCADA sites has been out sourced. All RTU and communications equipment is subjected a routine scheduled maintenance program consistent with the classification of that site being bi-annual for critical sites, annual for important sites and every 3 years for non-critical sites. The fundamental components of the maintenance programme include:

- Inspection
- Preventive Maintenance
- Corrective Maintenance - Faults and Defects

- Refurbishment

5.11.4 Renewal/Replacement

Equipment is considered for replacement when it is no longer fit for service. This can be either due to age, that is, maintenance parts no longer available, or that the operating criteria has changed and the equipment will no longer perform at a satisfactory standard.

6 Environment

6.1 Background

Multinet Gas embraces environmental compliance in all activities associated with the operations and maintenance of the gas distribution system

Environment Management System:

Multinet Gas maintains a Certified Environmental Management System (EMS). Through its annual environmental performance index, management system and process audits, Multinet Gas monitor its major contractors for compliance to ISO 14001.

Multinet Gas is covered under the:

- National Greenhouse and Energy Reporting Scheme (NGERS).
- Carbon Pollution Reduction Scheme (subject to legislation enactment)
- Energy Efficiency Opportunities Program

Performance:

The Gas Environmental Performance Index is used as management"s key performance reporting tool for environment management. This weighted index monitors implemented environmental initiatives, programs and performance against the major environmental risk areas.

Regular review of all environmental risks is conducted through an aspects assessment. This ensures that any significant impacts are considered in setting company environmental objectives and programs.

Initiatives and Programs In Place:

A Gas Noise Study was completed in winter 2004 involving 30 regulator sites. Sites which have exceeded allowable limits during peak load days have been modified with noise insulations. Further analysis and measurement was performed in winter 2006 & 2007 as outlined in an Environmental Improvement Plan (EIP) – Gas Noise, which has been developed based on the study results.

Outstanding Issues and Risks:

Multinet Gas retains a liability for the site contamination at South Melbourne depot and the Box Hill regulator sites. An Environmental Improvement Plan (EIP) approved by an EPA accredited auditor is in place for both sites. A number of actions are identified in the plan and are completed on an annual basis for South Melbourne and every two years for Box Hill. Included among these actions is monitoring and analysis of samples taken from the groundwater bores.

Noise Complaints:

There is a risk of increasing numbers of noise complaints from neighbours or notices from the EPA in relation to exceeding SEPP N-1 noise levels. This risk is exacerbated in areas where there is residential building encroachment on existing gas regulator assets such as at the old Highett Gas works site in Nepean Highway and at the old Tooronga or East Hawthorn gas storage site. A watching brief is being maintained on developments at these sites in order to protect Multinet Gas interests.

6.2 Introduction

The environment strategy for Multinet Gas is to manage its assets responsibly through an implemented Environmental Management System (EMS) based on the international standard, namely AS/NZS ISO 14001:2004. Such a system helps ensure that a structured and effective approach to environmental management is achieved.

The continual improvement of an effective EMS enables Multinet Gas to confidently achieve the aims of the Environmental Policy, corporate and commercial goals and regulatory obligations. The EMS covers all of Multinet Gas"s gas distribution operational activities.

Multinet Gas"s environmental strategy is driven by the following goals derived from the Health, Safety and Environmental Policy:

- To be recognised as an environmentally responsible company
- To demonstrate responsible and diligent governance of its operations in the environment in which it operates
- To ensure management and employees work together to limit adverse environmental effect in providing for the efficient, safe, and reliable distribution and supply of energy and energy related services

The Policy is effectively discharged through construction, maintenance and administrative programs that take into account environmental impacts and benefits. These programs can be segregated into those that are carried as part of normal construction and maintenance programs, and those, which are associated with the certification of an ISO 14001 compliant environmental management system, and the minimisation of waste.

This report summarises the environmental management activities, current and planned, and provides cost estimates for those programs which are explicitly „environment-driven".

6.3 Costs

Budget allocations associated with each program are detailed in the respective Asset Strategy.

6.4 Construction and Maintenance Programs

Multinet Gas seeks to mitigate its environmental impact by ensuring that construction and maintenance programs take account of the environmental impact. A range of environmental management programs are reflected through all aspects of the business including construction, operation and maintenance activities. As part of the SWMS/JSA (Safe Work Method Statements / Job Safety Analysis) process, contractors assess tasks or activities and decide on the most appropriate environmental requirement eg. Silt traps, spill kits or erosion control.

6.5 Contractor Management and Auditing

The work that contractors perform to maintain and install the network is regularly audited to ensure appropriate standards are met on routine and project audits. In addition, each major maintenance and construction contractor is visited for an end-to-end audit of their management systems and processes at least annually. Where shortfalls exist, corrective action requests are raised and the close out of these items is monitored through contractor management meetings.

6.6 Gas Leakage and Losses

The principal aim is the minimisation of gas leakage to achieve the targets set by ESV. Gas leakage is identified through annual surveys of high risk areas conducted by Multinet Gas contractors and „public-reported" leaks. These indications are pinpointed and repaired within set time frames by maintenance personnel contracted to perform this work.

The NGERS requires reporting of Greenhouse Gas Emissions on an annual (financial year) basis. A methodology and process for reporting the amount of Greenhouse Gas emissions (both from operational use and gas leakage) is in place for each year.

The benefit of reduced UAFG has been included in the financial evaluation of replacement projects in the past and will continue with the implementation of NGERS and future carbon trading.

Improved asset protection systems (e.g. cathodic protection) and asset management techniques achieved through „modelling" of the various component supply systems also help to minimise leakage from the system. The implementation of mains replacement strategies have further served to reduce leakage.

6.7 Contaminated Sites - South Melbourne and Box Hill

State Environmental Improvement Plans (EIPs) for two gas regulator sites located at Box Hill and South Melbourne (adjacent to old gas works) were developed in 2002 and have been reviewed in 2007. Ground water sampling, testing and monitoring is conducted annually at South Melbourne and every two years at Box Hill by a specialist consultant.

The plans have been endorsed by SKM (an EPA accredited Environmental Auditor). These plans were included in the EMS in 2003. The document provides contractors acting on behalf of Multinet Gas, with guidance on the significant environmental aspects that require management at these nominated sites.

The contaminated land has arisen from coal gas manufacture many decades ago and should not be the cause of adverse impacts if the issue is responsibly managed. The EIP provides general information on land contamination and other environmental risks and guidance on managing these risks.

The document details a specific Action Plan for each site and delegates responsibility to guide on-going management of the key environmental aspects at these sites. The Action Plans require review and audit at least annually.

Groundwater monitoring bores at both sites are sampled and analysed at a NATA certified laboratory. In line with the recommendations of the EIP a watching brief will be maintained.

In 2005 Monarc Environmental Services were engaged to undertake an up-to-date assessment of the environmental liabilities associated with the South Melbourne gas regulator site to determine the contaminated sites the extent of liability associated with the site"s contamination.

The objective of this assessment was to develop a credible and supportable estimate of the environmental liability associated with the South Melbourne Gas Regulator site for use by Multinet Gas.

The report drew on a number of disciplines to develop the environmental liability estimate including legislative and regulatory standards from accounting, property valuation, soil and water chemistry and environmental sectors. The liability has been determined through the adoption of a Most likely Value (MLV approach). This MLV captures the cost of the scenario believed to be the most likely to occur (for example, a stated preferred remedy) using engineering estimates. Hence, off-site disposal to landfill has been adopted as the Most Likely Scenario as providing the most straight forward technical option, the greatest certainty of outcome and the shortest project programme.

This valuation has also drawn on primary investigations undertaken by Monarc Environmental from the consultant"s report prepared in 1997 by CMPS&F Environmental. The environmental liability based on the key parameters and assumptions is $2,540,000. Incorporating ranges for uncertainty of 10% at the lower level and +17% at the upper level, this provides a cost range of $2,286,000 to $2,972,000. This has been incorporated in the Multinet Gas General Ledger has a non-current environmental provision for South Melbourne and further $200k for Box Hill. The values provided by the report in 1997 are out-dated and require review. Since 1997 an assessment by Golders valued the rectification of the South Melbourne depot contamination at $5m.

6.8 Noise Abatement

The Main noise problems are associated with gas regulator stations where gas pressures are reduced and often a high continuous whistling noise is emitted, or where areas are upgraded to High Pressure, a whistling noise can be generated at the meter regulators in residential areas.

If noise levels exceed those set down in the State Environment Protection Policy (SEPP) N-1 (Control of Noise from Commerce, Industry and Trade), and a complaint is received, the „noise generator" is required to reduce the noise level below the limits. Multinet Gas includes noise as one of the determining criteria when selecting sites for new regulator stations, and designs new regulator stations to comply with EPA noise emissions requirements.

In 2004, a study was conducted involving noise testing of 30 field and district gas regulator assets. The results gained have been used as the basis in the development of an Environmental Improvement Plan (EIP)– Gas Noise, which was completed in July 2005. A correlation study was conducted to extrapolate the data gained from the study across the wider population of gas regulator assets. As a result a further 26 sites were tested to provide a broader outlook. Engineering solutions for the identified noisy assets have been implemented, providing a range of potential solutions and possible outcomes given similar situations.

Under the Policy, the „noise generator" is obliged to implement mitigation works if a consumer has reasonable cause for complaint. However, Multinet Gas"s strategy is to manage the process utilising an Environmental Improvement Plan to pro-actively and progressively address the risk. The program over the next five years is based on addressing high noise emission sites first and progressively coordinate noise mitigation works with augmentation projects. A budget provision has been made beyond 2006 to address consumer noise complaints and fund some pro-active works although this may not be fully utilised.

6.9 Land Slippage

Land stability can be an issue when constructing new gas pipelines. Before any new construction projects commence, consultation with local councils is undertaken to identify zoned areas of landslide risk. Further site assessments are conducted by experts, to establish „best-practice" in maintaining land stability. An EMP for the Multinet Gas Pipelines was rolled out to the Operations Team early in 2008. The EMP included the requirements to review land slippage and training to ensure relevant employees were clear on their responsibilities. The training was facilitated by Monarc Environmental and identified the areas that are prone to land slippage. Patrols are carried out over the pipeline in areas that maybe subject to land slippage regularly.

6.10 Soil Erosion / Siltation

Wherever possible backfill materials are stored away from gutters and drains and stockpiled on the nature strip rather than the side of the road. Control devices are put in place to capture sediment run off with care taken to thoroughly reinstate excavated areas to minimise any subsequent soil erosion. Soil erosion and siltation can be a serious problem if spoil is allowed to wash into any stormwater drains or waterways. This practice is an offence under the Clean Waters Act and could result in heavy penalties under the Environmental Offences and Penalties Act.

6.11 Concrete Saw Cutting

Concrete saw cutting creates silt that can contaminate natural waterways. Where extensive cutting is performed proper catching devices may need to be used. Consideration must also be given to noise levels from concrete cutting operations.

Run off from cutting operations are managed so as not to run directly into storm water drains though applying sediment-trapping devices or by removing sediment out of drains and disposing with other spoil material.

6.12 Vegetation Management

Trees and shrubs may be adversely affected by natural gas leaking from underground Mains. Damage to flora is similar to that caused by water-logging and poor aeration. Natural gas causes low oxygen levels in the soil and the root systems of affected trees are subjected to asphyxiation as if waterlogged or starved of oxygen. Awareness of these issues assists in detection and helps to reduce long term impact. The use of boring techniques from tree drip line to drip line helps avoid damage to tree toots particularly in sensitive areas.

The Multinet Gas licensed pipeline easements are patrolled in accordance with AS2885. Where the pipeline is not licensed, leaks are reported through notification from the public/customers. A majority of easements are licensed and are subsequently patrolled.

All pressure regulating facilities (supply and large connection regulators) are frequented at least once per year or every three years. During each maintenance activity monitoring of the surrounding vegetation is a required task. This is one of the bushfire mitigation tasks performed at above ground facilities.

6.13 Disposal and Treatment Of Siphon Water

Water sometimes penetrates into the Low Pressure reticulation gas system. Water in gas Mains absorbs odorant from the gas stream and pipes and may gather in sufficient quantities to interrupt gas flow to consumers. It is removed at various points in the system by periodic syphoning.

Polluted siphon water is managed with care to ensure that any impact to the existing environment is minimised. Water pollution occurs by placing any matter into waters or drains, so that the condition of the water changes adversely.

Small amounts of siphon water may be dispersed onto porous ground if immediately mixed with a 3% hydrogen peroxide solution. Larger quantities of siphon water is transferred into a vehicle with a tank and treated immediately with a hydrogen peroxide solution. It is later disposed of via the sewer system covered under an approved trade waste agreement. Treatment ensures that the pH value of the wastewater is between 6.0 and 10.0, ensuring compliance with sewerage system regulations.

6.14 Waterways

The community regards the condition of our rivers and creeks as an important indicator of environmental health. As a responsible service provider Multinet Gas, aims to ensure any construction occurring near or around waterways is conducted with the utmost care. Rivers and creeks improve the quality of our urban and rural environments, often containing significant vegetation, provide important habitat for native animals and are valued as recreational assets.

The SWMS are always conducted prior to the commencement of any project to identify any potential issues. Where necessary work is completed with the water authorities" consultation to ensure potential environmental incidents are appropriately mitigated.

6.15 Disposal and Treatment Of Mains Dust

All Mains dust is collected in the course of field activities and returned in appropriate containers for treatment and disposal. Mains dust can come from a variety of sources, one of which is the internal corrosion of Mains due to poor cleaning during construction. Internal corrosion occurs if pipe is exposed to the atmosphere for long periods before being installed or if unprotected pipework is not commissioned immediately with natural or inert gas after construction.

6.16 Waste Management

Waste reduction strategies have been implemented based on a waste management hierarchy which utilises the following waste management methods; waste avoidance and reduction, waste reuse or recycling, waste treatment by physical, chemical or biological means and waste disposal. In late 2008 a waste audit of many of its facilities and depots to identify further improvements and initiatives to be implemented to reduce waste emissions.

6.17 Mains Cleaning Operations and Insertion Of Services

Foreign particles are restricted from becoming airborne when „Mains Cleaning and Service Insertion Operations" are conducted. Air operated pipe cleaners are used to remove scale from the internal wall of steel service pipes into which PE pipe is to be inserted. As much as possible the particles are collected into plastic bags and disposed in accordance with standard procedures.

6.18 Purging

All purging is carried out in accordance with Engineering Standard EG-DD-4090 and the Standard Procedures Manual. The standard helps ensure that proper planning takes place prior to the function and that the area around the purge is safe. As gas pipes are repaired, renewed or altered, gas is released to the atmosphere. Where possible, gas is flared and converted to predominantly carbon dioxide and water. If not flared, it is released into the atmosphere as methane. Methane and carbon dioxide are known as greenhouse gases, but with different atmospheric lifetime and greenhouse impacts.

