# WHOLESALE MARKET SYSTEM SECURITY PROCEDURES (VICTORIA)

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| PREPARED BY: | AEMO ~~[Insert Dept/Group]~~Gas System Operations |
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# VERSION RELEASE HISTORY

| Version | Effective Date | Summary of Changes |
|---|---|---|
| NGR 1.1 | November 2015 | Update to reflect changes to the ~~Declared Transmission System~~DTS.<br>Clarifications made around normal operating state and threats to system security.<br>General improvements to clarity. Removal of critical location pressures as a separate document has been created to cover this. |
| NGR 1.0 | 1 July 2010 | Rebranded and updated to reflect the transition of the MSOR to the NGR |
| 9 | 24 March 2009 | Last version under the Victorian Market and System Operating Rules (MSOR) |
| 8 | 6 June 2008 | |
| 7 | 13 May 2005 | |
| 6 | 15 August 2003 | |
| 5 | 23 December 2002 | |
| 4 | 19 February 2002 | |
| 3 | 12 June 2001 | |
| 2 | 16 June 2000 | |
| 1 | 7 May 1999 | |

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# CHAPTER 1. INTRODUCTION

## 1.1 Purpose and Scope

These are the Wholesale Market System Security Procedures made under rule 205(1) of the National Gas Rules (**NGR**) (**Procedures**).

These Procedures have effect only for the purposes set out in the NGR. The NGR and the National Gas Law (**NGL**) prevail over these Procedures to the extent of any inconsistency.

~~These procedures provide for the operation of the declared transmission system in a way that averts or minimises threats to system security, as required by rule 205 of Part 19 of the National Gas Rules.~~

These Procedures ~~are not exhaustive and do not cover every possible situation. They~~ represent general principles applicable to the operation of the declared transmission system (DTS) in a way that averts or minimises threats to system security, but they do not cover every possible situation~~contain information based on methodologies and assumptions that may not be applicable in every situation, and represent general principles applicable in most situations, subject at all times to exceptions~~. Where a Contingency is of such severity that it cannot be managed using the principles and strategies detailed in these Procedures, AEMO may be required to implement other elements from the Eemergency Pprotocol.

~~These procedures do not provide information concerning the management of gas quality, scheduling or emergencies. These processes and requirements are covered in the gas quality specifications, gas scheduling procedures, and the emergency protocol, respectively.~~

## ~~1.3~~1.2 Definitions and Interpretation

### ~~1.3.1~~1.2.1 Glossary

The words, phrases and abbreviations set out below have the meanings set out opposite them when used in these Procedures.

Terms defined in the NGL or the NGR have the same meanings in these Procedures unless otherwise specified in this section.

| Term | Definition |
|---|---|
| **BBP** | Brooklyn to Ballan Pipeline |
| **BCP** | Brooklyn to Corio Pipeline |
| **BLP** | Brooklyn to Lara Pipeline. |
| **BoD** | The beginning of a gas day. |
| **CG** | City Gate. |
| **Contingency** | An event, incident or situation that may pose a threat to system security (eg. failure in essential operational facilities causing the loss of transmission capacity). |
| **CS** | Compressor station. |
| **DCG** | Dandenong City Gate. |
| **DTS** | Declared Transmission System |
| **Emergency Protocol** | Processes detailed in Emergency Procedures (Gas), Gas Load Curtailment and Gas Rationing and Recovery Guidelines, Wholesale Market System Security Procedures. |
| **GPG** | Gas-fired power generation. |
| **Interconnect** | The Barnawartha to Culcairn 10,200 kPa pipeline linking the Northern Zone to New South Wales. |

