Jemena Gas Pipelines Holdings Pty Ltd

Safety Case for Eastern Gas Pipeline & VicHub Pipeline

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Abbreviations

ABS	Asset Business Strategy
ACM	Asset Class Managers
ACS	Asset Class Strategies
AIP	Asset Investment Plans
ALARP	As Low As Reasonably Practicable
AMS	Asset Management System
AMT	Area Management Team
APAIR	Asset Performance and Integrity Review
APSC	Asset Public Safety Committee
AS	Australian Standard
COWP	Capital and Operational Work Plans
DBYD	Dial Before You Dig
ECMS	Enterprise Content Management System
EGP	Eastern Gas Pipeline
EMP	Emergency Management Plan
EMT	Emergency Management Team
FSA	Formal Safety Assessment
GIS	Geographic Information System
GSMRC	Gas Safety Management Review Committee
GTCR	Gas Transmission Control Room
HAZOP	Hazard and Operability Study
HSE	Health Safety and Environment
HSEC	Health Safety and Environment Council
KGMS	Kembla Grange Meter Station
MAOP	Maximum Allowable Operating Pressure
RHSEC	Risk, Health, Safety & Environment Committee
SGSPAA	State Grid Singapore Power Australian Assets
SMS	Safety Management Study
PKET	Port Kembla Energy Terminal
PKP	Port Kembla Pipeline
VicHub	VicHub Gas Pipeline

Overview

This document is Jemena's Safety Case for its Eastern Gas Pipeline (**EGP**) and VicHub Gas Pipeline (**VicHub**) assets. The document provides a summary of the approach to managing gas safety risks and is made up of the following seven (7) elements.

This Safety Case describes the operation and maintenance of gas assets in a safe and reliable manner. The arguments and evidence for safety is assured by an appropriate Asset Management System (**AMS**) operating under a controlled environment in accordance with the applicable gas legislation and regulatory instruments across various Australian jurisdictions.

The Safety Case represents a commitment by Jemena to ensure its assets are operated and maintained in a controlled environment with the purpose and objective that assure:

- The safety of the public and persons working on or near the gas assets;
- The protection of property and environment;
- The prevention of uncontrolled release of gas;
- The commitment to prevent the delivery of out-of-spec gas; and
- The protection of the community from threats to safety arising from overpressure and the loss of supply.

1. Safety Case Purpose and Objectives

1.1 Purpose

1. The purpose of this Safety Case (Safety and Operating Plan / Pipeline Management Plan referred to as Safety Case) is to demonstrate and communicate a convincing and evidence-based safety argument for the management of gas assets throughout their life cycle, providing a description of:

- The network, including network design, configuration, asset types, location and geography, and technical and management challenges related to the safety argument;
- The nature of gas safety risks faced by the business;
- The methodologies used to identify and assess gas pipeline safety risks;
- Risk appetite which is “the amount and type of risk that the organisation is willing to take in order to meet its strategic objectives”;
- How gas safety risks are controlled to minimise these risks as far as practicable, including providing evidence of control effectiveness; and
- The extent and role of asset management and safety management systems in ongoing management, monitoring and governance.

1.2 Safety Case Intended Audience and Benefits

2. The Safety Case is intended to inform and educate external stakeholders including government bodies, economic and technical regulators, local communities and customers. To facilitate understanding by external stakeholders who may have limited knowledge of gas technical matters, the Safety Case provides a simple explanation of the nature of gas safety risks and Jemena’s approach to risk management.

3. The structure of the Safety Case aims to enable stakeholders to review particular areas of interest without reading the entire document. **Table 1–1** provides a list of the safety case elements described:

Table 1–1: Safety Case Elements

Description	Element
Asset Description provides a description of physical infrastructure that make up the asset including in-built component or parts available for use in case of emergency with the purpose to prevent unintended consequences as well as maintain asset objectives.	Element 2
Operating Environment provides context related to: Stakeholders / community expectations Historical performance and trends Asset condition and integrity	Element 3

Description	Element
Safety Risk Assessment and Management provides an overall framework understanding of Jemena's: Risk Identification, analysis and evaluation Risk Management – application of resources and controls to risk processes Significant Risks – provision of asset risk registers.	Element 4
Safety Management System describing the Safety Management System and supporting processes that Jemena has in place to provide for the safe and reliable operation of gas assets (transmission and distribution) in accordance with Jemena's operational, societal and environmental objectives as well as legislation, industry standards and specific pipeline licence conditions.	Element 5
Emergency Management System providing the system for managing events which are impacting on the business and have been classified as being an emergency.	Element 6
Governance (Management Review and Assurance) provides the basis by which Jemena assures that its asset management systems have adequate processes and systems in place to satisfy the safety case purpose and objectives, meets applicable statutory and regulatory requirements and maintains and improves Jemena reputation and stakeholder expectations.	Element 7

1.3 Objectives

1.3.1 Business Objectives and Strategies

4. Jemena is committed to meeting its legislative and regulatory requirements to operate and maintain a safe and reliable asset in Australia.

5. Our key corporate objectives and strategies are:

- **Safety**: Embed a world class safety culture by implementing our People Safety and Environment strategy to build and continuously improve leadership culture, manage Gas risks and safeguard the health and well-being of all personnel;
- **Customer**: Deliver energy services that are safe, reliable, affordable and responsive to our customers' preferences;
- **People**: Be a high performing and engaged workplace that attracts, develops and retains industry leaders;
- **Performance**: Deliver operational and financial efficiencies aligned to the business plan; and
- **Growth**: Grow scale to be an influential market leader with strong customer, regulatory, stakeholder and community relationships. Deliver financial performance that is superior to our industry peers.

6. Further details of Jemena's business objectives and strategies can be found in the Jemena Business Plan 2015-2020.

1.3.2 Safety Case Objectives

7. The objectives of the Safety Case are to:

- Present a set of reasoned safety arguments and evidence that the asset is operated and maintained in a safe and reliable manner within a controlled operating environment in accordance with applicable legislative and regulatory instruments across various jurisdictions in Australia;
- Describe the assets and the controls that are applied to eliminate or mitigate these risks to asset safety, people and environmental to as low as reasonably practicable (**ALARP**); and
- Inform stakeholders of the context, operating environment and challenges faced in identifying, assessing and controlling gas safety risk.

1.4 Scope

8. The scope of the Safety Case is for Jemena EGP/VicHub pipeline assets. It will take into account the applicable details as per Element 2 of this document and the gas assets as described in **Appendix A**.

9. The EGP operates under two licences, Victorian Licence PPL232 and New South Wales (NSW) Licence PPL26. The VicHub operates under Victorian Licence PPL247.This Safety Case addresses the requirements of Australian Standard (**AS**) 2885 and includes information as required by the relevant legislative and regulatory requirements.

1.5 About Jemena

10. Jemena Limited owns and operates a diverse portfolio of energy and water infrastructure assets across the east coast of Australia. With more than $9 billion worth of major utility infrastructure, we supply millions of households and businesses with essential everyday services.

11. The following **Table 1–2** lists 100 per cent ownership by Jemena Limited:

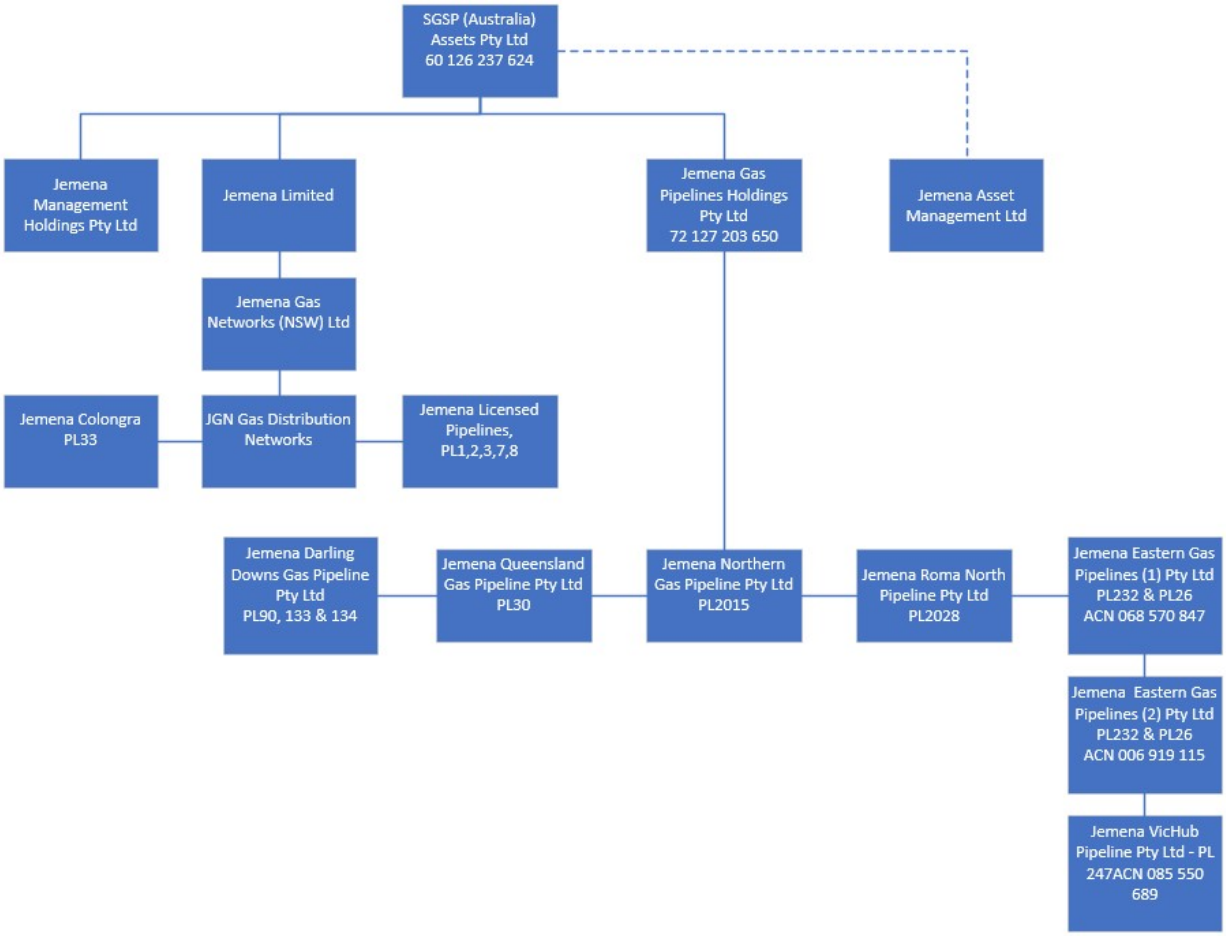
Table 1–2: Jemena Assets

Asset	Description
Jemena Gas Network	Established in 1837, the 25,000 km system delivers gas to more than 1.3 million homes, businesses and industrial customers in NSW.
Queensland Gas Pipeline	627km pipeline delivers gas from the Surat/Cooper Basin to the Gladstone and Rockhampton markets.
Eastern Gas Pipeline	797km pipeline delivers gas from Victoria's Gippsland Basin to Sydney, the Australian Capital Territory (ACT) and regional NSW.
VicHub Pipeline	The is an interconnect facility and 2km pipeline located in Longford enabling gas to flow between the EGP and the Australian Pipeline Association Victorian Declared Transmission System.
Northern Gas Pipeline	This is a new underground natural gas pipeline. Commissioned in 2019, the pipeline is 622km in length and connects the Amadeus Gas Pipeline at the Warrego Compressor Station (in the Northern Territory) to the Carpentaria Gas Pipeline at Mount Isa (in Queensland). The pipeline traverses 457km of land in the Northern Territory and 165 km in Queensland.
Roma North Gas Pipeline	This is a 5.2km DN200 pipeline. This start of line compressor station includes three reciprocating compressors, three screw compressors and a gas dehydration system. The end of line metering facility ties into the Comet Ridge to Wallumbilla Pipeline (adjacent to the Queensland Gas Pipeline). There is the potential for this pipeline to be tied into the Queensland Gas Pipeline at approximately KP43.1.
Atlas Gas Pipeline	This is a 60.48 km DN200 pipeline. This start of line compressor station includes seven reciprocating compressors, seven screw compressors, gas dehydration system, metering and an oily water separator. The end of line tie-in facility ties into the Darling Downs Pipeline PPL134 at approximately KP37. There are scraper stations at each end of this pipeline allowing for inline inspections.
Darling Downs Pipeline	The pipeline is three interconnected gas transmission pipelines in the Darling Downs region in South East Queensland that operate as a single pipeline network and spans 292km in length.
Colongra Gas Transmission and Storage Facility	13 km pipeline and compressor station transports and stores gas for Delta Electricity's 667 MW gas fired peaking generator.

Asset	Description
Jemena Electricity Network	The 6,301 km system delivers electricity to more than 327,000 homes and business in north-west Melbourne.

12. Jemena Limited is 60% owned by State Grid of China and 40% by Singapore Power via State Grid Singapore Power Australian Assets (**SGSPAA**) Pty Ltd. **Figure 1-1** provides the company structure:

Figure 1-1: Company Structure



1.6 Risk Management Philosophy

13. Gas safety risks may arise from a number of issues including failure or deterioration of an asset. On a pragmatic basis, Jemena will seek to remove the risk and if this is not possible, will mitigate the risk as far as practicable. Jemena draws on its safety management policies, philosophies and commitments to risk management. Accordingly, the policies aim at the following:

- Managing our assets without compromising employees, contractors and public safety as per the Jemena Health and Safety Policy and Compliance with the Law Policy;
- Managing our assets in an environmentally sustainable manner in support of the Jemena Environmental Policy;
- Complying with all relevant regulatory and legislative requirements;
- Meeting our stakeholder and customer expectations;

- Ensuring that asset management plans deliver against corporate and business plan objectives;
- Applying the Jemena risk management approach to asset management and related activities; and
- Facilitating continual improvement in the safety, reliability and performance of our assets, through the establishment, maintenance and governance of effective asset and safety management systems.

14. Jemena's asset management philosophy is the coordinated activity Jemena undertakes to realise value from assets. It involves the balancing of costs, opportunities and risks against performance of assets to achieve Jemena's Business Plan. An effective AMS enables Jemena to direct, coordinate and control asset management activities throughout an asset's whole life. It facilitates an optimal mixture of capital investments, operations, maintenance, resourcing, risks, performance, sustainability and good governance. In order to drive good practice asset management throughout Jemena, a systematic, documented AMS has been established which is consistent with the requirements outlined in ISO 55001, and in alignment with the Institute of Asset Management's 'Asset Management – An Anatomy'.

15. Jemena's has obtained certification of its AMS to the international standard ISO 55001:2014 - Asset Management-Management Systems which is underpinned by ISO 31000 Risk Management (a global standard for risk management). ISO 55001 emphasizes identifying and controlling risks affecting internal and external stakeholders of the defined asset portfolio, while looking for opportunities for continuous improvement throughout the asset life cycle.

1.7 Risk Appetite

16. Our Risk appetite is the amount and type of risk that Jemena is willing to take in order to meet our objectives.

17. Jemena's risk appetite is determined by the Board and underpinned by our legislative obligations.

18. Jemena's risk appetite is reflected in the Jemena corporate risk matrix which is a table used during risk assessment to define the various levels of risk as the product of the harm probability categories and harm severity categories. (Refer to **Table 1–3** for further details).

19. In general, risks are identified and analysed via workshops which allow the subject matter experts to define the risks, consequences and likelihoods which in turn is used to assign the risk rating. Once the risk is analysed, to minimise the risks as far as practicable, attempts are first made to eliminate the risk and only when the risk cannot be eliminated then the risks are then mitigated using appropriate strategies.

20. The prioritisation of risk for attention across the different levels of management is set out in **Table 1–3**.

21. For risk assessments performed as part of AS2885 Safety Management Study (**SMS**) process, the AS2885 risk matrix is used as mandated by the standard. It is acknowledged that the AS2885 matrix takes precedence over the Corporate matrix in this instance.

Table 1–3: Risk Acceptability, Prioritisation and Escalation

Risk Rating	Acceptability	Action	Timing
EXTREME	**Generally Intolerable.** Cannot be accepted except under extraordinary circumstances with approval at Board-level.	Requires immediate action. Highest priority to treat risk. Senior level monitoring.	Action plans prepared and normally implemented within 1 month. Status of risk should be monitored monthly.

Risk Rating	Acceptability	Action	Timing
HIGH	**ALARP or Tolerable Region.** Must drive risks towards Broadly Acceptable Region. Risks only tolerable if further risk reduction is impracticable and cost of reducing the risk is grossly disproportionate to the benefits gained.	Requires immediate attention – must manage with senior level monitoring. Includes Jemena Executive Team oversight of Unlikely Likelihood, Catastrophic Consequence Events.	Action plans prepared and normally implemented within 3 months. Status of risk should be monitored monthly.
SIGNIFICANT		Requires Management attention with a degree of priority. Includes Jemena Executive Team oversight of Rare Likelihood, Catastrophic Consequence Events. High level monitoring.	Action plans prepared and normally implemented within 6 months. Status of risk should be monitored every 6 months.
MODERATE	**Broadly Acceptable Region** Risk reduction may be disproportionate to benefits gained	Requires routine to periodic monitoring.	Action plans prepared and normally implemented within 6 months. Status of risk should be monitored at least every 6 months.
LOW		"Business as usual" - should be reviewed at least annually. Managed by routine policies and procedures.	Ongoing control as part of a management system. Risk Facilitators to maintain register of Low risks and reassess annually.

1.8 Risk Based Asset Management

22. Risk management draws on Jemena's processes which is aligned to the principle and requirements of AS/NZS ISO 31000.

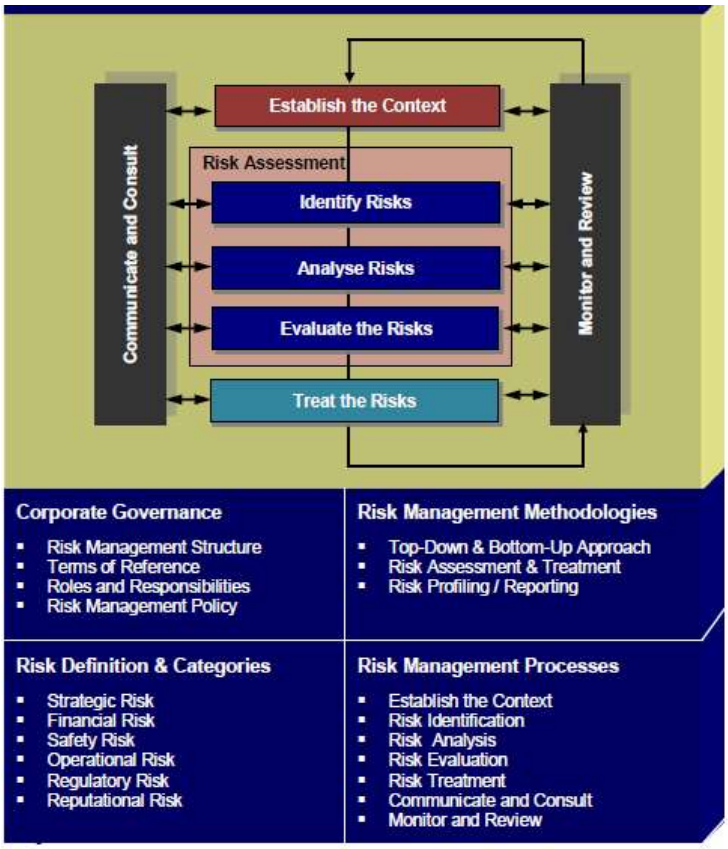
23. Jemena is committed to risk-based asset management. Risk management is implemented at all functional levels to the appropriate risk appetite to meet the business and safety case objectives. Jemena has a well-developed Corporate Risk Management process tailored to meet all contingencies, in alignment with the JAA MA 0050 Group Risk Management. These procedures ensure that strategic, tactical and operational decision making is applied consistently across the organization.

24. Risk assessment is the overall process of risk identification, risk analysis and risk evaluation. Risk assessments are usually completed in workshops facilitated by members of the Asset Risk and Assurance team and attended by managers, subject matter experts, employees and contractors.

25. The risk assessments are documented within a risk register and they are updated and reassessed periodically to ensure that the risks and their controls are current, relevant and reliable.

26. Jemena's Risk Management Framework is shown in **Figure 1-2**:

Figure 1-2: Risk Management Framework



27. The General Manager, Internal Audit and Risk supports the Executive Risk and Management Committee, Managing Director and Risk, Health, Safety & Environment Committee (**RHSEC**) in their governance roles and has a dual reporting line, with a solid line reporting relationship to the RHSEC and a dotted line reporting to the SGSPAA Managing Director. The Risk Manager is responsible for ensuring regular and structured communication between all External Service providers, Risk Facilitators and the Jemena Risk team.

28. The following sub-committees function under the RHSEC, which evaluate all relevant risks:

- Health Safety and Environment Council (**HSEC**) – deals with health, safety and environmental risks;
- Asset Public Safety Committee (**APSC**) – deals with asset and public safety;
- Asset Management System Review Committee – AMS Management Review; and
- Gas Safety Management Review Committee (**GSMRC**) – deals with gas and water risks.

29. The Managing Director SGSPAA uses the above committees to facilitate the development of a common risk management approach across SGSPAA by:

- Implementing a Risk Management Framework;
- Sharing information that has broad applicability across all areas of the business;
- Reporting on the progress of implementing the Risk Management Framework;

- Chairing the Executive Risk Management Committee; and
- Integrating risk management as part of business-as-usual activities.

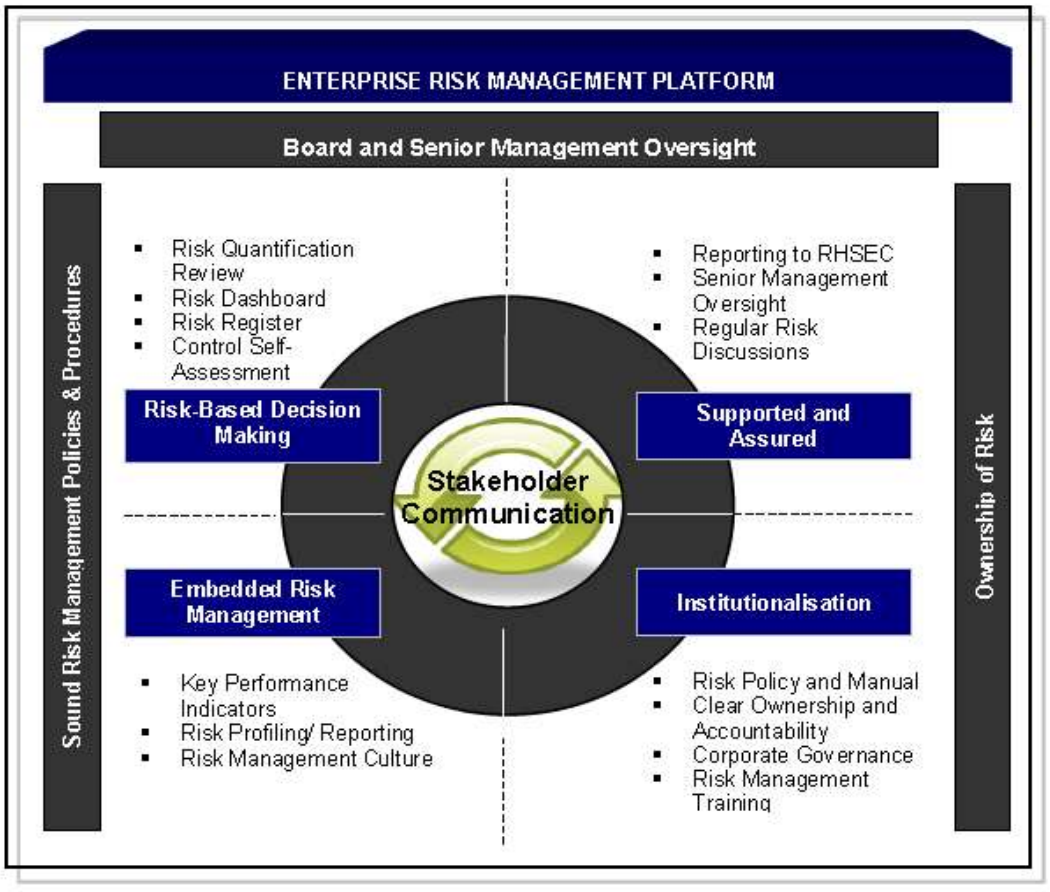
30. SGSPAA recognises that effective risk management requires three key pillars to be in place, namely:

- SGSPAA Board and Senior Management oversight;
- Sound risk management policies and procedures; and
- Active participation by all personnel to risk management practices.

31. The SGSPAA Board has corporate governance responsibilities and meets on a monthly basis to discuss risk prioritisation, escalation, risk management and reporting requirements to fulfil Jemena's safety objectives and legal requirements.

32. **Figure 1-3** below represents the arrangements for senior management oversight of the Risk Management Platform.

Figure 1-3: Enterprise Risk Management Framework



1.9 Overview Of Risks Faced by Jemena

33. For the purpose identifying and efficiently managing risk, Jemena adopts the following six risk categories:

- **Strategic Risk**- Risks that prevent Jemena from achieving its strategic objectives and impacts the business model;

- **Financial Risk**- Risks associated with inadequate financial management or a loss arising from changes in the financial market variables;
- **Safety Risk, including Gas Safety Risk**- Risks associated with harm to the public, workers and contractors, including physical and mental harm to any person contributed by Jemena's assets or personnel;
- **Operational Risk**- Risks which have adverse impacts on quality, cost and performance of the gas safety resulting from failed processes, policies, systems and people or from external events. They can broadly be sub-classified as risks associated with *Asset Management, Asset Security, Technical, Project Management, Environment, Disaster Recovery, Emergency Management, Commercial Management, Human Resources, Business Continuity, Information & Communication Technology and Regulatory and Compliance*;
- **Regulatory Risk**- Risks associated with additional scrutiny by a regulator or risks from regulatory/legislative changes or uncertainty emerging from any such changes; and
- **Reputational Risk**- Risks attributed to negative publicity that impacts the brand, image or confidence of stakeholders in the business.

1.10 Gas Safety Risks

34. For the purpose of identifying, assessing and controlling gas safety risk, the following risk categories are considered significant and underpinned by this safety case:

- Uncontrolled release of gas;
- Overpressure of gas supply;
- Delivery of 'out of spec' gas quality; and
- Loss of supply.

2. Asset Description

35. The asset description is documented as required by AS 2885 for the specific asset and describes the activities, or operation, and configuration of the asset and details technical and other control measures identified as a result of safety assessment of the pipeline.

36. The asset description is outlined as follows:

- Overview map – typically a Geographic Information System (**GIS**) map and any additional imagery;
- Pipeline system specification;
- Facility components; and
- Operating parameters.

37. Refer to **Appendix A** for details.

3. Operating Environment

38. Jemena operates in an environment defined by its asset characteristics and condition, ownership and control, stakeholders, regulatory objectives and financial considerations. The operating environment is crucial in managing and future proofing asset safety and reliability and enable the business to remain focussed on the key gas safety risks (refer to 1.10).

39. Jemena's view of its operating environment aims to meet expectations and commitments as set out by the following business drivers and in compliance with applicable legislative and regulatory requirements:

- Stakeholders / community expectations;
- Historical performances and trends; and
- Asset condition and integrity.