6.19 Asbestos Waste

Appropriate protective clothing is used while working with asbestos or material containing asbestos. Asbestos or materials containing asbestos can be found in meter boxes (owned by consumers), asbestos cement gas Mains, within the protective coating of some coal tar enamelled steel pipes.

Asbestos must only be disposed of at a site licensed by EPA to accept waste asbestos. The EPA has a list of approved licensed premises to accept asbestos waste. Multinet Gas ensures that asbestos waste is securely double wrapped/bagged in plastic and labelled before transporting from a site.

All known asbestos Mains have been removed from service.

In circumstances where the asbestos removal is minimal, the necessary work is performed as per Multinet Gas and Australian standards. For all other asbestos removals a licensed contractor is used.

6.20 Dangerous Goods and Hazardous Materials

Where practicable and economic, the least hazardous substance is purchased where alternatives exist. Transport, storage, use and disposal of dangerous goods are done in accordance with health and safety guidelines,

manufacturer"s instructions, and state and local authority regulations. Registers on all hazardous materials that are used for normal operations are maintained at all times.

6.21 Cultural Heritage

Aboriginal cultural heritage is acknowledged and planning advice is sought when conducting work in these particularly sensitive regions. Archaeological surveys are conducted to identify any areas of heritage significance prior to the commencement of significant excavation activities.

6.22 Significant Environmental Aspects on South Gippsland Pipeline

Significant environmental aspects identified during the construction of the South Gippsland Gas Pipeline include significant and endangered fauna and vegetation including the giant earthworm, Strzeleckie and Bog Gums require ongoing management.

6.23 Environmental Management Plans for Existing Multinet Gas Pipelines

The revised Pipeline Act 2005 and Pipelines Regulations 2007 require approved Operational Environmental Management Plans (OEMPs) for all existing licensed gas transmission facilities. Development of such Plans entails flora, fauna and environmental site surveys as well as a review of environmental overlays for existing pipeline easements. Once approved, environmental aspects require ongoing management of possible risks, EPBC issues and reporting using pipeline overlays incorporating significant environmental aspects and features. „Net gain" requirements may also apply if easements are maintained and kept clear of regrowth of classified species.

6.24 Environmental Management System Programs

Multinet Gas"s environmental Management System (EMS) is certified to ISO 14001. An effective Environmental Management System is a critical tool in ensuring that the work performed for Multinet Gas can comply with legal requirements and liabilities, community expectations and its own commercial considerations. Critical activities affecting the EMS are discussed below.

6.24.1 Environmental Programs

An ISO 14001 compliant EMS has inherent within its processes the notion of continuous improvement. Therefore a number of programs dedicated to reducing environmental impacts, beyond those already listed above, will be developed. Such programs are likely to include:

- Waste Management focussing on improving the efficiency of energy consumption within major buildings
- Fleet Management with an emphasis on reduction in emissions
- Expansion of the office paper and other waste collection and recycling
- Asbestos management
- Maintenance and review of Trade Waste Agreements
- Monitoring/auditing of contractors" environmental practices
- Environmental Internal Audit Program
- Environmental Awareness Training

- NGERS reporting

6.24.2 List of Environmental Issues

- Gas losses to atmosphere, through leakage and venting or purging
- Management of contractors – compliance to standards, legislation and regulations
- Vegetation management and destruction – damage to flora and fauna
- Release of gas odorant to the environment
- Noise pollution
- Environmental incidents and spills
- Contaminated sites, South Melbourne and Box Hill
- Decommissioned cathodic protection anode beds
- Siltation – discharge of excavated material into storm-water drains and waterways
- Disposal of Mains dust
- Disposal of siphon water
- Disposal of waste materials
- Storage and disposal of excavated soils
- Soil erosion of cover over underground assets
- Cultural Heritage
- Land Slippage
- Excavation in Acid Sulphate Soil areas
- Endangered fauna
- Significant vegetation

6.25 Summary

The key Environmental Strategy of Multinet Gas is to maintain a superior standard of environmental management though continuous improvement of Multinet Gas"s ISO 14001 compliant Environmental Management System. Such a system will ensure that the many activities and programs undertaken to minimise its environmental impact are documented and controlled. Many of these activities are part of normal operating construction and maintenance processes and an effective EMS will ensure that Multinet Gas can demonstrate that it effectively discharges its environmental responsibilities and duty of care.

7 Safety

7.1 Safety Case

Multinet Gas has a duty of care to provide a safe environment for the community, contractors and employees. Multinet Gas exercises its responsibility by fully integrating gas safety into the management of other aspects of its business. For example, the same processes, that are used to manage the commercial aspects of contracted work, are also used to manage the safety aspects of that work. Multinet Gas is able to ensure that the accomplishment of gas safety and workplace occupational health and safety is part of normal daily work practices rather than a separate effort, which may compete with other commercial requirements.

Multinet Gas"s Safety Case has been prepared to support its operation and provide compliance with the Gas Safety Act, 1997.

The Safety Case represents Multinet Gas"s assurance to the community of its commitment, concern and attention to issues of safety. It also demonstrates Multinet Gas"s ability to self-manage safety and comply with regulatory requirements.

Multinet Gas"s Safety Case is a dynamic or "living" set of documents, procedures and systems, which changes as the business changes. This ensures our approach to safety is always up to date, meets regulatory requirements and is continually improving for everyone"s benefit.

These changes have included organisational and contractual arrangements as well as the extension of the Multinet Gas network in 2005 to incorporate Yarra Ranges townships and new supply to the South Gippsland towns in 2007/8. Ongoing growth of these distribution networks is expected to continue over the coming years. The Multinet Gas Safety Case has been updated with appended sections covering these new gas networks.

The Safety Case comprises four distinct sections, each with a specific purpose:

- Facility Description
- Formal Safety Assessment
- Quantitative Risk Assessment
- Safety Management System

The Safety Case is a major component of the Asset Management Plan dealing specifically with the safety of the gas grid for employees, contractors, end users the public at large. Where relevant in this plan, reference is made to the Safety Case as the controlling system for safety rather than repeat sections of the Safety Case.

7.2 Safety Management System Elements

Multinet Gas"s Safety Management System forms the cornerstone of the company"s Safety Case. The Safety Management System is an integral part of the management system encompassing existing procedures and processes which when combined with a number of new processes form the 17 element Safety Management System.

The Safety Management System is the means of managing "safety critical" activities, associated with the distribution of gas. Gas "safety critical" activities are those, which impact on the safety of the public and the safe distribution of gas.

Multinet Gas"s Safety Management System consists of 17 individual elements, each element focussing on an area critical to the good management of safety within the company:

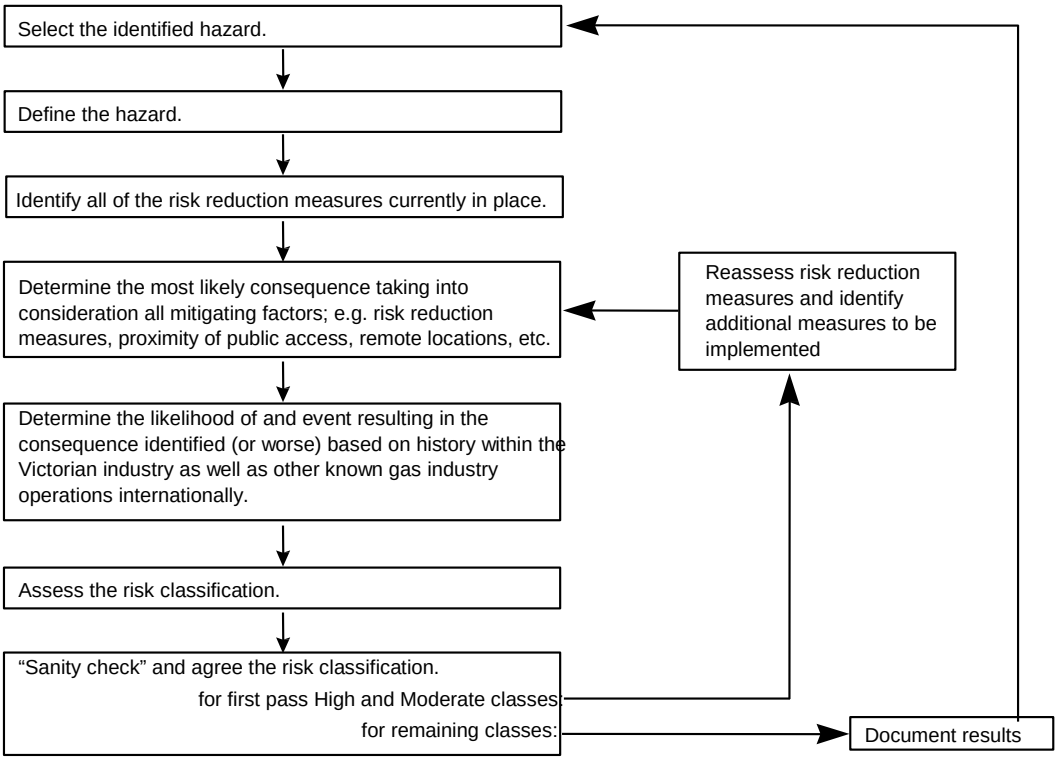
- Policy and Planning
- Organization and Responsibilities
- Document Control
- Risk Management
- Key Performance Indicators (KPIs)
- Selection, Training and Competence
- Supervision and Motivation
- Change Management
- Management of Contractors
- Design, Construction, and Operations
- Network Control Systems
- Machinery, Equipment and Materials
- Safe Work Practices
- Emergency Preparedness and Communications Systems
- Incident Reporting, Investigation and Review
- Internal Monitoring, Audit and Review
- Maintenance of Safety Case

7.3 Process Improvement Arising from the Safety Case

In order to ensure that the risk associated with the operation of its gas distribution network is effectively managed, Multinet Gas conducts regular hazard identification and risk assessment workshops involving its key personnel and contractor representatives.

This Formal Safety Assessment is a qualitative assessment of risk, involving the identification of hazards and use of a formal process to rank them.

Figure 7-1: Risk Assessment Process



In the case of Multinet Gas, a decision was made to assess the residual risk or the level of risk present after all current risk reduction measures had been implemented. This involved:

Systematic identification of all hazards having the potential to cause a gas incident using an "all risks" approach; and Determination of the consequence and likelihood of a gas incident as a result of the hazard with due regard to measures already in place to mitigate risk.

The outcomes of this process are used to target areas of identified significant risk in the scheduling of audits and the allocation of resources in capital works programmes and maintenance activities.

8 Risk Management

8.1 Introduction

Multinet Gas recognises risk management as an integral part of its business operation and strategic planning and has therefore created an independent Risk Management Policy and Framework. Risk management, including risk evaluation, treatment and documentation, is undertaken in a systematic manner in conformance with AS/NZS 31000. All risk management activity within the Company is governed by the methodologies outlined in the MNG Risk Management Framework, which was updated in February 2009.

Multinet Gas has a low tolerance to risk exposure due to the nature of the service it provides, the safety aspects of conveying gas and the requirements of the Multinet Gas Safety Case.

Multinet Gas has an ongoing process for systematic identification, analysis, assessment, treatment, monitoring and communication of all credible risks associated with conveyance of gas across the distribution network as well as regulatory compliance risks and construction and maintenance risks. The Risk Management Committee meets regularly and is represented by personnel from all levels of the operation of the Multinet Gas asset and functions.

Risks have been identified and are set out in risk registers. From the risk registers, risk mitigation actions are planned as capital development, maintenance/operational enhancement, contingency planning or hold and review.

Since external events may impact on extended areas of the network, conveyance risk management also extends to consideration of catastrophic risk events (earthquake, landslide, volcanic action, floods, fire or malicious damage) and APA GasNet Australia"s gas transmission supply risks.

Investment based solutions to conveyance and other risks are not the only alternative considered. Non-asset based factors such as speed of response to incidents and communication with consumers may be preferable to expensive capital solutions.

Risks are assessed in-group workshops using risk criteria tables (detailed later in this section). Risk Action Plans are developed by the nominated risk owner (usually the senior manager responsible) to plan, monitor and report on the implementation of identified treatment actions.

The Board of Directors is ultimately responsible for risk at Multinet Gas and discharges its responsibility through the Audit and Risk Committee and Multinet Gas Management and by monitoring the operational, regulatory and financial aspects of the Company"s activities.

Whilst responsible for Multinet Gas risks remains with Multinet Gas, risks have been split in to two groups, being Strategic and Operational Risks.

The governance structure is shown diagrammatically;

Figure 8-1: Governance Structure

Risk assessments are also carried out when there are significant changes to processes, equipment or materials, as a part of change management. All significant projects also undergo a risk assessment phase. Risk management concepts influence all decision-making processes within Multinet Gas including contractor management. Field based activities completed by contractors are monitored through targeted, risk-based audits.

The concept of risk greatly influences the development of Multinet Gas"s Asset Management strategies.

The process of risk identification and assessment is detailed in the Risk Management Policy and Framework.

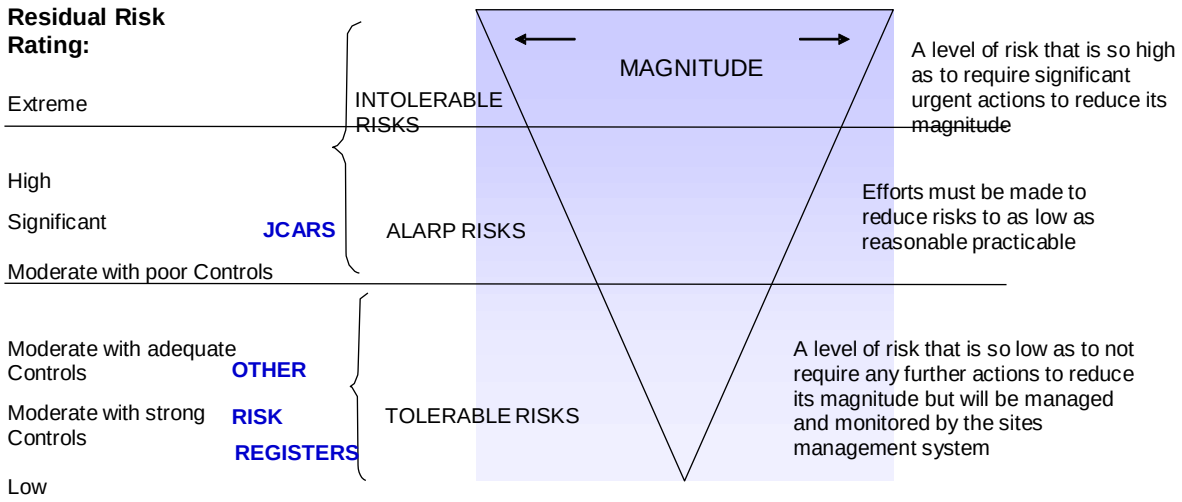
The next three sections cover:

- Strategic risks
- Operational risks
- Catastrophic risks
- Risk Framework

This section only commentates on the risks identified as significant or greater. The following chart describes the philosophy behind this approach.