| Term | Definition |
|---|---|
| **Linepack** | The amount of energy in the gas stored in the declared transmission system. |
| **Linepack Reserve** | Linepack above the absolute minimum linepack, which is required to ensure system pressures will remain above their minimums at all locations in the DTS during periods of peak demand. |
| **MAOP** | Maximum Allowable Operating Pressure (Pipeline). |
| **MHQ** | Maximum Hourly Quantity. |
| **MinOP** | Minimum Operating Pressure (Pipeline). |
| **NEM** | National Electricity Market. |
| **NGL** | National Gas Law. |
| **NGR** | National Gas Rules. |
| **Northern Zone** | Described in Table 1. |
| **Out of merit order gas** | Gas injections that are scheduled above market price, or gas withdrawals that are scheduled below market price |
| **PRS** | Pressure Reduction Station. |
| **Registered participant** | A participant registered in a registrable capacity under Rule 135A |
| **SCADA** | Supervisory Control and Data Acquisition |
| **Shoulder** | The months of October and November and the months of March and April inclusive. |
| **Spring** | October and November |
| **Summer** | The months of December to February inclusive. |
| **SWP** | South West Pipeline (Iona to Lara). |
| **t/h** | Tonnes per hour (of LNG). |
| **VGPR** | Victorian Gas Planning Report |
| **Winter** | The months of May to September inclusive. |

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### ~~1.3.2~~1.2.2 Interpretation

These Procedures are subject to the principles of interpretation set out in Schedule 2 of the NGR and Division 1 of Part 19 of the NGR.

## ~~1.4~~1.3 Related Documents

| Title | Location |
|---|---|
| Emergency Procedures (Gas) | http://www.aemo.com.au/Gas/Policies-and-Procedures/Gas-Emergency-Procedures |
| Gas Quality Guidelines | http://www.aemo.com.au/Gas/Market-Operations/Declared-Wholesale-Gas-Market/Gas-Quality-Information |
| Gas Quality Standard System Injection Points | http://www.aemo.com.au/Gas/Market-Operations/Declared-Wholesale-Gas-Market/Gas-Quality-Information |
| Wholesale Market Gas Scheduling Procedures (Victoria) | http://www.aemo.com.au/Gas/Policies-and-Procedures/Declared-Wholesale-Gas-Market-Rules-and-Procedures |
| Gas Load Curtailment and Gas Rationing and Recovery Guidelines | http://www.aemo.com.au/About-AEMO/Services/Emergency-Management/~/media/Files/Other/emergency_public/0990-0005%20pdf.ashx |

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| Gas Statement of Opportunities – Attachment B Victorian Gas Planning Review | http://www.aemo.com.au/Gas/Planning/Gas-Statement-of-Opportunities |
| Wholesale Market Critical Location Pressures | http://www.aemo.com.au/Gas/Policies-and-Procedures/Declared-Wholesale-Gas-Market-Rules-and-Procedures |
| Wholesale Market Maintenance Planning Procedures Victoria | http://www.aemo.com.au/Gas/Policies-and-Procedures/Declared-Wholesale-Gas-Market-Rules-and-Procedures |

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## CHAPTER 2. NATURE OF THE DECLARED TRANSMISSION SYSTEM

The ~~declared transmission system~~DTS consists of ~~six~~a number of major pipelines and laterals supplying the metropolitan and regional zones. Each of the major pipelines is characterised by its own dynamics in ~~regard to~~ demand, flows, linepack and pressures~~. Ensuring~~ as shown in Figure 1 and Table 1. AEMO will exercise operational control of the DTS in a way that ensures a secure state for each major pipeline~~, by operational control, results~~ that should result in security of the ~~declared transmission system~~DTS as a whole.

**Figure 1 Declared Transmission System Pipelines**


**Table 1: An Overview of the Major System Pipelines (Zones)**

*Note: information regarding major pipeline capacities may be found in the Victorian Gas Planning Review (VGPR).*

| Gippsland | Longford to Gooding CS Inlet |
|---|---|
| | This pipeline is used to transport Bass Strait gas from Longford to Gooding.<br>Control is by the operation of Gooding ~~CS~~compressor station (CS) and by rescheduling Longford injections.<br>~~Nominal injection capacity at Longford (from Esso and VicHub) is 990 TJ/d.~~ |

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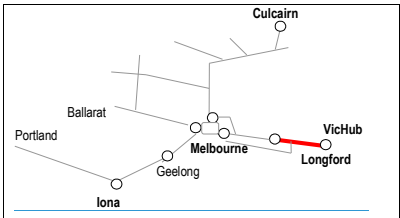
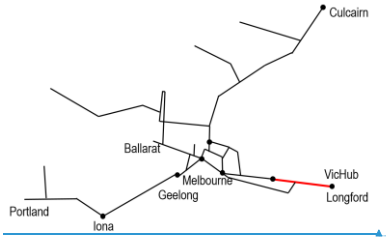


