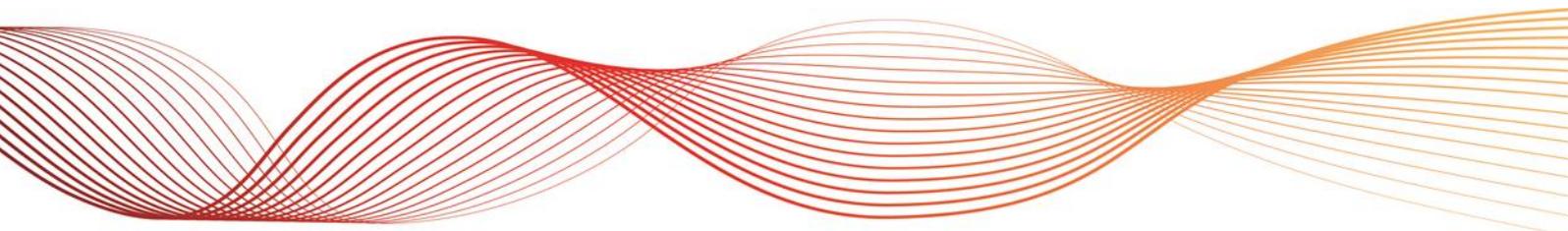




NEM EVENT – DIRECTION 17 SEPTEMBER 2017

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IMPORTANT NOTICE

Purpose

Where the Australian Energy Market Operator (AEMO) intervenes in the National Electricity Market (NEM) through the use of directions, AEMO must publish a report in accordance with National Electricity Rules (NER) clause 4.8.9(f) and 3.13.6A(a). This report satisfies those NER obligations, and is based on information available to AEMO at 6 April 2018.

Unless otherwise indicated, terms in this report have the same meanings as those defined in the NER.

All references to time in this report are based on Australian Eastern Standard Time (AEST).

Disclaimer

AEMO has made every reasonable effort to ensure the quality of the information in this report but cannot guarantee its accuracy or completeness. Any views expressed in this report are those of AEMO unless otherwise stated, and may be based on information given to AEMO by other persons.

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1. SUMMARY

To ensure adequate system strength for secure operation of the South Australian power system, certain combinations of synchronous generating units must be in service at all times¹.

Clause 4.8.9 of the National Electricity Rules (NER) allows AEMO to intervene in the market by issuing directions or clause 4.8.9 instructions, if AEMO is satisfied that it is necessary to maintain or re-establish the power system to a secure, satisfactory, or reliable operating state. Section 116 of the National Electricity Law allows AEMO to issue directions to take certain action if AEMO considers that it is necessary to maintain power system security or for reasons of public safety.

On 17 September 2017, AEMO issued one direction to a South Australian Market Participant to maintain power system security. The direction is summarised in Table 1.

Table 1 Summary of the South Australia direction on 17 September 2017

Direction	Directed Participant	Issue time	Cancellation time	Direction instruction
Quarantine PS unit 5	Origin Energy Electricity Limited	0733 hrs, 17 Sept 2017	0905 hrs, 17 Sept 2017	Synchronise Quarantine Power Station (PS) unit 5 at 0733 hours on 17 September 2017 and follow dispatch targets.

2. INTERVENTION ASSESSMENT

2.1 The need for intervention

To ensure adequate system strength for secure operation of the South Australian power system, certain combinations of synchronous generating units must be in service at all times¹. AEMO continues to investigate system strength requirements in South Australia, and updates the set of viable combinations on a regular basis. The need for intervention, and options considered, were assessed against the set of viable combinations available on 17 September 2017.

At 0719 hrs on 17 September 2017, Pelican Point PS gas turbine (GT) 11 tripped, followed by the trip of Pelican Point PS steam turbine (ST) 18 at 0721 hrs. As a result, there were insufficient online synchronous generating units available to meet South Australian system strength requirements.

AEMO assessed available options, and determined that an immediate intervention response was required.

2.2 Assessment of market response and latest time to intervene

Under NER clause 4.8.5A(a) and (c), AEMO must notify the market of any anticipated power system security or reliability issue that may require intervention, and the latest time for market response before AEMO would need to intervene.

In this instance, AEMO did not publish market notices under those clauses due to time limitations. However, AEMO contacted all Registered Participants who operate eligible synchronous generating units in South Australia to confirm their availability. Those Registered Participants indicated they did not intend to adjust their market offers, but identified units that would be available if directed.

¹ <http://www.aemo.com.au/Media-Centre/South-Australia-System-Strength-Assessment>.

2.3 Decision to intervene

As no market response could be provided, AEMO evaluated the operational parameters provided in relation to eligible synchronous generating units, and issued a direction to Origin Energy Electricity Limited to synchronise Quarantine PS unit 5 and to follow dispatch targets from 0733 hrs on 17 September 2017.

3. INTERVENTION PROCESS

AEMO considers that it followed all applicable processes under NER 4.8 for the management of the direction on 17 September 2017². AEMO did not publish market notices prior to intervention under NER 4.8.5A(a) or (c), as there was insufficient time to do so. Table 2 provides a high level timeline of the intervention event.