The intent is to reduce risks down to the threshold levels of what is considered As Low As Reasonably Practicable (ALARP).

Figure 8-2: The ALARP Triangle



8.2 Strategic Risks

The following have been identified as significant strategic risks facing Multinet Gas:

Table 8-1: Strategic Risks

In period revenue:	• Tariff Optimisation • Billing & revenue collection – credit risk • Billing and Revenue collection – billing systems • Upstream supply loss
Cost Blow Out	• Regulatory Changes (etc. Safety Regulations) - Technical • Large Scale Project Management Capabilities • Rising wholesale gas prices • Completeness of communication and correspondence with the AER • Increase in prevalence of inset networks • Declining throughput from competing fuels / regulation
Customer Service / Stakeholder Management	• Network Reliability • Changing role of EWOV • Stakeholder management / Customer Service / Complaints
Physical or Legal incapacity / liability affecting Reputation	• Occupational Health, Safety and Environment • Public Safety • Climate Change • Industry interfaces (Commercial) • Major technical failure of network • IT System Failure • Loss of Upstream Supply
Corporate Image / Market Perception	• Tax and accounting issues • Poor forecasting – Revenue • Poor forecasting – Capex • Carbon Pollution Reduction Scheme mandatory

These risks have been evaluated and responsibility for managing these risks has been assigned to key personnel. Action plans have been developed to mitigate the risks.

The action plans and responsibilities can be viewed via the Risk Management Committee.

8.2.1 Templestowe Line Valve

The Templestowe Line Valve is a normally shut valve on the inner ring main at the boundary between Multinet Gas and Envestra. Its operation is governed by a contractual agreement which expired in February 2009. The risk associated with this valve relates to either a contractual dispute or physical malfunction that prevents operation of the valve when Multinet Gas relies on flow through the inner ring main from Envestra to support the Multinet Gas distribution network. In terms of physical malfunction, the valve can be opened remotely or manually and also has bypass valving and pipework. This means that two or three failure events would be required to prevent physical opening.

In terms of contractual dispute, there is provision within the agreement for dispute resolution if required. In the event that Multinet Gas is legally prevented from opening the valve the impact is generally likely to be limited to a few thousand customers. Construction of the Lilydale pipeline will greatly reduce this risk.

8.3 Operational Risks

Multinet Gas has a Formal Safety Assessment within the Safety Case that is reviewed each year. Each risk is evaluated in accordance with the MNG & UEDH Risk Management Policy. Appropriate risk treatments are then devised and implemented.

The FSA nominates individuals to ensure risk mitigations and controls are implemented acceptably. Monitoring of the controls is assisted by JCARS, KPI"s and managerial reviews.

8.3.1 Reporting of Public Safety Risks

Public Safety Risks are reported to senior management monthly and trends are closely monitored. The Public Safety KPI reports in summarised form incidences of:

- The number of Network Incidents formally reported to Energy Safety Victoria as per Industry Emergency Response definitions
- Physical injury to a member of the public caused during the course of works
- Gas escapes (Level 1 sensitive locations and all Level 2 to 5)
- Gas Outages affecting five or more customers

8.3.2 Climate Change Risks

There is agreement in the scientific community that a level of climate change can now be described as „locked in" or as „unavoidable". This is regardless of even the most aggressive of mitigation and greenhouse reduction proposals. The Climate Change effect will arrive on the back of an Australian environment that already has a rich history of weather related natural disasters. There is a prudential need for Multinet Gas to consider a broad variety of events that climate change influences in its preparedness and asset management.

The Climate Change risks faced by Multinet Gas and the mitigation actions being taken are outlined;

- Drought and ground movement causing widespread fractures on Cast Iron mains
- Change in generation mix
- National Greenhouse and Energy Reporting Scheme (NGERS)
- Carbon Pricing (eg emissions trading scheme (ETS) such as the postponed Carbon Pollution Reduction Scheme (CPRS), a carbon tax or a hybrid scheme)
- Change in long term temperature and rainfall profile

8.3.2.1 Drought and Ground Movement Causing Widespread Fractures on Cast Iron Mains

Multinet Gas"s experience monitoring cast iron fracture rates indicates that variations of double or triple the current rates are possible based on severe drought/weather impacts and poses the highest physical risk to the network from the effects of Climate Change.

Based on failure events in the UK, a fatality would be an expected event on the Multinet Gas system somewhere between 1 in 25 and 1 in 50 years during periods of high fracture rates (3 times the current average). Multinet Gas"s modelling of high fracture areas and targeting of these areas for renewal is progressively reducing the average rate of fracture. Asset renewal from cast iron to polyethylene is the best long-term mitigation to high fracture rate risk.

8.3.2.2 Change in Generation of Electricity Mix

According to the ACIL Tasman Report, the long term retiring of coal fired power generation is likely and may increase the volume of electricity generation from gas fired power plants. The location of these new generation plants is unknown however any large gas fired power generation within Multinet Gas boundaries will pose risks as well as potential benefits.

The risks of large gas fired power plants are associated with commercial agreements with the ability to secure supply and augmentation works. The risks of small gas fired power plants and co-generation facilities that are not large enough to be considered a demand customer may increase demand reinforcement requirements above what is currently predicted (see Demand, section 4).

8.3.2.3 National Greenhouse and Energy Reporting Scheme (NGERS)

NGERS is a Federal Government regulatory program which enforces mandatory reporting of industry GHG emissions. NGERS will also underpin the GHG emissions data requirements of the Federal Government"s Carbon Pollution Reduction Scheme (CPRS) (see next section). The first NGERS reporting period was 2008/09. An emissions and energy inventory which was independently audited by Ernst and Young (EY), to enable Multinet Gas to accurately meet the October 31st deadline for submission of the report each year.

NGERS requires scope 1 (direct release of GHG emissions at a facility) and scope 2 (GHG emissions released external to facility via purchase/use of energy) emissions, energy consumed and energy produced to be reported under the scheme. Under NGERS, networks are considered a single facility for ease of reporting purposes, and the facility GHG emissions threshold for reporting is 25 kilotonnes carbon dioxide equivalent (kt CO2-e). The NGERS corporate GHG emissions threshold is 125 kt CO2-e, above which all facilities are required to be reported on whether these facilities exceed the facility threshold or not.

NGERS has the ability to impose significant financial penalties on organisations, with fines up to $220K for each individual breach and personal director liabilities are possible.

Multinet Gas"s GHG emissions are predominately the leakage of natural gas through the network and regulator venting and are well above the NGERS reporting facility and corporate thresholds. A number of methodologies are proposed by various industry groups that can be used to estimate the amount of leakage in a distribution system and the frequency and volume of regulator venting.

At this stage the NGERS methodologies" published are either focussed on using a portion of Unaccounted for Gas as a benchmark, or other types that respect asset integrity which are not highly developed and can lack the agility to incorporate idiosyncratic gas networks like Multinet Gas. The range of methodologies was assessed including further SWOT analysis by consultants Sinclair Knight Merz (SKM) in early 2009. The recommendation to Multinet Gas was to adopt NGERS method 1 for calculating gas leakage as this retained greatest flexibility to change methodology in response to risks and opportunities associated with the lack of clarity regarding what the AER"s final interpretation on pass through of CPRS costs will be. The review of NGERS methodology options will continue as the implementation of the proposed CPRS occurs.

A developed and customised NGERS reporting tool, which provides appropriate controls to ensure data accuracy and full auditability back to original source documentation to assist with efficient independent third party auditing has been created. This reporting tool enables Multinet Gas"s GHG emissions and energy inventory to be developed efficiently as part of NGERS data collation process and then easily separated into a standalone inventory at the end of the process.

The qualitative risks are the penalties for not reporting GHG emissions, increase in overhead costs due to reporting and regulatory workload and sub-optimal pass through of carbon costs.

8.3.2.4 Carbon Pricing

The Intergovernmental Panel on Climate Change (IPCC) is currently considering the full range of options available to implement an explicit carbon price mechanism on the Australian economy. A multi-party climate change committee has been formed and will consider options such as emissions trading schemes (ETS - an example of this is the postponed Carbon Pollution Reduction Scheme (CPRS)), carbon taxes or hybrid combination of an ETS and a carbon tax. The committee will make a recommendation regarding the preferred carbon price implementation option in late 2011.

An ETS or carbon tax is likely to rapidly increase the cost of carbon intensive energy products for consumers. While a carbon price mechanism is likely to further drive the installation of energy efficient appliances, increase the penetration of solar hot water systems, drive performance increases of thermal efficiency of new buildings, the carbon price is also likely to create an increase in demand of less carbon intensive energy sources like natural gas.

The increase in gas connections, appliance penetration, temperature increases effecting demand, combined with the uncertainty of government policy and the type of carbon credits eligible, cost increases of carbon-intensive materials and services used on the network; the overall effect on revenue and margins due to the CPRS for Multinet Gas over the long term remains difficult to predict given a proposed carbon price mechanism is yet to be agreed upon.

8.3.2.5 Change in Long Term Temperature and Rainfall Profile

The IPCC Report in 2007 predicts an increase in average temperature of 2.0 to 4.5 degrees. The incremental increase in temperature may not increase the temperature of the coldest winter days in the future. The long term demand for gas will be affected, however load growth stated in the previous 2 sections may surpass the long term temperature effect.

Regional projections for rainfall are less certain than the temperature projections due to the complex relationship between temperature, wind, topography, evaporation and ocean circulatory changes (Garnaut 2008). The effect of severe decreases in long term rainfall amounts is explained in 8.3.2.1. The effects of short term severe increases of rainfall to Multinet Gas are water in mains and explained in 8.4.2.4.

The NIER economic modelling produced in the Demand section [4] allows for all regulatory, climate, CPRS and economic fluctuations when making predictions about future gas consumption and load growth.

8.3.3 Reliability of Supply

The system reliability is monitored through the following indices, which reflect the performance at the consumer‟s premise.

SAIDI (total average duration of interruptions to customers interrupted)

SAIFI (the average frequency of unplanned interruptions per 1000 customers)

Effective asset inspection and maintenance programs have been implemented. These, together with efficient load forecasting, monitoring and investigation activities, ensure the high standard of network reliability performance is maintained

8.3.4 Contractor Selection and Practices

Considerable care is taken in the selection of contractors to perform works. Maintaining effective communication with contractors occurs through meetings at various levels. Risk is one of the key criteria used in the selection process for contractors. Improvements have been made to field audits by the introduction of a risk based, targeted auditing system with results input to a database to store and analyse the results. Contractors not following the

correct procedures can cause undesirable outcomes. Appropriate training and refresher courses are completed to maintain appropriate skill and competency levels equivalent to the national competency system.

8.3.5 Contractor Performance

Contractor performance is closely monitored through the Contractor Management System and monthly reports and field audits across many contract areas. From a risk perspective, one key area is contractor response to consumers" calls for gas escapes. The Gas Priority One Response Index tracks the percentage of urgent calls responded to within 60 minutes.

8.3.6 Skills and Workforce Ability

The gas industry is experiencing a reduction of skilled workers in areas of engineering, management, construction supervision and field operators. The causes are many and time taken to develop skilled workers through training and experience takes longer than the time required for replacement workers.

This risk may effect Multinet Gas in the future if construction and replacement rates accelerate to high levels and exceeds the capacity of the industry.

8.4 CATASTROPHIC RISKS

The objective of this risk evaluation was to identify and assess potential points of catastrophic failure and to provide a reasonable assurance on adequacy of control or identify new measures of control or contingency. The evaluation identified the majority of Multinet Gas"s catastrophic risks relate to assets and events upstream of Multinet Gas"s network.

Catastrophic risks generally tend to have a very low likelihood combined with very severe consequences. Control measures against these risks tend to be extremely expensive, thus emphasis is placed on a cost-benefit approach, with due emphasis placed on contingency measures.

Risks of a catastrophic nature on Multinet Gas"s assets generally relate to damage to Transmission Pressure assets and the potentially severe impact on the public in the vicinity of the incident.

8.4.1 Transmission Failure

Transmission Pipeline failure can lead to intense fire with sufficient radiant heat to cause combustion of surrounding buildings and severe injury or fatalities to people with short exposure times within several hundred metres.

The risk associated with urban Transmission Pipelines is managed through compliance to industry codes in relation to protective measures such as depth of cover, pipeline wall thickness, pipeline patrols and warning markers. This is supported by proactive support for programs to educate parties likely to damage pipelines and promotion of industry based „One-Call" Systems.

The mitigations of this risk are controlled by the implementation of standard procedures and work activities. These are detailed in the Transmission Pipeline Maintenance and Replacement Plan.

Integrity Management of the Transmission Pipelines is controlled by Regulations. Tools to increasing the quality of integrity management such as pigging is performed as required.

8.4.2 Other Key Risks

A series of other risks have been evaluated which although not catastrophic, are pertinent to the safe and efficient operation of the network and could have significant public outrage impact, namely:

- Templestowe Line Valve
- Failure of a APA GasNet Australia Custody Transfer Point
- Network Performance - Poor operating performance / end use customer service increases regulatory political risk
- Major Technical Failure of the Network

8.4.2.1 Failure of an APA GasNet Australia Custody Transfer Point

All regulated custody transfer points are designed with independent dual run regulation streams and so have redundant capacity within the installation in the event of a regulator run failure. In the event that a complete custody transfer installation was inoperable then the impact would depend on which installation was affected and the degree of loading on that day. Most of the Multinet Gas system is supplied by multiple custody transfer points such that the failure of any single point does not necessarily result in loss of supply to a significant component of the network. In the event of complete loss of a custody transfer point recovery could be achieved by installation of a temporary regulator which could be up and running within 48 hours.

8.4.2.2 Network Performance - Poor operating performance / end use customer service increases regulatory political risk

Three risks were examined as potential causes of network performance risk.

Reduced asset renewal capital funding impacting public safety, network performance and end user customer service. As a result of recent regulatory reviews asset replacement budgets have been reduced. This is recognised as sustainable only in the short term. This risk is categorised as Moderate for this review period only, however it would be Significant over the longer term if capital funding remains constrained.

The effect of reduced resources resulting in increased restoration times. It was deemed that unusual, severe, weather related, or major third party, short duration, high workload periods, will test existing resource levels (field and back office) and extend response times. This risk is categorised as Major with the likelihood to be Unlikely for this review period only.

Regulator not looking favourably on the company at future rate reviews due to poor operating performance / end user customer service. Despite strong existing controls this was viewed as a Significant risk.