3.1 Stakeholder / Community Expectations

40. Ownership, operation and maintenance of public utility gas asset infrastructure places *inherent* (implied) and *stated* expectations on Jemena and is collectively viewed under the stakeholder and community expectations.

41. Jemena stakeholders include investors (typically the board), technical and commercial regulators, emergency services, voluntary subscription entities, the local communities and customers, retailors, market determinants, contractors and employees.

42. The '*stated'* requirements are nominally dictated by the various gas safety codes and the legislative requirements. In addition, the '*implied'* requirements (perceived or collated expectation) is captured through various consultative and communication channels with the community/public and other stakeholders. This allows Jemena to respond to changes or emerging business needs and remain focussed to evolving operating environments. Also included is the ability to provide the necessary assurance to the communities with respect to asset safety and reliability, the emergency response arrangements through various community engagements and involvements processes.

43. The asset management system (underpinned by Jemena corporate objectives) is the system by which these expectations are satisfied. The system allows a process for effective decision (strategic, tactical and operational) making and deployment of effective interventions to operate and maintain assets satisfying stakeholder / community expectations.

3.2 Historical Performance and Trends

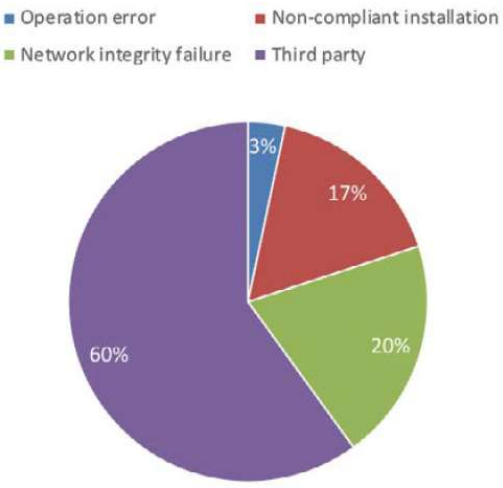
44. Jemena demonstrates performance to the technical or other regulators and internal management with regards to safety. The key reporting is against a set of specified requirements by the regulators as well as those established internally by Jemena. The results of reported performance that are publicly available and help support stakeholders towards planning and assessments needs. Gas Pipeline reports reflect status of distribution and transmission assets respectively to the community.

45. The publicly available reports on performance and trends can be accessed from the respective regulatory entity websites and includes a status summary of the following performance measures:

- Asset Information;
- Accidents Escapes and Ignition; and
- Operational Performance.

46. Key reportable incidents by cause, detailed in the Energy Safe Victoria (ESV) "Gas and Pipeline Infrastructure Safety Management Report – 2016/17" are as shown in **Figure 3-1**.

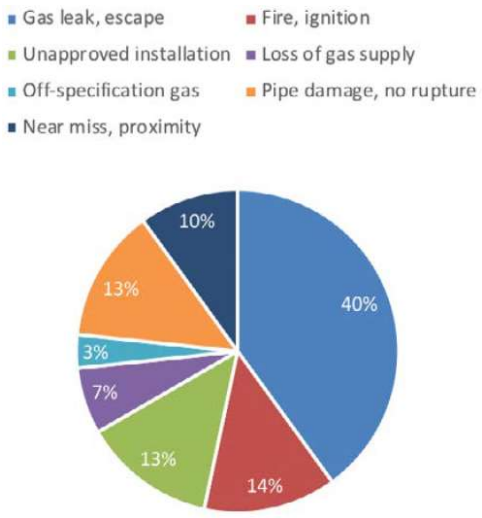
Figure 3-1: Reportable incidents by cause



Cause	Definition
Operation error	Misuse of operating system or failure to execute control mitigation procedures (for example, management of Supervisory Control and Data Acquisition).
Non-compliant installation	An installation that does not meet the prescribed Australian Standard (for example, a main-laying installation that does not comply with AS 4645).
Network integrity failure	Degradation of an asset or the inability for a system to deliver in its intended purpose (for example, ageing infrastructure that has become brittle resulting in ineffective joint seal).
Third party	Any individual or organisation that does not have a legal transaction with the relevant asset owner (for example, installation of electrical conduit within three metres of a licensed pipeline).

47. Key reportable incidents by category, detailed in ESV's "Gas and Pipeline Infrastructure Safety Management Report – 2016/17" are as shown in **Figure 3-2**:

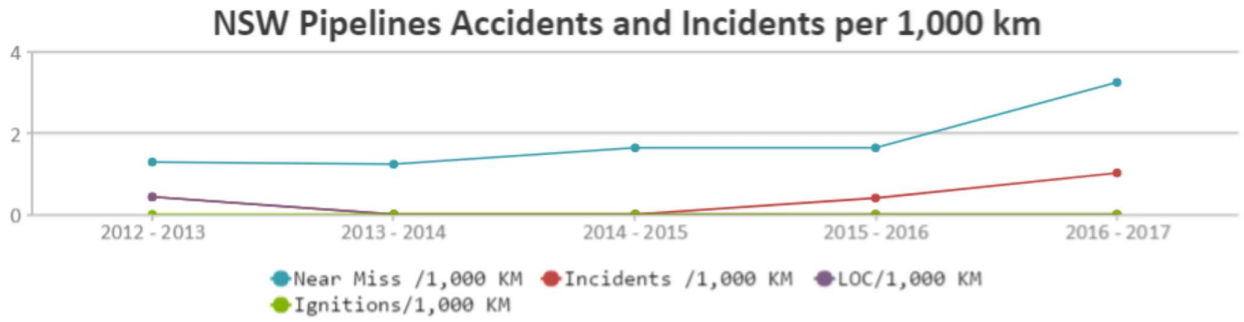
Figure 3-2: Reportable incidents by category



Category	Definition
Near miss, proximity	Unauthorised excavation within three metres of a licensed pipeline.
Gas leak, escape	Unplanned gas release.
Fire, ignition	Unplanned gas release that ignites.
Unapproved installation	Gas installation that does not meet the prescribed Australian Standards.
Loss of gas supply	Interruption of supply customers.
Off-specification gas	Conveyance, supply or sale of gas that does not meet the minimum quality prescribed by the Gas Quality Regulations.
Pipe damage, no rupture	A hit on a main or service that damages the asset without causing an escape of product.

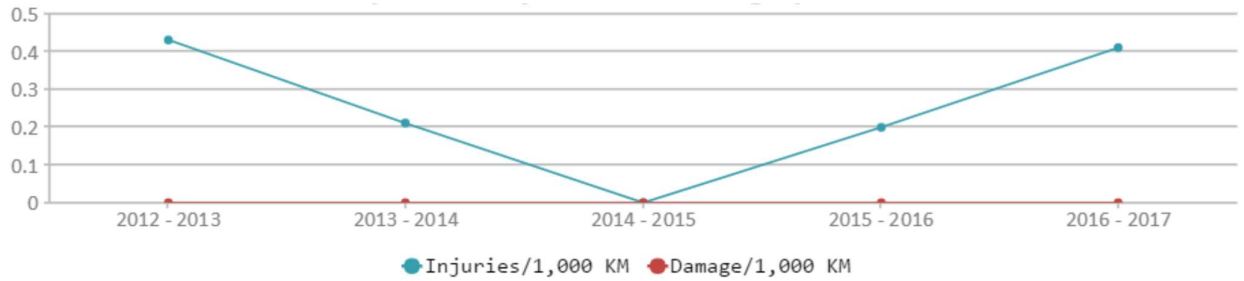
48. Key performance indicators for pipeline accidents and incidents reported in the NSW Government's "2016-17 Licensed Pipelines Performance Report" include the following in **Figure 3-3**:

Figure 3-3: Incidents on NSW Pipelines per 1,000 km



49. Key performance indicators for pipeline injury and damage reported in the NSW Government's "2016-17 Licensed Pipelines Performance Report" include **Figure 3-4**:

Figure 3-4: NSW Pipeline Injuries & Damage per 1,000 km



50. Internally Jemena monitors and reports monthly on key safety performance indicators for each asset (as per its operating licence). The measures enable Jemena to respond to a changing operating environment with appropriate asset management intervention and meet its core business objectives. These include:

- Asset Safety;
- Asset Performance;
- Emergency Response and Customer Outages;
- Asset Condition; and
- Control Effectiveness.

51. A sample of EGP specific performance can be found below in **Figure 3-5**, **Figure 3-6**, **Figure 3-7** and **Figure 3-8**.

Figure 3-5: Number of pipeline damage incidents (EGP Victoria)

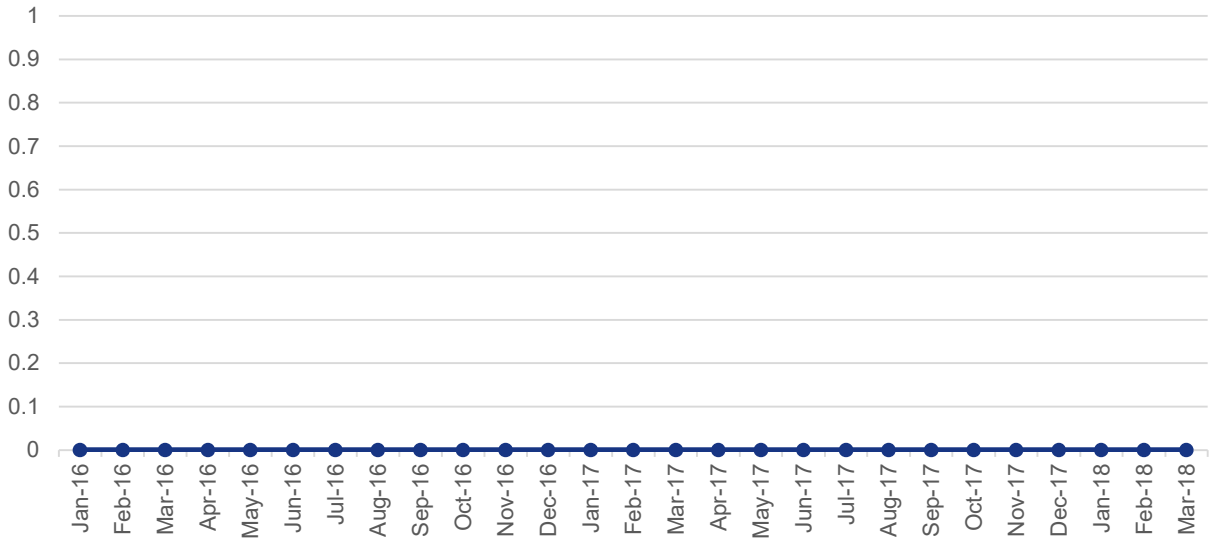


Figure 3-6: Number of unauthorised 3rd party activities near transmission pipelines (EGP Victoria)

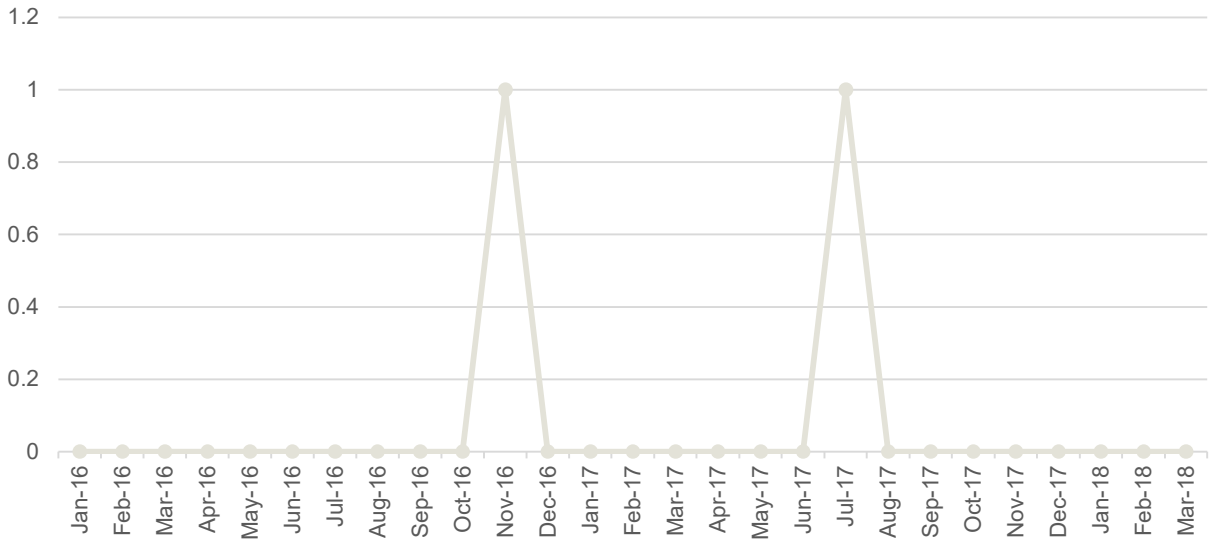


Figure 3-7: Number of significant gas leaks (EGP Victoria)

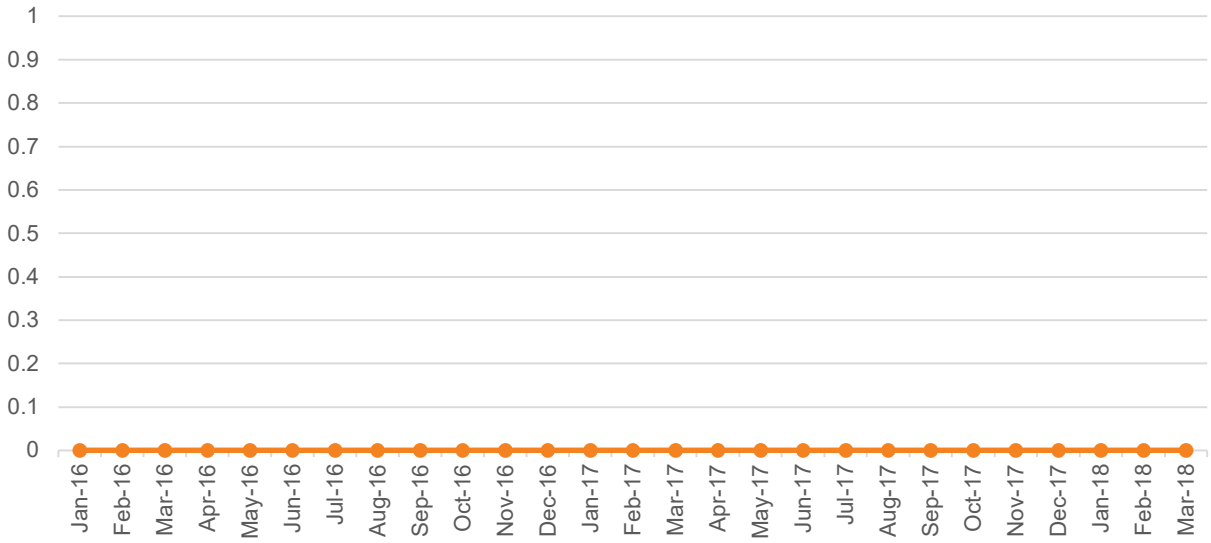
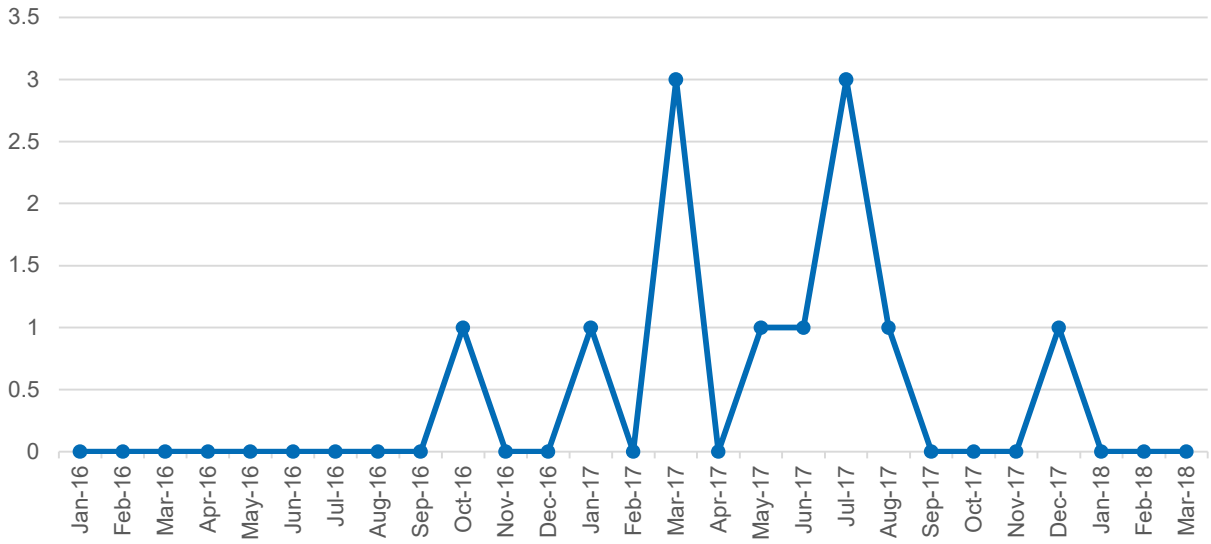


Figure 3-8: Number of unplanned gas release (EGP Victoria)



52. The 2016-17 EGP Annual Asset Performance and Integrity Review (APAIR) report has identified no known issues on the pipeline which would impact the EGP and its laterals in providing the design capacity or requiring a reduction in Maximum Allowable Operating Pressure (MAOP). The asset performance remains Strong.

3.3 Asset Condition and Integrity

53. Asset safety and performance can be impacted in many ways along the lifecycle of the asset. These include a range of issues from poor design and construction to inadequate maintenance or operational procedures through to third party activities. The case for safety of the assets must therefore consider these various aspects that affect asset condition and integrity and thereby to asset safety. The process of assessing this is done through periodical monthly monitoring and reporting as referred in section 3.2 and internal reporting through the annual APAIR. The focus of the APAIR is to assess the overall function performance of the asset against the asset performance objectives, review condition assessment data and assess the effectiveness of key risk control functions. These findings feed directly into the update of the asset class risk registers and provides the basis for assessment of the effectiveness of asset management strategies and plans to meet its core business strategy and objectives and help maintain asset safety within the operating environment i.e. exposure and proximity to communities, impacts to environment and people safety working with or near gas assets.

4. Safety Risk Assessment and Management

54. The gas asset safety risk assessment and management is an assessment, or series of assessments essentially reinforced by risk principles as noted in element 1 of this document. These asset risk assessments include the following structured methodologies:

- Safety Management Study (**SMS**) (under AS 2885);
- Formal Safety Assessment (**FSA**) (under AS 4645); and
- Hazard and Operability Study (**HAZOP**) (under AS 2885).

55. To establish the 'line-of-sight' from the perspective of the AMS, the Strategic Business Objective level risks are flowed down into asset specific risks and maintained via the asset risk register loaded in the Jemena Compliance and Risk System (**Omnia**).

56. AMS risks are periodically evaluated to determine if they are ALARP (or continue to remain) at a level that is within the risk appetite taking into consideration a robust control effectiveness assessment. These control assessments occur through a combination of self-evaluation and facilitated workshops (via Asset Risk and Assurance, an independent function within Jemena Asset Management).

57. The requirements to assess asset safety is underpinned by:

- JEM-AM-GU-0007 Asset Risk Management Guideline;
- GAS-999-OM-HSE-001 Safety Management Manual; and
- JEM-AM-PR-0017 ALARP_AFAP Review Procedure.

58. The various hazard identification methodologies adopted by Jemena are detailed in JEM-AM-GU-0007 Asset Risk Management Guideline.

59. **Table 4–1** summarises the various safety assessments applied within the business.

Table 4–1: Safety Assessments

Safety Assessment	Purpose / Intent	Reference
Asset Risk Register ISO 31000	Platform to capture risk against each asset class	Omnia- Asset Risk Register
Formal Safety Assessment (FSA) AS 4645	A process to identify gas distribution network threats and hazards and assess the risk of these threats and determine controls required to meet the acceptable risk level	GAS-999-PR-RM-001 Formal Safety Assessment Procedure
Hazards and Operability Study (HAZOP), AS 2885, AS 61882	A structured and systematic technique to identify and assess hazards inherent in the design, operation and maintenance of the facilities	GAS-999-PR-HZ-001 HAZOP Procedure

Safety Assessment	Purpose / Intent	Reference
Safety Management Studies (SMS), AS 2885	A process to identify pipeline system threats and hazards and assess the risk of these threats and determine controls required to meet the acceptable risk level	GAS-999-PR-RM-002 Procedure for 5 Yearly Operational Safety Management Studies

60. Embedded in this document are links to the original source documents of the safety assessments. These documents are maintained by relevant functional groups and are subject to periodical audits by the regulator.

61. Refer to **Appendix B** and **Appendix D** for further information.

5. Safety Management System

62. Jemena's safety management system is described in GAS-999-OM-HSE-001 Safety Management Manual. Please refer to **Appendix B** and **Appendix D**.

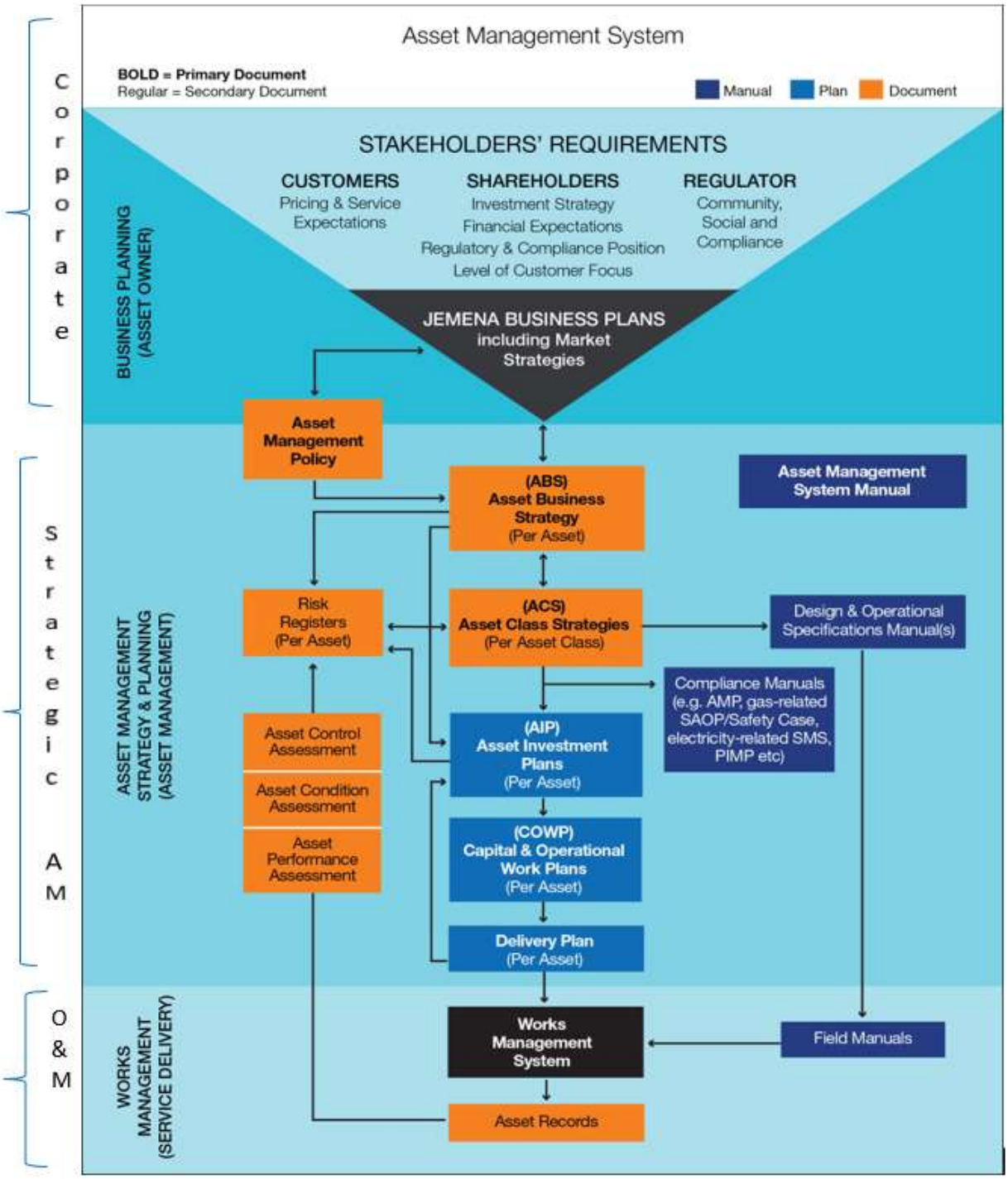
5.1 Asset Management System Overview

63. Jemena has an overall AMS within which Safety Management is a key element. The AMS provides the principle framework for the organization to direct, coordinate and control asset management activities and provides assurance that Jemena's operational, societal and environmental objectives are achieved on a consistent basis. It brings together the external influences, asset management drivers, business values and selected strategies to deliver sustained performance for the benefit of all stakeholders.

64. Jemena's strategy for asset management is explained in detail in JEM AM MA 0001 Asset Management System Manual.

65. The Overall Asset Management System document hierarchy is summarised in **Figure 5-1** which details the document hierarchy that transforms Jemena's strategic objectives into the required actions that underpin the asset management function. **Figure 5-1** also shows secondary documents that support the strategy and planning documents.