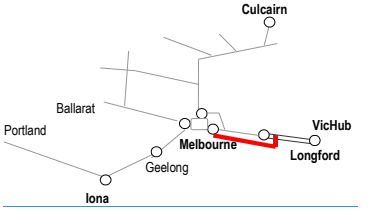



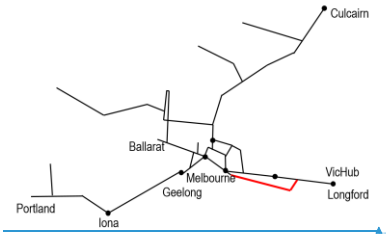

~~BassGas and Iona injections reduce nominal injection capacity at Longford.~~

BassGas injections tend to reduce Longford nominal injection capacity in a ratio of approximately ~~2~~3 to 1~~. For BassGas injections at a maximum rate of 67 TJ/d Longford capacity reduces to around 960 TJ/d, but~~ (i.e. for every 30TJ injected at BassGas, the ~~total~~ Longford ~~pipeline transmission~~injection capacity is ~~increased to 1,030 TJ/d.~~reduced by 10TJ).

Longford and Iona back off each other at high injection rates, depending on linepack levels.

**Lurgi**




**Lurgi pipeline**

The Lurgi pipeline ~~capacity~~ is ~~around 65 TJ/d. Significant load is off~~normally supplied from the ~~end of the Lurgi~~Longford to Melbourne pipeline at ~~DTS.~~Tyers/Morwell.

Alternative supply to the Lurgi pipeline is through the Morwell Backup Regulator at Dandenong. This can be used ~~under~~during unusual demand scenarios or ~~cases~~in case of maintenance ~~or works~~ on this pipeline.

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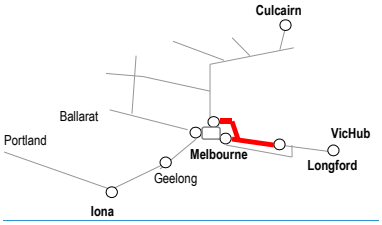
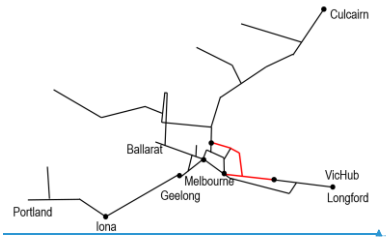
**Melbourne**



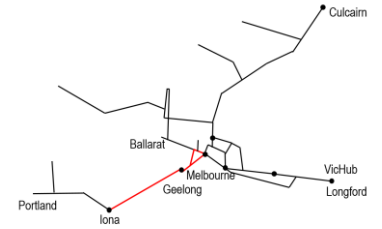

**Gooding-DCG and Pakenham-Wollert-Keon Park pipelines**

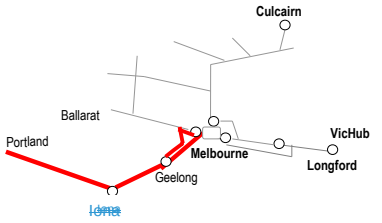
This pipeline system consists of the Gooding to Dandenong pipeline, the Pakenham-Wollert pipeline and Wollert to Keon Park pipeline. It is used to supply Melbourne load, and for onward supply to Ballarat and Geelong ~~Zones~~zones, via Brooklyn, and the Northern ~~zone~~Zone, via Wollert and Wandong.

Control is by the operation of Gooding CS, Wollert CS ~~and the~~, Wollert Pressure Limiter~~.~~

~~Nominal BassGas (near Pakenham) injection capacity is 67 TJ/d~~, Wollert city gate (CG) and the Dandenong CG.