The controls implemented to reduce this risk are detailed in the Lifecycle Management Plans in Section 5, the risk is monitored by KPI"s detailed in Section 3 and capital expenditure to continuously offset the degradation of network condition in Section 5 and Section 13.

8.4.2.3 Major Technical Failure of the Network

Three scenarios were examined in detail under this risk at the level of consequence stipulated (100,000 customers off supply).

Scenario 1 – Significant piece of plant or control system fails. Only two locations were identified where such a magnitude of loss could be anticipated and this was only realistic when coinciding with a >90% peak demand event.

The controls implemented to reduce the likelihood of this risk are scheduled and condition based maintenance. These are detailed in Section 5.

Scenario 2 – Terrorism or natural disaster (earthquake, flood or bushfire). Loss of Dandenong Terminal Station (APA GasNet Australia) and inner ring main (Multinet Gas) due to terrorism was considered a significant risk. Also considered significant was a larger than Newcastle size earthquake leading to multiple cast iron fractures and other pipe work failures across the network leading to area shutdowns as the only viable means of control. Flooding and inundation of widespread areas leading to low pressure areas being filled with groundwater and significant customer loss of supply was considered to be a moderate risk. A bushfire scenario was not considered to be credible at this magnitude of loss.

Scenario 3 – IT System Security and recovery time – malicious damage to the SCADA system given the level of controls was considered a moderate risk.

The IT system has a disaster recovery plan and its own management plans.

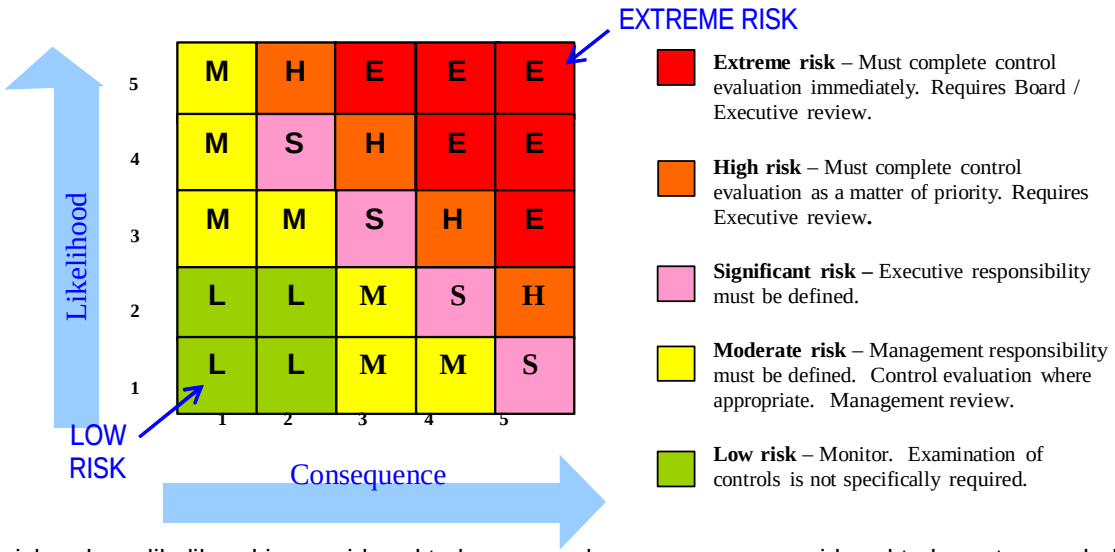
8.4.2.4 Third Party Damage

Third party damage is a risk that occurs frequently. Most third party damages do not incur significant consequences. Damage occurring on transmission pipelines, network injection points and other select locations on the network could result in significant consequences being realised. Physical and procedural measures are implemented where possible, however the acts of others" weather malicious or not cannot be prevented in all cases.

8.5 Risk Framework

The combined ratings for likelihood and consequence for each risk will be combined, using the matrix below, to determine the overall risk ranking.

Figure 8-3: Risk Matrices



Note: All risks where likelihood is considered to be rare and consequence considered to be extreme shall be rated as a high risk.

Rating	Guide Treatment Responsibility
Extreme	High risk is generally unacceptable. Comprehensive consideration by senior management required to ensure that the net risk remaining is consistent with corporate objectives and risk appetite. If not, detailed research and planning required to mitigate risk.
High	Senior management attention required to assess the acceptability of remaining net risk or required mitigation measures. Management need to ensure that necessary mitigation actions are carried out and the risk does not increase by actively monitoring any changes to the control environment, consequence or likelihood.
Significant	Senior management attention required to assess the acceptability of remaining net risk or required mitigation measures. Management needs to monitor any changes to the control environment, consequence or likelihood. Implementing cost effective controls.
Moderate	Management to ensure that the control environment, consequence and likelihood does not substantially change. Consider the implementation of any additional cost effective controls
Low	Manage by routine procedures and be mindful of changes to nature of risks. Consider the implementation of any cost effective internal controls.

Table 8-2: Risk Criteria and Definitions

Rating		Consequence Descriptions	Customer Service/ Business Continuity	Human Resources / OH&S	Financial	Legal	Outrage
Catastrophic	5	Would threaten the survival of MGH	Major disruption of multiple services capacity for greater than 1 month – failure of gas supply	Multiple death / serious injury Unexpected / unplanned resignation of several all key senior managers	Financial loss greater than $40,000,000 or greater than $20,000,000 ongoing. Inability to pay dividend Banks require unscheduled repayment of debt Down grade to non-investment grade rating or equivalent equity market reaction	Major class action Parent company De-listed from stock exchange Loss of operational licence(s) Major civil law suit and/or criminal charges laid against organisation and / or individual Inability to obtain adequate insurance	Total outrage (eg. Longford, Auckland (attributable to MGH)) Catastrophic, long term harm
Major	4	Would have a significant effect on how MGH will operate in the future, including its ability to raise capital. Or threaten the effective operation of MGH for a substantial period	Major disruption of multiple services capacity up 1 month – failure of gas supply	Single death / serious injury Unexpected / unplanned resignation of several key managers Industrial action – significant time or impact on operations	Financial loss greater than $16,000,000 or greater than $8,000,000 ongoing Inability to pay dividend Down grade in credit rating and severe equity market reaction	Potential laws suit over $2m Significant regulatory investigation	Major alarm and anger - Impact supply to >10% of customers for a day (electricity), several days (gas)
Severe	3	No threat to the effective operation of Multinet Gas, but exposes MGH to unacceptable cost consequences	Major disruption of a single service capacity – partial failure of gas supply Loss of business offices and systems	Lost time due to workplac e injury requiring hospitalisation Unexpected / unplanned resignation of several staff Industrial action – resolved quickly Repeated employee EEO/HR matters raised	Financial loss greater than $8,000,000 or greater than $4,000,000 ongoing. Down grade in credit rating or equivalent equity market reaction Significant reduction in dividend	Potential laws suit between $500,000 and less than $2,000,000 Regulatory investigation	Widespread complaints and anger Significant release of pollutants with mid-term recovery

Rating		Consequence Descriptions	Customer Service/ Business Continuity	Human Resources / OH&S	Financial	Legal	Outrage
Serious	2	No significant impact on MGH, issues are dealt with internally	Minor disruption of service capacity – minor failure of gas supply Damage to business offices and systems	Unexplained / unplanned resignation of some senior staff member. Minor workplace injury - no lost time Employee raise EEO/HR related matter	Financial loss greater than $1,000,000 or greater than $500,000 ongoing. Credit watch (negative) or equivalent equity market reaction	Isolated complaint / incident where there is a threat of legal action, resolved by management	Limited complaints and anger Minor transient environmental harm
Minor	1	No significant impact on MGH, issues are routinely dealt with by operational areas	Disruption to business offices and systems	-	Financial loss up to $2,000,000 over 5 years or up to $800,000 in an y one year Questioning from rating agencies or equity analysts	Minor complaint / incident not requiring management intervention	Annoyance, concern and some complaints Pollution, but no environmental harm

Note 1:

When assessing consequence each risk should be considered in relation to its cumulative effect in the period under review. If the cumulative effect increases the magnitude of the consequence then the highest identified consequence rating should be used.

Note 2:

When selecting the desired consequence rating under the “non-financial” and “financial” consequence areas, it is important to keep a balanced perspective of the ultimate impact of the risk to MNG. The consequence rating that represents the highest impact on MNG should be selected, i.e. if a risk is both a moderate financial risk and a major reputation and image risk, rate the risk as „major“.

Table 8-3: Risk Likelihood

Rating		Likelihood of Occurrence	Example
Almost Certain	5	The event is almost certain to occur within the planning period	Will almost certainly occur once or more within the current strategic plan.
Likely	4	The event is likely to occur within the planning period.	Will probably (>50%) occur once (or more) within the current strategic plan.
Possible	3	The event may occur within the planning period.	Might occur once (or more) within the current strategic plan (ie: will occur once every 5 - 10 years).
Unlikely	2	The event is not likely to occur in the planning period.	Could occur once (or more) within the current strategic plan (ie: will occur once every ~10+ years).
Rare	1	The event will only occur in exceptional circumstances.	May occur only in exceptional circumstances (ie: will occur once every 20 - 100 years).

Table 8-4: Risk Analysis – Level of Control

Strong	Risk has been reduced to as low as reasonably practicable within acceptable cost parameters Meets best practice for the type of risk identified
Adequate	Controls are satisfactory, but may not be optimum Quite confident. Satisfactorily implemented. Some variance in control quality
Fair	Marginal risk reduction Moderately confident. Quite a degree of variance in performance. Fair implementation only
Poor	Controls need to be improved if the risk is high or extreme Additional controls should be put in place for risk

Table 8-5: Risk Analysis – Level of Influence

Direct	The management of the risk is largely in the MGH"s control Typically applies to Operational Risks
Indirect	The management of the risk is not in the MGH"s control, at best the MGH can play an influencing role. Typically applies to Strategic Risks driven by legislation, Government Policy, etc.

Table 8-6: Potential Sources of Risk

Category	Indicative Risks		
Asset Management	• Property • Environment • Adequacy of fire protection • Plant maintenance	• Adequacy of protection of cash and valuables in transit • Security documentation • Records management	• Access controls • Dual custody / shared assets • Maintenance • Capital planning / replacement strategy
Business Continuity	• Knowledge of critical activities • Resilience to disruption • Single points of failure • Knowledge retention	• Concentration of assets • Reliance on single supplier • Back-up and (off-site) storage of records • Reliance on key processes	• Alternate processing capabilities • Maintenance / testing of plans • Communication of roles, responsibilities & training
Compliance / Regulatory	• Documented policies & procedures • Codes of conduct • Reputation	• Due diligence • Intellectual property, copyright • External environmental issues • Regulator revenue	• Regulatory compliance • Taxation issues • Industrial relations • Government Regulatory changes
Contract Management (Outsourced and In-	• Adequacy of legal agreements • Loss of direct control over Outsourced Service Providers	• Service requirements and performance of both parties • Adequacy of OSPs risk	• Adequacy of OSPs insurance program • Difficulty in changing OSP (eg

Category	Indicative Risks		
sourced Services)	(OSPs) staff • Suppliers	management systems • Insurers	cost-efficiencies)
Corporate Governance	• Board composition	• Media Liaison	• Independence
Finance	• Share price • Inability to control costs • Tax • Financial controls	• Budget setting and reporting process • Raising equity • Pricing regulation	• Procurement cost effectiveness • Cash reserve management
Information Technology	• Hardware platform(s) • Operating system(s) • Stability of vendors • File Management Systems • Packaged / in-house development • User identification / password	• Infrastructure • Degree of customisation required (maintenance costs) • Integration with other systems • Segregation of duties • Exception reporting • Data Integrity, accuracy, completeness and accessibility	• Functionality does not meet business needs • Application does not meet functionality • Security and audit logs • Protection from viruses, hackers, etc
Occupational Health & Safety (OH&S)	• Internal practices and procedures • Staff guidance and training	• Organisational response to Legislative requirements • OH&S Audits	• Incident reporting • Return to work policy
Operational Management	• Operations: • Group Policy • Delegations of Authority	• Procedures Manual • Budget performance • Management reporting	• Duplication of processes, systems and resources • Cost management (clinical costing)
	• Fraudulent conduct: • Disgruntled employee • Theft (internal & external) • Staff errors	• Customer fraud • Vandalism • Credit fraud • Misdemeanours	• External party • Sabotage • Internet based fraud
	• Organisational culture and structure: • Scale diversity	• Segregation of duties • Reporting	• Training courses • Employee awareness initiatives
	• Project Management: • Adequacy of project management skills • Allocation of resources • Adequacy of timeframes • Impact of project changes in functionality / scope / budget • Adequacy of resources to support critical path • Adequacy of integration effort	• Adequacy of project accounting / financial management • Degree of customisation required (maintenance costs) • Integration with other systems • User identification / password internal controls • Ongoing risk assessment and formal sign-off	• Project scope not controlled • Functionality does not meet business needs • Security and audit logs • Protection from viruses, hackers, etc • Training / refresher courses • Approval process
Service Provision	• New and Existing Services • Pricing	• Customer service • Marketing • Impact of insurance arrangements	• Feasibility of new business opportunities • Alliances
Staff Development and Performanc e Management	• Structured career (management and staff) development and evaluation processes • Use of technology to facilitate performance evaluation	• Staff training and Seminars on soft, management, other skills	• Staff buy-in and participation in performance evaluation process
Stakeholder Management	• Stakeholder requirements • Community Based Agencies • Unions • Insurers	• Government regulator • Professional Associations • Community groups	• Research bodies • Joint Ventures / Partnerships / Alliances
Environmental	• Reusable energy focus • Environmental management plan	• Customer and stakeholder obligations	• EPA performance standards
Research Risk	• Reputation • Cost effectiveness	• Commercialisation • Funding	• Insurance • Legal liability

Category	Indicative Risks		
Workforce Management	• Pre-employment checks • Discrimination • Equal opportunity • Workplace diversity • Health & safety • Segregation of duties • Enterprise Bargaining Agreements	• Leave • Stress • Unfair dismissal • Control over contractors / consultants / agents • Exception reporting • Remuneration versus vocation • Existing workforce workload	• Harassment • Cost of addressing staffing shortfalls by casual workforce • Managing industrial relations • Skill matrix of staff • Staff utilisation levels

9 Monitoring and Improvement Plan

9.1 Monitoring

The Australian Standard for gas networks; AS4645.1 demands an approved performance monitoring plan as part of the SAOP. Multinet Gas fulfils this obligation via a wide range of KPI"s reported (see section 3) to stakeholders including Energy Safe Victoria (ESV), the Essential Services Commission (ESC) and a range of other external organisations.