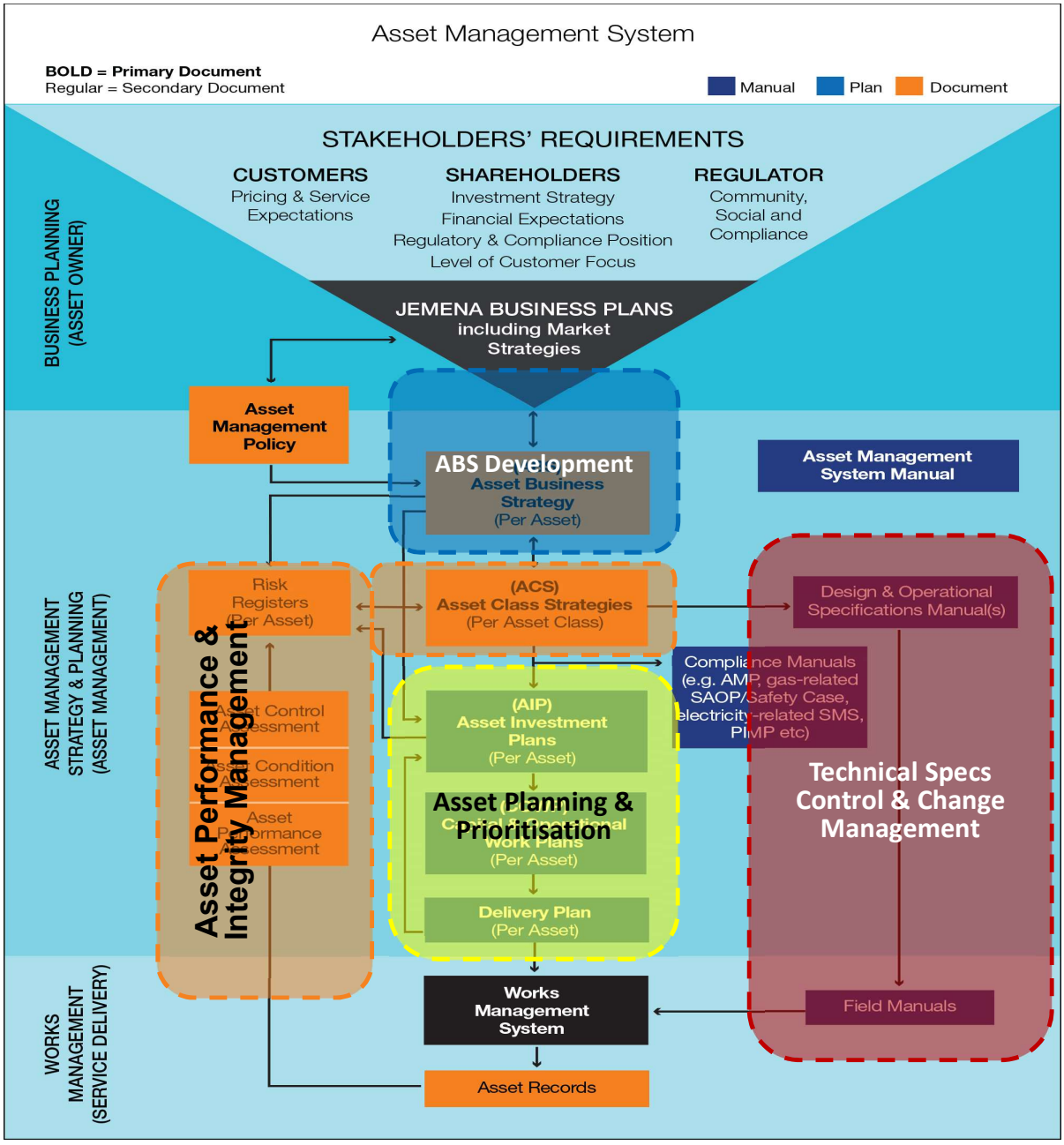
Figure 5-1: Jemena Asset Management System Document Hierarchy



5.2 Safety Management Processes

66. The overall Safety Management process is defined in the context of the level 2 processes, shown in **Figure 5-2**:

Figure 5-2: Jemena Asset Management Level 2 Processes



5.2.1 Asset Business Strategy Development

5.2.1.1 Asset Business Strategy

67. The Asset Business Strategy (**ABS**) translates Jemena's organisational objectives including safety into individual Asset objectives, e.g. profitability, cash flows, desired performance, current and expected performance, etc. It is also, used to confirm with customers whether the Asset is meeting their expectations.

5.2.2 Asset Planning and Prioritisation

68. Asset specific activities are prioritised and planned in accordance with Asset Investment strategy as well as the results of asset condition and performance assessments and risk assessments to ensure the safe operation of the assets. The planning and prioritisation cascades down from Asset Class Strategies (**ACS**), Asset Investment Plans (**AIP**), Capital and Operational Work Plans (**COWP**) to Delivery Plans as described in the following sections. This includes engineering assessments, business plans, minor business plans etc as required for the size of the work.

69. Once works are approved, the work is delivered, via a confirmed Scope of Work, within the Works Management System (**WMS**).

5.2.2.1 Asset Class Strategy

70. The ACS explains the approach and principal methods by which each asset class contributes to delivering Asset Management objectives as stated in relevant ABSs, considering the age, criticality and condition profile of the class. It may also include scenario analysis for various strategies (e.g. replacement vs. refurbishment, non-asset solutions, etc), and demonstrates how the Asset Management activities throughout the asset lifecycle for the asset class are to be prioritised or optimised to achieve Asset Management objectives (as defined in ABS).

5.2.2.2 Asset Investment Plan

71. Each AIP is a response to one or more ACS, and it defines an optimum set of Asset Management activities (operating expenditure and capital expenditure with budgetary financial information) to achieve Asset Management objectives set for the Asset as defined in the relevant ACSs. The AIP sets out proposed costs and activities for the next 7 years as a feed to corporate planning and forecasting.

72. The content of the AIP in our new format has been substantially reduced to provide the list of proposed projects in the programs of work and explanatory notes on the prioritisation of competing programs of work and any mitigation actions required to maintain targeted risk levels.

5.2.2.3 Capital & Operational Work Plan

73. The COWP contains details on optimised capital and operational expenditures for next two years, linking each expenditure item to one or more Asset objective(s). It sets out the detailed programs of work, resource requirements and costs that feed the Jemena business planning and budgeting process.

5.2.2.4 Delivery Plan

74. The delivery plan describes how our field delivery function will deliver to requirements of COWP including management of supply contracts, resource planning, etc. It provides assurance to Senior Management and the Board that our proposed business plan and budget can be delivered.

5.2.3 Asset Performance and Integrity Management

75. All field work is completed under the WMS, as directed by Asset Planning and Prioritisation process and/or Technical Specifications. As a result of these activities, Asset Records are prepared as specified by the Work Codes or as defined by an Asset Management prepared Scope of Work.

76. The schedule of works describes maintenance schedule activities (described in GAS-599-PA-IN-002 Appendix B – EGP and VicHub pipeline asset class planned operational integrity management plan). This document outlines maintenance activities for integrity management.

77. These asset records are provided to Asset Management who carry out a series of assessment to confirm the asset condition and performance (Asset Performance and Integrity Management). These assessments are described in the following sections. As a result of these assessments, anomalies (technical risk items that may require corrective action to ensure continued safe operation) are identified and are risk assessed to determine criticality. These are recorded and tracked in the Risk Registers.

78. Mitigation against third party damage to pipeline, activities include pipeline surveillance (right of way patrols, aerial, ground), pipeline markers, Dial Before You Dig (**DBYD**), landowner contact.

79. Mitigation for external corrosion includes pipeline coating and cathodic protection. The effectiveness of these controls is measured by in line inspections, coating defect surveys, cathodic protection surveys, earthing and surge protection and cathodic protection monitoring by SCADA.

80. Facility risk assessment are also performed on a continuous basis as asset information is updated. The risk assessments include SMSs, FSAs and HAZOPs. These are described in detail in **Appendix A**.

5.2.3.1 Asset Condition Assessment Report

81. Asset condition assessments evaluate how the condition of the assets has changed over time in comparison to set targets. For example, the level of corrosion observed during inspections. The condition of the asset includes not only the physical condition but also the age and criticality of the asset.

82. The condition assessment reports help to inform the expected life expectancy of the asset, when preventative actions are required and if there is a need to be make changes to the frequency of inspections.

5.2.3.2 Asset Performance Assessment Report

83. The performance report compares the performance of the Asset Classes against set targets and identifies trends in performance. Examples of the performance measures assessed include:

- engineering investigations and incident report findings;
- plant availability;
- failure rates or frequencies;
- asset performance;
- reliability;
- asset-specific costs;
- mean time between failure;
- plant defects and cause codes;
- corrective maintenance rates; and
- major incidents.

5.2.3.3 Asset Control Assessment Report

84. Controls are processes or actions designed to eliminate, control or mitigate key business risks.

85. The asset control assessment report evaluates the annual compliance to these controls and effectiveness of the control. This is achieved by reviewing:

- Omnia;
- project management compliance;
- internal and external audits;
- work in backlog; and
- rework.

5.2.3.4 Risk Register

86. Asset Class registers are used to record and track all “Above appetite risks" which are under active management, held in Omnia by agreement with the Asset Class Managers (**ACM**s).

87. The risk register and identified risks are used to underpin the asset class strategy considerations to ensure the safe operation of the gas assets.

88. Risks and controls are owned by the ACMs.

5.2.4 Technical Specifications

89. Technical Specifications are the suite of documentation defining the minimum technical requirements for the creation and management of gas assets to meet Jemena safety and performance objectives and legislative requirements. These specifications underpin the safety management process by ensuring “industry best practices” are adopted in all design, construction, inspection, maintenance, assessment and repair activities carried out by Jemena.

90. Specifications are prepared by Asset Management to address the following:

- Design and construction of pipelines, facilities and networks;
- Operational monitoring, control and response of pipelines and networks;
- Field operations and maintenance of pipelines, facilities and networks; and
- Gas measurement and reconciliation.
- These Technical Specification address the following:
- Compliance with applicable codes and standards;
- Approved, “industry best practice” inspection techniques;
- Preventative and corrective maintenance activities;
- Methods to determine frequency of activities e.g. fixed interval, risk based;
- Anomaly assessment methods; and
- Repair methods.

91. These Specifications define the critical requirements of each activity to provide the basis for asset specific Field Manuals, thus ensuring that best practices and consistency is provide in the management of all Jemena Assets.

92. Design principles applied to ensure that all identified risk descriptions (and risks) are eliminated or reduced to an acceptable level during the life cycle of the facility are contained 500-RP-006 Pipeline Design Basis – EGP (design basis manual for EGP). Relevant standards used in the design are contained within Section 4 Codes, Standards and Statutory Requirements of the design basis manual for EGP.

93. Jemena will draft a separate construction safety management plan if additional assets are constructed. This document will outline the processes for the control of construction and commissioning activities to ensure they are implemented in accordance with the necessary standards and specifications.

94. If required, Jemena will draft a decommissioning plan to outline the processes for controlling decommissioning activities (in future) to ensure they are implemented in accordance with the necessary standards and specifications.

95. Field manuals provide the specific activities (type, frequency and procedures) which will be carried out for the asset via Work Codes.

96. Routine, prescriptive works as defined in the Field Manuals are automatically input into the Work Management System, unless there is a strategic change which would cause a change to the Specifications.

5.2.4.1 Technical Change Management

97. Review and updates to Technical Specifications will be carried out on a periodic basis. The suitability of any changes will be demonstrated by an assessment to ensure the change is in compliance with legislation and Jemena's objectives and all changes will be carried out in accordance with Jemena Change Management Manual. All changes will need to be approved by the Asset Strategy Manager.

98. Changes in the Technical Specifications will be reflected in subsequent updates to the relevant Work Codes, which are referenced in the Service Delivery field manual. Updates to Work Codes will be carried out by Asset Strategy and approved by the Asset Strategy Manager, for execution by field delivery functions.

5.2.5 Works Management

99. The delivery of the tasks/activities needed to operate and maintain Jemena assets is performed by the Works Management System. These tasks/activities are governed by the design basis manuals and operational/maintenance specifications established by asset management, as previously described.

100. Routine, prescriptive works as defined in the Field Manuals (i.e. Work Codes as described above) would be automatically input into the WMS, unless there was a strategic change which would cause a change to the Asset Management Specification and hence a change to the field manuals.

5.2.6 Documentation and Records Management

5.2.6.1 Document Management

101. The requirements for document and data control are specified in the GAS-999-PA-DM-001 Gas Pipelines, Facilities and Metering Records Management Plan.

102. Documents include: management plans, policies, standards, guidelines, specifications, drawings, procedures, work instructions, templates, checklists and forms.

5.2.6.2 Records Management

103. Retention of records is an integral part of the operation of a pipeline as evidence of compliance with applicable licences, codes, management plans, procedures and contractual obligations.

104. Records (and data) include: completed inspection reports, check lists, forms and data recorded during work activities, surveys, inspection and operations. Records are the evidence of the completion of work activities. They also permit the capture of data and information which is analysed to determine the effectiveness of the operations and maintenance activities in protecting the integrity of the asset and ensuring the safety of the public and personnel.

105. EGP and VicHub records are classified as follows:

- engineering records including pipeline design, construction records, change requests, engineering assessments, operating condition data, welding qualifications, communication systems data, drawings, risk assessments, HAZOPs, easement information, location class review, MAOP review, maps, coating inspections, pipeline inspections (both internal and external), cathodic protection, hydrotest and commissioning reports;
- operations and maintenance records including inspection and test records, surveillance records, quality and integrity data from forms;
- audit records of field operations, work practices, competency details, health, safety and environment performance data;
- operational reports as required by the company and by regulators;
- incident reports and corrective action reports;
- work management system data including work orders and completion reports;
- health and safety including meeting minutes, safety grams, Safe Work Method System (SWMS), audits and environmental issues;
- administrative processes including financial records of purchasing and accounts payable; and
- approvals and correspondence with the Regulator.

106. Records and data is stored in a number of locations including the Enterprise Content Management System (**ECMS**), file servers and hard copy filing systems at the Wollongong and Collins Street offices, and major station facilities.

107. All records are retained for specific periods as outlined in GAS-999-PA-DM-001 Gas Pipelines, Facilities and Metering Records Management.

5.2.7 Contractor Management

108. JEM CMS GU 2701 Contract Management Framework provides a clear and standardised approach to managing and administering contracts for goods and services purchased from vendors. This document also details the roles and responsibilities together with the governance requirements, including processes for contractor corrective action where risk is not being effectively managed.

109. Table 2-1: Roles and Responsibilities within Section 1.2 Contract Management Roles details the roles and responsibilities of various stakeholders and defines the:

- Contract Owner
- Contract Manager
- Contract Administrator

- Category Manager
- Contractor Manager

110. The following sections of JEM CMS GU 2701 Contract Management Framework details processes for contractor corrective action where risk is not being effectively managed:

- 5.2 Contractor Performance
- 5.3 Performance Monitoring
- 5.7 Risk Management

5.2.8 Permit To Work System

111. As listed within Section 5.6 Safe Work Systems of **Appendix B**, typical pipeline related activities that the require implementation of a Permit to Work System include cold work, hot work, excavation, confined space entry, critical work . These activities are covered in detail within GAS-999-PR-HSE-006 Permit to Work Procedure.

112. Permit Issuers are responsible for issuing Permits to Work. As per Section 2.3 Permit Issuer of GAS-999-PR-HSE-006 Permit to Work Procedure a Permit Issuer must complete the Safe Work System training, validation and assessment requirements for each Authority they hold and shall only complete and issue a Permit To Work up to their recorded level of authority. Competency requirements and preliminary training required for persons responsible for issuing a Permit to Work are listed within Section 6 Safe Work Systems Training of GAS-999-OM-HSE-002 Safe Work System Manual. The training requirements for authorized contractors who can issue Permits to Work are the same as those described above, except for onboarding procedures (which are for employees only). Training is monitored using Network Compliance System which tracks all training and refresher training for permit issues.

113. The Permit Issuer:

- has responsibility for onsite planning and preparation;
- conducts inductions as required;
- defines the scope of work and prepares/reviews the work instructions, procedures etc.;
- conducts site inspections, carries out pre-start meetings including Safe Work Method Statement review and completion and assigns specific work roles;
- identifies isolation points and carries out isolations and de-isolations in accordance with the GAS-999-PR-HSE-007 Isolation and Tagging Procedure;
- prepares the Permit to Work to suit the type of work activities required;
- requests permit authorisation number/s from the Control Room;
- prepares and maintains the work site in accordance with Permit conditions;
- acts as a Safety Watch Person as required;
- monitors the work for changes in hazards and control measures and responds accordingly; and
- performs gas monitoring with a calibrated and bump tested/approved gas detector as required.

114. The relevant training, procedures, tools, equipment and emergency support provided to people carrying out work under the Permit to Work System are listed as follows:

a. Training: GAS-999-OM-HSE-002 Safe Work System Manual Procedures:

- GAS-999-OM-HSE-002 Safe Work System Manual
- GAS-999-PR-HSE-006 Permit to Work Procedure
- GAS-999-PR-HSE-007 Isolation and Tagging Procedure
- GAS-999-PR-HSE-008 Pipeline Excavation Procedure
- GAS-999-PR-HSE-010 Third Party Works Procedure

b. Relevant tools and equipment:

- GT approved equipment list as per AS2885 contained at link: AS 2885 Asset Technical Code Committee & Approved Equipment & Material List

c. Emergency support:

- Documented in JAA NSO PL 0003 Emergency Management Plan and includes Emergency Management Teams and Emergency Management Response exercises.

5.3 Compliance Assurance Matrix Mapping

115. The Compliance Assurance Matrix is designed to demonstrate to the Regulator and the external auditor (nominated by the regulator) that safety management system requirements stated in AS 2885 and AS 4645 standards are effectively mapped against current processes and procedures. .

116. The compliance assurance matrix will act as a "sole source of truth" during external audits. The currency of these supporting processes/procedures will be maintained by the functional areas that own them.

117. All procedures set out or referred to in the Compliance Assurance Matrix are in place and have been tested and proved. Refer to **Appendix C**. Mapping to specific jurisdictional Act / Regulatory requirements is provided in **Appendix D**.

6. Emergency Management System

118. The Emergency Management Plan (**EMP**) and its annexes are intended to support the actions of the Emergency Management Team (**EMT**) and Area Management Team (**AMT**) and includes guidance on:

- effective decision-making for significant incident and emergency events;
- effective identification, assessment and escalation of events;
- effective recording of EMT/AMT actions and decisions:
- supports the post-event review of EMT/AMT management to support recommendations for future improvement; and
- provision of training.

119. JAA NSO PL 0003 Jemena Emergency Management Plan Jemena Emergency Management Plan can be accessed via the following link: http://ecms/otcs/livelink.exe/properties/305832340

120. The purpose of JAA HSE PR 0003 Jemena Investigating Incidents Procedure is to explain the following aspects for the undertaking of an Asset, People, Environment, Systems or Security (Physical) investigation:

- Initiate Investigation;
- Classify and Appoint Lead/Support;
- Gather Data;
- Identify Root Causes(s); and
- Develop Report and Approve Findings and Recommendations.

7. Governance (Management Review and Assurance)

121. The Jemena governance process described below fundamentally provides the management review and assurance of gas assets.

122. The Health Safety and Environment (**HSE**) Council provides overall HSE leadership and assists Jemena to fulfil its overall responsibilities in relation to HSE matters as they affect workers (employees and contractors), customers and the community. Membership of the Council includes the Managing Director as the Chair, all Executive General Managers and the General Manager of HSEQ.

123. The HSE Council has established an APSC, which monitors and reports on the effectiveness of strategies and practices to manage risks. The APSC includes all Asset Management and Delivery General Managers as well as HSE and Risk Management. The APSC chair reports to the HSE Council on the asset and public safety performance of its Jemena gas assets.

124. The APSC oversees a number of operational and review committees which have specific objectives, including the GSMRC. Through the GSMRC, the APSC reviews and monitors the operation of gas safety management processes and systems.

125. The GSMRC oversees the following areas insofar as they relate to asset and public safety as detailed in the GSMRC charter (refer to compliance matrix for the charter). Typically the review inputs include:

- Technical specifications and allied artefacts;
- Acts, Regulations, Codes, Standards and other applicable requirements;
- Audit and incident investigations;
- Performance, integrity and condition monitoring; and
- Good industry practice, research and innovation.

126. The GSMRC reports to the APSC, on a quarterly basis, the current status of the asset and public safety program and management system including:

- Performance against key performance indicators;
- Trend analysis of significant events;
- Major incident logs and major incident review completed;
- Formal Safety Assessments and Safety Management Studies;
- Legislative and regulatory compliance;
- Status of relevant management system audit or corrective actions; and
- Changes to the status of risks and controls.

127. **Table 7–1** details performance standard auditing and monitoring for risk controls:

Table 7–1: Performance Standard Auditing And Monitoring For Risk Controls

Control	Performance Standard	Monitoring Mechanism	Audit Frequency
Maintenance	Whether planned work is being done as required based on the percentage of service orders finalised to schedule	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Monthly
DBYD	DBYD high pressure line inquiries validated by phone call or email within three working days of inquiries raised	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Monthly
SCADA availability	Reliability of SCADA communications from the control room to the SCADA servers and RTUs. Outages are measured as total outages rather than partial outages.	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Monthly
Pipeline Patrol Scheduled Compliance	Whether Pipeline Patrol is being completed per schedule	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Monthly
Significant Encroachments Monitoring	Unauthorised encroachment or third party activities resulting in damage to the asset or a credible material threat of damage. Definition of Significant Encroachments: • Excavation/ground breaking >300mm in depth by a landowner/land user within 3m of the pipeline centreline, where not a permitted activity Mechanised digging, boring, auguring, ripping or continuous to this depth or lower, typically included	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Annual

Control	Performance Standard	Monitoring Mechanism	Audit Frequency
Land User Liaison Communication Plan Compliance	Engagement with landholders over 12 month period	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Annual
Odorant Monitoring	Only material odorant injection points	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Monthly
Emergency Management Availability	Emergency Management Capability Readiness Desktop emergency exercises in each jurisdiction	Monthly KPI developed by Asset Investment distributed to GM Asset Management – Gas Markets, GM Commercial Operations, Manager Gas Transmission, Commercial Manager, Pipelines Asset Investment Manager and Field Manager	Annual
Cathodic Protection	% of pipeline compliant based on the relevant cathodic protection criteria as per AS2832.1. % is determined based on number of TPs that are compliant compared to total number of TPs tested	Corrosion Integrity Report	Annual

128. The GSMRC is supported by the AS2885 Pipeline Code Committee and the AS4645 Code Committee.

129. In addition to the above committees and management reviews, Jemena utilises its risk based asset management (note the risk in section 1.10), APAIR and control assessments that relate to gas safety. The control assessments include periodical evaluations and other monitoring and measurements through reported data on asset condition and performance.

130. Jemena also utilises Omnia to support the assurance processes by continuous monitoring of its commitment to comply with laws, regulations and other subscribed requirements. Outputs from the management review processes may trigger a review of the safety case. The management recommends a periodic review of the safety case once every 2 years. In some jurisdiction, the safety case review / resubmission is required once every 5 years.

131. The organization's role responsibilities accountabilities and authorities is largely addressed within the Jemena Accountability Model and the GAS-999-PA-DM-004 GAS AS 2885 Document Approvals Structure.

132. **Figure 7-1** depicts organisation structure.

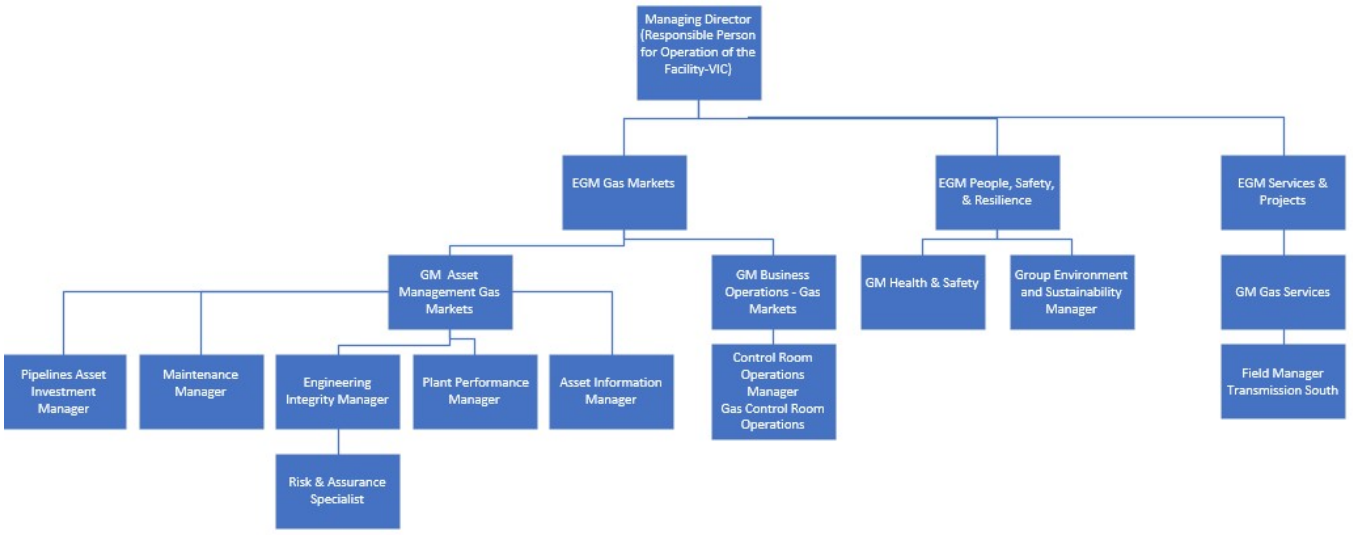


Figure 7-1: Organisational Structure

133. **Table 7–2** below briefly describes accountabilities and responsibilities.

Table 7–2: Key Positions – Accountabilities / Responsibilities

No.	Key Position	Accountabilities/ Responsibilities
1	Managing Director (level 1) (David Gillespie)	Person Responsible for Operation of the Facility (Victoria) and his accountabilities Approve the Jemena Health and Safety Policy Approve the Jemena Asset Management Policy Approve budgets and resource plans Approve Service Provider contracts (as required by) State Grid Singapore Power (Australia) Assets Pty Ltd (SGSPAA) Delegated Financial Authority (DFA) Policy) Delegate responsibilities for management of the assets Approve the EGP(PPL232 & PPL26) and VicHub (PPL247) Safety Case 567 Collins Street, Melbourne VIC 3000 Tel: 03 9173 7914 Mobile: 0407 863 795 Email: david.gillespie@jemena.com.au

No.	Key Position	Accountabilities/ Responsibilities
2	GM Asset Management Gas Markets (level 3) (Sean Ward)	• Person-In-Charge (NSW) • Approve the Jemena Safety Case for all Jemena Gas Assets within Victoria. • Represents the asset owner and is responsible for all asset and investment related issues including engineering strategy and planning, asset delivery, network development, commercial services and business services. This position is also the Person In-Charge and the Licensee. The position is also responsible for the approval of business cases in accordance with the SPI (Australia) Assets, Delegations of Financial Authority (DFA). Business cases requiring approval in excess of this position and the appropriate authority levels are also detailed in the DFA. • Person responsible for transporting in-specification gas. • 567 Collins Street, Melbourne VIC 3000
3	Asset Class Managers (level 4) Engineering Integrity Manager Plant Performance Manager Maintenance Manager Pipelines Asset Investment Manager Asset Information Manager	• Prepare Asset Management Plans and Asset Strategies • Prepare and manage the Works Program to ensure the long term integrity of the asset • Monitor Works Delivery performance • Monitor Asset Performance to ensure it meets regulatory, code and business requirements • Coordinate and assist operations management in the implementation of the requirements of the Safety Management System. Undertake the role of Principal Engineer for the pipelines design and operations engineering sectors • Asset information management
4	Risk & Assurance Specialist (level 5) (Harj Kooner)	• Person responsible for the preparation, revision and submission of the Safety Case in Victoria and NSW Reports to the Planning & Assessment Manager • with regards to the monitoring and auditing programme for the Safety Case compliance • Develop and implement the auditing program for Safety Case compliance • Provide reports to the Jemena Executive and the Jemena Board on the performance of the Safety Case • Liaise with safety regulators about matters relating to the Safety Case and the Compliance Management System • Liaise with relevant positions within Jemena to ensure operational input into the Management Systems and specifications including this Safety Case • Communicate and manage compliance with regulatory, industry and code obligations and requirements. • 567 Collins Street, Melbourne, 3000, VIC

No.	Key Position	Accountabilities/ Responsibilities
5	GM Gas Services (level 3)	• Responsible for the strategic oversight of end to end maintenance and operations activities including scheduling, dispatching, logistics, contractor management and ensuring work standards and quality are upheld • The overall responsibility for contractor management lies with the GM Jemena Network Services. The majority of maintenance and operations works are performed by Zinfra employees. Other contractors may be employed to do minor tasks (eg painting, erosion remediation works, calibration activities)
6	Field Manager Transmission South (level 4)	• Responsible for maintenance and operations activities including scheduling, dispatching, logistics, contractor management and ensuring work standards and quality are upheld.
7	Gas Markets Control Room Operations Manager (level 4)	• Responsible for overall operational control of the network and leading Jemena's emergency response approach, including policies, documentation and user training. This role is also responsible for management of call answering, work scheduling and dispatch, incident investigation and overseeing the operations of the emergency management system & emergency incident simulations
8	GM Health and Safety (level 3)	• Responsible for the provision of Health and Safety, strategy, policies and programs throughout Jemena
9	Group Environment and Sustainability Manager (level 3)	• Responsible for the provision of Environment and Sustainability strategies, policies and programs throughout Jemena

134. Note: Names in the table are to satisfy VIC gas safety case regulations and are subject to change.

Appendix A
Asset Description EGP & VicHub Gas Assets

A1. Asset Description

135. Note: This appendix (Appendix A – Asset Description EGP & VicHub Gas Assets) is provided to accommodate specific Jemena gas asset during external audits or for regulatory submission.

