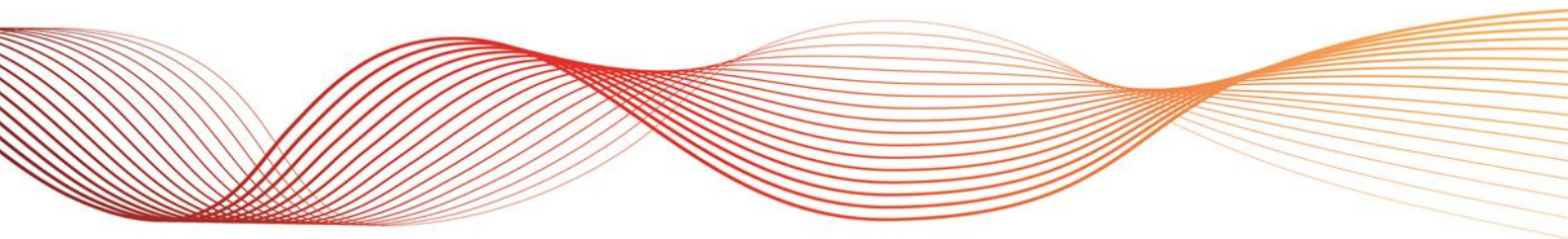


NEM EVENT – DIRECTION 17-19 MARCH 2018

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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 25 May 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.

Between 17 and 19 March 2018, AEMO issued three directions to South Australian Market Participants to maintain power system security. The directions are summarised in Table 1.

Table 1 Summary of the three South Australia directions between 17 and 19 March 2018

Direction	Directed Participant	Issue time	Cancellation time	Direction instruction
Quarantine PS unit 5	Origin Energy Electricity Limited	1302 hrs, 17 Mar 2018	1600 hrs, 17 Mar 2018	Synchronise Quarantine Power Station (PS) unit 5 at 1305 hours on 17 March 2018 and follow dispatch targets.
Osborne Power Station (PS)	Origin Energy Electricity Limited	1635 hrs, 17 Mar 2018	1730 hrs, 18 Mar 2018	Remain synchronised and follow dispatch targets from 2030 hrs on 17 March 2018.
Pelican Point Gas Turbine (GT) 12	Pelican Point Power Pty Ltd (ENGIE)	1745 hrs, 18 Mar 2018	0700 hrs, 19 Mar 2018	Remain synchronised and follow dispatch targets from 2200 hrs on 18 March 2018.

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 March 2018.

At 1249 hrs on 17 March 2018, Pelican Point PS Gas Turbine (GT) 11 tripped, followed by the trip of Pelican Point PS Steam Turbine (ST) 18. As a result, there were insufficient online synchronous generating units available to meet South Australian system strength requirements following the credible loss of a generating unit.

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

At 1357 hrs on 17 March 2018, Origin Energy Electricity Limited submitted a rebid de-committing Osborne Power Station (PS) from 2030 hrs on 17 March 2018².

AEMO determined that there would be insufficient online synchronous units available to meet system strength requirements following this de-commitment.

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

² Rebid reason: 1355E CORRECT BID – CONSTRAINT MANAGEMENT – S_V_NIL_ROCOF SL.



At 1706 hrs on 18 March 2018, ENGIE submitted a rebid a de-committing Pelican Point PS from 2200 hrs on 18 March 2018³.

AEMO determined that there would be insufficient online synchronous units available to meet system strength requirements following this de-commitment.

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, and the latest time for market response before AEMO would need to intervene.

Following the trip of Pelican Point PS GT11 on 17 March 2018, AEMO did not publish a market notice prior to issuing a direction. An immediate response was required and AEMO contacted all eligible 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.

Following the rebid of Osborne PS at 1357 on 17 March 2018, AEMO did not publish a market notice. However, all eligible Participants had already been contacted regarding their availability following the trip of Pelican Point PS GT11.