9.2 Improvement Plan

The improvement plan focuses on technological and engineering upgrades to the network and its facilities. General network improvement via replacement is detailed in Section 5; Lifecycle Management Planning.

Key improvements & initiatives to be investigated in the 2012/13 year include:

(Note: All proposed improvements will be subject to feasibility and economic analysis)

- Pipe Lining for Rehabilitation

  Pipe lining is a technique heavily used in the water industry to maintain water quality and reduce leakage. The technique is to pull a plastic sleeve or flat hose through a main then inflate and cure with steam or hot water. The result is an existing main with all leaks repaired and not likely to occur for another 30+ years. This technique is of most benefit where large diameter low pressure mains that require abandonment cannot be replaced due to location factors such as a lack of local high pressure or offsets being unavailable. The disadvantage of this technique is that the main must be able to supply downstream consumers whilst being relined. Also all service and mains connections are sealed off and need to be retapped, which creates further technical hurdles and additional cost. This technique is likely to be trialled on the Danks St 450mm cast iron main in South Melbourne in summer of 2013.

- Introduction of remotely read Impressed Current Cathodic Protection Units (CPU)

  The CPU"s control the current and voltage impressed into the cathodic protection system. The 192 CPU"s within Multinet Gas are inspected every month to check the electrical current output. Installing telemetry equipment will reduce the inspection costs. Furthermore, if low current and voltage alarms were included in the telemetry equipment this would enhance the present level of monitoring from monthly to real time, thus reducing the amount of time the transmission pipelines or reticulation mains are without cathodic protection in the event of a CPU failure. This system is currently being designed and implemented in NSW and Multinet Gas is actively monitoring developments. The roll out of this mature technology is planned for 2013.

- District Regulator Maintenance and Replacement Strategy Review

  Currently district regulating stations are overhauled every six years depending on regulator type. As the life of these installations is expected to be shortened due to decommissioning via Pipeworks the opportunity to reduce overhaul frequency exists. Generally the district regulator installations are very reliable and are overhauled more frequently than field regulating stations.

Key improvements & initiatives being considered for future plans include:

(Note: All proposed improvements will be subject to feasibility and economic analysis)

- Intelligent pigging of transmission pressure pipelines

  Intelligent pigging of the inner ring main was completed November 2009. This plan proposes the pigging of more transmission pipelines in this planning period. Pigging provides for state-of-the-art inspection techniques and provides a thorough analysis of pipeline condition.

  The necessary rectification of the pipelines is the barrier to implementation of this project. The expenditure required to rectify pipelines is large and documented in the Transmission Pipelines Strategy.

- Smart Meters/Networks

  Smart meters are a term with a loose definition and are only bound by the limits of the current or future technology. Generally, smart metering aims to help consumers manage their energy use and carbon emissions better via tariff changes and energy use feedback. The benefit to the network is demand management; a reduced maximum demand as the tariff increase defers usage of some appliances.

  Multinet Gas remains open to opportunities presented and representatives actively remain educated on the latest developments of this rapidly developing industry. Presently the likely smart gas meter will utilise the developing AMI electricity communications grid with radio frequency index heads on existing meter designs. The below barriers are not overwhelming and are likely to be mastered in coming years.

  The physical or technical barriers to smart meter roll out within Multinet Gas are;

  - 90% of the existing meters installed are not capable of retrofitting RF index heads
  - Retrofitting of RF heads is likely to require retesting of the meter, thus preventing retrofitting in the field
  - Communications medium and infrastructure
  - Synergies from utilising any electrical or water communication mediums may force accelerated future replacement of the smart meter hardware and/or software
  - Increasing the accuracy of diaphragm meters requires pressure and temperature sensors
  - Smart meter technologies are still evolving

Currently there are 322 interval meters within Multinet Gas which store data in hourly quantities. Of those, 135 have communications and are remotely read daily. The remainder are read fortnightly, manually. Any roll out of smart meters is likely to be directed towards the interval meters first. These connections consume large quantities of gas however have a different consumption profile to domestic connections.

All large meters are fitted with pulse points. Pulse points are required to retrofit any data logging equipment to an existing meter. Therefore the greater roll out of smart meters in Multinet Gas is likely to reach the large meter population (22,600) after the interval meter connections.

The next step to prepare Multinet Gas for smart meter roll out could be to purchase meters only with pulse points. This would add a cost of approximately 10% to new (small) meters and take approximately 20-30 years to saturate the network. Unfortunately these meters may need to be replaced or refurbished before this time, squandering the money spent.

Some of the issues with a smart meter or grid that may inhibit initial roll out are;

- Meter exchanges will become more expensive

- 50% of the meters do not overlap the United Energy distribution and network (AMI network)
- There is no requirement to curtail customers or manage load during peak load days
- The cost of a meter read via a smart meter and communications facilities may not be cheaper than the current system of manual reads
- Government mandate for roll out is required to justify cost recovery dependant on the success of the AMI roll out

The above issues may be resolved depending on the developments from the Victorian Smart Network program initiated in 2010.

Some of the drivers for smart gas meters within Multinet Gas are;

- Current lag time from gas consumption to settlement is up to 18 months
- Demand analysis techniques include large assumptions based on monthly billing data, rather than hourly, creating the possibility of inefficient demand capital expenditure
- Multinet Gas"s majority shareholder is a majority shareholder of United Energy electricity distribution network that overlaps 50% of Multinet Gas"s territory. Thus synergies could be attained during implementation and operation
- An efficient smart meter network might reduce meter read costs in the long term

The realisation of the benefits of smart meters is likely to only be gained when fully rolled out to every meter and is unlikely to be economically justified if the scope is limited to small numbers of connections. As the smart meter is rolled out to the last meter the marginal benefit of each smart meter will slightly increase. Thus a commitment to smart metering beyond the interval meters requires very high capital expenditure. High costs and uncertain/undefined benefits prohibit commencement within the current GAAR period. A project of this scale would need to be planned years in advance with extensive stakeholder consultation and government/regulatory support from at least a technical level.

The smart meter and smart grid roll out within the electricity distribution networks funded or sponsored by Government policy will lead the energy distribution industry. However State and Federal Government policy should not be assumed as the only driver for smart meter development and roll out.

The wholesale gas market in Victoria is the longest serving free market in Australia. This market promotes market forces of supply and demand to reach price equilibrium every four hours, with a price ceiling. The enhanced knowledge of demand to real time (or close to) would make the wholesale gas market more accurate and could drive efficiencies of production and retailers" purchases resulting in possibly lower wholesale price for gas with more or less volatility. This goal could initialise the smart meter, smart grid roll out in the gas distribution sector in Victoria sooner than other states in Australia.

- Consideration of new generation PE100 pipe materials

  The increasing (world-wide) production volumes of PE100 products, over recent years, indicates that this material will eventually become the industry standard for gas network applications. Accordingly, PE80B (existing utilised material) will become less viable as the market moves to PE100. One of the main benefits of PE100 is the enhanced strength. This permits thinner wall pipe (higher SDR) and therefore the cost reduction can offset the higher material price per unit.

  The barriers to utilising PE100 are;

  - Fittings need to use PE100 as standard across the entire suite of fittings

- Hot tool fusion of service tees is not safe when using thinner wall pipe.
- Further development of PE100 pipe joining techniques and parameters are also required
- Cost savings are likely to be present only with larger pipe sizes of which Multinet Gas does not lay enough to realise the savings.

The expected time for PE100 roll out is uncertain, however the larger pipe sizes could be rolled out within 2 years depending on other gas distributors and pipe suppliers.

Key improvements/initiatives implemented in recent years:

- The use of insertion cameras for live line inspection

The Synthotec insertion camera was acquired in 2010 and has improved the speed and accuracy of fault location.

The equipment has been particularly useful in identifying points of water ingress and other pipe obstructions to the low-pressure network. Particular locations have been problematic for a long time and traditional methods of fault finding have not been able to locate points of water ingress. The insertion camera has found these faults quickly and without repetitive excavation.

This equipment also allows internal visual inspections of large diameter pipes that are otherwise expensive and time consuming.

- The introduction of PE stop off equipment

This device has the capability to reduce the amount of time required to stop gas flow through PE mains in comparison to squeeze off. This technology does not damage the main in the same manner as squeeze off for a small hole is drilled in a similar fashion to stop off equipment used on steel and cast iron as opposed to squeezing the pipe closed with a hydraulic clamp. This equipment will increase in value as the amounts of large diameter PE are laid within Multinet Gas.

10 Major Projects

10.1 Pipeworks

10.1.1 Introduction

In 2002, Multinet Gas"s Gas Access Arrangement Review (GAAR) submission to the Essential Services Commission (ESC) demonstrated that approximately 540 km of Mains and associated services would require replacement throughout the years 2003 to 2007 in order to maintain system integrity. This was the first tranche of a 30 year program to replace the Multinet Gas low-pressure network.

The ESC final determination set Multinet Gas"s forecast capital expenditure for 2003 to 2007 and it was agreed that a portion of Multinet Gas"s Low Pressure system would be targeted for renewal. The name “Pipeworks” was given to this project.

The objective of the Pipeworks project is to replace low pressure gas mains and associated gas services with either medium or high pressure supply. The projects aim is to manage the risk associated with cast iron and unprotected steel, minimise repeated consumer outages, minimise maintenance activities associated with aged assets and alleviate the growing demand for gas supply on the low pressure distribution system. The ultimate goal is to eradicate practically all the low pressure systems from the Multinet Gas Network.

10.1.2 Progress

Construction of this project achieved the forecast target of 540 km for the 2003 to 2007 period. Since the 2008 Access Arrangement review the progress has fallen behind the Access Arrangement forecast due to funding constraints; see 10.4.

10.1.3 Prioritisation

Areas are prioritised in the following order:

1. Safety risk,
2. Local capacity constraints
3. Local interruption to supply
4. Maintenance costs

It is common for one pipeworks project to address elements of all of the above criteria.

The highest safety risk projects are determined by annual modelling. The model, created by consultants AIA, uses recent failure history and location factors to rank projects. The highest risk projects are those with a high probability of mains failure combined with site factors that increase the risk of gas ingress to buildings and high population exposure.

Mulltinet experience is that annual safety risk modelling is necessary due to the unpredictability of problem areas arising. A rigid long-term plan will result in sub-optimal replacement. Hence the safety risk projects within the five year plan are reviewed each year based on the previous year failure history and ranking may change within the plan period.

Local capacity constraints are identified though a winter testing program, forecast load growth by postcode and network modelling. Network models are calibrated to winter testing results, load growth is applied to the models and constraints are identified.

Multinet Gas experience shows that approximately 30% of the low-pressure network is either capacity constrained or will become so soon. Reasons for the high level of capacity constraint on the low-pressure network are often related to the condition of the assets. Residue from manufactured gas, build-up of corrosion products, ingress of water, blockage due to soil ingress etc. inhibit the flow capacity of pipes significantly. Even though peak load growth is low (circa 1%), this growth is sufficient to cause capacity constraints.

It is not recommended to address such capacity constraints by increasing the operating pressure of the existing pipes due to the increased number of gas leaks that pressure increases create on the old deteriorated pipes.

Capacity constraints on the low-pressure network are alleviated by Pipeworks projects by transferring the customers on the capacity constrained low-pressure network to the newly constructed high pressure network. The remainder of the adjoining low-pressure network is off-loaded in this process thus assisting in reducing future capacity constraints.

Annual modelling is the most efficient way of prioritising such projects. Load forecasts are progressively less accurate over longer time periods and adherence to a rigid long-term program would result in sub-optimal replacements.

Interruption to supply can be problematic for particular areas of the network with the same streets experiencing interruption rates orders of magnitude higher than the average for the network. Water in gas mains drains to low-lying areas and streets in these areas may experience very high levels of interruption. Activities such as syphon pumping are carried out to attempt to reduce the impact but often there are not enough syphons are the syphons are too small to cope with the volume of water. Syphon pumping often ends up being a reactive action to restore supply until the next weather event. Such areas and streets are prioritised on the number of complaints received and the number of supply interruptions recorded. New problem areas can arise each winter hence the priority of this work is reviewed annually.

Repeated syphon pumping, clearing of water from gas services, repairing leaks and investigating the source of water and EWOV complaints can significantly increase the maintenance cost associated with sections of the low-pressure network. Pipeworks replacement of the low-pressure network significantly reduces maintenance costs in some of these areas. Maintenance cost reduction is a benefit stream in most Pipeworks project business cases but is rarely the most significant driver in determining the priority of a project.

10.1.4 Budget Summary

Refer Financial Summary Table – Executive Summary

10.1.5 Key Issues

The ongoing Pipeworks project will require some work in more difficult (higher density) areas and therefore average unit costs will increase. Cost increases will be driven by the need to extend Grid Mains into some of these areas and the additional difficulty and complexity of the work in highly trafficked areas and multi residential units and flats, including high-rise. The 2003-2007 programs was mostly focussed in the areas abutting the existing High Pressure networks to ensure High Pressure supply is available to the upgrade areas without extensive Grid Main construction. The asset condition of some of the inner suburban areas is such that some of this work must be programmed over the period covered by this plan. The past winter had rainfall consistent with the long-term average and this exposed many areas where water ingress into the system can occur. Many of these areas are distant from high pressure supply or are in inner suburban areas. Trial projects were carried out in Hawthorn, Toorak and South Melbourne in 2006 and these confirmed that substantially higher unit rates apply in higher density areas than in outer suburban projects.

Materials costs have increased substantially for both PE and steel pipe over the last five years as a result of the resources boom and increases in the price of oil. PE pipe prices are directly linked to the price of oil.

The large diameter backbone supply Mains that support the Low and Medium Pressure systems cannot be left to be decommissioned at the end of the 30 year replacement program. Condition assessment of a sample of these Mains has indicated that some are at risk of structural collapse. A prioritised replacement program targeting Mains with high traffic loading is required. Most if not all of the replacements for these Mains will have to be operated at Low Pressure until the downstream networks are replaced. Alternatively, pipe lining or similar technology will need to be employed to extend the life of the existing backbone Mains. To date pipe lining has not been used on gas networks in Victoria and its usage will require trials and development of new procedures prior to routine implementation.

Upstream reinforcement of existing High Pressure systems is sometimes required to accommodate Pipeworks upgrade in immediate vicinity. This may be in the form of section duplication, Supply Regulator inlet manifold upgrades or regulator capacity upgrades.

The levels of renewal carried out in 2003 to 2007 are consistent with previous long-term replacement modelling (based on the asset installation profile and industry accepted asset lives) and are sufficient (if maintained) to ensure no “bow-wave” of replacement builds up. All indications were that this level of replacement was prudent given the current condition of the assets. Evidence of this was the flat profile of Mains and Services maintenance volumes however with higher rainfall over the past winter combined with the reduction in Pipeworks since the end of 2007 maintenance volumes have increased markedly. If the past winter is assumed to be the norm, higher levels of complaints can be expected.