136. For this instance, the asset description includes all EGP gas assets within VIC and NSW. However, during regulatory audit, the auditor should consider the necessary inclusions / exclusions to remain in scope for the audit.

137. Licensed Pipelines EGP (VIC) PPL232, VicHub (VIC) PPL247 and EGP (NSW) PPL26 (including receipt points, delivery points and meter stations).

ASSET DESCRIPTION

EASTERN GAS PIPELINE & VICHUB GAS ASSETS

INTERNAL

Jemena
bringing energy to life

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1 OVERVIEW OF ASSETS

1.1 INTRODUCTION

The Eastern Gas Pipeline (EGP) was commissioned in August 2000. The 797km long pipeline primarily transports natural gas from the Gippsland Basin in Victoria to markets in Sydney and regional centres along the route. Gas is supplied to the EGP at the Longford Compressor Station by local gas producers, through the VicHub facility, and imported gas through the Port Kembla Pipeline (PKP). EGP owned laterals also run-off the EGP to Bairnsdale, Port Kembla, Smithfield and Wilton.

The Port Kembla Pipeline was constructed in 2023 to connect the Squadron Energy owned Port Kembla Energy Terminal (PKET) to the EGP. The PKP has the capability, when commissioned, to transport up to 522TJ/d of natural gas which is imported as Liquified Natural Gas (LNG), regasified, and injected into the pipeline at PKET. The PKP ties into the EGP at the existing Kembla Grange MLV. As presently configured the PKP is not gas commissioned and is operating as a suspended pipeline under a small positive pressure (~ 100 kPa) of Nitrogen while Jemena awaits completion of the PKET and arrival of LNG.

The PKP has two owners and Licensees. Jemena owns, holds the License and operates the pipeline segment from KP 4.1 to KP 11.8 (end of line). Squadron Energy owns and holds the License for the pipeline segment from KP 0 to KP 4.1,

The VicHub facility was commissioned in November 2000 and is an interconnect facility situated at Longford, that enables gas to flow between the EGP and APA's Victorian Declared Transmission System (VTS).

An overview map in Figure 1 shows the general route of the EGP and VicHub, and all the related off-takes, valves, laterals and compressor stations. Specific details of the location of the pipeline are contained in alignment sheets which are also available through the Geographical Information System (GIS). Figure 2 shows the custody points along the EGP and VicHub pipelines.

The EGP has a variety of facilities along the pipeline. There are 4 receipt points (Longford, VicHub, Orbost, and Port Kembla) on the pipeline which permit the measurement of gas into the pipeline. Odourant is injected at the Longford Compressor Station in the suction line between the station outlet ESD valve and the pig launcher. This design ensures that only unodourised gas is released during a station vent, thereby eliminating odour issues and community concerns. The gas receipted from the VicHub and Orbost Meter Station is odourised prior to injection into the EGP.

There are 15 delivery points and / or meter stations along the pipeline permitting measurement of the gas flow out of the pipeline which are Albion Park, Bairnsdale City Gate, Bairnsdale Power Station, Bomaderry, Bombala, Cooma, Horsley Park, Hoskinstown, Nowra, Port Kembla, Smithfield, Tallawarra, Tasmanian Gas Pipeline (TGP), VicHub and Wilton.

There are 17 mainline valve stations located along the pipeline and 4 lateral that permit isolation of the pipeline sections for operational or emergency activities.

There are 4 compressor stations located along the pipeline which includes four Taurus 60 compressor engines at the Longford Compressor Station and one Taurus 60 compressor engine located at each of the midline compressor stations at Mila, Michelago and East Gippsland.

The Michelago Compressor Station and the East Gippsland Compressor Station were commissioned in November 2015 as part of a major project to increase the capacity in the EGP. These compressors

were added in conjunction with an interconnect facility at Wilton to deliver gas into the Jemena NSW Gas Network as well as into the APA Moomba to Wilton pipeline.

There are 4 scraper stations along the pipeline which include Horsley Park, Longford, Mila and Oallen. These stations permit the launching and receiving of pipeline inspection and cleaning tools known as pigs. The Longford and Mila scraper stations are located within the compressor station compound. Permanent launcher and receiver facilities are installed on the Bairnsdale, Port Kembla and Smithfield laterals with connection flanges for a temporary installation available on the Tallawarra lateral. The Port Kembla Pipeline has provisions for launcher and receiver facilities to be installed, however, they have not been installed as of time of construction.

The EGP operates under two licences, Victorian License PPL232 and NSW License PPL26. The Port Kembla Pipeline also operates under PPL26. The VicHub operates under Licence PP247. The pipeline is governed in Victoria by the Victorian Pipelines Act 2005 and the Gas Safety Act 1997 and in NSW by the National Gas Act (NSW) 2008 and the Pipelines Act 1967.

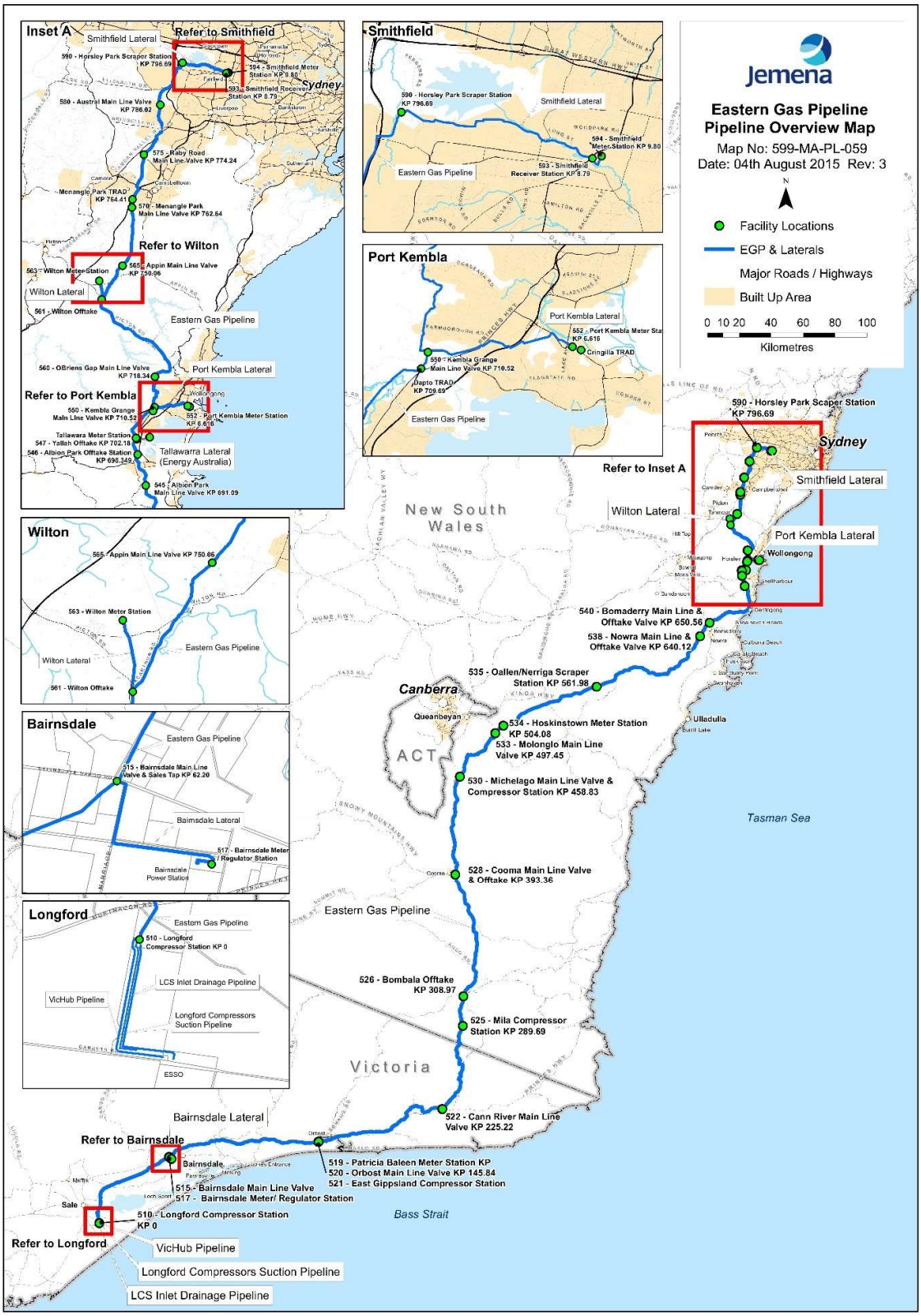

Figure 1 : Overview of the EGP and VicHub Pipelines and offtakes.

Section	Licence #	Length	Start – End
Longford to NSW border	232	276.7km	**START** – Downstream weld of above ground MIJ located on the station outlet pipeline in the Longford Compressor Station. **END** - Victoria/NSW border
Suction line (unodourised gas)	232	2.4km	**START**- first flange located upstream of the above ground MIJ located in the ESSO off take station. **END** – Upstream weld on the first above ground shutdown valve located in Longford Compressor Station.
Bairnsdale lateral	232	2.2km	**START** – Downstream weld of above ground MIJ located in the Bairnsdale MLV station. **END** – Upstream weld of MIJ located in Bairnsdale meter station. In November 2017 the section of the pipe from the upstream flange of valve 150 V403 055 and the upstream joint of valve 25 V414 056 in Jemena's compound located within the Bairnsdale Metering Station was transferred to Alinta.
East Gippsland Compressor Station; suction and discharge pipe lines.	232	500m	**Suction line START –** buried offtake on EGP (E.96.078 ,N.196.761).**END** – above ground upstream flange of compressor station inlet valve. **Discharge line START -** above ground downstream flange of compressor station outlet valve. **END -** Buried offtake valve on EGP (E.193.813, N.178.903)
VicHub	247	2.3km	**START** – Downstream weld of above ground MIJ located in the Longford Compressor Station **END** - Upstream weld of above ground MIJ located in the APA metering station

Figure 2: Custody Points of EGP and VicHub Pipelines

2 PIPELINE SYSTEM SPECIFICATIONS

2.1 PIPELINE SPECIFICATION DETAILS

The pipeline specification details for the EGP and Vic Hub are found below in Table 1.

Table 1 : Pipelines Specification Details

DESCRIPTION	EGP	VICHUB
Licence No.	232 Victoria 26 New South Wales	247 Victoria
Maximum Allowable Operating Pressure	14.895 MPa(g) [168.3mm & 450mm lines] 9.786 MPa(g) [610mm line]	10.2 Mpa(g) [350mm line]
Pipeline Contents	Gaseous Hydrocarbons	Gaseous Hydrocarbons
Supply Source	ESSO [Longford] Santos [Orbost]	ESSO [Longford] Santos [Orbost]
Gas Quality	To meet Vic and NSW gas specifications	To meet Vic and NSW gas specifications
Pipeline Capacity	~350 TJ/day	~135 TJ/day
Pipeline Route	Refer alignment sheets in GIS	Refer alignment sheets in GIS
Pipeline Length	Victoria : 280.6km New South Wales : 516km Total : 796.6km	Victoria : 2.2km
Nominal Diameter	450mm [Main Pipeline Section] 150mm [Laterals] 600mm [Suction Pipeline]	350mm & 250mm
Pipe Seam Welding	Electric Resistance Welded	Electric Resistance Welded
Age	Construction Completed Aug 2000	Construction Completed Nov 2000
Steel Grades	API 5L Grade X70	API 5L Grade X70 and X65
Wall Thickness	9.8mm to 14.1mm	9.8mm & 12.7mm
Coating	Fusion Bonded Epoxy	Fusion Bonded Epoxy
Depth of Burial	750mm minimum	1200mm

2.2 PIPELINE JURISDICTIONS

The pipeline jurisdiction details for the EGP and Vic Hub are found below in Table 2.

Table 2 : Pipelines Jurisdictions and Description

SIZE	REGULATORY ADMINISTRATIVE JURISDICTIONS	DESCRIPTION	ODOURISED
200NB MAOP : 14.9 MPa(g)	NSW	**Smithfield Lateral** : 10km long buried pipeline and associated facilities.	Yes
300NB MAOP : 16.55 MPa(g)	NSW	**Wilton Lateral** : 3.9km long buried pipeline and associated facilities.	Yes
200NB MAOP : 14.9 MPa(g)	NSW	**Port Kembla Lateral** : 7km long buried pipeline and associated facilities.	Yes
450NB MAOP: 14.9MPa(g)	NSW	**Port Kembla Pipeline** : 12km long buried pipeline and associated facilities.	Yes
450NB MAOP : 14.9 MPa(g)	NSW	A 516km buried pipeline from the VIC / NSW border to Horsley Park, near Sydney. Includes : **Mila Compressor Station** : One Taurus 60 gas turbine compressor unit. **Michelago Compressor Station** : One Taurus 60 gas turbine compressor unit.	Yes
	VIC	A 280.6km buried pipeline from Longford to the VIC / NSW border. Includes : **East Gippsland Compressor Station** : One Taurus 60 gas turbine compressor unit.	Yes
150NB MAOP : 14.9 MPa(g)	VIC	**Bairnsdale Lateral** : 2.2km long buried pipeline and associated facilities.	Yes
350NB & 250NB MAOP : 10.2 MPa(g)	VIC	**VicHub** : 2km long pipeline & facilities from the Longford Compressor Station to allow transfer of gas in either direction between the higher pressure EGP pipeline and the lower pressure Longford to Melbourne pipeline.	Yes
600NB in MAOP : 10.2 MPa(g) 450NB out of EGP MAOP : 14.9 MPa(g)	VIC	**Longford Compressor Station** : Four Taurus 60 gas turbine compressor units – an integrated hub which can receive gas from and deliver gas to a number of suppliers.	Yes
600NB MAOP : 10.2 MPa(g)	VIC	**ESSO Suction Line** : 2.4km buried pipeline from the ESSO plant to the Longford Compressor Station.	No

2.3 PIPELINE SAFETY PARAMETERS

The pipeline conditions are assessed and confirmed based on the :

- Licence conditions;
- Jemena Safety Management Manual;
- Australian AS2885 standards; and
- Jemena Pipeline Integrity Management Plan (PIMP).

The PIMP provides an integrated and structured pipeline operation and maintenance management system and outlines key processes and assessment methodologies to maintain pipe integrity. The integrity of the pipeline is based on pipeline conditions derived from data by inspection and testing which includes :

- Inline Inspection (ILI), also referred to as 'Pigging', to assess metal loss or mechanical damage;
- CP Monitoring, providing additional pipe protection against corrosion at locations of damaged pipe coating;
- Direct Current Voltage Gradient (DCVG) measurement, providing an indication of coating defects which may lead to potential corrosion;
- Validation Digs, provide direct measured pipe data at selected locations following an ILI; and
- Safety Management Studies (SMS), which enables pipeline safety and risk assessments to identify threats, review controls and implement additional protection measures where existing controls are inadequate. The SMS also considers all relevant data obtained from the inspection and testing activities to determine the pipeline integrity for purposes of confirming or validating the pipeline MAOP.

In the event of a pipeline failure or required maintenance activity, the pipeline has various Main Line Valves (MLV) located along on the pipeline to either mitigate risk (lessen the consequence) and provide safe isolation to the public and staff.

3 FACILITY COMPONENTS

3.1 COMPRESSORS

3.1.1 DESCRIPTION

Jemena EGP owns and operates a fleet of seven Solar Taurus gas turbine and compressor packages at four station on the EGP. Four units are located at the Longford Compressor Station (LCS). LCS Units 1 and 2 were installed as part of the construction of the EGP which was commissioned in October 2000, Unit 3 was commissioned in January 2004 as part of the Tasmanian Gas Pipeline (TGP) construction and Unit 4 was commissioned in June 2010 to further increase pipeline capacity.

The fifth unit is a midline unit installed at the Mila Compressor Station (MCS) and commissioned in August 2008 as part of a capacity expansion. The sixth and seventh units were commissioned in November 2015 as part of a further increase in pipeline capacity which are located at the Michelago Compressor Station (MoCS) and the East Gippsland Compressor Station (EGCS).

A further summary of the compressors are found below in Table 3. Longford Compressor Station (KP 000) is the starting point of the EGP and the receipt point for gas from ESSO's gas facility.

Table 3 : Compressor Summary

#	COMPRESSOR NAME	LOCATION	NOMINAL INSTALLED POWER (MW ISO[1])
1	Longford Compressor 1, 2, 3	KP 000	3 x 5.3 MW
4	Longford Compressor 4	KP 000	1 x 5.8 MW
5	Mila Compressor Station	KP 290	1 x 5.8 MW
6	Michelago Compressor Station	KP 458	1 x 5.8 MW
7	East Gippsland Compressor Station	KP 145	1 x 5.8 MW

3.1.2 COMPRESSOR SAFETY PARAMETERS

Jemena EGP aims to adhere to the Solar recommendation of 30,000 hours between overhauls for the Taurus 60 engines. To mitigate the impact of midline compressor failure, strategic spares were purchased and currently reside in the central store at Kembla Grange.

Condition reporting provides an assessment of the compressors based on a collation of the various condition monitoring methods; including vibration analysis, lube oil analysis, borescope of engines, characteristic trend analysis (including engine power and compressor efficiency trends), routine maintenance activities and inspection reports.

The expected target reliability for each compressor is 99% over a year, or approximately 3.5 days of forced outages over each year. The expected availability of a compressor (routine and non-routine maintenance) is 95.3% a year which allows for approximately 17 days of preventative maintenance.

[1] *ISO Rating : At seas level, ambient temperature of 15oC, relative humidity of 60%,no inlet or exhaust losses and optimal power turbine speed.*

3.2 OTHER FACILITIES

3.2.1 RECEIPT POINTS

There are 4 receipt points (Longford, VicHub, Orbost, and Port Kembla) on the pipeline which permit the measurement of gas into the pipeline. Odorant is injected at the Longford Compressor Station in the suction line between the station outlet ESD valve and the pig launcher. This design ensures that only unodourised gas is released during a station vent, thereby eliminating odour issues and community concerns. The gas receipted from the VicHub and Orbost Meter Station is odourised prior to injection into the EGP.

3.2.2 DELIVERY POINTS

There are 15 delivery points and / or meter stations along the pipeline permitting measurement of the gas flow out of the pipeline which are Albion Park, Bairnsdale City Gate, Bairnsdale Power Station, Bomaderry, Bombala, Cooma, Horsley Park, Hoskinstown, Nowra, Port Kembla, Smithfield, Tallawarra, Tasmanian Gas Pipeline (TGP), VicHub and Wilton.

3.2.3 MAINLINE VALVES

There are 17 mainline valve stations located along the pipeline and 5 laterals that permit isolation of the pipeline sections for operational or emergency activities.

3.2.4 SCRAPER STATIONS

There are 4 scraper stations along the pipeline which include Horsley Park, Longford, Mila and Oallen. These stations permit the launching and receiving of pipeline inspection and cleaning tools known as pigs. The Longford and Mila scraper stations are located within the compressor station compound. Permanent launcher and receiver facilities are installed on the Bairnsdale, Port Kembla and Smithfield laterals with connection flanges for a temporary installation available on the Tallawarra lateral.

3.2.5 SAFETY PARAMETERS

The general components within these other facilities may include above and below ground pipework, isolation valves, insulating joints, control valves / regulators, filters, SCADA and other related components to promote the safe delivery of gas to the customers. Odourant injection, over pressure protection, duty / standby runs, 24 /7 monitoring and alarms along the various facilities assist in maintaining safe and secure supply reliability.

4 OPERATING PARAMETERS

4.1 PRESSURE

The different delivery points off the Eastern Gas Pipeline operate at various pressures, throughout the day and year based on the market gas demand at any given time. Hence, the pipeline operates within these given operating pressure envelopes as shown in Table 4 below.

Table 4 : Normal Operating Pressure Conditions along the Pipeline

Location	State	Minimum Operating Pressure (kPa)	Maximum Allowable Operating Pressure (kPa)
ESSO	VIC	5,400	10,200
Longford Compressors Upstream Side	VIC	5,400	10,200
Longford Compressors Downstream Side	VIC	8,500	14,895
VicHub	VIC	8,500	10,200
Bairnsdale	VIC	6,500	14,895
East Gippsland Compressor Upstream Side	VIC	5,000	14,895
East Gippsland Compressor Downstream	VIC	8,500	14,895
Mila Compressor Upstream Side	NSW	5,000	14,895
Mila Compressor Downstream Side	NSW	8,500	14,895
Bombala	NSW	8,500	14,895
Cooma	NSW	8,500	14,895
Michelago Compressor Upstream Side	NSW	5,000	14,895
Michelago Compressor Downstream Side	NSW	8,500	14,895
Hoskinstown	NSW	8,500	14,895
Nowra	NSW	8,500	14,895
Bomaderry	NSW	8,000	14,895
Albion Park	NSW	6,500	14,895
Tallawarra	NSW	6,500	14,895
Port Kembla	NSW	6,000	14,895
Wilton	NSW	6,000	14,895
Horsley Park	NSW	6,000	14,895
Smithfield	NSW	3,000	5,100

4.2 FLOW & LINEPACK

The EGP / VicHub delivers gas from the Gippsland Basin to the markets in Victoria, ACT and NSW, including Sydney and the Moomba to Sydney Pipeline. EGP's physical operations are characterised by flows to a mix of distribution networks, power stations, LNG export plants and industrial facilities. Traditionally, EGP physical flows have been driven by residential heating demand, peaking in winter. This has changed following the introduction of the Wilton MSP connection point that will allow new shippers to take advantage of underutilised summer loads.

The current capacity of the EGP and VicHub pipelines are 350TJ/day and 135TJ/day respectively. The performance of these capacities is varied slightly due to the variation in winter and summer temperatures, affecting the throughput capacity through the various compressors. For example, the lower ground temperatures during winter allows the compressors to operate at a higher power (kW), in turn, greater throughput through the compressors and vice versa with summer ground temperatures.

The EGP has the capacity to maintain sufficient linepack for the safe and efficient operation of the pipeline. The VicHub pipeline (~2km) has minimal linepack and draws on the flows from EGP Longford Compressor Stations. The quantity of linepack maintained, is a combination of the gas supply requirements to customers with an additional security of supply quantity which is assessed according to our response capability in the event of a supply interruption.

The PKP allows the injection of up to 522 TJ/d of imported gas into the EGP. As currently configured this quantity cannot be delivered into EGP customers north of Kembla Grange and gas flowing in this lateral

Pipeline pressure, temperature and gas composition values are continually monitored by the SCADA system and transferred into a linepack calculation to assist in the identification of any leaks which may have occurred along the pipeline and for use in the gas accounting package.

4.3 GAS COMPOSITION / QUALITY

Gas composition must comply with Australian Standard AS4564 (Specification for General Purpose Natural Gas), and the key requirements are listed below :

- Wobbe Index 46.0 – 52.0 MJ/Sm3
- Higher Heating Value Maximum 42.2 MJ/Sm3
- Oxygen Maximum 0.2 mol%
- Hydrogen Sulphide Maximum 5.7 mg/Sm3
- Total Sulphur Maximum 50 mg/Sm3
- Water Content Maximum Dewpoint 0oC at MAOP (Max 112.0 mg/Sm3)
- Hydrocarbon Dewpoint Maximum 2.0oC at 3500 kPag
- Total Inert Gases Maximum 7.0 mol%
- Oil Maximum 20 mL/TJ

The Jemena Gas Transmission Control Centre (GTCR) in Melbourne monitors on a continuous basis the quality of the gas entering the pipeline. The instruments used to measure the key requirements are:

- Gas Chromatographs (GCs) are instruments which analyse the components of gas. From the components, they calculate the specific gravity and heating value of the gas. This is important for billing in general and in particular, when there are sources of gas supplied into a gas pipeline. These are located at Longford, Orbost, Port Kembla and Smithfield, with manual sampling and analysis done by an independent laboratory providing a backup, if required. Wobbe Index is calculated from the measurements of GCs which have a sampling cycle of 6 minutes. The GCs

at Longford undergo daily automatic calibrations and are validated every three months by Jemena technical officers. The calibration procedure uses a calibration bottle of gas of certified gas composition and compares the results of the GC analysis to the calibration bottle to ensure the GC results are within tolerance.

- Hydrocarbon and Water Dewpoint analysers are used to see if gas is out of specification. It is possible that water and liquid hydrocarbons could drop out of the gas as the gas pressure is regulated and reduced. This material could block regulators and pipes and stop supply of gas to townships and end users. Hydrocarbon and Dewpoint temperature analysers are installed in meter stations to monitor the gas quality and provide alerts when the gas is out of specifications.

- Longford has analysers that monitor sulphur, moisture, and hydrocarbon dewpoint levels. Orbost has analysers that monitor sulphur and moisture levels, and Port Kembla has analyser that monitor sulphur levels. H2S is measured using a separate analyser which have a sampling cycle of 12 minutes.

- Odourant is added at Longford Compressor Station. Odour levels will conform with AEMO's Gas Quality guidelines with a target nominally maintained > 4 mg/sm3 and below 24 mg/sm3. Jemena will at all times conform with Part (a) of Reg 46 of Gas Safety (Safety Case) Regulations 2018 for the odorant in the gas to remain distinctive and unpleasant.

GAS-599-OM-GM-001 Eastern Gas Pipeline Measurement Manual provides a technical reference for the operation and maintenance of the Jemena gas measurement and monitoring systems.

4.4 SCADA SYSTEM

The Jemena EGP / VicHub Supervisory Control and Data Acquisition (SCADA) and Real Time System (RTS) assets are infrastructure put in place to ensure that all alarms and protective systems are in place so that pipeline integrity, the safety of personnel, the public, suppliers and customers are not compromised and that security of supply is maintained. Similarly, the EGP / VicHub systems are suitable for pipeline activities carried out under normal operations and also during any foreseeable emergency.

The pipeline is monitored 24 hours per day, on a 12 hour rotating shift basis from a central Gas Transmission Control Room (GTCR) located in Melbourne via a distributed SCADA system. Each site is locally controlled by dedicated Remote Terminal Units (RTUs), which communicate back to the central SCADA system. Sites are designed to be unmanned, and loss of communication with SCADA does not impact safe operation and control of the site.

The control system consists of high availability servers running a distributed Honeywell Experion SCADA system. There is also the capacity for data recovery given that the servers are geographically isolated. The system is connected to stations and facilities along the EGP / VicHub via the data communication network.

The system retrieves information on pipeline operating conditions and allows control of plant and pipeline equipment systems remotely from the GTCR. Systems and processes include cathodic protection systems, pressures, temperatures, valve status, metering selections, alarms, gas quality, flow rates, condition monitoring site entry and pig signalling.