**Geelong**




**Corio ~~pipeline~~ and South West Pipeline (BLP and SWP ~~+ BLP~~ and BCP)**

This pipeline system is used to transport gas from Iona to Geelong, Melbourne (through Brooklyn CG) and to the Ballarat zone. It also transports gas in the opposite direction from Melbourne to Geelong (via the Brooklyn to Corio Pipeline (BCP)) and Iona.

Control is by operation of the Brooklyn CS, Winchelsea CS, Lara ~~City Gate~~CG, Brooklyn-Corio ~~City Gate~~CG, Brooklyn-Lara ~~city gate~~CG, and Brooklyn-Ballan (to Ballarat) ~~Pressure Limiter~~PRS.

~~The Corio + SWP + BLP nominal transmission capacity to Melbourne is 347 TJ/d in Winter.~~

~~Each 1,000 kPa of pressure in the Corio + SWP + BLP equates to about 20 TJ of linepack in the Corio + SWP + BLP.~~

~~In Summer, the maximum SWP capacity from Melbourne to Iona is up to 45 TJ/d with one Centaur compressor operating and up to 129 TJ/d with two Centaur compressors operating at Brooklyn.~~

The Brooklyn CS provides compression towards Iona while the Winchelsea CS provides compression towards Melbourne.

**The Western Transmission System (WTS)**

The WTS is supplied through the Iona CG ~~Outlet~~or CS outlet. The WTS supplies Portland, Hamilton, Koroit, Warrnambool, Allansford, and Cobden. Primary control is by supply through the Iona CG

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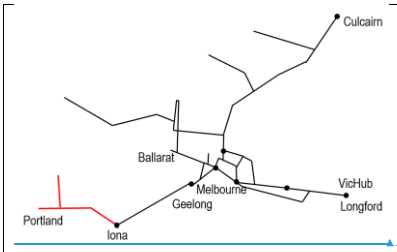
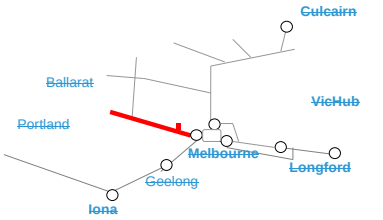
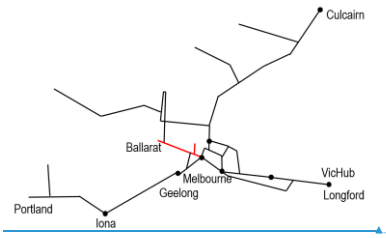



~~Outlet~~outlet. Secondary control is by operation of Iona compressor ~~and Iona City Gate~~.

~~WTS capacity is up to 20 TJ/d, depending on Iona pressure~~ Compression at Iona ~~is~~may be required during withdrawals into storage. WTS load peaks in late ~~Winter/Spring~~winter/spring due to the increased activity of the food processing plants in the region.

**Ballarat**




**Brooklyn- Ballan (Ballarat) and ~~Hopkins Rd~~ Sunbury ~~(Sunbury)~~branch pipelines**

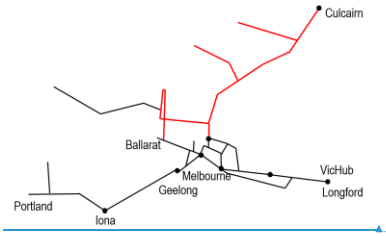
This pipeline system is used to transport gas from Brooklyn to the Ballarat zone. Control is by operation of the Brooklyn CS and Brooklyn ~~Pressure Limiter~~.Ballan pressure reduction station (PRS).

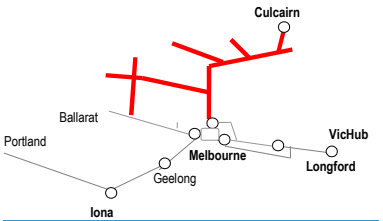
Ballarat ~~Zone~~zone loads are supplied mostly from Brooklyn and partially through Wandong, via Daylesford, depending on the pressure difference between Daylesford and Ballan. Wandong ~~Limiter~~PRS is the controlling point for interaction between Ballarat and Northern zones.