The forecast Pipeworks for the plan period is shown in the table below together with a comparison to the 2008 GAAR final decision:

Table 10-1: Pipeworks Forecast

Year	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Actual/ Forecast (km/year)	33	47	41	87	90	93	63	62	73	117
2008 GAAR forecast	110	110	110	110	110	NA	NA	NA	NA	NA

10.2 South Gippsland Towns

10.2.1 Background

Multinet Gas was selected to deliver gas to the towns of Lang Lang, Korumburra, Leongatha Inverloch and Wonthaggi in South Gippsland, Victoria as part of the State Government's $70 million Natural Gas Extension Program (NGEP).

The project involved laying a Transmission Pipeline, Supply and Distribution Mains, making gas available to approximately 10,000 properties in the five towns.

Scope

Principally, the project involves the reticulation of the following towns in the South Gippsland area:

- Lang Lang
- Korumburra
- Leongatha
- Wonthaggi

- Inverloch

The project consists of the following assets:

- Approximately 66 km of licensed Transmission Pressure pipeline (>1050 kPa)
- Approximately 22 km of large diameter mains (>63mm) Mains (<515 kPa)
- Approximately 205 km of Distribution Mains (<515 kPa)
- 2 Custody Transfer Stations (Lang Lang and Bass Gas- Gas plant)
- 2 Pressure Reduction Stations “City Gates” (Lang Lang and Korumburra)
- Provision has been made for the potential need to construct City Gates at Leongatha, Inverloch and Wonthaggi, in the event that the licensed TP pipeline currently operating at below 515 kPa is required to operate above 515 kPa.

All construction works of transmission pipelines and mains and associated facilities has been completed. The pipelines were completed in 2007 and last distribution main completed in December 2009. New Gas services are currently being installed to the residents in the respective towns who have requested a gas connection.

10.2.2 Budget Summary

Refer Financial Summary Table – Executive Summary

10.2.3 Project Finalisation Issues

- The process of finalising agreements with a few landowners where properties were compulsory acquired (approx 3 are still outstanding out of 78 properties) is protracted and this is due to the significant difference between the landowner expectations and Multinet Gas"s valuations for the land. This is currently being addressed with those affected landowners and their representatives with the aim to finalise as soon as possible (expected by early 2010)
- Service connections are running significantly below project forecasts with approximately 2000 connections to date.

Based on the current rate, the project is not anticipated to achieve the forecast connections within 3 years as outlined in the original submission to Government.

Connections have been slower than forecast due to a number of key reasons:

- The cost of natural gas does not make it economically viable for households currently using less than 4 LPG bottles per annum. Approximately 40% of residents are on LPG for stovetops and/or hot water only with a usage less than 4 LPG bottles per annum.
- The current retail tariffs (from Red) include disincentives such as:
  - A final connection charge of $75 and
  - An annual service (supply) fixed charge of approx $200 pa (LPG rental per 45 KG bottle is approx $30pa)
- The cost of conversion to natural gas from existing appliances is high.
- Conversion of old appliances is not often possible and therefore new appliances would be required

- LPG flued heaters cannot be converted
- Many residents installed electric reverse cycle heating /cooling in recent years.
- The major LPG suppliers are offering incentive deals to retain their customers.
- Red Energy is the only Energy Retailer in South Gippsland and some residents are reluctant to enter into a retail contract with Red preferring to wait for another entrant.
- No other energy (gas) retailer has expressed any interest to enter the South Gippsland Market at this stage

The proposed response is reduce marketing activities during the summer season and to continue to market for another winter to maximise the connections (whilst the state government marketing subsidies are still available under this project) and then minimise the marketing campaign and let natural load growth achieve connections over time. Future natural growth will come from older appliances being replaced over time and LPG usage increases to more than 4 bottles per annum. Growth will also come from new residential and commercial estates where natural gas is installed as part of the development.

10.2.4 Operational Issues

The operational issues that face Multinet Gas and its contractors are similar to the metropolitan gas network. The main difference is the travel time from Multinet Gas"s metropolitan area and the lack of a sufficiently large base level of maintenance activity to support establishment of dedicated local resources.

Actions to facilitate the smooth operation and maintenance of the South Gippsland network;

- An emergency store has been created at Lang Lang
- Local gas fitters are trained and utilised
- Local gas fitting shops used where possible
- SCADA controlled cathodic protection
- Contractors engaged in service laying for the project utilised for maintenance activities

Over time consideration will be given to establishment of a small local presence to manage the response time for maintenance and emergency issues. Such a presence will be more viable when connection numbers eventually increase towards the forecast level.

10.2.5 Non Principal Transmission System (PTS) Network

South Gippsland Towns comprise a non PTS network. They are supplied off a non-regulated pipeline (Bass Gas). This means that a raft of market and retail rules that apply to the PTS do not automatically apply to this network. Multinet Gas has some discretion as to the market and retail rules to be applied. To the maximum extent possible, for reasons of system compatibility, cost and simplicity, Multinet Gas operates this network under substantially the same rules as the PTS.

10.3 10.3 LILYDALE PIPELINE

10.3.1 10.3.1 Background

In order to meet forecast load growth in the next ten years, Transmission Pipeline augmentation is recommended to reinforce the Dandenong to Templestowe „Inner Ring Main".

This augmentation is currently on track for completion prior to winter 2012 and involves the interconnection to the new supply point created at Yarra Glen off the APA GasNet Australia „Outer Ring Main" Transmission Pipeline. This will consist of 7.5 kilometres of 300 mm Class 600 Transmission Pipeline and 2.5 kilometres of 300 mm Class 300 Transmission Pipeline.

The installation of a city gate regulator station in Yering (TP-TP), SCADA facilities and custody transfer meter will also be required.

10.3.2 Progress

Substantial progress has been made with construction underway and set for completion in mid-2012.

10.3.3 Budget Summary

Refer Financial Summary Table – Section Executive Summary

10.4 SIGNIFICANT ASSET RELOCATION PROJECTS

10.4.1 Highett Redevelopment

Highett Outstation contains an 80mm 2800 kPa licensed pipeline, 2 large diameter MP Mains, 1 TP-TP limiter, 3 TP - MP regulators, 2 TP- HP regulators, and 1 TP- LP regulator.

The gas infrastructure is located on Crown Land which the Department of Treasury and Finance (DTF) are in the process of redeveloping into medium density residential land. The land, including the adjacent Sir William Fry Reserve (the Reserve), was previously a gas manufacturing plant and was contaminated by gas manufacturing wastes. DTF has remediated the site except for a few small areas adjacent to gas facilities and fence lines where access is difficult. The Reserve remains unremediated.

To maximise the value of DTF"s site and to address safety concerns, DTF want to relocate the majority of the gas assets (particularly the facilities) away from the site. The only feasible location for the facilities is in the Reserve which is managed by the City of Kingston.

Agreement has been reached with the City of Kingston to locate the facilities in the Reserve.

A small part of the project (Stage 1) comprising construction of a 300mm diameter steel gas main through Sir William Fry Reserve has been completed. DTF has agreed to fund up to $1m for a detailed design for Stage 2 prior to committing to the construction phase. This Design phase has been completed and discussions are ongoing with DTF with regards to potential construction commencement.

10.4.2 Keysborough Industrial Estate Redevelopment

There is a proposal to redevelop the section of land bounded by Perry Rd, Bend Rd and Greens Rd in to an Industrial Estate.

In this significant area for redevelopment there is currently approximately 700m of 300mm 1050kPa pipeline that traverses the site and is protected by easements.

The developers (Australand) have requested its relocation into Bend Rd and through their proposed roadways which will result in the construction of approximately 1250m of 300mm main.

All costs for the relocation will be fully recovered from the third party. No acceptance has been made and it is unclear if the proposal will be implemented before 2013/14.

10.4.3 Ordish Rd Field Regulator (P4-052) Relocation

There is a proposal to improve the intersection of Greens Rd and Ordish Rd increase adjoining land for redevelopment.

The Consultants desire (Hyder Consulting) to have Ordish Rd field Regulator relocated out of the immediate vicinity.

A solution of replacing the PRS with mains has been made.

All costs for the relocation will be fully recovered from the third party. No acceptance has been made and it is unclear if the proposal will be implemented before 2013/14.

10.4.4 Dandenong Revitalisation & the Central Service Hub.

Vic Urban on behalf of the State Government of Victoria has commenced works in reshaping Dandenong CBD. The project involves land purchase, building demolition and title consolidation with the aim of encouraging developers to buy and develop the „Greenfield" site. The area is currently serviced by low pressure mains constructed in the 1960"s. The condition of the assets could be described as average to poor and accessing these assets is difficult due to their locale in shopping strips, nature of paving (all concrete) and major roads. These factors result in excessive traffic management requiring works to be carried out at night or weekends.

Another implication it is likely that the existing LP network will be insufficient to cope with the expected demand being created from the proposed developments and any renewal work to improve supply will be expensive to implement but will likely result negative perception for Multinet Gas from the State Government/Vic Urban if their site was to be ripped open post completion.

As such a bipartisan contribution approach is being adopted to promote the renewal of the existing low pressure mains with high pressure polyethylene mains. The volume of renewal is unknown and is likely to fluctuate depending on VicUrban"s schedule and other economic factors.

Finally, independent of the revitalisation, there is also the Central Services Hub which is an investigation into a project to build a Cogeneration plant somewhere within the Dandenong CBD.

11 Knowledge Management

11.1 Introduction

The knowledge used to manage the distribution network assets in order to meet the various stakeholder requirements is of significant value to Multinet Gas. This knowledge, sometimes also referred to as an Intellectual Asset or Intellectual Property (IP), represents a component of Multinet Gas that cannot be readily attributed to "physical" assets but consists of the creative application of human intelligence.

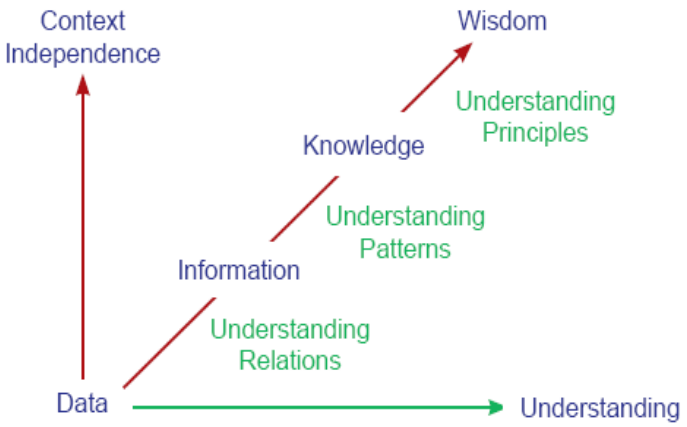
This section has been introduced in 2009 in preparation for the commercial agreements with major contractors. Under the existing agreements Multinet Gas owns all physical intellectual property, IT systems and software, reports, business cases, data and data storage, GIS, CIS and more. However, the skills and experience required to analyse this information and make meaningful and efficient asset management decisions is not owned by Multinet Gas. This separation is a risk to Multinet Gas as the commercial agreements may change in the future and this form of IP is no longer accessible to Multinet Gas. To mitigate this risk there are many options available to Multinet Gas, these will not be explored here. This section will focus on outlining what IP is available and the system that manages the information.

Intellectual Assets are built up from the analysis of asset data and the data itself, collected from a number of sources including asset management business systems. The analysis of the relationship between the data, yields asset information that is static in time. By observing patterns in the asset information over time and applying appropriate interpretation, informed asset management decisions can be made and the result is further knowledge of the network and its assets.

Knowledge Management (KM), in the context of asset management, is then the organisational processes used to identify, create, represent, distribute and enable the adoption of network and asset knowledge.

The following diagram illustrates the process[1]

Figure 11-1: Knowledge Management Process



The core asset management business systems and IP include:

[1] *(Gene Bellinger "Knowledge Management – Emerging Perspective", 2004)*

Geographical Information System (GIS)

- District Plans
- Network Models
- Engineering Standards
- Engineering Drawings
- Mains Fracture Models
- Asset Information Databases (SAP)
- Winter Testing History
- Works Management & Logistics (SAP)
- Metering and Billing Systems
- SCADA and Distribution Management System (DMS)
- Customer Information System (CIS)
- Document Management
- Real-time data historian
- General working tools

This list, while not exhaustive, illustrates the principle that knowledge management begins with the collection of relevant asset data in various applications and databases.

The asset management business systems have been developed based on the following philosophy:

- an architecture that allows integration with other internal systems or those of multiple third parties such as retailers, clients, regulators or contractors
- a platform that is able to be enhanced to meet the requirements of an evolving business
- a reduction in the number and variety of systems and databases
- retirement of systems that are unsupported or are not scalable

This has facilitated the resolution of various issues through the:

- elimination of inefficiencies in managing data and information
- elimination of unreliable and duplicated information
- increased visibility and utilisation of data and information
- reduction in the cost to perform engineering studies and analysis
- increased capability to respond to requests for information quickly

Initially, the emphasis was on system implementation and development, system integration and the cleansing and migration of data from disparate legacy systems. Once achieved, the focus is, and continues to be on implementing and auditing processes to collect, record, extract and utilise the data.

11.1.1 Asset Data Recording and Maintenance

The capture, recording and utilising accurate data is critical to support all facets of business activity whether it be day to day operations or during crisis management.

The implementation of these business systems provides the knowledge of which assets the business manages, where the assets are located, how the assets interact and the condition of the assets. This has facilitated high quality decision making in the areas of network design, operation and maintenance management.

11.1.2 Data Analysis Tools

Whilst the capture and recording of business data is fundamental to business operation, this data is of little use if it is stored in hardcopy format in a cabinet or is locked away in a database. To obtain value from the data, tools have been implemented to interpret, analyse and correlate the data and present it in a meaningful way as “information” which in turn becomes knowledge.

The key strategy has been to invest in tools that provide the flexibility to improve the construction, operation, servicing and management of assets and to facilitate the process of continuous improvement. These tools provide the mechanism by which business data is captured and recorded, and also the means by which the data is converted into information and then utilised to provide business benefit.

The utilization of superior data analysis tools is a catalyst for people to think and work differently. By supporting decision making through the availability of these tools, objective decision making with accurate facts and conclusions, as opposed to making large assumptions.. The use of tools for decision support provides the best information available at a given point in time on which to base a decision. The more advanced the tools and the more accurate the data on which the tool works, the better the information that is provided on which to make decisions.