Appendix B
Safety Management Manual

Jemena
bringing energy to life

B1. Safety Management Manual

138. GAS-999-OM-HSE-001 Safety Management Manual (Gas Assets)

Jemena Asset Management Pty Ltd

Safety Management Manual

Gas Assets

Protected

2 August 2021

An appropriate citation for this paper is:

Safety Management Manual
Our Ref: GAS-999-OM-HSE-001

Authorisation

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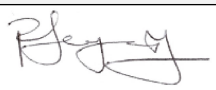
Technical Assurance:			
Raj Jeyarajah	Principal Pipeline Engineer – Gas Markets	02/08/2021	
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Peter Harcus	GM Gas Distribution	05/08/2021	
Sean Ward	GM Gas Markets	05/08/2021	

History

Rev No	Date	Description of changes	Author
1	10/05/2019	Inserted section on gas process safety and minor amendments	George Castline
2	05/05/2020	Updated section 2 legislation and standards	Harj Kooner
3	30/07/2021	Minor updates to various sections including authorisation page, pipelines within Applicable Assets section	Harj Kooner

Owning Functional Area

Business Function Owner:	Asset Management

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1. INTRODUCTION

1.1 PURPOSE

The purpose of this Safety Management Manual (Gas Assets) is to describe the Safety Management System and supporting processes that Jemena has in place to provide for the safe and reliable operation of gas assets (transmission and distribution) in accordance with Jemena's operational, societal and environmental objectives as well as legislation, industry standards and specific pipeline licence conditions.

1.2 SCOPE

The scope of the safety management system applies to the following Asset Classes:

AS2885 Pipelines: includes primary mains network and transmission pipelines including pipeline assemblies for assets operating above 1050kPa.

AS4645 Networks: includes distribution line pipe networks and associated pressure regulating devices operating at and below 1050kPa.

Facilities: includes gas facilities operating above 1050kPa. These asset are grouped into sub-classes as:

- Compressor/engine packages
- Pressure Equipment (Pressure equipment includes all piping, pressure vessels and regulator skids)
- Processing facilities

1.3 GAS SAFETY RISKS

For the purpose of identifying, assessing and controlling gas safety risks, the following risk categories are considered significant on the basis of Jemena's risk framework and underpinned by this safety case:

- Uncontrolled release of gas
- Overpressure of downstream gas supply
- Delivery of 'out of spec' gas quality
- Loss of Supply
- Gas Processing operational risks – cryogenic liquids, amine, hot oils etc.

1.4 APPLICABLE ASSETS

This manual applies for the following Jemena owned or managed gas assets:

- Evoenergy ACT Distribution Network (ACT)
- Jemena NSW Gas Distribution Network (NSW)
- Evoenergy PL 29 Pipeline (NSW)

- Jemena Gas Pipelines PL 1,2,3,7,8 (NSW)
- Evoenergy NSW Distribution Network and PL 29
- Evoenergy ACT Distribution Network
- Jemena Colongra Pipeline PL 33 (NSW)
- Eastern Gas Pipeline PL 26 (NSW) and PL 232 (VIC) and VicHub Pipeline PL 247 (VIC)
- Darling Downs Pipeline PL 90, PL133, PL134 (QLD)
- Queensland Gas Pipeline PL 30 (QLD)
- Northern Gas Pipeline PL 34 (NT) and PL 2015 (QLD)
- Atlas Lateral Pipeline PL 2040 (QLD) and Atlas Facility PL 29 (QLD)
- Roma North Pipeline PL 2028 (QLD)
- Western Sydney Green Gas Facility (NSW)

2. LEGISLATIVE COMPLIANCE

2.1 APPLICABLE LEGISLATION

Jemena gas assets are created, operated and maintained in accordance with the following Legislation and industry standards:

Legislation:

- Gas Industry Act 2001 (Victoria)
- Pipelines Act 2005 (Victoria)
- Pipelines Regulations 2017 (Victoria)
- Gas Safety Act 1997 (Victoria)
- Gas Safety (Safety Case) Regulations 2018 (Victoria)
- Pipelines Act 1967 No 90 (NSW)
- Pipelines Regulation 2013 (NSW)
- Gas Supply Act 1996 (NSW)
- Gas Supply (Safety and Network Management) Regulation 2013 (NSW)
- Petroleum and Gas (Production and Safety) Act 2004 (Queensland)
- Petroleum and Gas (Production and Safety) Regulation 2018 (Queensland)
- Energy Pipelines Act 1981 (NT)
- Energy Pipelines Regulations 2001 (NT)
- Utilities Act 2000 (ACT)
- Utilities (Technical Regulation) Act 2014 (ACT)
- Gas Safety and Operating Plan Code 2000 (ACT)

Primary Standards:

- AS/NZS 2885 suite of standards
- AS/NZS AS4645 suite of standards
- AS 4564 Gas Quality

2.2 COMPLIANCE ASSURANCE MATRIX

The Compliance Assurance Matrix is designed to demonstrate to the Regulator that Jemena's processes and procedures are in compliance with applicable requirements stated in the Acts/Regulations and standards. The

2 — LEGISLATIVE CO

Compliance Matrix forms an integral part of each asset Safety Case (Safety and Operating Plan) providing a roadmap between a requirement and the substantive document that addresses the requirement.

The matrix document will be utilised as "sole source of truth" for all regulatory external audits. It will point to various supporting processes/procedures. The currency of these supporting processes/procedures will be maintained by the functional areas that own them.

3. SAFETY MANAGEMENT SYSTEM

3.1 GENERAL

Jemena management is committed to ensuring that all operations meet or exceed its corporate standards and the requirements of relevant state and federal legislation, as well as meeting customer and community expectations for the management of health, safety, environment and quality performance. This includes ensuring that assets are managed safely whilst ensuring the reliable supply of gas for the duration of the asset life cycle. The Jemena Health and Safety Policy outlines management commitments, requirements and goals for Safety performance, including the following:

- Providing a safe and healthy workplace where the risk of injury and illness is minimised;
- Having systems and processes that enhance the way our people work, thus maximising reliable performance;
- Complying with applicable statutory obligations, standards, codes of practice and other regulatory requirement relevant to our assets and our operations;
- Designing, operating and maintaining our assets in a way that protects or enhances community safety; and continuity of supply

This manual describes how Jemena achieves these safety performance goals.

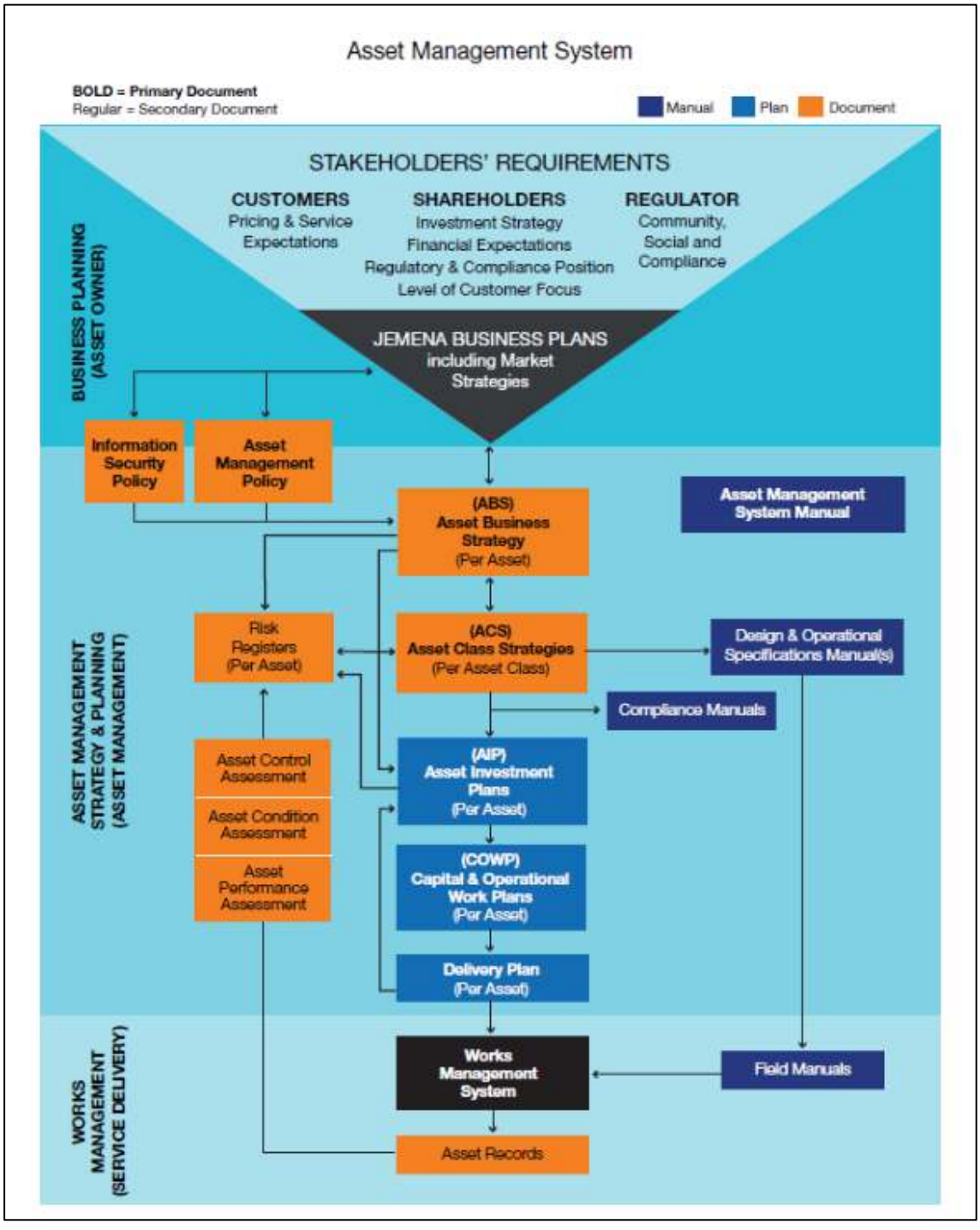
3.2 ASSET MANAGEMENT SYSTEM OVERVIEW

Jemena has a certified Asset Management System (AMS) within which Safety Management is a key element. The Asset Management System provides the principle framework for the organization to direct, coordinate and control asset management activities and provides assurance that Jemena's operational, societal and environmental objectives are achieved on a consistent basis. It brings together the external influences, asset management drivers, business values and selected strategies to deliver sustained performance for the benefit of all stakeholders.

Jemena's strategic approach to asset management is explained in detail in Asset Management System Manual JEM-AM-MA-0001.

The Overall Asset Management System document hierarchy is summarised in Figure 3-1 below.

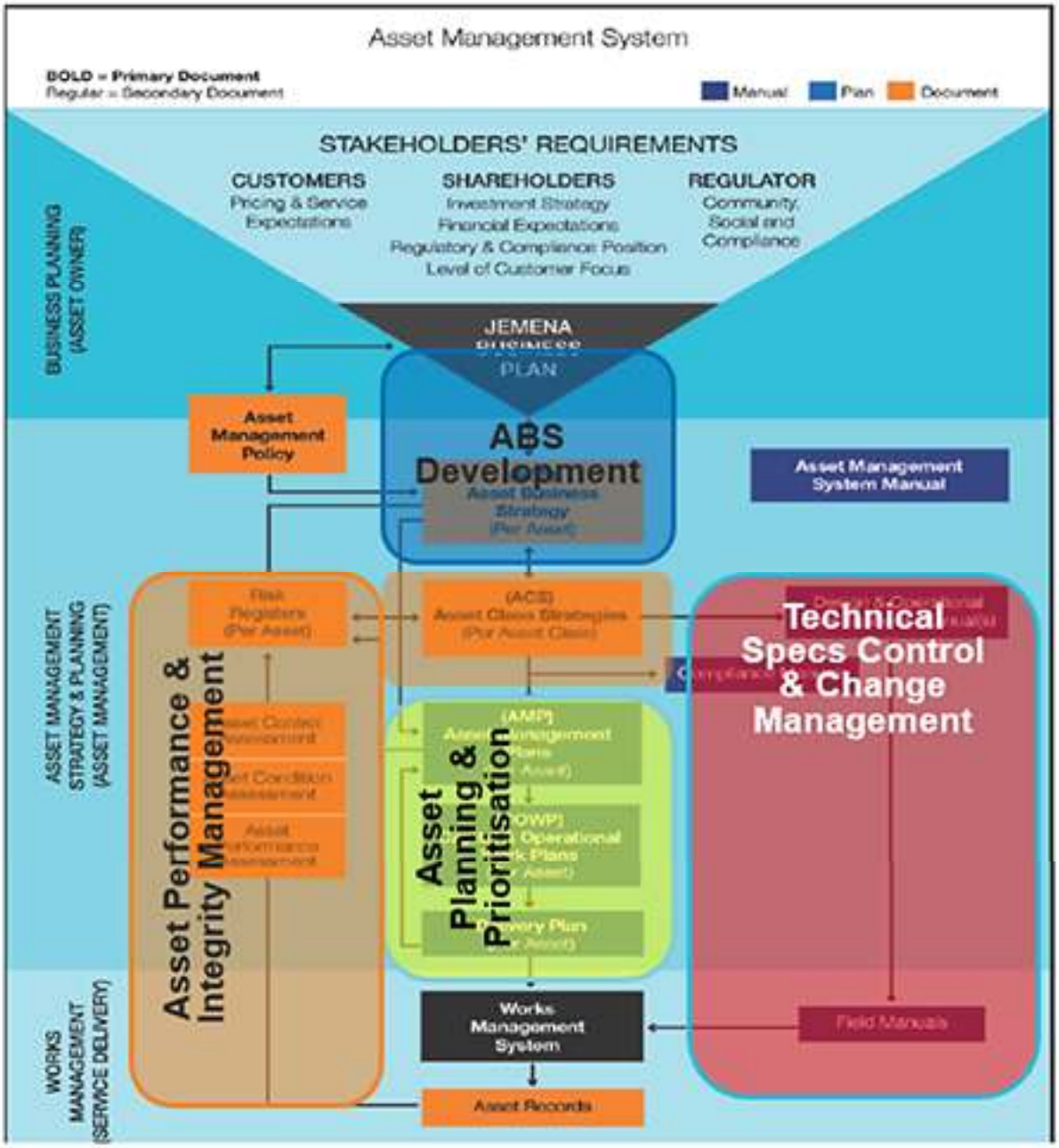
Figure 3-1 Jemena Asset Management System Document Hierarchy



3.3 SAFETY MANAGEMENT PROCESS

The overall Safety Management process is defined in the context of the level 2 processes, shown in Figure 3-2 below.

Figure 3-2 Jemena Asset Management Level 2 Processes



3.3.1 ASSET BUSINESS STRATEGY DEVELOPMENT

3.3.1.1 Asset Business Strategy

The Asset Business Strategy (ABS) translates Jemena's organisational objectives including safety into individual Asset objectives, e.g. profitability, cash flows, desired performance, current and expected performance, etc. It is also, used to confirm with stakeholders whether the Asset is meeting their expectations.

3.3.2 ASSET PLANNING AND PRIORITISATION

Asset specific activities are prioritised and planned based on the results of asset condition and performance assessments and risk assessments to ensure the safe operation of the assets. The planning and prioritisation cascades down from Asset Class Strategies (ACS) to Asset Investment Plans (AIP) then onto Capital and Operational Work Plans (COWP) and finally to the Delivery Plans as described in the following sections. This includes the development of engineering assessments, business plans, minor business plans, etc. as required for the size of the work.

Once works are approved, the work is passed to Jemena Network Services (JNS), via a confirmed Scope of Work, within the Works Management System.

3.3.2.1 Asset Class Strategy

The ACS explains the approach and principal methods by which each asset class contributes to delivering Asset Management objectives as stated in relevant ABSs, considering the age, criticality and condition profile of the class. It may also include scenario analysis for various strategies (e.g. replacement vs. refurbishment, non-asset solutions, etc), and demonstrates how the Asset Management activities for the asset class are to be prioritised or optimised to achieve Asset Management objectives (as defined in ABS).

3.3.2.2 Asset Investment Plan

Each AIP is a response to one or more ACS, and it defines an optimum set of Asset Management activities (OpEx & CapEx with budgetary financial information) to achieve Asset Management objectives set for the Asset as defined in the relevant ACSs. The AIP sets out proposed costs and activities for the next 7 years as a feed to corporate planning and forecasting.

The content of the AIP in our new format has been substantially reduced to provide the list of proposed projects in the programs of work and explanatory notes on the prioritisation of competing programs of work and any mitigation actions required to maintain targeted risk levels.

3.3.2.3 Capital & Operational Work Plan

The COWP contains details on optimised capital and operational expenditures for next two years, linking each expenditure item to one or more Asset objective(s). It sets out the detailed programs of work, resource requirements and costs that feed the Jemena business planning and budgeting process.

3.3.2.4 Delivery Plan

The delivery plan describes how JNS will deliver to requirements of COWP including management of supply contracts, resource planning, etc. It provides assurance to Senior Management and the Board that our proposed business plan and budget can be delivered.

3.3.3 ASSET PERFORMANCE AND INTEGRITY MANAGEMENT

All field work is completed by JNS under the Works Management System, as directed by Asset Planning and Prioritisation process and/or Technical Specifications. As a result of these activities, Asset Records are prepared as specified by the Work Codes or as defined by a prepared Scope of Work.

These Asset Records are utilised to carry out a series of assessment to confirm the asset condition and performance (Asset Performance and Integrity Management). These assessments are described in the following sections.

As a result of these assessments, anomalies (technical risk items that may require corrective action to ensure continued safe operation) are identified and are risk-assessed to determine criticality. These are recorded and tracked in the Risk Registers.

Risk assessments are also performed on a continuous basis as asset information is updated. The risk assessments include Safety Management Studies, Formal Safety Assessments and Hazard and Operability Studies (HAZOPS). These are described in Section 4.

3.3.3.1 Asset Condition Assessment Report

Asset condition / integrity assessments evaluate how the condition of the assets has changed over time in comparison to set targets. For example, the level of corrosion observed during inspections. The condition of the asset includes not only the physical condition but also the age and criticality of the asset.

The condition / integrity assessment reports help to inform the expected life expectancy of the asset, when preventative actions are required and if there is a need to be make changes to the frequency of inspections.

3.3.3.2 Asset Performance Assessment Report

The performance report compares the performance of the Asset Classes against set targets and identifies trends in performance. Examples of the inputs to these assessments include:

- engineering investigations and incident report findings;
- plant availability;
- failure rates or frequencies;
- Asset Performance
- reliability;
- asset-specific costs;
- mean time between failure;
- plant defects and cause codes;
- corrective maintenance rates;
- Major Incidents

3.3.3.3 Asset Control Assessment Report

Controls are processes or actions designed to eliminate, control or mitigate key business risks.

The asset control assessment report evaluates the annual compliance to these controls and effectiveness of the control. This is achieved by reviewing:

- Jemena's Compliance and Risk System (JCARS);
- Planned Maintenance PM compliance;
- internal and external audits
- work in backlog; and
- rework.

3.3.3.4 Risk Register

Asset Class risk registers are used to record and track all "Above appetite risks".[1] These risks are under active management.

The risk register and identified risks are used to underpin the ACS to ensure the safe operation of the gas assets.

3.3.4 TECHNICAL SPECIFICATIONS

Technical Specifications are the suite of documentation defining the minimum technical requirements for the creation and management of gas assets to meet Jemena safety and performance objectives and legislative requirements. These specifications underpin the safety management process and are adopted in all design, construction, operational, inspection, maintenance, assessment and repair activities carried out by Jemena.

Specifications are prepared by Asset Management to address the following:

- Design and construction of pipelines, facilities and networks;
- Operational monitoring, control and response of pipelines and networks;
- Field operations and maintenance of pipelines, facilities and networks;
- Gas measurement and reconciliation.

These Technical Specification address the following:

- Compliance with applicable codes and standards;
- Inspection techniques;
- Preventative and corrective maintenance activities;
- Methods to determine frequency of activities e.g. fixed interval, risk based;
- Anomaly assessment methods;
- Repair methods.

These Specifications dictate the content for the asset specific Field Manuals, which are maintained by JNS.

[1] JAA MA 0050 Group Risk Management Manual , refer to ALARP 'Carrot' diagram

Field Manuals provide the specific activities (type, frequency and procedures) which will be carried out for the asset via Work Codes.

Works defined in the Field Manuals are inputted into the Work Management System.

3.3.4.1 Technical Change Management

Review and updates to Technical Specifications will be carried out. The suitability of any changes will be demonstrated by an assessment to ensure the change is in compliance with legislation and Jemena's objectives and all changes will be carried out in accordance with the Change Management Manual.

3.3.5 WORKS MANAGEMENT SYSTEM

The delivery of the tasks/activities needed to operate and maintain Jemena assets is performed by the JNS Works Management System. These tasks/activities are governed by the Specifications.

3.4 SUPPORTING ELEMENTS

The key elements which support the Safety Management System process and ensures the safe operation of the gas assets are:

- Risk Management;
- Asset Integrity Assurance;
- Incident Investigation and reporting;
- Emergency Management System;
- Competency and Training;
- Management Review and System Audits;
- Asset Information Management.

These elements are described in the following sections.

4. RISK MANAGEMENT

4.1 RISK MANAGEMENT PRINCIPLES

Risk Management provides the basis of Jemena's Asset Management System. Jemena's approach to risk management is described in the JEM AM GU 0007 Jemena Asset Risk Management Guideline.

Safety and performance management is ensured through the following application of risk management:

- Training of staff in Company Health Safety & Environment (HSE) systems, operations safe work systems and associated processes;
- Pre-job planning, including task step identification and job hazard analysis, involving personnel undertaking the tasks;
- Use of safe work systems including Permit to Work Procedure to ensure that no work is undertaken on the pipeline or associated facilities without appropriate control;
- Regular workplace inspections to identify and control hazards;
- Timely reporting and investigation of hazards, near misses and incidents and the assignment of appropriate corrective and preventative action;
- Development and use of Risk Registers to identity and track risks;
- Use of pipeline and facility integrity risk review information and recommendations;
- Undertaking asset risk assessments for all new projects and where there is a change or modification to existing plant, equipment or processes, or as required by legislation. The type of hazard/risk identification and assessment process applied is dependent on the nature of the activity being assessed.

4.2 ASSET RISK ASSESSMENTS

Jemena undertakes risk assessments for all new projects and periodic risk assessment for all existing assets as required by JAA MA 0050 Group Risk Management Manual and the applicable codes and standards.

The following sections describe the risk assessments undertaken by Jemena to ensure the safe operation of the gas assets, which includes the method of assessment based on the gas asset class.

These risk assessments are undertaken to:

- Ensure, and provide assurance that the asset is operated safely;
- Identify and assess threats to the assets that have the potential to impact on integrity;
- Identify procedural and design measures necessary to eliminate or reduce significant risks to a level regarded as either acceptable or as low as reasonably practicable (ALARP); and
- Demonstrate that the entire gas asset meets or exceeds code requirements and the level of risk is acceptable or ALARP.

The following risk assessments are performed:

4.2.1 SAFETY MANAGEMENT STUDIES

Safety management studies (SMS) identifies threats to AS 2885 pipeline systems and applies controls to them, and (if necessary) undertakes assessment and treatment of any risks to ensure that residual risk is reduced to ALARP.

Safety management studies are carried out in accordance with AS 2885.6.

Safety management studies are conducted as per AS 2885.6 requirements, which include:

- During design and construction process(as per Section 5.4 of AS 2885.6 - 2018);
- Periodic operational review, at intervals not exceeding five years;
- Land use change;
- Encroachment SMS;
- Change of operating conditions SMS
- Failure event SMS

4.2.2 FORMAL SAFETY ASSESSMENTS

Formal safety assessments (FSA) are used to identify specific threats and hazards associated with gas networks and metering systems and the mitigation of threats and hazards operating at or less than 1050kPa. As for SMS, FSA identify threats to the gas network and applies controls as required to ensure that the residual risk is reduced to an acceptable level.

FSA are carried out in accordance with AS/NZS 4645.1.

4.2.3 HAZARD AND OPERABILITY STUDIES

Hazard and Operability Studies (HAZOPS) are a process aimed at the systematic review to identify and assess hazards inherent in the design, operation and maintenance of the facilities. HAZOPS are carried out for all Jemena gas facilities in accordance AS IEC 61882.

4.2.4 GAS PROCESSING SAFETY

Jemena has a comprehensive review of process safety, which mirrors the SMS process. The details of which is reflected in the Group Risk Management Manual.

Jemena has conducted HAZOP and Safety Integrity Level (SIL) studies for its gas processing facilities to ensure that process hazards are identified and their control mechanisms are reliable and functional. These studies have identified key process and instrumentation risks and testing and maintenance requirements. These risks will form the starting point for process hazard management which uses risk assessment and procedural control effectiveness principles. The process hazard management system analyses the following aspects of operation, as a minimum:

- Incident identification
- Review of maintenance
- Alarm Management

- Technical review of Change Management System requests

4.2.5 ENCROACHMENT MANAGEMENT

Jemena employs an encroachment management system to monitor and assess the impact of developments occurring within the vicinity of gas assets. The encroachment management system uses the AS 2885.6 Safety Management Study process to assess the impact of any development and advise the proponent of the impact identified as a result of the change in land use and to define appropriate mitigation measures to be implemented.

5. ASSET INTEGRITY ASSURANCE

5.1 GENERAL

Asset safety and performance can be impacted in many ways along the lifecycle of the asset. These include a range of issues from poor design and construction to inadequate maintenance or operational procedures through to third party activities. The case for safety of the assets must therefore consider these various aspects that affect asset integrity and subsequently asset safety.

Jemena ensures gas asset system integrity by performing design, construction, commissioning, inspection, operations and maintenance activities in accordance with Jemena Specifications, practices, procedures and applicable codes and standards, as described in the following sections.

5.2 ASSET CREATION

Asset Creation involves all the Design, Construction, Procurement, Commissioning and Handover activities needed to turn a business requirement into a functional and safe asset.

Jemena Specifications covering design, construction and commissioning ensure asset integrity is enhanced during Asset Creation through reference to:

- Applicable codes and standards;
- Best industry practices;
- Jemena experience;
- Risk management principles.

5.3 INSPECTION AND MAINTENANCE

Ongoing asset integrity is monitored through inspection and enhanced through maintenance activities documented in the Field Operations and Maintenance Specification (FOMS). This includes the following key elements:

- Inspections to identify and collect relevant integrity data;
- Asset condition assessments to identify anomalies;
- Gas Asset anomalies assessment;
- Planned maintenance to maintain integrity;
- Corrective maintenance to return equipment to a safe condition.

As with other Specifications, the FOMS is updated as part of the ‘plan, do, check, act cycle inherent in the AMS.

5.4 OPERATIONS

All Jemena gas assets are operating in accordance with operating manuals which define the actions to be taken in the event of normal, abnormal, and emergency operating conditions to ensure the safe operation of the assets.

These operating manuals and procedures for each gas asset are developed and established on the basis of the Operational Monitoring, Control and Response Specifications (OMCR).

The OMCRs provide the operational monitoring, control and fault and emergency response requirements for all Jemena gas assets in accordance with relevant legislation and Jemena's operational, societal and environmental objectives.

5.5 MANAGEMENT OF CHANGE

All gas asset modifications are required to follow the requirements of the Change Management Manual. The change management process includes the following activities.