Following the rebid of Pelican Point PS at 1706 on 18 March 2018, AEMO did not publish a market notice. ENGIE required a direction to Pelican Point PS as soon as possible, to source fuel.

2.3 Decision to intervene

As all eligible participants had indicated that no market response would be provided in all three cases, AEMO evaluated the operational parameters and cost information provided in relation to eligible synchronous generating units, and issued directions to Origin Energy Electricity Limited and ENGIE for:

- Quarantine PS unit 5 to synchronise and follow dispatch targets from 1305 hrs on 17 March 2018
- Osborne PS and Pelican Point PS GT12 to remain synchronised and follow dispatch targets from 2030 hrs on 17 March 2018 and 2200 hrs on 18 March 2018 respectively.

AEMO cancelled the Quarantine PS unit 5 direction at 1600 hrs once Pelican Point PS GT11 and ST18 had returned to service and AEMO had received advice that the units were stable.

AEMO cancelled the Osborne PS and Pelican Point PS GT12 directions at 1730 hrs on 18 March 2018 and 0700 hrs on 19 March 2019, respectively, when Origin Energy Electricity Limited and ENGIE rebid their directed units into the market.

3. INTERVENTION PROCESS

AEMO considers that it followed all applicable processes under NER 4.8 for the management of the directions between 17 and 19 March 2018⁴, other than the publication of market notices prior to the interventions under NER 4.8.5A(a) or (c). It was not reasonably practicable to publish those notices in respect of two of the three directions, due to the timing and operational parameters associated with each intervention. For the direction issued to Origin at 1635 hrs, in hindsight it would have been possible to issue a market notice at least under clause 4.8.5A(a), although it is noted that all Market Participants

³ Rebid reason: 1650-P-FUEL MANAGEMENT: MANAGE SEAGAS LINEPACK DUE TO GAS PLANT OUTAGE-.

⁴ 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.



capable of providing a response had already been contacted. Table 2 provides a high-level timeline of the intervention event.

Table 2 Timeline of key events between 17 and 19 March 2018

Time	Events / comments
17 March 2018	
1249 hrs	Pelican Point PS GT11 and ST18 trips.
1302 hrs	Direction issued to Origin Energy Electricity Limited for Quarantine PS unit 5 to synchronise and follow dispatch targets from 1305 hrs.
1310 hrs	Intervention constraints applied to Quarantine PS unit 5 in central dispatch from dispatch interval (DI) ending 1315 hrs.
1325 hrs	AEMO published market notice (MN) 61715 declaring a direction was issued to a South Australian Participant at 1302 hrs. AEMO published MN 61716 declaring an AEMO intervention event had commenced and that all DIs during the AEMO intervention event would be intervention price dispatch intervals.
1357 hrs	Origin Energy Electricity Limited submitted a rebid to de-commit Osborne PS from 2030 hrs on 17 March 2018.
1433 hrs	Pelican Point PS GT11 returned to service.
1600 hrs	Origin Energy Electricity Limited (Quarantine PS unit 5) direction was cancelled at 1600 hrs, after Pelican Point PS GT11 and ST18 were stable. Intervention constraints were revoked for Quarantine PS unit 5.
1602 hrs	AEMO published MN 61718 declaring the cancellation of the AEMO intervention event.
1605 hrs	AEMO published MN 61719 declaring the cancellation of the direction.
1635 hrs	Direction issued to Origin Energy Electricity Limited for Osborne PS to remain synchronised and follow dispatch targets from 2030 hrs.
1645 hrs	AEMO published MN 61722 declaring a direction was issued to a South Australian Participant at 1635 hrs.
1646 hrs	AEMO published MN 61723 declaring an AEMO intervention event had commenced and that all DIs during the AEMO intervention event would be intervention price dispatch intervals.
2030 hrs	Intervention constraints applied to Osborne PS in central dispatch from DI ending 2035 hrs.
18 March 2018	
1706 hrs	ENGIE submitted a rebid to de-commit Pelican Point PS from 2200 hrs on 18 March 2018.
1730 hrs	Origin Energy Electricity Limited (Osborne PS) direction was cancelled at 1730 hrs, after Osborne PS had returned to commercial operation. Intervention constraints were revoked for Osborne PS.
1732 hrs	AEMO published MN 61749 declaring the cancellation of the direction. AEMO published MN 61750 declaring the cancellation of the AEMO intervention event.
1745 hrs	Direction issued to ENGIE for Pelican Point PS GT12 and ST18 to remain synchronised and follow dispatch targets from 2200 hrs.
1800 hrs	AEMO published MN 61752 declaring a direction was issued to a South Australian Participant at 1745 hrs.
1801 hrs	AEMO published MN 61753 declaring an AEMO intervention event had commenced and that all DIs during the AEMO intervention event would be intervention price DIs.
2200 hrs	Intervention constraints applied to Pelican Point PS in central dispatch from DI ending 2205 hrs.
19 March 2018	
0700 hrs	ENGIE (Pelican Point PS) direction was cancelled at 0700 hrs, after Pelican Point PS had returned to commercial operation. Intervention constraints were revoked for Pelican Point PS. AEMO published MN 61757 declaring the cancellation of the direction. AEMO published MN 61758 declaring the cancellation of the AEMO intervention event.