Asset Information is obtained by analysis of asset data in various applications and databases using:

Modelling

- Methodology to treat data to predict an operational or financial outcome or result

Software Applications

- Software, either developed in-house or customised from “off the shelf” proprietary product, is used to transform, manipulate or store asset technical or business data

Reports

- Reports are generated from these applications / databases which apply business rules to distillate the data into information that is meaningful to the asset management engineers
- Examples include reports generated from CIS which calculate indices of reliability of supply (such as SAIDI, SAIFI, CMOS) and can be used for regulatory reporting, asset failure trends over time, derived from SAP Plant Maintenance Module is a key input into the formulation of the models for mains replacement
- Asset utilisation is derived from measurements of real-time loading information captured by SCADA and Cello devices and stored in the data historian.

In addition, asset knowledge is created through various asset management activities including:

- Replacement and Extension of existing assets – South Gippsland project and Pipeworks are excellent examples. Knowledge created includes business case, high level scope of work, detailed scope of work, equipment specifications, standard designs, tender documents, contracts, technical drawings, welding procedures, emergency response plans, equipment manuals, operating instructions, commissioning reports, project management correspondence, project reports and asset register. Field supervisor feedback on the condition of all the assets replaced can be vital to future replacement of similar assets where full inspections are costly.
- Routine maintenance of network assets – knowledge created from maintenance faults and preventative maintenance comments. These are included in SAP for each asset unit and are used for input into models, lifecycle management and business case development.
- Implementation of major IT system – knowledge created includes business case, statement of requirements, tender documents, contracts, project management correspondence, customisation / configuration details, acceptance testing, project reports, licensing, support agreement, and asset register.
- The mandatory requirements for project documentation management are covered under the Project Management Methodology.

11.1.3 Storage of Documentation

Effective storage of the asset documentation is crucial for the efficient management of the Multinet Gas assets and has been one of the strongest initiatives pursued in recent years.

Documentation is controlled through established policies. The policies direct how Multinet Gas manages, and controls content received, created, stored, published, retained and disposed of by Multinet Gas employees, contractors and consultants during the course of all business activities.

This content provides evidence of a business transaction, assistance in decision making, description and communication of policy, procedure and strategies and also represents Multinet Gas"s corporate memory.

The objectives of the Policy are to:

- facilitate progression to electronic capture and management of Multinet Gas business content
- connect staff to business information in a timely way
- preserve the integrity of our information assets
- provide compliance with our relevant legal, business and ethical obligations

Establish employee competence in document management

With the implementation of Enterprise Content Management System (ECMS) and Enterprise Drawing Management System (EDMS), and Aconnex, IP information will be stored in these systems.

Multinet Gas"s records are kept with integrity and according to all relevant professional standards, including:

- AS ISO 15489 Australian Standards for Records Management
- Privacy Act 1988 (Cth)
- Freedom of Information Act 1982 (Cth) and relevant stage legislation
- Copyright Act 1968 (Cth)

The business processes established for this storage will help to ensure that integrity of the information is maintained via version control and incremental backup.

11.1.4 Initiatives

In order to implement the philosophy stated earlier initiatives are required. Recent initiatives are to improve the management of the document revisions. Engineering Standards now have a schedule for review.

This document (AMP) and its supporting documents undergo rigorous annual revisions that are time consuming. A review of the management of this review process is to be undertaken in the future.

The most recent initiative has been through document control. More document controllers are employed by Multinet Gas"s contractors than previously and additional software has been implemented.

ECMS and Aconnex are excellent electronic document and drawing storage software. Aconnex specialises in projects, whereas ECMS specialises in organisation and review control. Multinet Gas has produced large projects in recent years (South Gippsland and Lilydale Pipeline) and these document control packages have significantly enhanced document retention and search rates.

12 References

Multinet Gas Controlled Documents:

- Asset Maintenance and Replacement Strategies:
  - Supply Regulators
  - Above Ground Supply Regulator Replacement Program
  - Distribution Mains
  - Distribution Services
  - Large Diameter Cast Iron Mains
  - Large Consumer Meters
  - Large Consumer Regulators
  - Small Consumer Meters
  - Small Consumer Regulators
  - Corrosion Protection
  - Distribution Valves
  - SCADA and Communications
  - Equipment Enclosures
  - Transmission Pipelines
- Capital Growth Plan
- Critical Infrastructure Strategy
- Standard Procedures (various)
- Engineering Standards (various)
- Asset specific maintenance manuals
- Policies (various)
- Management systems (quality, environmental and safety. Refer note 2)
- NIEIR – Natural Gas and Customer Number Projections for Multinet Gas

Notes:

1. Most of the above listed documents are currently available on the intranet. All other documents are available upon request.
2. Multinet Gas"s compliance group is responsible for maintaining and auditing the various management systems in place to ensure compliance, eg. Environmental, Safety Case, Quality, etc. The ISO 9000 accredited Quality System Improvement Process is used to record and monitor non-conformance and improvement projects across various systems.

External Reference Documents/information:

- Gas Industry Act 2001
- Gas Distribution System Code (Version 9) 2009
- Gas Safety Act 1997
- Gas Safety Regulations 2007/2008
- Victorian Access Code
- Declared Wholesale Gas Market Rules
- National Measurement Act 1960
- Pipelines Act 2005
- Pipeline regulations 2007
- National Third Party Access Code
- Roads Management Act 2004
- Road Safety (Traffic Management) Regulations 2009
- Trade Measurement Regulations 2007
- National Greenhouse and Energy Reporting (NGER) Act 2007
- Various Australian Standards

13 Multinet Gas Discretionary Capital – 2012/13 and 2013/14

13.1 Discretionary Capital Justification

General

This section provides a summary of the generic public safety issues associated with the Multinet Gas discretionary capital program (including pipe replacement) and then examines in more detail the projects for 2012/13 and 2013/14 that are recommended to proceed on the basis of public safety or gas supply risk.

Although some capital asset replacement programs are somewhat discretionary, the implications of excessively deferring these programs may be an increase in the long-term lifecycle cost of operating the network and an increase in public risk. During periods of constrained capital the focus of these programs has been directed to projects that have been identified as having significant public risk or major impact on customer service based on recent maintenance or failure history. However this does not address the risk associated with maintaining a large population of assets that are subject to a hazardous failure mode (albeit at a low frequency of occurrence) where maintenance history is not necessarily indicative of impending failure.

Public safety issues relating to pipe replacement on the Multinet Gas network are driven by a number of factors:

Cast Iron

Multinet Gas has had one explosion due to cast iron mains in recent years. An underground sewerage pumping station was damaged by an explosion causing approximately $50k damage. The cause of the explosion was traced back to a leaking cast iron main. Many similar incidents in other countries have resulted in fatalities. The Multinet Gas cast iron network is most similar to the low pressure network in the UK. Due to the much greater size of the UK low pressure network there have been many more incidents. Studies of the UK incidents and methods of managing cast iron have led to the current Multinet Gas policy on cast iron replacement.

The British Gas policy on cast iron replacement was established after a major enquiry into a number of explosions. Following four severe gas explosions over the Christmas period 1976/77, an Inquiry was established jointly by the Department of Energy and the British Gas Corporation. The terms of reference were to examine the circumstances surrounding the incidents and to establish common factors against the background of statistics on serious gas explosions.

The main findings of the team, led by Dr. PJ King (the King Inquiry) were:

- About one third of gas explosions were caused by gas escaping from mains and services; the remainder were associated with installation pipework, appliances and meters;
- Cast iron, although in many ways an excellent material for gas distribution systems, suffers from the possibility of fracture when subjected to quite low tensile stress. The resultant break is usually circumferential and significant loss of gas results;
- Fractured cast iron mains were a major reason for gas explosions and very few explosions resulted from leaking joints in the mains;
- Fractures resulted, not so much from age or corrosion, but from ground movement;
- Ground movements occur through the drying out and wetting and freezing and thawing of soils, particularly clay. Heavy traffic, particularly when driving or parking on pavements and verges, often causes broken mains;
- Fractures most often occur in winter;

- When the ground surface is sealed, either by a permanent surface or ice, gas cannot vent to atmosphere and tends to travel horizontally and does, on occasions, enter buildings where there is a high risk of ignition.

The findings above are generally applicable to Victorian conditions other than the peak period for fractures which is generally at the point when soil surrounding the cast iron pipe reaches its minimum moisture content; generally around April each year. Multinet Gas experiences around 300 cast iron fractures which result in a number of incidents of gas in buildings. The operating pressure of the main heavily influences the amount of gas released in a mains fracture incident and hence the risk. Medium pressure cast iron mains operating at up to 80 kPa are considered the highest risk assets for this reason. The photograph below shows a typical gas escape on a medium pressure cast iron main as a result of a main collapse. The volume of gas and dust traveling into residential premises is worthy of note. This main has been subsequently replaced.

Figure 13-1: A large diameter Medium Pressure escape

There was one recorded incident of gas detected in confined spaces in buildings as a result of this failure mode in the past year (gas in a house in Park Street, Sth Melbourne). An incident in 2007 where gas was detected in a basement car park in a multistorey residential premise in Graham St Port Melbourne had the potential for a major explosion.

Below is a photograph of damage to a house in which two people died in Dundee UK in 1990 caused by a fractured 100mm cast iron main. This type of pipe is common to the Multinet Gas system.

Figure 13-2: Damage to a House (Dundee UK 1990)

Below is a photograph showing the fracture failure mode. Generally a small crack (seen as discolouration at the base of the pipe on the right) suddenly radiates around the pipe causing a complete severing of the pipe and full bore gas release.

Figure 13-3: Fracture Failure Mode

Another significant failure mode is pipe wall collapse. This occurs where the iron in the pipe wall has corroded, leached away and left only a crystalline graphite structure which has almost no structural strength. The slightest disturbance of the pipe wall (asmay occur during maintenance) can cause the wall of the pipe to collapse. The

photograph below shows large parts of a 300mm diameter medium pressure cast iron main in Balwyn North that collapsed in 2009.

Figure 13-4: Parts of a 300mm diameter MP main

The photograph below shows extensive loss of wall thickness from a 450mm diameter medium pressure cast iron main in two of Melbourne"s major arterial roads, Nepean Highway, Elsternwick, and intersection of Toorak Rd and Auburn Rd Hawthorn. These mains are at risk of structural failure at these and possibly other locations. These mains are still in service.

Figure 13-5: Wall Thickness Loss

The charts below show areas known to be prone to cast iron fractures in the Multinet Gas territory. The Pipeworks program is targeting the high and medium fracture zones as first priority in the replacement program. Although high concentrations of mains fractures do occur in clusters the remaining zones of low fracture rates still pose a risk and need to be managed via a long-term replacement program.

Figure 13-6: Highest Priority fracture Zones

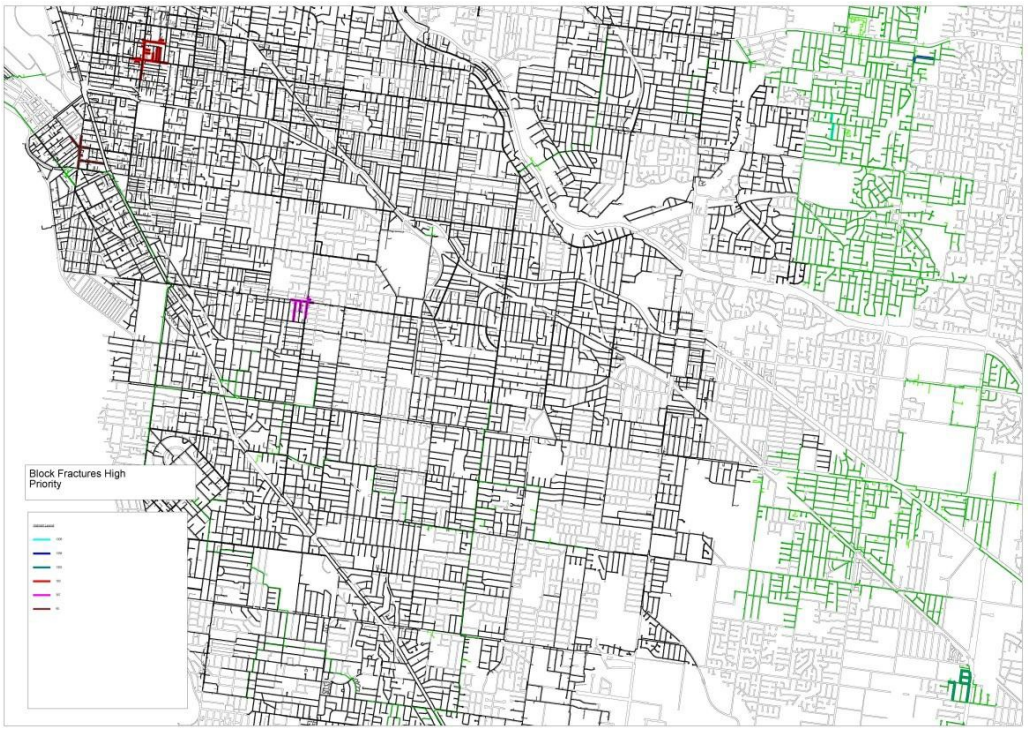


Figure 13-7: Medium Priority fracture Zones

Corrosion of uncoated steel pipe

Although the majority of low-pressure gas mains are cast iron, a sizeable minority (approximately 450 km) of pipe consists of uncoated steel. Due to the age of this material and the lack of any form of cathodic protection, severe corrosion damage is common. Usually gas escapes due to corrosion on such pipe materials are not of a serious nature because the low operating pressure and the gradual onset of corrosion initially producing a pin hole keeps the amount of gas escaping relatively low. However there are instances of gas traveling from such gas escapes which can potentially impact adjacent properties. Below is a photograph of a section of 225 mm diameter uncoated steel pipe suffering severe corrosion. The pipe has now been decommissioned as part of a Pipeworks project.

Figure 13-8: Sever Corrosion on 225mm uncoated steel pipe

Substandard fittings

Due to the history of mains construction in Multinet Gas"s territory and the age of many important supply mains there are many areas where substandard pipe and fittings have been installed. In many cases the standard of pipe and fittings is not known without extensive investigation. Some of the fittings and past construction practices pose risk of significant gas release, particularly where the network is operating at medium or high pressure.

Substandard fittings can include major connection to mains, service tees, lead meter bends or fittings that have been misused eg: low pressure fittings used in medium or high pressure applications. Regulators with unregulated bypasses are also included because they have the potential to allow over pressurisation of significant areas.

Establishing the location of substandard fittings is extremely difficult because the asset records are not sufficiently detailed or accurate to enable the identification of the fittings or locations.

An example is shown below. This is a “trombone” regulator, 50 years old with an unregulated by-pass. The corrosion shown is typical. Multinet Gas has an ongoing program to remove these regulators due to safety risks. In most cases the most appropriate means to replace these regulators includes upgrading the associated pipe networks.