The Sunbury branch pipeline is supplied by one of two methods. Primarily, Sunbury is supplied from the South-West Pipeline (SWP) via the Truganina to Plumpton pipeline and Plumpton PRS. Alternatively, Sunbury is supplied from the Brooklyn to Ballarat pipeline when pressure in the SWP is low and a Brooklyn compressor is operating towards Ballarat.

The Ballarat pipeline cannot be supplied from the SWP via the Sunbury branch due to the presence of a check valve.

**Northern**




**Northern system (incl. Interconnect)**

This pipeline system is used to transport gas from Wollert northward, as well as to import NSW gas at Culcairn via the Interconnect. Control is by operation of the Culcairn Regulator, Wollert CS, Springhurst CS, Euroa CS and the Wollert, Wandong, Glenrowan and ~~Clonbinane Limiters~~.Euroa pressure limiters.

Import capacity ~~from~~ decreases with decreasing system demand, a reduction in available compressors or operational constraints in NSW.

Maximum export capacity is ~~up to 50 TJ/d, depending on~~ achieved through use of the ~~local~~Wollert, Euroa and ~~NSW operating conditions. Imports over 30 TJ/d may require~~ Springhurst ~~compression. Import capacity up to 90 TJ/d could be available with use of compression at Young~~compressor stations and ~~Springhurst~~optimisation of the Northern Zone linepack.

~~Export capacity to NSW is 10 to 50 TJ/d, depending on system demand and operating conditions on the pipeline. Exports are operationally feasible in Summer and Shoulder seasons, while very limited in Winter.~~The pipeline between Wollert and Culcairn has been partially looped to increase the export capacity at Culcairn.

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## ~~Chapter 4.~~CHAPTER 3. NORMAL OPERATING STATE

~~The declared transmission system is~~ AEMO aims to operate the DTS in a normal operating state, which is achieved when all of the following conditions are met:

~~1.~~(a) the ~~declared transmission system~~DTS is operating ~~within the requirements of~~in accordance with the ~~gas quality procedures~~Gas Quality Guidelines and breaches of the gas quality specifications as outlined in the Gas Quality Guidelines do not require intervention by AEMO;

~~2.~~(b) in AEMO's reasonable opinion, there is no gas related threat to public safety[1];

~~3.~~(c) in AEMO's reasonable opinion, there is no threat to the supply of gas to customers; and

~~4.~~(d) system pressures and flows are within, and forecast to ~~be~~remain within (given the observed and anticipated rates of change~~))~~, the ~~agreed~~ operating limits specified in ~~Table 2~~the Wholesale Market Critical Location Pressures. Each of the following is an example of when this condition is met:

- sufficient assets within the DTS are available ~~declared gas transmission system assets to~~ provide ~~adequate~~the capacity to meet forecast gas supply and demand conditions;
- sufficient information is available to assess the ~~state~~status of the ~~declared transmission system~~DTS; and
- the effects of unplanned events that affect the ~~state of the declared transmission system~~DTS can be controlled by operational responses, such as~~, publishing an ad hoc operating schedule,~~ changing the operation of compressors, or changing ~~the~~ regulator set pressures~~, injection of LNG and declaring an emergency and curtail load~~.

[1] b) and c) align the definition of a normal operating state with the definition of an emergency (NGR 333) such that a normal operating state and an emergency cannot coexist.

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# CHAPTER 4. THREAT TO SYSTEM SECURITY

A threat to system security may eventuate if a normal operating state (as defined in Chapter 3) cannot be maintained.

## 4.1 Notice of Threat to System Security

Under rule 341(1), if AEMO reasonably believes there is a threat to system security, it must provide Registered participants without delay details of that threat to system security, including AEMO's estimate of:

(a) The nature and magnitude of the threat, including the likely duration of the threat and the likely shortfall in gas supplies likely to occur during that period;
(b) Whether AEMO needs to intervene in the market to avert the threat and the time by which intervention will be required if the threat has not subsided; and
(c) The system withdrawal zones within the DTS in which the threat to system security is likely to be located.

AEMO may issue a notice requiring Registered participants to provide estimates of the information specified in rule 341(2). This includes, but is not limited to:

(a) whether the Registered participant may make additional injections or withdrawals of gas;
(b) whether the Registered participant is in a position to inject non-firm gas into the declared transmission system; and
(c) whether the Registered participant is in a position to inject off specification gas into the system.