In circumstances when a modification is necessary, the Change Management Manual is followed. In this instance, the suitability of the modification shall be demonstrated through a documented assessment which will ensure all relevant inputs and implications on existing facilities are considered

All modifications work is carried out in accordance with Jemena Safe Work practices, as defined in Section 5.6.

Reference to Change Management procedures is provided in the Compliance Assurance Matrix.

5.6 SAFE WORK SYSTEMS

Jemena operates safe work systems to ensure high levels of health and safety and ensuring the environment is maintained when work is carried out on gas assets. The activities and processes that Jemena employ to ensure all field work is carried out safely is described below.

Risk assessment for field operations are carried out in advance of the operations to identify threats to the assets and confirm adequate controls have been included in the work procedures to mitigate any residual risk to acceptable levels. The most typical risk assessments include the following:

- Construction Work Safety Management Studies/Risk Assessments in accordance with AS2885.1;
- In-service welding risk assessments in accordance with AS 2885.2 and WTIA Technical Note 20;
- Hot tapping risk assessment.

Hazard Identification and Risk Assessments (HIDRA) are performed prior to operations to address threats to personnel and confirm adequate controls are established within the work procedures to reduce any residual risk to acceptable levels.

Jemena operates a Permit to Work (PTW) system for work carried out on all Jemena gas assets. The PTW System is an additional procedural control employed for site works involving high levels of risk when working with any pipeline or its facilities to ensure high levels of health, safety and the environment are maintained. Types of Permit to Work include:

- Cold Work Permit;
- Hot Work Permit;
- Excavation Permit;
- Confined Space Entry Permit
- Critical Work Permit

References to the Safe Work Systems is referenced in the Compliance Assurance Matrix.

6. INCIDENT INVESTIGATION AND REPORTING

Within the Asset Management System, Jemena utilises an Incident Management System for logging incidents. The management of the incident investigation is completed through JAA HSE PR 003 Investigating Incidents Procedure where appropriate persons are tasked with investigation of the incident.

Jemena has established procedures for identifying, notifying, recording, investigating and reporting accidents or incidents resulting from the operation and maintenance of the assets. This includes any event associated with the pipeline or facility that either causes or has the potential to cause:

- Injury or death to pipeline personnel or the public
- Significant damage to the environment
- Significant impact on the pipeline's operation or integrity

These procedures provide for feedback to ensure appropriate preventative actions are implemented in the Safety Management process.

Reference to Jemena Incident Investigation and Reporting procedures is provided in the Compliance Assurance Matrix.

7. EMERGENCY MANAGEMENT SYSTEM

Jemena maintains an Emergency Management Plan (EMP) which provides a common emergency management structure surrounding an event which is impacting on the business and has been classified as being an emergency.

This EMP and its annexes, are prepared to support the actions of an established Emergency Management Team (EMT) and Area Management Team (AMT), and include the following elements:

- Effective decision-making for significant incident and emergency events;
- Effective identification, assessment and escalation of events;
- Effective recording of EMT/ AMT actions and decisions:
- Supports the post-event review of EMT/AMT management to support recommendations for future improvement; and
- Provision of training.

This EMP provides guidance on EMT processes and the roles and responsibilities of team members during an event and describes the structure of the EMT and AMT. This includes the process of escalation, activation and mobilisation to provide a state of readiness for effective deployment and response.

The EMP and other supporting documentation is referenced in the Compliance Assurance Matrix.

8. COMPETENCY AND TRAINING

Jemena has systems in place to ensure that it's management, supervisors, employees and contractors are recruited appropriately, have the necessary skills and knowledge and are competent to operate and maintain the facilities in compliance with Jemena safety objectives.

Competency procedures address the following to ensure the safe operation of the gas assets:

- Appropriate employee selection;
- Engineering and Asset Management staff competency;
- Field staff technical and HSE competency;
- Contractor management;
- Employee performance review and development.

Reference to Competency and Training Procedures is provided in the Compliance Assurance Matrix.

9. SYSTEM AUDITS

Management review and auditing activities are part of Jemena's continual improvement process as outlined in the Asset Management System. These activities incorporate the principles of 3 lines of defence. Along with asset assessments, AMS monitoring, compliance management and incident investigations, these audits assure that the AMS is providing the necessary outcomes to meet Jemena's objectives.

Reference to system audit activities and procedures is provided in the Compliance Assurance Matrix.

The audits related to the gas safety management systems are described below.

9.1 EXTERNAL AUDITS

Jemena complies with external audit regimes as relevant, to monitor and evaluate the level of compliance. This may include:

- Auditing of the Safety and Operating Plans (SAOPs), Pipeline Management Plans (PMP), Safety Cases, Safety Management Plans, Safety Management Schemes and Environmental Management Plans associated with the gas assets;
- Auditing the accuracy of compliance obligation;
- Acting upon deficiencies identified in the audit in a timely manner;
- The inclusion of audit results in management reviews;
- Non-conformance, Corrective and Preventative Action Plans.

9.2 INTERNAL AUDITS

Jemena carries out internal audits to monitor and evaluate compliance to technical safety requirements. This includes:

- Auditing of the Safety Management Plans, SAOPs, Safety Management Schemes and Environmental Management Plans associated with the various assets under management;
- Scheduling of audits in order of the importance of the activities and associated risk and the results of previous audits taking into account scheduled external regulatory audits;
- Acting upon deficiencies identified in the audit in a timely manner;
- The inclusion of audit results in management reviews;

9.3 AUDIT FOLLOW UP AND CONTINUOUS IMPROVEMENT

JCARS action progress is tracked through the dashboard and followed up by respective General Managers and also highlighted in the monthly key performance indicator (KPI) reports. The Risk & Assurance function reviews the outcomes of these actions following the closure of each action item.

10. SAFETY PERFORMANCE MANAGEMENT AND GOVERNANCE

Safety performance is managed and governed through the preparation of asset safety performance reports, the results of which are reported through a number of established safety committees. This safety performance management and government process is described below.

The Safety Council provides overall HSE leadership and assists Jemena to fulfil its overall responsibilities in relation to HSE matters as they affect workers (employees and contractors), customers and the community. Membership of the Council includes the Managing Director as the Chair, all Executive General Managers and the General Manager Safety and People.

The HSE Council has established an Asset and Public Safety Committee (APSC), which monitors and reports on the effectiveness of strategies and practices to manage asset and public safety risks. The APSC includes all Asset Management and Delivery General Managers as well as representatives from HSE and the Corporate Risk Management team. On behalf of the APSC, the APSC chair reports to the HSE Council on the APSC's activities and on the safety performance of Jemena gas (and electricity) assets.

The APSC oversees a number of operational and review committees which have specific objectives, including the Gas Safety and Management Review Committee (GSMRC). Through the GSMRC, the APSC reviews and monitors the operation of gas safety management processes and systems to ensure they deliver to the Jemena objectives.

The GSMRC oversee the following asset and public safety elements as detailed in the committee charter:

- Technical policies, procedures and work instructions;
- Regulations, codes, standards and contractual compliance;
- Audit and incident investigations;
- Performance, integrity and condition monitoring;
- Good industry practice, research and innovation.

The GSMRC reports to the APSC, on a quarterly basis, the current status of the asset and public safety program and management system including:

- Performance against KPIs;
- Trend analysis of significant events;
- Major incident logs and major incident review completed;
- Formal Safety Assessments and Safety Management Studies;
- Legislative and regulatory compliance;
- Status of relevant management system audit or corrective actions;
- Changes to the status of risks and controls.

The GSMRC is supported by Jemena's AS 2885 Pipeline Code Committee and the AS 4656 Code Committee.

These are operational level committees with the purpose of developing operational excellence across all gas infrastructure assets governed by the AS 2885 suite of standards for gas pipelines and facilities and AS 4645 suite of standards for gas networks.

Performance reports are prepared at the operational level for the gas assets, which relate performance to a number of KPIs, including:

- Reportable incidents;
- Gas releases;
- Response time;
- Encroachments;
- Cathodic Protection performance;
- Third party hits;
- Pipeline defects;
- Pipeline patrols;
- Maintenance completion.

11. ASSET INFORMATION MANAGEMENT

Information management, which supports asset management process including decision making, reporting and activities, is fundamental to the assured safe performance of the assets.

Jemena has established record management plans for the identification, preparation, collection, storage, transfer and disposal of information pertinent to the safe operation of the assets. This information includes the following:

- Engineering records including pipeline design, construction records, change requests, engineering assessments, operating condition data, welding qualifications, communication systems data, drawings, risk assessments, HAZOPs, easement information, location class review, Remaining Life Review, maps, coating inspections, pipeline inspections (both internal and external), cathodic protection, hydrotest and commissioning reports;
- Operations and maintenance records including inspection and test records, surveillance records, quality and integrity data from forms;
- Audit records of field operations, work practices, competency details, health, safety and environment performance data;
- Operational reports as required by the company and by regulators;
- Incident reports and corrective action reports;
- Work management system data including work orders and completion reports;
- Health and safety including meeting minutes, safety grams, safe work method statements (SWMS), audits and environmental issues.

Jemena utilises a Geographic Information System (GIS) to manage pipeline information, landowner management, crossing notifications, field data capture, pipeline inspections and other asset information. The GIS allows users to view, query, analyse and map information related to the asset and surrounding land, and provides access to the following types of data:

- As-built pipeline data;
- Pipe & weld traceability recorded during construction;
- Above ground & below ground features near pipeline;
- Right of Way information / environmental / land management data / Inspection records;
- Safety Management (AS 2885) information including. Location Class;
- Aerial photography.

The overall principles of Asset Information management is addressed in the AMS Manual. Reference to the asset information Management procedures are provided in the Compliance Assurance Matrix.

Appendix C
Compliance Assurance Matrix

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C1. Compliance Assurance Matrix

139. **Table C1–1** below highlights the compliance assurance matrix:

Table C1–1: Compliance Assurance Matrix

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
1	AS2885.3 Cl.2.2.2.1	Management - Policy and Commitment Policy and commitment The Licensee shall define its policy towards the various aspects of operating the pipeline. Policies shall address at least— pipeline integrity management; environmental management; and occupational health and safety management. NOTE: A clear commitment by the Licensee towards specific outcomes forms the basis of the pipeline management system.	Jemena is committed to being the customer's choice for world leading, reliable and sustainable energy solutions. Please note the various applicable Policies.	Jemena Compliance With The Law Policy Jemena Asset Management Policy Group Health, Safety & Environment
2	AS2885.3 Cl.2.2.2.2 & Cl.2.2.2.3	Management - Structure A defined management structure for the pipeline shall be established to identify key positions and or personnel. A management structure appropriate to the size and complexity of the pipeline shall be maintained. Management - Responsibilities, Accountabilities and Authorities The responsibilities, accountabilities and authority levels of personnel and or contractors with respect to the various aspects of the operation and maintenance of the pipeline shall be detailed in the pipeline management system. In particular, personnel shall be identified and documented with the responsibility and authority to—	The organization structure for the asset is broadly described in element 7 of the safety case. Details of the organizational arrangements in managing the assets is described through the Jemena's Accountability Model. Note: Jemena's Accountability Model. The Accountability Model is a tool that utilises the Enterprise Process Model (EPM) to provides a single source of truth for accountabilities across the business. It is expected that the tool will enable the business to clarify roles in planning and executing work, executing a process, and making day-to-day decisions.	Asset Management Manual – Section 9 Jemena Organisation Chart GAS-999-PA-DM-004 GAS AS 2885 Document Approvals Structure The Accountability Model (RASCI)

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		initiate action to prevent a loss of pipeline integrity, damage to the environment, impact to public, or to correct an occupational health and safety issue initiate action to prevent a loss of pipeline integrity, dam age to the environment, impact to public, or to correct an occupational health and safety issue; identify and report on any existing or potential deficiencies within the pipeline management system or the pipeline's operation and maintenance; initiate, recommend and approve corrective and preventiv e actions in relation to identified existing or potential deficiencies within the pipeline management system or the pipeline's operation and maintenance; evaluate and verify the effectiveness of any corrective or preventive action implemented; and satisfy the mandatory approval requirements of this Standard. NOTE: AS 2885.0 requires the development of an approval matrix to document the delegations of the Licensee.	In addition to this, as required by the standard, Jemena has established AS 2885 Document Approvals Structure to meet necessary compliance (refer Document Approvals Matrix)	
3	AS2885.3 Cl.2.2.2.4	Management - Training and Competency Personnel shall be competent to perform the specific tasks and functions for which they are responsible. The Licensee shall establish and maintain procedures for identifying and providing the training needs of all personnel performing functions covered by the pipeline management system. As a minimum and as applicable to each position, personnel responsible for the operation and maintenance of the pipeline shall be—	Jemena has comprehensive Learning and Development Processes in place to meet ongoing training and competency needs. These are met through several processes. The details of which can be demonstrated by a member of the Jemena Learning and Development team. In addition, People leaders have responsibility to ongoing management of competency and support. Sever tools are available to support the training and competency requirements. Learning includes Success Factors, Competency Framework. Passport (Contractors).	Asset Management Manual – Section 9 Jemena Learning & Development Website G-HR-PR-50389 Plan Implement and Monitor Compliance Training

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		a. adequately trained and experienced in all aspects of the equipment in their control; b. adequately trained in the obligations of the pipeline management system and briefed in the requirements of the controls and actions id entified during the safety management study; c. aware of properties of the fluid, including its hazards (see Note 1); and d. adequately knowledgeable in the design, construction, welding, hydrostatic testing, cathodic protection and coating of pipelines as required by AS 2885, the relevant pipeline coating and cathodic protection standard and other technical documents and Standards relevant to the pipeline's integrity (see Note 2 and Note 3). NOTES: 1. For more information on fluid properties see AS 4343. 2. Detail on the framework for National Competencies for Transmission Pipeline Operators can be found at www.ee-oz.com.au. 3. Detail on the engineering competencies can be found at the APIA website www.apia.net.au		
4	AS2885.3 Cl.2.2.2.5	Management – Resourcing The Licensee shall identify the resourcing, equipment and material requirements for the pipeline's operation and	Resourcing is undertaken via specific processes within the AMS. The purpose of the plan is to assess and formulate the delivery strategy. It analyses of the ability of the business to	Asset Management Manual – Section 6.4

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		maintenance, including the resources required to ensure the appropriate development, implementation and review of the pipeline management system. NOTE: Where the pipeline is in continuous operation, sufficient personnel should be available for undertaking planned and unplanned operations and maintenance, taking into account the requirements for leave and training.	deliver the program of work and including the delivery approach. This Delivery Plan provides the framework to deliver the projects specified in the Asset Management Plan (AMP) and an assessment of the deliverability of the Capital Programme of Works including the delivery approach.	Asset Management System (AMS) Intranet Site
5	AS2885.3 Cl.2.2.2.6	Management - Change Management The Licensee shall establish procedures for managing changes to the pipeline management system, procedures, pipeline design or operation so that they are conducted in a controlled manner, and reviewed and approved. Any change to the pipeline or its operating context shall be reviewed and approved. Change shall be considered to have taken place if the engineering design has been upgraded or modified (see Section 10), or if any event or newly identified threat initiates an operational, technical or procedural change in the measures in place to— a. protect the pipeline and associated components; b. promote public awareness of the pipeline; c. operate and maintain the pipeline safely; d. respond to emergencies; e. prevent and minimize loss of containment; f. carry out inspections in accordance with Clauses 6.4, 6.5, 6.6 and Clause 6.7; and g. ensure that the plans and procedures continue to comply with the engineering design. The change management procedures shall address implementation of any resulting pipeline management system changes, including notification and training of staff impacted by the change, and the allocation of responsibilities for any	Jemena has established several change management procedures to address changes to asset (i.e. design, process, projects etc). Examples include Engineering Change Management, Field Technical Change and Acts & Regulations Change.	Asset Management Manual – Section 10.4 GAS-999-PR-CM-001 GAS Field Technical Change Notification and Implementation Process Field Technical Change Intranet Site GTS-980-OM-CM-001 Change Management Manual Lessons Learned Projects Change JEM PR 0047 Acts & Regulation Change Procedure

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		identified actions. The change management procedures shall also include communication of changes to relevant stakeholders		
6	AS2885.3 Cl.2.2.2.7	Management - Management Review The Licensee shall establish procedures for regular management review of the effectiveness and appropriateness of the pipeline management system. NOTE: The management review should include review by the Licensee for those elements of the pipeline management system considered high risk, and take into account the outcomes from the various procedures covering the measurement and evaluation of elements of the pipeline management system (see Clause 2.2.5). The pipeline management system shall be reviewed and, if necessary, updated, at least every 2 years or in the event of any change to the pipeline management system elements (as detailed in Clause 2.2.2 to 2.2.6). NOTE: For example, updating of the pipeline management system may be necessary when there are changes to legislative requirements, Licensee, or organization structure.	Gas Safety Management Review Committee. The purpose of this committee is to monitor and report on the effectiveness of strategies and practices to manage risks associated with the safe operation of all gas network and pipeline assets in accordance with the charter. The meetings are held quarterly and are supported by an operating charter and minutes with retained within the process. Follow-up of decisions and actions are supported by several process within Jemena.	Asset Management Manual – Section 10.7 GAS-999-GL-RM-001 GSMRC Operating Charter GSMRC Intranet Link
7	AS2885.3 Cl.2.2.6	Consultation, Communication and Reporting 2.2.6 Consultation, communication and reporting The Licensee shall identify external people and organizations with a legitimate interest in the safety and environmental aspects of the pipeline's operation and maintenance. These	Jemena engages several methods to communicate consult and report including statutory reporting. The process is robust and uses latest IT tools, mobile solutions and Jemena Intranet. Other means include team meetings, dashboards, townhalls etc including management review process. external reporting normally is coordinated through the relevant approval processes and document approvals structure.	Asset Management Manual – Section 10.10 Crisis Emergency and Physical Security Website

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		may include landowners, contractors, utilities, local and emergency authorities, regulatory authorities and government agencies. The Licensee shall establish procedures for regular consultation with, and communication and reporting to, these identified stakeholders. These procedures should include statutory reporting requirements. NOTE: Clause 7.3.1 provides details of stakeholders and community awareness processes as they relate to external interference protection.		Annual Reports (NSW Technical Regulator) Property Portfolio Landholder & Stakeholder Engagement Strategy
8	AS2885.3 Appendix D D2 (c)	Document Approvals - Approval Matrix	Please note the Document Approvals Structure	GAS-999-PA-DM-004 GAS AS 2885 Document Approvals Structure The Accountability Model (RASCI)
9	AS2885.3 Cl.2.2.3.2	Planning - Planning for Normal Operation When developing the policies and procedures of the pipeline management system, the Licensee shall utilize the various safety management studies undertaken under the requirements of AS 2885.1 and this Standard. Control measures required to eliminate threats or reduce them to an acceptable level, including threats to the environment as a result of pipeline operation activities, shall be incorporated into the appropriate procedures. The Licensee shall also establish a process for the identification of occupational health and safety and environment hazards and mitigation of occupational health and safety and environment risks as described in Section 4, prior to the commencement of any activity.	Jemena Asset Strategy Gas with its asset classes define planning requirements from Design Basis Manuals, Operational and Maintenance Specifications, Risk Management Guidelines etc. These culminate in workplans which are managed in SAP.	Asset Management Manual – Section 5 Group HSEQ Management System Asset Management System (AMS) Intranet Site JEM AM GU 0007 Asset Risk Management Guideline GAS-999-PR-HSE-006 Permit To Work Procedure

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
				GAS-999-PR-RM-002 Procedure for 5 Yearly Operational Safety Management Studies
10	AS2885.3 Cl.2.2.3.3	Planning - Planning and preparation for Abnormal Operations The Licensee shall plan and prepare for operation of the pipeline in circumstances that are different from those initially considered during the design of the pipeline or during significant disruption to normal operations. These circumstances may include the following: a. Operating under emergency power supplies. b. Operating without key assets such as compressors. c. Operating at low flow, pressure or linepack levels. d. Operating under communication outages. e. (e) Operating under changed conditions to maintain safety of a damaged pipeline.	Jemena Asset Strategy Gas with its asset classes define planning requirements from Design Basis Manuals, Operational and Maintenance Specifications.	Asset Management Manual – Section 5 Technical Specifications GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure AS2885 Pipeline Design Basis Manual AS2885 HP Facilities Design Basis Manual AS2885 Pipelines Field Operations & Maintenance
11	AS2885.3 Cl.2.2.3.4	Planning - Emergency Planning and Preparation The Licensee shall plan and prepare for emergency events resulting from the pipeline's operation and maintenance and from external events that may affect the safe and reliable operation of the pipeline (see Section 11). In the event of an emergency, the Licensee shall ensure that any response is performed in a safe manner. NOTE: Liaison with emergency services and stakeholders may a	Jemena Asset Strategy Gas with its asset classes define planning requirements from Design Basis Manuals, Operational and Maintenance Specifications. Also refer to Implementation - Emergency Response (Section 11) requirements within this matrix.	Asset Management Manual – Section 5 Asset Management System (AMS) Intranet Site Technical Specifications GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure AS2885 Pipelines Field Operations & Maintenance

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		ssist the Licensee to be adequately prepared for an emergency event.		Crisis Emergency Management & Security Intranet site JAA NSO PL 0003 Jemena Emergency Management Plan
12	AS2885.3 Cl.2.2.4	Implementation - Preparation for Operation (Section 3) Please refer to section 3 of the 2885.3 Standard.	Jemena Project Management Methodology includes the construction and commissioning processes. Project Gating ensure necessary administrative and technical controls are obtained, implemented and made available before an asset is transitioned into normal operation/maintenance – including as-built records. Asset related risk management requirements (eg: SMS, HAZOP, ALARP etc.) are detailed in the Asset Risk Management Guideline.	Asset Management Manual – Section 5 Asset Management System (AMS) Intranet Site Technical Specifications AS2885 Pipeline Design Basis Manual AS2885 HP Facilities Design Basis Manual Project Delivery Centre Intranet PMM Gating Portal – Jemena 7 Step Gating online management portal JEM AM GU 0007 Asset Risk Management Guideline

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
13	AS2885.3 Section 4	Implementation - Site Safety and Environmental Management (Section 4) Please Refer Section 4 of the 2885.3 Standard.	Jemena HSE Systems largely provides the basis for personnel working under safe systems of work. In addition several work instructions e.g. SWMS, etc provide a trigger for field operatives to perform a routine review of site HSE risks before any work activity is performed.	Asset Management Manual – Section 5 Group HSEQ Management System GAS-999-PR-HSE-006 Permit To Work Procedure GAS MA 0001 Gas Transmission Safe Work Method Statement Manual GAS MA 0003 Safe Work System Manual
14	AS2885.3 Section 5	Implementation - Pipeline Integrity Management (Section 5) Please Refer Sections 5, 6,7,9,10 of the 2885.3 Standard	Pipeline Integrity Management is addressed by several Jemena Artefacts and as relevant/applicable to the specific 2885 asset. Jemena Asset Strategy Gas with its asset classes define planning requirements from Design Basis Manuals, Operational and Maintenance Specifications. Service Delivery is required to meet these specifications and where required, provide necessary data re work accomplishment, asset condition and asset performance.	Asset Management Manual – Section 10.6 Asset Management System (AMS) Intranet Site Technical Specifications GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
				Asset specific Pipeline Integrity Management Plans
15	AS2885.3 Section 8	Implementation - Stations Operations and Maintenance (Section 8) Please Refer Section 8 of the 2885.3 Standard	The requirement is addressed by several Jemena Artefacts and as relevant/applicable to the specific 2885 asset. Jemena Asset Strategy Gas with its asset classes define planning requirements from Design Basis Manuals, Operational and Maintenance Specifications. Service Delivery is required to meet these specifications and where required, provide necessary data re work accomplishment, asset condition and asset performance.	Asset Management Manual – Section 7.2 Asset Management System (AMS) Intranet Site Technical Specifications AS2885 HP Facilities Design Basis Manual GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure AS2885 Pipeline Design Basis Manual AS2885 HP Facilities Design Basis Manual AS2885 Pipelines Field Operations & Maintenance
16	AS2885.3 Section 11	Implementation - Emergency Response (Section 11) Please Refer Section 11 of the 2885.3 Standard	The purpose of emergency management is to manage an adverse event or series of events, which has the potential to impact on employee, public safety or loss of supply. Emergency procedures have been established and implemented to minimise any consequences resulting from incidents. The Emergency Management Plan provides guidance on emergency processes and the roles and responsibilities of team members during an event. This includes the process of	Asset Management Manual – Section 7.4 Crisis Emergency Management & Security Intranet site JAA NSO PL 0003 Jemena Emergency Management Plan

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
			escalation, activation and mobilisation to provide a state of readiness for effective deployment and response. The Crisis & Emergency Management Framework provides a standardised approach to crisis and emergency management training and exercising (simulations) and supports crisis and emergency preparedness. These processes are detailed in the specified procedures.	JAA NSO FW 0002 Crisis and Emergency Management Framework
17	AS2885.3 Section 12	Implementation - Records Management (Section 12) Please Refer Section 12 of the 2885.3 Standard	Jemena applies various tools and systems towards management of asset records. These include , ECMS, SharePoint, SAP, ASPiRE, Omnia, Leaning and Development, etc.	Asset Management Manual – Section 8 Asset Data Management (ECMS) Aspire Incident Investigation & Reporting System Jemena Intranet Omnia
18	AS2885.3 Cl.2.2.5.1 & 2	Measurement and evaluation - Data Acquisition and Analysis 2.2.5.1 General The pipeline management system shall incorporate procedures for the appropriate measurement and evaluation of the performance of the p ipeline management system elements.	The requirement is addressed by several Jemena Artefacts and as relevant/applicable to the specific 2885 asset. Jemena Asset Strategy Gas with its asset classes define planning requirements from Design Basis Manuals, Operational and Maintenance Specifications. Asset Information corresponding to pipeline's operation and performance is retained in relevant asset records. The links below provide the common areas and must be cross referenced to specific asset information on ECMS	Asset Management Manual – Section 10.7 GAS-999-GL-RM-001 GSMRC Operating Charter GSMRC Intranet Link

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		NOTE: The results of audit, review and monitoring processes should be utilized for the purpose of management review of the pipeline management system. 2.2.5.2 Data acquisition and analysis The Licensee shall establish procedures for identifying, collecting and analysing the pipeline's operational, maintenance and reliability data to identify trends in the pipeline's operation and performance. NOTE: Analysis of this data should enable operation of the pipeline to continue as planned. It should also identify any negative trend that may result in an event adversely impacting the safe and reliable operation of the pipeline.		Operational Reports Asset Specific Annual Performance and Integrity Report (APAIR) Process.
19	AS2885.3 Cl.2.2.5.3	Measurement and evaluation - Accident/Incident Investigation and Reporting 2.2.5.3 Accident/incident investigation and reporting The Licensee shall establish procedures for identifying, notifying, recording, investigating and reporting accidents or incidents resulting from the operation and maintenance of the pipeline. This shall cover any event associated with the pipeline that either causes or has the potential to cause— a. injury or death to pipeline personnel or the public; b. significant damage to the environment; and/or c. significant impact on the pipeline's operation or integrity. Reporting shall include notification of relevant regulatory authorities as required by legislation. NOTE: Apart from incident reporting to the regulatory authority where required by legislation, the circumstances of any incident, as defined in the Australian Pipeline Industry Association (APIA) Pipeline Incident	Jemena has several procedures, tools or systems to support this requirement, including ASPiRE, ICAMs, Crisis and Emergency procedures / systems.	Asset Management Manual – Section 10.7 JEM HSE PR 0032 Management of Health & Safety Risk & Legal Obligations Registers Jemena Crisis Emergency Management & Security Intranet site Aspire Incident Investigation & Reporting System JAA HSE PR 0003 Jemena Investigating Incidents Procedure