Figure 13-9: Typical Corrosion on Trombone Style Regulator

Non-compliant meter locations

Meters are a frequent source of leaks, both due to connection leaks and regulator leaks or venting, either minor or more rarely catastrophic. For this reason Multinet Gas has a policy on meter location to ensure that meters remain safe even in failed conditions. Unfortunately many old installations do not comply with current policy, either because the installation never complied or subsequent works by others has compromised the safe location of the installation. When mains and services are renewed, any meter which is in a location which is unsafe or high risk is relocated to comply with current standards.

In addition to the meter installations first located decades ago to unknown (if any) standards, there are many thousands of meter installations that are non-compliant to current Engineering Standards, primarily as a result of the location of items such as earth stakes, Pay TV and telecommunications junction boxes, gas and electricity appliances or rainwater pumps too close to a gas meter.

Figure 13-10: A Hexagram meter inside an overhead cupboard above hotplates and adjacent to a power point.

A substantial number of these are non-compliant with the Australian Standard on hazardous areas. There are also meter locations that are non-compliant where the owner has built a structure over or around the meter location.

This is an issue for the gas industry in Victoria, not just Multinet Gas and the comments below could equally apply to all Victorian gas distributors.

Most instances of non-compliances with hazardous area standards are low risk. For example, risk assessment of Pay TV/telecommunication junction boxes shows the risk resulting from them being within the hazardous zone of the meter to be negligible.

Although smaller in number, the installations that are more significant are electrical and gas appliances within 1m of the meter installation, particularly gas appliances with a permanent pilot light or split system air conditioners. It is worth noting that these appliances are almost always installed by others after the gas meter has been installed by Multinet Gas. These installations are being addressed by Energy Safety Victoria by raising awareness amongst appliance installers of the requirements to maintain minimum clearances to gas meters. This should reduce the future incidence of this issue.

In addition these types of installations are dealt with on an opportunistic basis. As they are identified in the normal course of work they are reported to ESV for action.

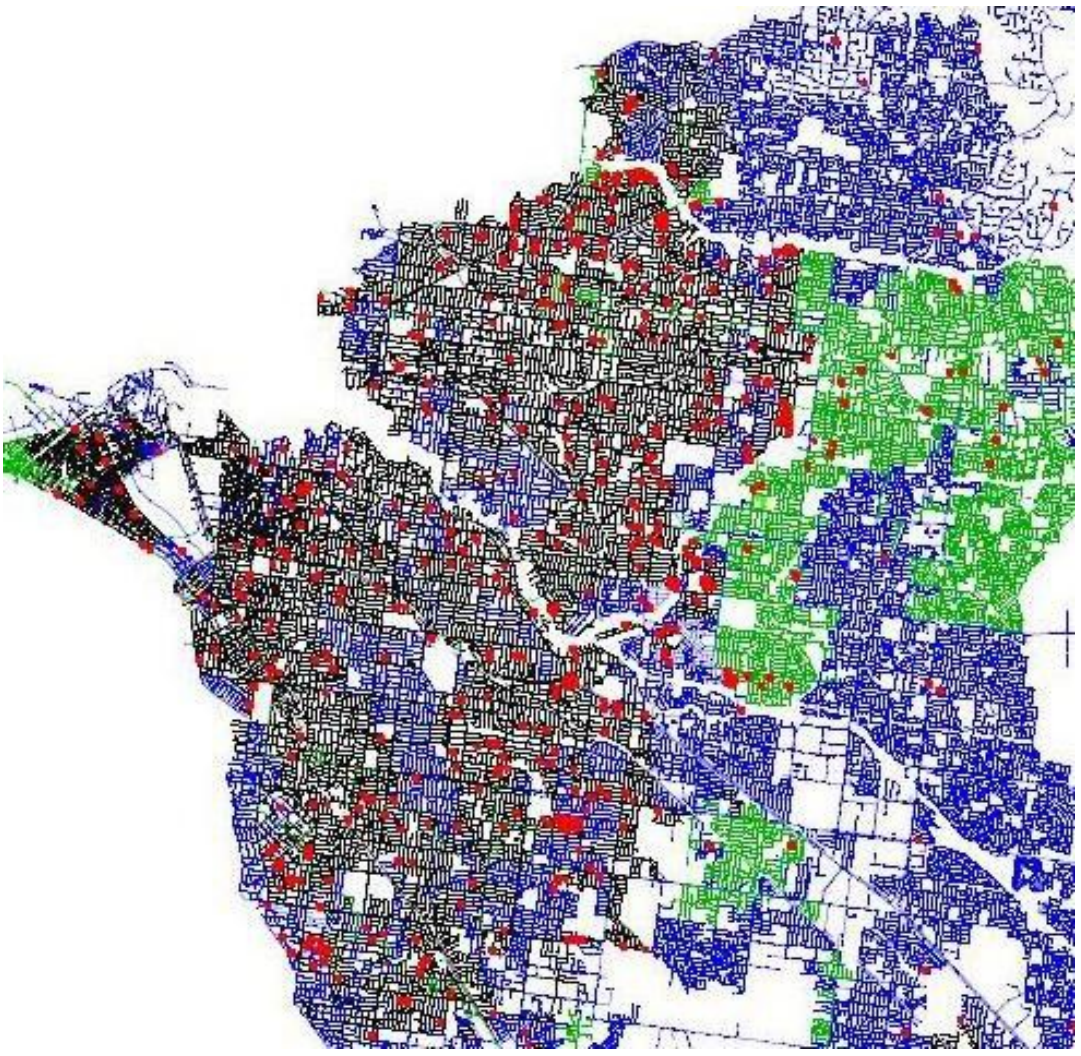
An engineering policy has been drafted to improve the identification and assessment of non-compliant meter installations. This document contains an on-site risk assessment tool to facilitate accurate assessment of the gas meter location by the Multinet Gas gasfitter/contractor.

Non-compliant installations will be identified on an opportunistic basis by the gas fitter during meter exchanges and faults and the risk assessment will be completed when required by the policy. Tens of thousands of meter locations are observed by gas fitters during these normal visits and it is anticipated that most of the network will be assessed in due course.

13.2 Discretionary Capital

The below chart shows the single outages created in the month of May 2011 alone. This clearly shows isolated areas of high frequency of outages. The priority over the program is to upgrade as many of those areas as possible within capital constraints.

Figure 13-11: Single Outages May 2011



The following locations are being targeted for replacement in 2012:

- Berkeley Ct, Kew
- Arthur Av, Brighton
- Loch St, Surrey Hills
- Jellicoe St, Box Hill
- Neil Ct, Bentleigh East
- Ozone Av, Beaumaris
- Pendle St, Box Hill
- Tashinny Rd, Toorak
- The Boulevard, Balwyn
- Violet Gv, Kew

Other areas of focus are detailed in the Mains Strategy and are highlighted in conjunction with Demand projects below.

Balwyn Nth Renewal and Grid Main Projects

These projects are a continuation of the strategy to decommission a large diameter medium pressure cast iron supply main that has been subject to a main collapse and include the replacement of approximately 30 km of low pressure cast iron and corroded steel mains with high pressure polyethylene mains and the construction of approximately 2 km of grid main. The drivers for this project include load reduction on the existing low pressure system which has no further capacity to accommodate load growth and load reduction on the upstream medium pressure system (sole supplied) which contains cast iron mains of a high priority for replacement. The load reduction on the medium pressure upstream system is part of the strategy to bring forward replacement of the high risk cast iron medium pressure mains. The upstream medium pressure cast iron supply main has already experienced a collapse resulting in an 8 hour emergency repair. Balwyn Nth low pressure network is also one of the worst areas of the network for water in mains/services complaints.

Lower Templestowe/Doncaster LP to HP

This project involves replacing approximately 40km of low pressure cast iron and corroded steel mains with high pressure polyethylene mains. The project is an adjunct to the Balwyn Nth projects and supports the same strategy involving decommissioning of the 300mm diameter medium pressure cast iron supply main and eventually the decommissioning of the 450mm diameter medium pressure cast iron supply main in the area.

Knox MP-HP

The continuation of previous projects in accordance with the long term plan to augment the capacity of the MP in the Mount Waverley area.

This project involves upgrading existing medium pressure mains to high pressure to address the lack of supply capacity in this area and the dust issues that were escalated in 2011.

Kew East LP-HP Upgrade

This project includes the replacement of approximately 30km of low pressure cast iron and corroded steel mains with high pressure polyethylene mains. The drivers for this project include load reduction on the existing low pressure system which has no further capacity to accommodate load growth and load reduction on the upstream

medium pressure system (sole supplied) which contains cast iron mains of a high priority for future replacement. The load reduction on the medium pressure upstream system is part of the strategy to bring forward replacement of the high risk cast iron medium pressure mains in future years.

Kew LP-HP Upgrade

This project includes the replacement of approximately 30km of low pressure cast iron and corroded steel mains with high pressure polyethylene mains. The drivers for this project include load reduction on the existing low pressure system which has no further capacity to accommodate load growth and reduction of consistent water in mains problems in the Kew area. This project is the first major upgrade of the Kew suburb and will permit further upgrades necessary in the coming years.

Lower Templestowe/Buleen LP-HP Upgrade

This project involves the replacement of approximately 30 km of low pressure cast iron and corroded steel mains with high pressure polyethylene mains. It aligns with the works initiated with the Balwyn Nth renewal which ensures the strategic elimination of high risk large diameter cast iron mains operating at MP.

Tooronga HP

Augmentation is forecast as necessary at this time when the impacts of pipework projects planned in the Balwyn, Canterbury and Bulleen areas in the years 2012/13 and onwards are considered.

Malvern – CTS Upgrade

The Ewart Street Custody Transfer Station is operating at close to capacity based on transfer point metering accuracy compliance. Consequently, APA Group (upstream supplier) has alerted MGH to the need for augmenting the capacity of the station.

The ability to economically transfer load away from this site as was successfully achieved for the planned augmentations of Clayton and Noble Park Custody Transfer Stations is not possible for this site.

DTS/Lurgi CTS Upgrade

The DTS/Lurgi Custody Transfer Station in the Dandenong Terminal Station compound (DTS) is operating at close to capacity based on transfer point metering accuracy compliance. Consequently, APA Group has alerted MGH to the need for augmenting the capacity of the station.

As above, the ability to economically transfer load away from this site as was successfully achieved for the planned augmentations of Clayton and Noble Park Custody Transfer Stations is not possible for this site.

CTS Noble Park

The Noble Park custody transfer station has operated at near design capacity for many years. Based on forecast load growth and projected network boundary changes, e.g Mulgrave HP reinforcement 2012/13, it is expected this transfer point will be further burdened substantially and it will therefore be necessary to augment this facility for winter 2013.

CTS Clayton

The Clayton custody transfer station is operating at maximum design capacity. Earlier augmentation was deferred by the adoption of transferring load away from it, principally to the DTS/Lurgi CTS which will itself have reached its design operating condition. Consequently a continuance of the strategy applied to this time will be ineffective in diminishing total spend and is strategically inferior since this would place unnecessary disproportionate reliance on a small number of transfer points.

Vermont HP Regulator Consolidation

The Vermont Outstation contains a TP to MP above ground pressure reduction station consisting of four regulator runs.

To ensure stable operation the outlet pressure of each run is required to be set at least 5 kPa below that of another in cascading manner, which results in a minimum of 15 kPa lesser outlet pressure when each run operates at capacity to meet network load requirement. The MP network operates at a normal operating pressure of 60 kPa and at specific sites at 70 kPa during winter periods. Consequently the significant loss of network capacity when supplied at 45 kPa from this site triggers a need for network mains reinforcement that has been assessed to be less cost effective than enabling a higher operating pressure from this site by enlarging regulators and modifying pipe work on two runs to recover at least 10 kPa starting pressure.

Mulgrave HP

The former AFL park area redevelopment has placed significant additional load on a fringe of the Knox HP network which is strategically, and cost effectively better supplied from the south via the Noble Park transfer point. To support this area ahead of valve closures that will transfer the load to the Mulgrave HP system it is necessary to increase the capacity of Mulgrave HP through mains reinforcement works that will improve interconnectivity and network capacity

Sherbrooke Reinforcement

The project reinforces the Olinda Sth HP network, primarily in the proximity of the Gembrook City Gate since Olinda Sth HP experienced and is forecast to continue to experience above average load growth in areas distant from the source. The distance induced sensitivity requires considerable mainlaying to keep pace with the rate of pressure deterioration. The fringe pressure during winter 2009 was up to 60kPa below the design minimum.

Highett / Cheltenham / Parkdale / Mordialloc LP-HP upgrade

This project involves the replacement of approximately 50 km of low pressure cast iron and corroded steel mains with high pressure polyethylene mains. The bayside region has been targeted for replacement over recent years due to the poor operational performance and deteriorating condition of assets. The work will be conducted in two parts, one in each year, followed by further upgrades in the adjoining Mentone and Sandringham areas in the later years of this planning period.

14 Non-Network Plan

14.1 Background

This plan is to detail future capital expenditure on assets deemed to be non-network. Non-network assets are not necessary or critical to the operation of the network and can be property, buildings and gas specific equipment.

Gas specific equipment includes, but not limited to;

- Large diameter butt fusion equipment
- Large diameter polyethylene stopple equipment
- Various cast iron and steel stopple equipment
- Electrofusion control boxes
- PDE"s for meter reading
- Insertion cameras
- Inspection and test equipment for Cathodic Protection systems
- Gas detectors
- Gas pressure data loggers (cello)
- Gas pressure measurement equipment for commissioning and testing

14.2 Maintenance and Replacement Strategies

Generally the maintenance required is asset specific and basic in nature and usually pressure tests and electrical certification testing. Replacement of gas specific equipment is not routinely implemented. Generally the tools have an approximate life of 20 years and major enhancements to technology force upgrades where cost effective upon tool failure or end of life performance.

14.3 Current Projects

14.3.1 South Melbourne depot

The South Melbourne depot is the remainder of the South Melbourne gas works site. The site has small car park, gas regulation facilities and an office and is surrounded by high brick walls and a locked gate.

The land is contaminated from coal gas production, the office building is not used and contains asbestos and the building housing the regulator facilities is heritage listed.

The site has been partially renovated due to the degradation of the parapet wall on the No.2 building and a section of perimeter wall on Richardson St for safety concerns. No further structural works are expected in the near future. The asbestos has been recently risk assessed and what required removal was conducted in 2011.

14.3.2 Gas Specific equipment

The pressure measuring devices (Druck and manometer) are at least 15 years old and require progressive replacement.

The tube benders and flares are for pilot operated regulators. These pilot tubes can hold very high pressures and are likely to fail if they are not bent with correct tools.

The current gas detectors are beginning to show signs of age and a progressive replacement is advised.

An additional insertion camera is proposed after the successes of the first camera roll out in 2010.

Refer Financial Summary Table – Executive Summary for the Non Network Capital Expenditure forecast.