Additionally AEMO may request whether the Registered participant is in a position to voluntarily reduce industrial load.

Under rule 341(5), AEMO must inform Registered participants immediately when it reasonably considers a threat to system security to be at an end.

## 4.2 Responses to a Threat to System Security

AEMO responds by implementing the following if a threat to system security is identified. The below list is presented in order of preference, however specific circumstances may require a different order based on outcomes of a risk assessment.

### 1. Market Response

AEMO may determine that a threat to system security will subside without intervention (i.e. a market response will alleviate the threat). Under rule 342, AEMO must provide details of the existence of the threat to system security to Registered participants and what actions they would be required to take or refrain from taking in order to prevent AEMO from intervening.

A market response to alleviate a threat to system security includes re-bidding to increase or decrease the amount of gas injected or withdrawn at injection or withdrawal points within the DTS.

### 2. AEMO injecting out of merit order gas in the next Operating Schedule

AEMO may identify that a threat to system security can be alleviated through scheduling out of merit order gas (including LNG) in the operating schedule at the times specified in rule 215(3) as per rule 343(1).

### 3. Publishing Ad-Hoc Operating Schedules

AEMO may alleviate a threat to system security by publishing ad hoc schedules at times other than the times specified in rule 215(3), under rule 215(4). These ad hoc operating schedules may require the scheduling of out of merit order gas (including LNG).

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### 4. Directing Participants to Inject or Withdraw Gas

Should it be available, AEMO may direct participants to inject or withdraw off specification gas, non-firm gas, or gas that has not been bid into the market under rule 343(1) and section 91BC of the NGL. Gas accepted under rule 289(5)(b)(i) is not considered a direction.

### 5. Curtailment

AEMO may, under section 91BC of the NGL and rule 343, enact curtailment in accordance with the emergency curtailment list and the Gas Load Curtailment, Gas Recovery and Rationing Guidelines where the threat to system security cannot be alleviated through other means.

*Note: Options 3-5 are interventions under the NGR.*

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# CHAPTER 5. ~~–~~ MONITORING BY AEMO

AEMO ~~must monitor~~monitors the following operational factors for the purposes of identifying any material deviation from plan or forecast that may cause a potential threat to system security~~.~~:

- System Pressures
- Gas flows
- Forecast and actual supply/demand balance
- System and zonal linepack ~~and distribution of~~

~~5.1~~ From these indicators, AEMO determines whether the DTS is trending towards a threat to system ~~linepack~~security. If it does, an operational strategy to avert or manage the threat will be developed based on the results of computer simulations and operational experience.

The following are key areas monitored by AEMO to ensure system security with descriptions of contributing factors.

## 5.1 ~~System~~ Linepack and Distribution of Linepack

A large discrepancy between actual and expected ~~system~~ linepack, or a large discrepancy in ~~system~~ linepack distribution increases the risk of breaching pressure obligations. System security is more reliant on linepack and linepack distribution variability on ~~days of~~ high demand~~,~~ days and ~~in particular~~ when gas-fired power generation (GPG) is operating. A key operational objective is to achieve suitable starting conditions at the beginning of ~~each gas~~ day~~,~~ (BoD), that is, ~~a beginning of day~~BoD linepack that is adequate to meet the forecast level of demand taking into account the expected ~~within day~~ demand profile~~.~~ for that day. Linepack distribution is managed intra-day through the operation of compressors and changing regulator set points as required.