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		Database, should be reported to APIA to enable statistics of pipeline incidents to be gathered.		
20	AS2885.3 Cl.2.2.5.4	Measurement and evaluation - System Audits 2.2.5.4 System audits The Licensee shall establish procedures for planning and implementing audits of the pipeline management system to determine compliance with and effectiveness of the plans and procedures. System audits should also assess compliance with legal and regulatory requirements and ensure the pipeline management system adequately addresses these issues. The Licensee shall consider the threats identified and risks evaluated in the safety management study to ensure that audits evaluate— a. the effectiveness of the pipeline management syste m in controlling the risks identified; and b. the effectiveness of the monitoring procedures in place to identify new or changed threats and risks. Audits shall be performed by competent personnel who are independent of the section of the pipeline management system being audited. The audit procedures shall cover the timing of audits, including the conduct of external independent audits where chosen to be undertaken or where required by regulatory authorities. Audit procedures shall cover arrangements for verifying the effectiveness of corrective and preventive actions designed to address any non-conformances identified during the audit.	Jemena Asset Risk and Assurance has a process in place for internal and external audits for all Jemena managed gas assets. These audits have a primary intent to satisfy Jemena internal and external audits requirements as part of the pipeline management system.	Asset Management Manual – Section 10.8 Asset Risk and Assurance Internal Audit Plan (Electricity & Gas)

No	Standard	Requirement Title and Detail	How do we address the requirement – additional information	Supporting procedure / process
		The outcomes of audits shall be subject to management review.		
21	AS2885.3 Cl.2.2.5.5	Measurement and Evaluation - Corrective and Preventive Action 2.2.5.5 Corrective and preventive action The Licensee shall develop and implement procedures for determining, approving and implementing corrective and preventive actions. NOTE: Corrective actions are taken to deal with an existing issue while preventive actions address potential issues. The proposed actions shall, as far as reasonably practicable, eliminate or mitigate the issue and shall be appropriate and commensurate to the risk encountered. The proposed actions shall be recorded and their effectiveness determined by audit. The basis for any action shall be documented and the outcomes of actions taken, along with their effectiveness, shall be subject to management review.	Jemena Compliance and Risk System (Omnia) is the primarily system of corrective and preventive actions. The process is supported by additional artefacts such as procedures and other monitoring tools within Omnia to enable better management oversight. In addition there are other systems and processes within Jemena that support the corrective and preventive actions. e.g. ASPiRE.	Asset Management Manual – Sections 6 and 10.9 Omnia Asset Risk and Assurance Internal Audit Plan (Electricity & Gas) Aspire Incident Investigation & Reporting System JAA HSE PR 0003 Jemena Investigating Incidents Procedure

Appendix D
Specific Jurisdiction Requirements

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D1. Jurisdictional Compliance Matrix

140. A completed Jurisdictional Compliance Matrix must be submitted with the Safety Case to demonstrate that the following Acts, Regulations and Standards have been considered and addressed as relevant i.e.:

- VIC Gas Safety Act 1997. Part 3
- VIC Gas Safety (Safety Case) Regulations 2018.
- VIC Gas Safety (Gas Quality) Regulations 2017
- VIC Pipelines Act 2005
- VIC Pipelines Regulations 2017
- NSW Pipelines Act 2005
- NSW Pipelines Regulations 2013

141. **Table D1–1** below details the Jurisdictional Compliance Matrix:

Table D1–1: Jurisdictional Compliance Matrix

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
Gas Safety Act 1997 – Part 3: Division 1			
S 32 (a) (b) (c)	A gas company must manage and operate each of its facilities to minimise as far as practicable— (a) the hazards and risks to the safety of the public and customers arising from gas; and (b) the hazards and risks of damage to property of the public and customers arising from gas; and (c) the hazards and risks to the safety of the public and customers arising from— (i) interruptions to the conveyance or supply of gas; and (ii) the reinstatement of an interrupted gas supply.	1.6 Risk assessment and Risk Management Philosophy 1.7 Risk Appetite 1.8 Risk based asset management 1.9 Overview of risks faced by Jemena 1.10 Gas Safety Risks 4. Safety Risk Assessment and Management Appendix D.8. High Level Asset Risks and Controls	This requirement is addressed within the referenced sections.
S33 (1)	(1) A gas company must ensure that, as far as practicable, the gas which it conveys— (a) meets the prescribed standards of quality; and (b) complies with any other prescribed requirements.	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Design Basis Manuals, PMM documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
			available in the referenced section.
S33 (2)	(2) A gas company which supplies or sells gas to a customer for use in a gas installation must ensure that, as far as practicable, the gas supplied or sold— (a) meets the prescribed standards of quality; and (b) complies with any other prescribed requirements.	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Designs, Specifications and internal documentation. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is available in the referenced section.
S34 (1)	A gas company must not knowingly supply or sell gas for use in a gas installation which is unsafe.	Appendix A Asset Description Appendix D.2. Gas Quality Appendix D.3. Pipelines and Facilities Construction Appendix D.4. Gas Transmission Control Room (GTCR) EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Designs, Specifications and internal documentation. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is available in the referenced section.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
S34 (2)	A gas company must not knowingly supply or sell gas for use in a gas installation which does not comply with this Act or the regulations except in the prescribed circumstances.	Appendix A Asset Description Appendix D.3. Pipelines and Facilities Construction Appendix D.4. Gas Transmission Control Room (GTCR)	This requirement is addressed within the referenced sections.
S35	Gas company must not knowingly supply or sell gas for use in a gas installation to which an emergency plumbing order under section 221ZZF of the Building Act 1993.	Appendix A Asset Description Appendix D.3. Pipelines and Facilities Construction Appendix D.4. Gas Transmission Control Room (GTCR)	This requirement is addressed within the referenced sections.
S36 (1)	A gas company must report to Energy Safe Victoria in accordance with the regulations any gas incident which occurs in relation to a facility of that gas company.	5. Safety Management System Appendix D.7. Reporting Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure	Gas incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
S36 (2)	A gas company must report to Energy Safe Victoria in accordance with the regulations any gas incident of which it is aware and which occurs in relation to a gas installation to which it supplies or sells gas.	5. Safety Management System Appendix D.7. Reporting Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure	Gas incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
Gas Safety Act 1997 – Part 3: Division 2			
S 37 (1)	A gas company must submit a safety case to Energy Safe Victoria for each of its facilities in accordance with this section.	1. Safety Case Purpose and Objectives	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
S 37 (2)	A safety case for a facility must— (a) be in writing; and (b) in accordance with the regulations, specify the safety management system being followed or to be followed by the gas company— (i) to comply with the gas company's duties under Division 1; and (ii) in relation to any other matters relating to the safe conveyance, supply, sale, measurement or control of gas that are prescribed.	1. Safety Case Purpose and Objectives 4. Safety Risk Assessment and Management Appendix C Compliance Assurance Matrix Appendix D Specific Jurisdiction Requirements	This requirement is addressed within the referenced sections.
S 44 (1)	A gas company must not commission or commence to operate a facility of the gas company unless a safety case for that facility has been accepted or provisionally accepted under this Division.	1. Safety Case Purpose and Objectives	This requirement is addressed through Jemena's operational activities and within the referenced sections.
S 44 (2) (3)	Gas company must comply with the accepted Safety Case (management, operation, removal, dismantling or decommissioning of the facility).	1. Safety Case Purpose and Objectives	This requirement is addressed through Jemena's operational activities and within the referenced sections.
S 44 (4)	A gas company must not— (a) undertake or permit a modification of a facility that has the potential to significantly increase the overall levels of risk in relation to a facility; or (b) undertake or permit a modification that has the potential to significantly influence the level of a specific risk or the ranking of risk contributing factors; or (c) make or permit a significant change to the safety management system in relation to the facility— unless Energy Safe Victoria has accepted a revision of the safety case in relation to that matter for that facility.	4. Safety Risk Assessment and Management JEM-AM-GU-0003 AMS Change Management Framework	This requirement is addressed within the referenced sections.
S 45	A gas company must submit a revised safety case to Energy Safe Victoria if— (a) developments in technical knowledge or the assessment of hazards relevant to the facility make it appropriate to revise the safety case; or (b) proposed modifications of the facility will result in a significant increase in the overall levels of risk in relation to the facility; or	4. Safety Risk Assessment and Management 7. Governance (Management Review and Assurance) Appendix D.5. Review Requirements	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(c) a proposed modification of the facility may significantly influence the level of a specific risk or the ranking of risk contributing factors; or (d) the gas company proposes to make a significant change to the safety management system in relation to the facility; or (e) the gas company proposes to dismantle, decommission or remove the facility or part of the facility in a different manner from the procedures set out in the safety case for the facility.		
S 46	A gas company must submit a revised safety case to Energy Safe Victoria at the end of each period of 5 years commencing on the later of— (a) the date when the safety case is first accepted; or (b) the date of the most recent acceptance of a revision of the safety case submitted under this section.	7. Governance (Management Review and Assurance) Appendix D.5. Review Requirements	This requirement is addressed within the referenced sections.
Pipelines Act 1967 (NSW)			
11	Licence required for Construction and operation of pipelines	Appendix D.5. Review Requirements	This requirement is addressed within the referenced sections.
26	Waste or escape of substances from pipelines	Asset Management System Intranet Technical Specifications GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure Asset specific Pipeline Integrity Management Plans AS2885 Pipeline Design Basis Manual AS2885 HP Facilities Design Basis Manual AS2885 Pipelines Field Operations & Maintenance	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
27	Marking of route of pipeline and maintenance etc of property	Asset Management System Intranet Technical Specifications AS2885 HP Facilities Design Basis Manual GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure Asset specific Pipeline Integrity Management Plans AS2885 Pipeline Design Basis Manual AS2885 Pipelines Field Operations & Maintenance	This requirement is addressed within the referenced sections.
Pipelines Act 2005 (for Transmission pipelines only)			
100 & 109	Compliance with standards for construction and operation	5.2.4 Technical Specifications AS2885 Pipeline Design Basis Manual AS2885 HP Facilities Design Basis Manual	This requirement is addressed within the referenced sections.
116	Incident notification	Asset Management Manual – Section 7.4 5. Safety Management System Appendix D.7. Reporting Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure	Gas incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
124	A licensee must manage any pipeline operation so as to minimise as far as is reasonably practicable— (a) hazards and risks to the safety of the public arising from the pipeline operation; and (b) hazards and risks to the environment arising from the pipeline operation.	1.6 Risk assessment and Risk Management Philosophy 1.7 Risk Appetite 1.8 Risk based asset management 1.9 Overview of risks faced by Jemena 1.10 Gas Safety Risks	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
		4. Safety Risk Assessment and Management 5. Safety Management System Appendix D.8. High Level Asset Risks and Controls GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	
126	(1) Before carrying out any pipeline operation, the licensee must give Energy Safe Victoria a Safety Management Plan— (a) that identifies the risks to the safety of the public from the pipeline operation; and (b) that specifies what the licensee will do to eliminate or minimise those risks; and (c) that sets out any matter prescribed by the regulations. (2) A Safety Management Plan may be given to Energy Safe Victoria and accepted in stages.	1.6 Risk assessment and Risk Management Philosophy 1.7 Risk Appetite 1.8 Risk based asset management 1.9 Overview of risks faced by Jemena 1.10 Gas Safety Risks 4. Safety Risk Assessment and Management 5. Safety Management System Appendix D.8. High Level Asset Risks and Controls Asset Class Strategy EGP	This requirement is addressed within the referenced sections.
129	In carrying out a pipeline operation, a licensee must ensure that the operation is carried out in accordance with the Safety Management Plan accepted by Energy Safe Victoria in relation to the pipeline operation.	Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
132	A licensee must— (a) review its Safety Management Plan before the end of each period of 5 years after the date the Plan was accepted; and (b) report the results of each review to Energy Safe Victoria within 28 days after the completion of the review.	7. Governance (Management Review and Assurance) Appendix D.5. Review Requirements Jemena - AS ISO 19600:2015 Compliance Management System	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
133	(1) Before carrying out any pipeline operation, the licensee must give the Minister an Environment Management Plan— (a) that identifies the risks to the environment arising from the pipeline operation; and (b) that specifies what the licensee will do to eliminate or minimise those risks, including rehabilitation of land; and (c) that sets out any matter prescribed by the regulations. (2) An Environment Management Plan may be given to the Minister and accepted in stages.	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan.
136	In carrying out a pipeline operation, a licensee must ensure that the operation is carried out in accordance with the Environment Management Plan accepted by the Minister in relation to the pipeline operation.	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
139	A licensee must— (a) review its Environment Management Plan before the end of each period of 5 years after the date the Plan was accepted; and (b) report the results of each review to the Minister within 28 days after the completion of the review.	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan 7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced sections.
Gas Safety (Gas Quality) Regulations 2017			
6	Quality of gas	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Design Basis Manuals, PMM documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
			available in the referenced section.
7	Odourisation of gas	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Design Basis Manuals, PMM documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is available in the referenced section.
9	Testing of gas	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Design Basis Manuals, PMM documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
			Further information is available in the referenced section.
Pipeline Regulations 2017 (for Transmission pipelines only)			
20	Incident reporting	5. Safety Management System Appendix D.7. Reporting Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure	Incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
22	Construction and operation compliance with AS 2885	5.2.4 Technical specifications Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
32	(1) The Safety Management Plan must contain a description of the pipeline with sufficient information— (a) to show the technical details of the pipeline; and (b) to show how the licensee intends to ensure safety and maintain the integrity of the pipeline operation; and (c) to enable an assessment of the risks to the safety of the public from the pipeline operation to be undertaken. (2) In this regulation technical details includes— (a) design specifications and drawings; and (b) construction materials; and (c) details of function and operation.	2. Asset Description Appendix A: Asset description EGP Asset Class Strategy	This requirement is addressed within the referenced sections.
33	SMP, safety assessment	4. Safety Risk Assessment and Management	This requirement is addressed within the referenced sections.
34	SMP, emergency response plan	7. Emergency Management System 4. Safety Risk Assessment and Management Appendix D.6. Safety Management Study	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
		Appendix D.8. High Level Asset Risks and Controls Five Yearly SMS – Eastern Gas Pipeline (GAS-599-RP-RM-014) JAA NSO PL 0003 Emergency Management Plan	
35	Safety Management System	5. Safety Management System	This requirement is addressed within the referenced sections.
36	Safety policy, systems and procedures. The safety management system must specify the licensee's safety policy and the systems and procedures to be used to ensure that the licensee meets the licensee's duties under section 124 of the Act.	5. Safety Management System Appendix C Compliance Assurance Matrix Appendix D, D.1. Jurisdictional Compliance Matrix Jemena Health & Safety Policy Jemena Asset Management Policy	This requirement is addressed through a number of documents. Refer to the referenced sections for additional detail.
37	The safety management system must specify the responsibilities, accountabilities and authority levels of personnel with respect to the various aspects of the pipeline operation.	5. Safety Management System 7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced sections.
38	The safety management system must specify— (a) how reportable and non-reportable safety incidents are to be recorded and investigated; and (b) the management systems to be used for reviewing and taking action on information that is recorded or identified by an investigation to improve the safety of the pipeline operation.	5. Safety Management System Appendix D.7. Reporting Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure	Gas incidents are investigated and reported as per internal and regulatory requirements. The investigation looks at contributing factors and establishes actions to mitigate risk or make improvements. Further detail is available within the referenced documents.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
39	Work and staffing systems	5. Safety Management System Appendix C Compliance Assurance Matrix (Competency and Training) HSE Management Website GAS PR 0003 Permit To Work Procedure	This requirement is addressed within the referenced sections.
40	The safety management system must— (a) specify procedures for identifying, collecting and analysing a pipeline's operational, maintenance and integrity data to identify trends in a pipeline's operation and performance; and (b) specify procedures for planning and implementing audits of the safety management system to determine compliance with this regulation; and (c) specify procedures for regular management review of the effectiveness and appropriateness of the safety management system; and (d) specify procedures for managing changes to the procedures, pipeline design and operation.	GAS-999-GL-RM-001 GSMRC Operating Charter GSMRC Intranet Link Operational Reports Asset Specific Annual Performance and Integrity Report (APAIR) Process. 5. Safety Management System 7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced sections.
41	The Safety Management Plan must contain details of arrangements to record and keep— a) information about the licensee's performance in ensuring the safety of the public, employees and contractors; and b) details of all reportable and non-reportable safety incidents, including emergency situations; and c) details of the emergency response testing undertaken, in accordance with the requirements of regulation 34; and d) in the case of any emergency situation, information on the effectiveness of the emergency response plan in eliminating or minimising, as far as reasonably practicable, risks to the safety of the public, employees and contractors.	Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure Appendix D.7. Reporting 7. Governance (Management Review and Assurance) JAA NSO PL 0003 Emergency Management Plan Appendix D.6. Safety Management Study	This requirement is addressed within the referenced sections.
42	For the purposes of reporting to the Minister under regulation 11(1)(c), the Safety Management Plan must contain details of arrangements for reporting on the licensee's performance in ensuring the safety of the public, employees and contractors.	Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
		Appendix D.7. Reporting 7. Governance (Management Review and Assurance Appendix D.6. Safety Management Study	
44	Environment Management Plans, Description of pipeline operation and environment (a) describe the pipeline operation, including details and timing of activities involved in the construction and ongoing operation of the pipeline; and (b) describe the existing environment that may be affected by the pipeline operation; and (c) identify the particular relevant values and sensitivities (if any) of that environment.	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan.
45	Environment Management Plans, Description of environmental risks The Environment Management Plan must— (a) identify the risks to the environment arising directly or indirectly from the pipeline operation; and (b) assess the environmental risks identified under paragraph (a).	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan.
46	Environment Management Plans, Environmental performance objectives and standards The Environment Management Plan must contain— (a) environmental performance objectives and standards, against which the performance by the licensee to eliminate or minimise the risks identified in accordance with regulation 45 so far as reasonably practicable are to be measured, that address— (i) the environmental legislative requirements that apply to carrying out the pipeline operation; and (ii) any other environmental requirements that the licensee intends to comply with in carrying out the pipeline operation; and (b) a list of the environmental legislative requirements and any other non-legislative requirements referred to in paragraph (a); and (c) a statement of the licensee's environmental policy.	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan..

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
48	Environment Management Plans, Implementation strategy	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan.
49	Environment Management Plans, Records	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan.
50	Environment Management Plans, For the purposes of reporting to the Minister under regulation 11(1)(b), the Environment Management Plan must contain details of arrangements for reporting on the licensee's performance in protecting the environment from the pipeline operation.	GTS-500-PA-EV-002 EGP and VicHub Operational Environment Management Plan	This requirement is addressed within the referenced Plan.
Pipelines Regulation 2013 (NSW)			
10	Design and construction of pipeline to accord with appropriate standards (1) A licensee must ensure that the design, construction, operation and maintenance of any pipeline operated under the licence are in accordance with the relevant provisions of: (a) in the case of pipelines for high-pressure gas and liquid petroleum—AS 2885, or (b) in any other case—AS 2885 or a standard in respect of which an approval is in force under this clause in relation to the licensee concerned.	5. Safety Management System Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
11	Pipeline management system to accord with AS 2885	Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
12	(1) A licensee must lodge with the Secretary a pipeline management plan consisting of written plans, policies and procedures that: (a) relate to the pipeline operated under the licence, and (b) describe, and form part of, the pipeline management system relating to that pipeline. (2) The licensee must lodge the plan by whichever of the following dates occurs later: (a) 1 March 2014, or (b) the date occurring 6 months after the commencement of operation of the pipeline.	Table of Contents	This requirement is addressed within the entirety of this document. See table of contents for specific sections.
13	A licensee must implement its pipeline management plan.	Table of Contents	This requirement is addressed within the entirety of this document.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
			See table of contents for specific sections.
15	Pipeline management plan may be amended on licensee's initiative	7. Governance (Management Review and Assurance) Appendix D.5. Safety Case Review Requirements Appendix D.7. Reporting	This requirement is addressed within the referenced sections.
17	Availability of pipeline management plan	ECMS - Asset Data Management GAS-999-PA-DM-001 Gas Pipelines, Facilities and Metering Records Management Plan	This requirement is addressed within the referenced sections.
18	Nomination of person to audit pipeline management system	Appendix D, D.1. Jurisdictional Compliance Matrix Appendix D.7. Reporting	This requirement is addressed within the referenced sections.
20	Periodical audits of pipeline management system	Appendix D, D.1. Jurisdictional Compliance Matrix Appendix D.7. Reporting	This requirement is addressed within the referenced sections.
24	(1) Before commencing the construction, maintenance or operation of a pipeline under a licence, the licensee: (a) must appoint a person as person-in-charge who is authorised by the licensee to oversee the construction, maintenance and operation of the pipeline on behalf of the licensee, and	7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced section.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(b) must advise the Secretary in writing of the appointment (including the name and address of the appointee and the appointee's acknowledgment of the appointment). (2) Within 7 days after a person ceases to be appointed as a person-in-charge, the licensee: (a) must appoint another person in that person's place, and (b) must advise the Secretary in writing of the appointment (including the name and address of the appointee and the appointee's acknowledgment of the appointment).		
28	Escape or ignition of substances (1) Immediately after becoming aware of the uncontrolled escape of any substance from a pipeline, or the ignition of any substance being conveyed in a pipeline, the licensee must cause the Secretary to be notified of the escape or ignition by telephone or email. (2) Within 7 days after completing any repairs to the pipeline made necessary by the escape or ignition, the licensee must cause a written report to be sent to the Secretary giving full information as to: (a) the time and place of the escape or ignition, and (b) the approximate quantity of the substance that has escaped, and (c) the damage, if any, that has resulted from the escape or ignition, and (d) the conditions that caused or contributed to the escape or ignition, as they become known, and (e) the nature and description of the repairs that have been carried out and the method that has been adopted to carry out the repairs. (3) The obligations imposed on a licensee by this clause extend to a person appointed by the licensee as a person-in-charge under this Regulation, but if either the licensee or the person-in-charge complies with the requirements of this clause, the other is not required to comply.	Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure Appendix D.7. Reporting Appendix D, D.1. Jurisdictional Compliance Matrix Annexure 2 to the JAA NSO PL 0003 Emergency Management Plan (JAA NSO PL 0003 Annex Two Eastern Gas Pipeline (EGP)	Incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
29	Reports of accidents (1) If a person is killed or injured because of an accident involving the construction, maintenance or operation of a pipeline, the licensee must cause written notice of that fact to be served on the Secretary: (a) within 24 hours, in the case of death or serious injury, or (b) within 21 days, in any other case.	Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure Appendix D.7. Reporting Appendix D, D.1. Jurisdictional Compliance Matrix	Incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(2) The notice must specify the nature of the accident and the number of persons killed or injured, and (in the case of injured persons) describe the injuries. (3) The obligations imposed on a licensee by this clause extend to a person appointed by the licensee as a person-in-charge under this Regulation, but if either the licensee or the person-in-charge complies with the requirements of this clause, the other is not required to comply. (4) In this clause, serious injury means any injury requiring treatment at a hospital.	Annexure 2 to the JAA NSO PL 0003 Emergency Management Plan (JAA NSO PL 0003 Annex Two Eastern Gas Pipeline (EGP)	
30	Report emergencies and unplanned disruptions (1) A licensee must cause the Secretary to be notified immediately, by telephone or by email, of any event relating to the activities carried out under the licence that: (a) requires the carrying out of emergency procedures under the licensee's pipeline management system, or (b) is unplanned and causes a disruption to the operation of a pipeline, or to the conveyance of a product through a pipeline, under the licence. (2) In this clause, pipeline management system has the same meaning as in Part 3.	Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure Appendix D.7. Reporting Appendix D, D.1. Jurisdictional Compliance Matrix Annexure 2 to the JAA NSO PL 0003 Emergency Management Plan (JAA NSO PL 0003 Annex Two Eastern Gas Pipeline (EGP	Incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
31	Annual report (1) A licensee must, in respect of each financial year during which the licence is in force, provide a written report to the Secretary in accordance with this clause that includes the following matters: (a) details of any changes in the ownership of the land to which the licence relates and a summary of any contact made with any new landowners undertaken in accordance with AS 2885, (b) details of any damage caused to the landowners of the land to which the licence relates that required the licensee to make repairs or to pay the costs of repairs, (c) a summary of any pipeline surveillance carried out in accordance with AS 2885, and the results of the surveillance, including information on the following:	Appendix D.7. Reporting Appendix D, D.1. Jurisdictional Compliance Matrix	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(i) the use by the licensee, and the effectiveness, of the system known as the one-call system, that is, a system to enable persons to locate buried assets before excavating land, (ii) any activity that affects or could affect the pipeline that was carried out by a person other than the licensee, (iii) any inspection of any tunnels, shafts or valve pits for structural integrity, leaks and operational condition, (iv) access to, or security of, the pipeline and pipeline facilities, including locks, gates, fences and vegetation, (v) the condition and maintenance of warning signs and notices, (vi) the placement of fill on or near the pipeline, (vii) the placement of fencing or lighting, or power or telegraph poles, on or along the pipeline route, (d) details of the monitoring of the pipeline integrity, and any inspections and assessments, carried out in accordance with AS 2885, including: (i) any pipeline or coating repairs carried out as a result of any such monitoring, inspection or assessment, and (ii) the condition of any coating of above-ground pipework, and (iii) an assessment of the performance of any cathodic protection systems for below-ground pipework, (e) details of any unplanned or abnormal incidents in the operation of the pipeline that could have an effect on the long-term safety of the pipeline, including over-pressurisation, excessive temperature change, operational disruptions and equipment failures, (f) a summary of any measures taken to ensure community awareness of the pipeline and any safety issues relating to the licensee's activities under the licence. (2) Each such report must be provided before 31 August immediately following the financial year to which the report relates.		
32	Other reports A licensee must provide a written report to the Secretary on the following matters within 28 days after the activity concerned is carried out: (a) any review of the suitability of pressure-control and over-pressure protection systems of a pipeline operated under the licence that is carried out in accordance with AS 2885,	Appendix D, D.1. Jurisdictional Compliance Matrix Aspire Incident Investigation & Reporting System	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(b) any review, investigation or test relating to the maximum allowable operating pressure of the pipeline and carried out in accordance with AS 2885, (c) any investigation of the condition of the pipeline and any limits for its continued safe operation beyond its design life carried out in accordance with AS 2885, (d) any testing of the integrity of the pipeline carried out in accordance with AS 2885, (e) any review of the classification of the locations along the pipeline carried out in accordance with AS 2885, (f) any periodic audit and assessment of the pipeline carried out in accordance with AS 2885, (g) any planned emergency simulations.	JAA HSE PR 003 Investigating Incidents Procedure Appendix D.7. Reporting	
35	Marking the route of pipelines	Asset Management System Intranet Technical Specifications AS2885 HP Facilities Design Basis Manual GAS-999-PR-IN-001 AS2885 Pipeline Anomaly Assessment Procedure Asset specific Pipeline Integrity Management Plans AS2885 Pipeline Design Basis Manual AS2885 Pipelines Field Operations & Maintenance Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
Gas Safety (Safety Case) Regulations 2018 – Part 2: Division 4			
23	A safety case must specify the ABN or ACN of the gas company.	1.5 About Jemena	This requirement is addressed within the referenced section.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
24	A safety case must specify the name, title and business address of the person who – (a) is responsible for the management, control and safe operation of the gas company; and (b) has authorised the company's safety case.	7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced sections.
25	A safety case must specify the title of the position of the person who is responsible for preparing, submitting and updating the safety case.	7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced sections.
26	(1) A safety case must contain a facility description. (2) The facility description must provide a detailed description of the structure, assets, function and operation of the facility to which the safety case relates. (3) The facility description must provide sufficient information to enable the extent and scope of the assets and operations of the gas company in relation to the facility and the risks associated with those assets and operations to be assessed.	Appendix A. Asset Description	This requirement is addressed within the referenced sections.
27	(1) A safety case must contain a formal safety assessment. (2) The formal safety assessment for a facility must be consistent with the facility description for the facility and must provide— (a) a description of the methodology used and investigations undertaken for the formal safety assessment; and (b) an identification of hazards having the potential to cause a gas incident; and (c) a systematic assessment of risk, including the likelihood and consequences of a gas incident; and (d) a description of technical and other measures undertaken, or to be undertaken, to minimise that risk as far as practicable.	4. Safety Risk Assessment and Management Appendix D.6. Safety Management Study Five Yearly SMS – Eastern Gas Pipeline (GAS-599-RP-RM-014) Omnia - Asset Risk Register	This requirement is addressed within the referenced sections.
28	(1) A safety case must specify the safety management system followed or to be followed in relation to the facility. (2) The safety management system must contain the information specified in Division 5 and must demonstrate the adequacy of the technical and other measures adopted or to be adopted under regulation 27.	5. Safety Management System Appendix D.1. Jurisdictional Compliance Matrix	This requirement is addressed within the referenced sections.
Gas Safety (Safety Case) Regulations 2018 – Part 2: Division 5			