Table 2 Timeline of key events on 17 September 2017

Time	Events / comments
17 September 2017	
0719 hrs	Pelican Point PS GT11 trips (followed by Pelican Point PS ST18 at 0721 hrs).
0733 hrs	Direction issued to Origin Energy Electricity Limited for Quarantine PS unit 5 to synchronise and follow dispatch targets.
0740 hrs	Intervention constraints applied to Quarantine PS unit 5 in central dispatch from DI ending 0745 hrs.
0752 hrs	AEMO published market notice (MN) 59205 declaring a direction was issued to a South Australian Participant at 0733 hrs.
0758 hrs	AEMO published MN 59206 declaring an AEMO intervention event commenced from DI ending 0735 hrs and that all DIs during the AEMO intervention event would be intervention price DIs.
0807 hrs	Pelican Point PS GT11 returns to service.
0905 hrs	Origin Energy Electricity Limited (Quarantine PS unit 5) direction was cancelled at 0905 hrs, after Pelican Point PS GT 11 and ST 18 were stable. Intervention constraints were revoked for Quarantine PS unit 5.
0919 hrs	AEMO published MN 59211 declaring the cancellation of the direction.
0922 hrs	AEMO published MN 59212 declaring the cancellation of the AEMO intervention event from DI ending 0910 hrs.

3.1 Adequacy of responses to AEMO inquires

NER 4.8.5A(d) permits AEMO to request information from Scheduled Network Service Providers, Scheduled Generators, Semi-Scheduled Generators, and Market Customers.

AEMO is satisfied with the timeliness, adequacy, and effectiveness of all responses to its requests for information prior to issuing the direction on 17 September 2017.

3.2 Participant ability to comply with the intervention

NER 4.8.9(d) requires that a Registered Participant must immediately notify AEMO of its inability to comply, or intention not to comply, with a direction or clause 4.8.9 instruction.

AEMO did not receive any indication that a Registered Participant would be unable to comply with the direction.

² http://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3707---Intervention-Direction-and-Clause-4-8-9-Instructions.pdf.

4. CHANGES TO DISPATCH OUTCOMES

The direction for Quarantine PS unit 5 to synchronise and follow dispatch targets resulted in approximately 96 megawatt hours (MWh) of generation being added to the market.

Under NER 3.8.1(b)(11), AEMO must ensure that, as far as reasonably practicable, the number of participants affected by the intervention and the resulting changes to interconnector flows are minimised³. AEMO considered the application of counter-action constraints to achieve this objective, but concluded this was not practical during this intervention due to the imminent return of Pelican Point PS GT 11.

Table 3 and 4 summarise the estimated change to dispatch outcomes resulting from this direction. These are estimated by comparing against a simulated dispatch with the direction removed.

Directions in one region can cause dispatch changes to other regions, even when counter-action constraints are applied to minimise this effect. In particular, these changes are driven by economic co-optimisation within the market, and by the interplay between network constraint equations across multiple regions.

Of note is that while these directions displaced market-based generation in South Australia, they also increased exports from South Australia. The increased exports, coupled with an impact on network constraints, resulted in displacement of generation in all regions.

Table 3 Estimated changes to local generation in each region (MWh)

	QLD	NSW	VIC	SA	TAS
Without direction	9,073	8,015	6,106	1,777	2,140
Actual	9,076	7,974	6,106	1,740 + 96 ^A	2,144
Change	+3	-40	0	+59	+5

A. 96 MWh is the directed energy.

Table 4 Estimated changes to interconnector flow between regions (MWh)

	Terranora	QNI	VIC-NSW	Heywood	Murraylink	Basslink
Without direction^A	-194	-1,441	721	-490	-68	310
Actual^B	-195	-1,442	762	-522	-74	314
Change^C	1 MWh more to NSW	1 MWh more to NSW	41 MWh more to NSW	32 MWh more to VIC	6 MWh more to VIC	4 MWh more to VIC

A. Positive numbers are for flows flowing north or west, negative for flows flowing south or east.

B. Change = |Actual - Without direction|.

C. Intervention Pricing Methodology at <https://www.aemo.com.au/-/media/Files/PDF/Intervention-Pricing-Methodology-October-2014.pdf>.

4.1 Application of intervention pricing

AEMO declares intervention pricing for periods subject to an AEMO intervention event. Under intervention pricing, NER 3.9.3(b) requires that AEMO set the dispatch price and ancillary service prices at the value which AEMO, in its reasonable opinion, considers would have applied had the intervention event not occurred. AEMO determines and publishes these prices in accordance with the Intervention Pricing Methodology⁴.

Intervention pricing was applied for this event in accordance with NER 3.9.3(b) for the full intervention period from DI ending 0745 hrs on 17 September 2017 until DI ending 0905 hrs on 17 September 2017.

³ AEMO's power system operating procedure SO_OP 3707 "Intervention, Direction and Clause 4.8.9 Instructions" describes this objective. In practice, AEMO meets the objective by selecting generating units located in the same region as the directed generation (and, if possible, belonging to the same participant) and then constraining the dispatch of the selected generating units by an equal and opposite amount to that of the directed generating units.

⁴ Intervention Pricing Methodology <https://www.aemo.com.au/-/media/Files/PDF/Intervention-Pricing-Methodology-October-2014.pdf>.



5. CONCLUSIONS AND FURTHER ACTIONS

On 17 September 2017, AEMO issued a direction to a South Australian Market Participant to maintain power system security in response to a generator trip in the region resulting in insufficient system strength.

AEMO is satisfied that all applicable procedures and processes were followed in assessing the need for intervention, determining the latest time to intervene, enacting and managing the intervention, applying appropriate intervention pricing, and informing the market to the extent reasonably practical within time constraints.

AEMO is also satisfied with the timeliness and adequacy of participant responses and communication throughout.



ABBREVIATIONS

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
DI	Dispatch Interval
MN	Market Notice
NEM	National Electricity Market
NER	National Electricity Rules
PD	Pre-Dispatch
PS	Power station
SA	South Australia