## ~~5.2 Net exports and withdrawals into storage at Iona~~

~~Iona withdrawals occurring in Shoulder and Winter seasons results in an effective reduction in system linepack reserve of between 20 TJ to 30 TJ. If such withdrawals are occurring, significant system security risks may arise due to:~~

~~significant reduction in SWP BoD linepack, reducing transmission capacity to Melbourne;~~

~~reduction of usable linepack in the Longford-DCG Inlet pipeline and Pakenham-Wollert pipeline, as well as overall system linepack, due to increased gas transportation requirements; or~~

~~compression at Brooklyn is at a maximum, which leaves no redundancy at Brooklyn CS.~~

~~An effective reduction in system linepack reserve of between 20 TJ and 30 TJ would be created by those withdrawals into storage at Iona between May and September. This may prevent the BoD system linepack target being achieved and also force higher injections at Longford with the risk of Esso supply back off and potential for plant trips. The loss of system linepack reserve increases the risk to system security particularly on high demand days.~~

## ~~5.8 Net Exports to NSW at Culcairn~~

~~The declared transmission system has very limited capacity to export gas in Winter at Culcairn due to high differential pressure required from Wollert to Culcairn.~~

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~~Exports to NSW require sustained compression at Wollert CS and have a small impact on linepack distribution. Linepack tends to be packed in the Northern zone at the expense of linepack in the Gooding to DCG and Pakenham to Wollert pipelines.~~

### ~~5.11~~5.2 Weather forecast change

~~The advent of surprise~~Unexpected cold weather results in an increase in demand on the ~~declared transmission system and GPG demands and, therefore,~~DTS and a greater depletion of linepack throughout the day~~. On such days,~~, which means that the risk of a breach of minimum system pressure is materially increased. ~~The~~ The risk for system security is even higher if the BoD linepack is below target. Note that the linepack target varies seasonally.

~~The advent of surprise~~Unexpected warm weather results in ~~system~~ linepack being ~~built up~~ above target. Longford pipeline capacity is particularly sensitive to increased linepack and can impact on secure supply from Longford. ~~Therefore~~, linepack requires management ~~by~~through the use of the Gooding compressors and overnight rescheduling.

The risks posed by weather forecast changes are minimised by rescheduling gas five times a day and frequently monitoring changes in weather. Any potential adverse outcomes are managed to the greatest extent possible by rescheduling compressors to move linepack as appropriate. AEMO may employ demand forecast overrides in schedules if demand forecasts by Market Participants do not adequately account for weather forecast changes.

### ~~5.12~~5.3 Availability and ~~locality~~Locality of ~~gas supply~~Gas Supply

Aggregate gas supplies offered to the Market on each gas day from the ~~primary~~ system injection points may vary from day to day. Supply is dependent on the capacity of the ~~declared transmission system~~DTS to transport gas given the operating conditions on the day.

Supply problems, such as when a Producer or Storage Provider has not been able to meet scheduled injection rates, particularly in the first half of the gas day, ~~may create~~can pose material risks to system security and require rapid operational response(s), such as publishing an ad hoc operating schedule, requiring liquefied natural gas (LNG) injection or load curtailment. Less critical issues created by supply restrictions can be managed intra-day through rescheduling gas at trading intervals for the remainder of the gas day.

### ~~5.13~~5.4 LNG ~~plant capacity~~ Plant Capacity

The ~~contracted~~ firm LNG injection rate is 100 t/h. The maximum non-firm rate of 180 t/h can be sustained for a limited period but uses all redundant capacity in the LNG plant. ~~A~~AEMO monitors the LNG plant capacity because a loss of LNG injection capacity~~,~~ during ~~peak~~high demand periods~~,~~ increases the risk of load curtailment.

### ~~5.14 Gas power generation~~

### 5.5 Gas-Fired Power Generation

Depending on system demand and operating conditions on the day, planned or unplanned GPG can rapidly deplete linepack~~, with potential risk~~ and pose a threat to system security. ~~The~~This is because the potential maximum hourly quantity (MHQ) of GPG can be very high relative to the hourly demand from all other industrial and commercial gas customers. Operational readiness is maintained by frequent monitoring of the National Electricity Market (NEM) reserve levels and the NEM spot price for Victoria, both of which may trigger GPG operation.

The ~~Victorian Annual Planning Report~~VGPR includes information on the capacity of the ~~declared transmission system~~DTS to support GPG.

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### ~~5.15~~5.6 Availability of ~~gas transmission assets~~DTS Assets

A weekly and daily review of planned (i.e. maintenance) outages of compressors, regulators and other key ~~transmission~~DTS assets is required to assess any material impact on capacity and potential risk to system security, and to formulate AEMO's response. AEMO conducts maintenance planning and coordination conducted in accordance with the Wholesale Market Maintenance Planning Procedures Victoria and NGR 326.