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 directions between 17 and 19 March 2018.

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.

4. CHANGES TO DISPATCH OUTCOMES

The directions to Quarantine PS unit 5, Osborne PS, and Pelican Point PS GT12 resulted in approximately 4,488 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 minimised⁵. AEMO considered the application of counter-action constraints to achieve this objective, but concluded this was not practical during this intervention because all eligible units were either offline or operating at close to their technical minimum load.

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. 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	215,762	243,872	145,033	35,226	25,116
Actual	214,957	240,872	144,962	34,991 + 4,488 ^A	24,961
Change	-805	-3,000	-70	4,253	-155

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	-1,992	-14,074	3,916	-2,567	-263	-7,000
Actual^A	-1,893	-13,388	7,802	-5,670	-1,368	-7,154
Change^B	99 MWh less to NSW	686 MWh less to NSW	3,886 MWh more to NSW	3,103 MWh more to VIC	1,106 MWh more to VIC	154 MWh more to TAS

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

B. Change = |Actual - Without direction|.

⁵ 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.



4.1 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 Methodology⁶.

Intervention pricing was declared for these Directions in accordance with NER 3.9.3(b) for the full intervention period from:

- DI ending 1305 hrs on 17 March 2018 to DI ending 1600 hrs on 17 March 2018.
- DI ending 1640 hrs on 17 March 2018 to DI ending 1730 hrs on 18 March 2018.
- DI ending 1750 hrs on 18 March 2018 to DI ending 0700 hrs on 19 March 2018.

5. CONCLUSIONS AND FURTHER ACTIONS

Between 17 March 2018 and 19 March 2018, AEMO issued three directions to South Australian Market Participants to maintain power system security in response to a generator trip in the region resulting in insufficient system strength and a forecast lack of system strength in the region.

With the exception of publishing market notices prior to intervention, 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 seeking market response from all generators capable of meeting the system strength requirements. The market was informed after each direction was issued.

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

AEMO is required to publish market notices under NER 4.8.5A(a) and (c) even when aware that there will be no market response. The need for intervention to meet system strength requirements in South Australia generally arises at short notice, and is currently a frequent occurrence. Market notices are sometimes not published in advance because significant control room resources are dedicated to seeking and processing the information necessary to quantify the requirement and timing, then determine the most appropriate option for intervention.

AEMO is investigating changes in its processes to comply with these requirements while minimising the number of market notices issued. One measure AEMO has already implemented is to notify the market when AEMO has intervened and considers that further interventions are possible in the short term if synchronous generator availability changes.

⁶ Intervention Pricing Methodology <https://www.aemo.com.au/-/media/Files/PDF/Intervention-Pricing-Methodology-October-2014.pdf>.



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