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
30	The safety management system for a facility must specify the titles of the positions and the duties of the persons responsible for its implementation and management.	5. Safety Management System 7. Governance (Management Review and Assurance)	This requirement is addressed within the referenced sections.
31	The safety management system for a facility must specify the published technical standards applied to or used or to be used in the design, construction, commissioning, installation, operation, maintenance and decommissioning of the facility or any part of the facility.	5. Safety Management System Appendix C Compliance Assurance Matrix Appendix D.1. Jurisdictional Compliance Matrix	This requirement is addressed within the referenced sections.
32	The safety management system for a facility must specify the means by which a gas company will ensure that the design, construction, commissioning, installation, operation, maintenance and decommissioning of the facility and any modification of the facility— (a) is adequate for the safety and safe operation of the facility; and (b) is adequate to ensure the safety of the public; and (c) is adequate to minimise the risk of damage to another person's property; and (d) is adequate for the safe and reliable conveyance and supply of gas; and (e) is adequate for ensuring the quality of gas conveyed or supplied; and Note Regulations 45 and 46 prescribe standards of gas quality for the purposes of section 33 of the Act. (f) takes into account the results of the formal safety assessment for the facility; and (g) meets the published technical standards listed in the safety management system in accordance with regulation 31; and (h) is adequate for monitoring and maintaining the integrity of the facility taking into account the expected operational life of the facility.	5. Safety Management System Appendix C Compliance Assurance Matrix Appendix D.1. Jurisdictional Compliance Matrix Appendix D.6. Safety Management Study Five Yearly SMS – Eastern Gas Pipeline (GAS-599-RP-RM-014) Asset Class Strategy EGP & Facilities EGP and VicHub Pipeline Integrity Management Plan Appendix A - EGP and VicHub pipeline asset class planned operational integrity management plan Jemena Contract Management Framework	This requirement is addressed within the referenced sections.
33	(1) The safety management system for a facility must specify all work relating to the facility for which a permit to work system needs to be established. (2) If work is specified under subregulation (1), the safety management system must specify the permit to work system that is to apply in respect of that work. (3) A permit to work system must—	HSE Management Website GAS-999-PR-HSE-006 Permit to Work Procedure Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(a) prohibit any person from performing work for which a permit is required without a written permit to work issued by a person authorised by the gas company to issue that permit; and (b) specify the positions of the persons who are authorised to issue permits to work and to supervise that work; and (c) ensure that persons authorised to issue permits to work and persons carrying out operations under those permits are competent and are provided with appropriate training, procedures, tools, equipment and emergency support.		
34	(1) The safety management system for a facility must specify a response plan designed to address all reasonably foreseeable emergencies and gas incidents which have been identified through the formal safety assessment. (2) The response plan must— (a) ensure the safety of the public; and (b) specify the means to ensure the continued safe operation of the facility; and (c) specify the means by which the gas company ensures that it meets its duties under sections 32 and 33 of the Act.	5. Safety Management System Appendix D.6. Safety Management Study Appendix D.8. High Level Asset Risks andControls	This requirement is addressed within the referenced sections.
35	The safety management system for a facility must specify the means by which the gas company ensures that it meets its duties under section 36(1) and (2) of the Act in relation to the reporting of gas incidents.	5. Safety Management System Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure Appendix C Compliance Assurance Matrix Appendix D.1. Jurisdictional Compliance Matrix	Gas incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.
36	(1) The safety management system for a facility must specify the processes and the performance indicators to be used by the gas company for monitoring, auditing and reviewing the adequacy and implementation the safety management system. (2) The safety management system for a facility must specify the means to be used to ensure— (a) regular and systematic identification of deficiencies in the safety management system and its implementation; and	GAS-999-GL-RM-001 GSMRC Operating Charter GSMRC Intranet Link Operational Reports Asset Specific Annual Performance and Integrity Report (APAIR) Process. 5. Safety Management System	This requirement is addressed within the referenced sections.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(b) regular and systematic improvement of the safety management system and its implementation to improve the safety of the facility and its operation.	7. Governance (Management Review and Assurance) Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure JEM AM PR 0056 Asset Risk and Assurance Auditing Procedure	
37	The safety management system for a facility must specify— (a) the means to be used for recording and investigating gas incidents; and (b) the management systems to be used for reviewing and taking action on the information so recorded or arising from those investigations to improve the safety of the facility and its operation and to prevent gas incidents.	5. Safety Management System JAA HSE PR 003 Investigating Incidents Procedure Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
38	The safety management system for a facility must specify the work and staffing systems in relation to the facility to ensure that— (a) the minimum level of qualifications, skill and competence that is required for the carrying out of work in relation to the facility is identified; and (b) only persons with the qualifications, skills and competence appropriate to that work are assigned to carry out the work; and (c) any training necessary for persons assigned to carry out that work is provided.	5. Safety Management System Appendix C Compliance Assurance Matrix	This requirement is addressed within the referenced sections.
Gas Safety (Safety Case) Regulations 2018 – Part 2: Division 6			
39	(1) A gas company must, in accordance with this regulation, establish and maintain a system for keeping records relating to the safety case for each of its facilities.	ECMS - Asset Data Management GAS-999-PA-DM-001 Gas Pipelines, Facilities and Metering Records Management Plan	Jemena applies various tools and systems towards management of asset records. These include, ECMS, SharePoint, SAP, ASPiRE, Omnia, Leaning and Development. Further information is available in

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
			the referenced sections and document.
39	(2) The records required to be kept under subregulation (1) are— (a) the accepted safety case; and (b) any revisions of the accepted safety case; and (c) any written audit reports of the accepted safety case; and (d) any reports of investigations by the gas company of gas incidents; and (e) a copy of each report given by the gas company to Energy Safe Victoria.	ECMS - Asset Data Management GAS-999-PA-DM-001 Gas Pipelines, Facilities and Metering Records Management Plan	Jemena applies various tools and systems towards management of asset records. These include, ECMS, SharePoint, SAP, ASPiRE, Omnia, Leaning and Development. Further information is available in the referenced sections and document.
39	(3) The records must be kept— (a) at the address or location nominated in the safety case by the gas company; and (b) in a manner that makes their retrieval reasonably practicable; and (c) in a secure manner; and (d) for the period of 7 years from the creation of the record.	ECMS - Asset Data Management GAS-999-PA-DM-001 Gas Pipelines, Facilities and Metering Records Management Plan	Jemena applies various tools and systems towards management of asset records. These include, ECMS, SharePoint, SAP, ASPiRE, Omnia, Leaning and Development. Further information is available in the referenced sections and document.
Gas Safety (Safety Case) Regulations 2018 – Part 4			
44	(1) For the purposes of section 36(1) of the Act, a gas company must report gas incidents in the form of a statistical summary on a quarterly basis. (2) Despite subregulation (1), for the purposes of section 36(1) of the Act, a gas company must report a gas incident as soon as practicable after it occurs if the gas incident— (a) involves a transmission pipeline; or (b) causes the death of or injury to a person; or (c) causes significant property damage; or (d) causes significant disruption to the community. (3) For the purposes of section 36(2) of the Act, a gas company must report a gas incident as soon as practicable after it becomes aware of the incident.	Aspire Incident Investigation & Reporting System JAA HSE PR 003 Investigating Incidents Procedure Appendix D.7. Reporting Annexure 2 to the JAA NSO PL 0003 Emergency Management Plan (JAA NSO PL 0003 Annex Two Eastern Gas Pipeline (EGP) covers R44(4)	Gas incidents are investigated and reported as per internal and regulatory requirements. Further detail is available within the referenced documents.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(4) The report of a gas incident under section 36 (other than a gas incident to which sub regulation (1) applies) must specify, to the extent that the information is available to the gas company— (a) the nature of the gas incident; and (b) where and when the gas incident occurred; and (c) the cause of the gas incident; and (d) whether any emergency service attended the gas incident; and (e) the remedial actions (if any) that were taken by the gas company; and (f) the corrective actions that were taken or are proposed to be taken by the gas company to prevent a similar incident.		
Gas Safety (Safety Case) Regulations 2018 – Part 5			
45	Standards of quality – quality of gas For the purposes of section 33(1) and (2) of the Act – (a) the prescribed standard of quality for natural gas conveyed through a transmission pipeline or a distribution pipeline is set out in AS 4564; and (b) the prescribed standard of quality for the supply or sale of natural gas supplied to a customer is set out in AS 4564; and (c) the prescribed standard of quality for LP Gas supplied or sold to a customer for use in an appliance (other than LP Gas used or intended to be used for automotive purposes) is set out in AS 4670.	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Design Basis Manuals, PMM documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is available in the referenced section.
46	Standards of quality - odour	Appendix A Asset Description Appendix D.2. Gas Quality	Jemena define requirements within Design Basis Manuals, PMM

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(1) For the purposes of sections 33(1) and (2) of the Act, it is a prescribed standard of quality that all gas must— (a) have an odour which is distinctive and unpleasant; and (b) have an odour level that is discernible at one-fifth of the lower explosive limit of the gas. (2) This regulation does not apply to any of the following— (a) LPG used or intended to be used for automotive purposes; (b) liquefied natural gas used or intended to be used for automotive purposes.	EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is available in the referenced section.
47	Testing of gas quality conveyed through transmission pipelines (1) This regulation applies to a gas company that conveys natural gas through a transmission pipeline. (2) The gas company must test or cause to be tested the natural gas it conveys in accordance with this regulation to ensure that the gas meets the prescribed standard of quality referred to in regulation 45(a). (3) The gas company must test or cause to be tested the Wobbe Index of the natural gas it conveys by using— (a) an instrument that determines the Wobbe Index at least once every 6 minutes; or (b) an instrument that determines the Wobbe Index that is of a class approved by Energy Safe Victoria. (4) The gas company must test or cause to be tested the hydrogen sulphide content of the natural gas it conveys by using— (a) an instrument that determines the hydrogen sulphide content at least once every 6 minutes; or (b) an instrument that determines the hydrogen sulphide content that is of a class approved by Energy Safe Victoria. (5) The gas company must ensure that a test of the Wobbe Index or hydrogen sulphide content of the natural gas it conveys is carried out in accordance with methods— (a) accredited by NATA; or	Appendix A Asset Description Appendix D.2. Gas Quality EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission	Jemena define requirements within Design Basis Manuals, PMM documentation, Operational and Maintenance Specifications, etc. Once assets are operational, the gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification. Further information is available in the referenced section.

Clause	Clause Description From Relevant Act, Regulation or Standard	Reference / Supporting Procedure / Process	Comments
	(b) approved by Energy Safe Victoria.		

D2. Gas Quality

D2.1 Gas Composition

142. Gas delivered to receipt points are within the specifications prescribed by the Gas Safety (Gas Quality) Regulations 2017 and AS 4564, "Specification for general purpose natural gas' as follows in **Table D2–1**:

Table D2–1: Gas Composition

Parameter	Specification Limit
Wobbe Index	Min: 46 Max: 52
Water Dew Point	Dewpoint 0°C at the highest MAOP in the relevant transmission system (in any case, no more than 112.0 mg/m3)
Higher heating value Maximum	42.3 MJ/m3
Hydrocarbon Dewpoint	Max. 2^0C @ 3,500 kPag
Oxygen	Max. 0.2 mol%
Total Sulphur	Max (odorised) 50 mg/m^3
Hydrogen Sulphide	Max. 5.7 mg/m^3
Total Inert Gases	Max. 7.0 mol%
Oil	Max. 20 mL/TJ

D2.2 Monitoring of Gas Odorant Levels

143. The EGP / VicHub uses odorant comprising:

a. Tetrahydrothiophene ('THT'), 70%; and

b. Tertiary butyl mercaptan ('TBM'), 30%.

144. The Odorant Supplier provides certification confirming compliance to the specification and to the Material Data Safety Sheet and a sample Certificate of Analysis.

145. Gas quality is maintained in the network through a system of measures designed to monitor and alert system operation staff of any deviations from the 'standard' specification as referred to in the Gas Safety (Gas Quality) Regulations and prescribed in the relevant gas supply contracts of the retail businesses.

146. Under Market and System Operating Rules, Jemena is required to ensure that gas supplied into the EGP/VicHub system is 'on-spec'.

147. Emergency procedures are in place to handle any situation which may arise involving the occurrence of 'off-specification' gas or contaminants in gas such as water or dust. Liaison with AEMO involves routine communications, exception reports, and joint emergency exercises.

148. Jemena's Gas Transmission Control Room has procedures in place to respond to AEMO advice of gas quality alerts based on reports from upstream gas production facilities and also monitor network receipt point pressures to ensure that sufficient pressure is available for operational purposes.

D2.3 Alarm summary

149. Gas Quality alarms have been categorised in Jemena's alarm system as "Red Alarms" (refer to GTS-500-PR-PC-001 EGP Red Alarm Gas Quality Procedure). There are up to three levels of alarm for each item on the Red Alarm List which includes all gas parameters containing specification limits (**Table D2–1**):

- The HI Warning and LO Warning alarms (Blue Alarms) are set at levels where the gas quality is close to the contractual gas quality specification limit but is still within the gas quality specification. These alarms are intended to provide a warning of gas potentially going off specification so that warning messages can be conveyed to the gas suppliers and mitigating steps can be taken prior to reaching the yellow and red alarms. These Warning (Blue) alarms are only set for receipt points to avoid off specification gas being receipted in the first instance. These warning (blue) alarms are typically set at the AEMO "Confirm" limits where these limits fulfil a similar function for AEMO.
- The HI and LO (Yellow) alarms are set at the gas specification limit. This limit is usually set by State legislation and hence is usually set at levels defined in AS 4564. These alarms are sometimes set at contractual limits if the contractual requirements are within the legislated (AS 4564) limits. It is a commercial/business decision as to whether Jemena chooses to continue to accept gas that has breached this limit.
- The HIHI and LOLO (Red) alarms are set at levels at which the gas is off spec and may be potentially unsafe from either a transportation or utilisation perspective in some instances. This represents the point at which Jemena is unlikely to continue acceptance of the gas from the supplier. These alarm levels are typically set at the AEMO "Mitigate" alarm levels where AEMO is notified and considers that continued acceptance of the gas may require mitigating actions to be taken by either pipeline operators, distributors, retailers or consumers.

D2.4 Alarm Responses summary

150. Each of the three levels of alarm for each gas parameter has a different response as summarised below.

- When the HI Warning (blue) or LO Warning (blue) gas quality alarm is reached, it acts as a trigger point to:
  - Confirm if possible that the gas quality measurement equipment is reading accurately;
  - EGP / VicHub's Red Alarms Gas Quality Procedure GTS-500-PR-PC-001 Gas Transmission
  - Notify the on call Control Room Manager;
  - Monitor the item in question; and
  - The Control Room Manager will contact the Commercial Operations Team who will in turn contact the relevant supplier with the warning notification.
- When the HI or LO gas quality alarm is reached, it acts as a trigger point to:
  - Confirm if possible that the gas quality measurement equipment is reading accurately if not already done at a Warning (Blue) alarm;
  - Notify the on call Control Room Manager;
  - Monitor the item in question; and
  - The Control Room Manager will contact the Commercial Operations Team who will in turn contact the relevant supplier and may request the supplier to cease delivery.
- When the HIHI or LOLO gas quality alarm level is reached there may be an impact on customers and the integrity of infrastructure. Therefore, this level acts as a trigger point to:
  - Confirm if possible that the gas quality measurement equipment is reading accurately if not already done at a previous alarm level;
  - Notify the on call Control Room Manager;
  - Monitor the item in question;

  - The Control Room Manager will contact the Commercial Operations Team who will in turn contact the relevant supplier and will request the supplier to cease delivery;
  - The relevant parties to take actions by to mitigate any risk from the out of specification gas;
- The GTCR can respond to a red alarm by contacting the gas producer and reducing the gas flows to the minimum flow but not instruct to shut in unless authorised by the relevant Pipeline Manager]In the unlikely event that the on call Control Room Manager is uncontactable, the duty controller should contact the Commercial Operations Team directly.
- Where the alarm occurs at a gas delivery point the mitigation actions may include notifying the recipients of the off-specification gas.
- The GM Gas Markets is the person responsible for transporting in-specification gas.

D3. Pipelines and Facilities Construction

151. The construction of new and replacement Pipelines, Pipeline Assemblies and Facilities are generally performed by skilled contractors through a selective competitive tendering process. Contracts are typically either fixed-price lump sum or rates based target cost and awarded on a project by project basis. All work is carried out in accordance with AS 2885, applicable Australian Standards and approved Jemena standards and procedures as described in Reference Documents.

152. Typical construction projects may involve one or more of the following:

- Gas Transmission Facilities
- Remote Telemetry Units (RTU's)
- Corrosion protection assets
- Transmission pipeline
- Custody Transfer Metering

153. (Note: This list is not intended to be exhaustive)

154. The proximity of "Construction activities" to operational assets (pipeline or facilities) dictates whether they are classified as Greenfield or Brownfield.

155. Greenfield activities are classified as works conducted outside of hazardous areas and influence on the safe operation of existing assets. Supervision of Greenfield activities are the responsibility of the Jemena Project team and shall be compliant with the approved Construction Safety Management Plan for that project.

156. Brownfield activities are classified as works conducted within the hazardous area and directly impacts the operation of in service assets. Brownfield activities are managed by the construction team but supervised by Jemena Field Services or an authorised permit officer under Jemena's Safe Work systems (i.e.. Permit to work).

157. Pipeline Construction Activities and associated upgrades or modifications to the asset are coordinated through an Engineering Change Request Process (refer to Section 4.4.18) and managed by a dedicated project team. All activities are supervised and quality-assured to comply with relevant standards and codes and any changes to the design must be authorised and recorded according to Jemena procedures

158. When required, construction is undertaken in accordance with an Approved Construction Safety Management Plan and is undertaken in accordance with conditions set out by the relevant regulatory authorities and the procedures stipulated in the plan including:

- Construction Environmental Management
- Quality Management

- Cultural heritage Management
- Weed Management
- Risk Assessment

159. Where connections to new end users are constructed, approval to connect and supply is carried out in accordance with procedures prescribed by the Regulator

160. Contractors' training standards, certification and other credentials are assessed through a multifaceted process including:

- Upfront competency assessment through a skills matrix issued and evaluated during the supplier sourcing/ tender process
- Completion of an induction process prior to commencing work
- Project audits.

D4. Gas Transmission Control Room

161. The Gas Transmission Control Room (**GTCR**) activities include day-to-day project and maintenance operations, monitoring, management and scheduling of the throughput of pipelines. Billing is also conducted by the Control Room and activities include daily gas accounting and customer reporting, data analysis and business reporting, general customer support and system maintenance and improvement. Further to this the Control Room provides modelling services to the wider team by generating models for current operations, future expansions or projects.

D5. Safety Case Review Requirements

162. The Licences along with AS 2885 impose certain review requirements on a pipeline operator.

163. A review of this Safety Case will be carried out as triggered by any of the following events:

a. Changes to organisational structure, position titles, contact details will be advised to the Safety Case regulator in writing;

b. Minor changes to the facility description or the safety management system will be addressed by amending the relevant Safety Case documentation sections and resubmission of the documentation with the changes to the previously accepted version clearly marked; and

c. Changes to the Safety Case of an even more significant nature than (2) above will be addressed by completing a full review and resubmission of the entire Safety Case for formal acceptance by the regulator.

164. Other than as described above, the Safety Case will be revised and submitted to the relevant regulatory bodies in response to more specific trigger events, as defined below:

- After each five year period from acceptance of a revision of the Safety Case;
- As required by relevant Acts or Regulations;
- Prior to decommissioning the facility;
- When an assessment indicates a significant increase in risk levels;
- Changes requiring a change to the pipeline licence;
- Changes to critical functions or items such as control room location;

- Outsourcing of critical functions; and
- Changes to procedural measures from original licence conditions.

D6. Safety Management Study

165. Note : SMS embedded

Link: Five Yearly SMS – Eastern Gas Pipeline (GAS-599-RP-RM-014)

D7. Reporting

166. The Eastern Gas and VicHub Pipelines are subject to a range of reporting requirements, both internally and externally. The external reporting covers obligations under Commonwealth, State, local legislation and regulations. These reporting obligations will be managed within the framework of the Legislative Compliance Register maintained by Asset Risk & Assurance.

167. Currently, as per **Table D7–1**, these reports include:

Table D7–1: Reporting Requirements

Body	What to Report	When
Victoria		
ESV	EGP/VicHub Gas Incidents	As required
	Changes to the Safety Case	As required
	Quarterly Status & KPI Reports	Jan, Apr, Jul, Oct.
	EGP/Vic Hub (VIC) Integrity Report-annual	September
DELWP	Modifications to the Pipeline	As required
CFA	Fire Emergencies	As required
	Dangerous Goods Spills (For Longford Compressor Station)	
Vic WorkCover	Serious Incidents and Injuries	As required
Vic EPA	LCS Waste Management Assessment & Review Report **if** >5 consignments of assigned waste per year	June
NSW		
NSW EPA	Environmental Incidents	As required
WorkCover NSW	Serious Incidents and Injuries	As required
OECC	Gas Incidents	As required
	Modifications to the Pipeline	As required
	Emergency Exercise Reports	As required
	Annual Performance Report	August
	Landholder and Reparation annual report	February
	EGP (NSW) Notification of (new) Auditor Nomination	October
	EGP (NSW) Submission of OECC Annual Audit Report	November

168. Specific regulatory notification requirements in the event of an incident or emergency are detailed in the Emergency Management Plan.

D8. High level asset risks and controls

D8.1.1 Functional Group Risk Register

169. Risk registers have been developed for each Asset Class which identify credible risks, existing controls and the strength of those controls. Each risk is assessed in terms of consequence and likelihood to provide a residual risk rating. Risks that are above Jemena's risk appetite are managed in conformance with the requirements of the Risk Policy and Risk Manual and actions are raised where the risk is not ALARP (as low as reasonably practicable). Action plans are raised to further mitigate risks which were identified at the residual level to be above moderate and monitored and tracked through to action plan closure within Omnia.

170. Using the risk registers that have been established (through the SMS process, asset class level risk registers or other), risks requiring management oversight and monitoring are fed to different levels of management. Gas Markets safety related risks are detailed in **Table D8–1**:

Table D8–1: Functional Group Risk Register

Risk Name	Overall Assessment of Effectiveness of Controls	Residual Consequence	Residual Likelihood	Residual Risk Rating
GS1 - Fire or explosion due to non-compliant Hazardous Area equipment in facilities resulting in fatalities/injuries to workers.	Effective	Catastrophic	Rare	Significant
GAM2.1 - Third Party Mechanical Damage - Uncontrolled release of gas from a transmission pipeline or facilities caused by external third party mechanical damage.	Effective	Catastrophic	Rare	Significant
GAM2.2 - Loss of Asset Integrity - Uncontrolled release of gas from a transmission pipeline or facility caused by loss of asset integrity	Effective	Catastrophic	Rare	Significant
GAM1 - Loss of Gas Supply to Customers (excluding loss of supply caused by a loss of containment event)	Effective	Major	Unlikely	Significant
GAM3 - Inaccurate metering or measurement of gas resulting in the incorrect volume of	Effective	Major	Rare	Moderate

Risk Name	Overall Assessment of Effectiveness of Controls	Residual Consequence	Residual Likelihood	Residual Risk Rating
gas purchased or billed.				
GAM4 - Supply of out of specification gas caused by failure of measurement equipment leading to consumer hazard or service failure and loss of supply. Gas Metering Team are responsible for ensuring equipment identifies off spec gas through the management of a range of analysers including Gas Chromatographs, Water Dew Point Analysers and Sulphur Analysers. Please note the scope of this risk is restricted to off-spec gas on the pipeline as a result of a meter/analyser failure only. Other contributing factors and mitigations not the responsibility of the Metering Team have been excluded specifically.	Effective	Severe	Possible	Sigificant
GAM5 - Unforeseen major event impacting the integity or supply of the asset.	Effective	Severe	Unlikely	Moderate
GS2 - Unsafe Operation leading to loss of pipeline licence.	Effective	Catastrophic	Rare	Significant

Risk Name	Overall Assessment of Effectiveness of Controls	Residual Consequence	Residual Likelihood	Residual Risk Rating
Failure to provide an appropriate, complete and effective compliance and assurance system to manage safety case requirements and meet compliance obligations. Failure to ensure Key Asset Process Safety Controls (as required by Safety Cases), are adequately implemented and maintained. An effective safety management system must be in place to ensure the controls are effectively and consistently applied by: • Ensuring asset safety cases comply with all requirements and are adequately maintained to prevent asset process safety incidents. • Monitoring and reporting on the performance of key asset process safety controls. • Completing internal audits and facilitating external regulatory audits				

Risk Name	Overall Assessment of Effectiveness of Controls	Residual Consequence	Residual Likelihood	Residual Risk Rating
over the asset safety management system and key asset process safety controls in order to identify and communicate necessary actions to address weaknesses and failures. • Providing governance for monitoring and reporting on the effectiveness of strategies and practices to manage asset process safety risks.				

D8.2 Controls and Effectiveness Assessment

171. Risk controls are relied on to prevent or mitigate the risk and often appear in Jemena risk assessments as controls against multiple risks.

172. Risk control effectiveness assessment is a process used to determine the strength and adequacy of the controls that underpin the safety case and mitigate risks identified within the asset risk registers. These controls are managed in Omnia and assessed annually or more frequently on an as needs basis.