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### ~~5.16~~5.7 Gas ~~quality~~Quality

Gas injected at all injection points must comply with the ~~gas quality specifications.~~Gas Quality Guidelines. If gas is out of specification, actions may be required as specified in the ~~gas quality specifications~~Gas Quality Guidelines or the ~~Rules~~NGR.

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## 5.8 SCADA System Availability

The availability of the SCADA system that AEMO uses to monitor and operate the DTS is critical to maintaining system security. The probability of SCADA system unavailability is minimised by having appropriate redundancy in both the SCADA system and the communications to critical DTS assets.

## Chapter 6. – CRITICAL LOCATIONS

AEMO's objective is to maintain operating pressures between the relevant MAOP and MinOp across the declared transmission system. Table 2 shows the list of critical locations and associated pressure requirements.

Other locations on the declared transmission system are generally located between these critical locations. Their pressures are normally interpolated from pressures of adjacent upstream and downstream critical locations.

Any operational response taken to restore or maintain system security at a location will take into consideration any secondary effects on other locations within the system.

AEMO will operate the declared transmission system so as to meet connection pressure requirements across the declared transmission system to the extent reasonably possible, and, where flows are within the limits specified in the relevant schedules in connection deeds and connection agreements. In the cases where such flow limits are exceeded at a connection point, AEMO will use all reasonable endeavours to meet pressure requirements at that point.

Table 2: CRITICAL LOCATIONS ON DECLARED TRANSMISSION SYSTEM

| | | | |
|---|---|---|---|
| | MAOP in kPa | MinOP in kPa | |
| Longford (with VicHub) | 6,890 | | Pipeline Licence pressure |
| Sale | | 4,800 | AEMO-Distributor Connection Deed |
| Morwell CG | 2,760 | | Lurgi pipeline licence pressure |
| Pakenham South | | 1,400 | AEMO-Distributor Connection Deed |
| DTS | | 2,650 | AEMO-Distributor Connection Deed<br><br>Maintaining the DCG Inlet Guideline Pressure ensures maintenance of DTS Pressure Obligation |
| Dandenong North | | 2,500 | AEMO Connection Deed<br><br>Maintaining the DCG Inlet Guideline Pressure ensures maintenance of Dandenong Nth Pressure Obligation |
| Brooklyn (Melbourne side) | | 1,700<br><br>1,800 | AEMO-Distributor Connection Deed |

| | | | |
|---|---|---|---|
| | MAOP in kPa | MinOP in kPa | |
| | | | Brooklyn compressor suction min pressure requirement |
| Wollert | 7,400 | | Wollert-Wodonga Pipeline Licence pressure |
| Keon Park | | 2,200 | AEMO-Distributor Connection Deed |
| Corio | 7,390 | 2,100 w<br><br>1,900 s | 7,390 kPa Pipeline Licence pressure<br><br>2,100 kPa in Winter, 1,900 kPa in Summer, Distributor Connection Deed |
| BLP | 10,000 | <br><br>3,800 | 10,000 kPa Pipeline Licence pressure<br><br>3,800 kPa approved AEMO-Distributor Connection Deed (Wyndham Vale) |
| Iona (SWP)<br><br>Iona (WTS) | 10,000<br><br>7,400 | <br><br>3,800 | 10,000 kPa Pipeline Licence pressure<br><br>7,400 kPa Pipeline Licence pressure<br><br>3,800 kPa Operating Agreement |
| Iluka | | 2,500 | APA Group-Distributor Connection Deed |
| Portland | | 2,800 | AEMO-Distributor Connection Deed |
| Bendigo | | 3,000 | AEMO-Distributor Connection Deed |
| Maryborough | | 3,000 | AEMO-Distributor Connection Deed |
| Shepparton | | 2,400 | AEMO-Distributor Connection Deed |
| Wodonga | | 2,400 | AEMO-Distributor Connection Deed |
| Sunbury | | 1,100 | AEMO-Distributor Connection Deed |
| Ballarat | | 2,000 | AEMO-Distributor Connection Deed |