



NEM Event – Direction 22 May 2018

October 2018

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 4 September 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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ABBREVIATIONS

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
DI	Dispatch Interval
GT	Gas Turbine
MN	Market Notice
NEM	National Electricity Market
NER	National Electricity Rules
QLD	Queensland

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1. Summary

Section 116 of the National Electricity Law allows AEMO to direct a registered participant to take certain actions, in accordance with the National Electricity Rules (NER), if AEMO considers that it is necessary to maintain power system security or for reasons of public safety.

Clause 4.8.9 of the 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.

On 22 May 2018, AEMO issued a direction to a Queensland Market Participant to maintain power system security. The direction is summarised in Table 1.

Table 1 Summary of the Queensland direction on 22 May 2018

Direction	Directed Participant	No.	Issue time	Cancellation time	Direction instruction
Mt Stuart gas turbine (GT) unit 1 and 2	Origin Energy Limited	1	1025 hrs, 22 May 2018	1105 hrs, 22 May 2018	Synchronise and follow dispatch targets

2. Intervention assessment

2.1 The need for intervention

At 1001 hrs on 22 May 2018, multiple network elements at the Ross substation in north Queensland tripped simultaneously. This non-credible contingency event was caused by a voltage transient on the 125V DC system. This voltage transient occurred during planned work on secondary system wiring and was caused by a pre-existing wiring error in the heating element circuitry of an isolator control cubicle.

To maintain power system security, AEMO acted to limit the flow at the Ross cutset to 200 megawatts (MW), with constraint set Q-RS_200 invoked. The constraint set required increased generation in north Queensland (from Barron Gorge Hydro, Townsville GTs, Kareeya Hydro, and Mt Stuart GTs).

In response to the increased dispatch targets, the north Queensland generators were either:

- Synchronising (Barron Gorge unit 1 & 2, Townsville GT unit 1, Mt Stuart unit 1 & 2),
- Fully dispatched to their availability (Kareeya), or
- Unavailable (Townsville GT unit 2).

With insufficient generation available, the network security constraint equation Q_RS_200 (within constraint set Q-RS_200) violated as soon as it was invoked (from DI ending 1020 hrs).

At 1019 hrs, Origin Energy submitted a rebid to de-commit Mt Stuart GT unit 1 & 2 until 1130 hrs on 22 May 2018¹. At 1021 hrs, AGL submitted a rebid to de-commit Townsville GT unit 1 until 1430 hrs on 22 May 2018².

The network security constraint equation continued to violate until DI ending 1115 hrs.

¹ 1015A AVOID UNECOMIC START – AVOID SHORT RUN SL.

² 1019~A~060 UNCAST NETWORK CONSTRAINT~61 CONST ON OUT OF MERIT ORDER.

To reduce the flow at the Ross cutset and restore power system security, an immediate response was required from AEMO.

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 circumstances that may require AEMO to intervene (for example through the issue of a direction), and the estimated latest time for market response before AEMO would need to intervene.

Following the non-credible contingency event, constraint equation Q_RS_200 violated, and could only be alleviated by increased generation from north Queensland. AEMO contacted all eligible Participants who operated eligible generating units in north Queensland to confirm their availability. Those eligible Participants all indicated they did not intend to adjust their market offers, but identified units that would be available if directed.

AEMO did not publish market notices under NER clause 4.8.5A(a) or (c) prior to issuing a direction. An immediate and specific response was required.

2.3 Decision to intervene

As all eligible Participants had indicated that no market response would be provided, AEMO deemed Mt Stuart GT was the only viable option, and issued a direction to Origin Energy Limited for Mt Stuart GT unit 1 & 2 to synchronise and follow dispatch targets. AEMO cancelled the direction upon satisfactory return to service of the relevant network elements at the Ross substation.

3. Intervention process

AEMO considers that it followed all applicable processes under NER Clause 4.8 for the management of the direction on 22 May 2018³, other than the publication of market notices prior to the intervention under NER 4.8.5A(a) or (c). It was not reasonably practicable to publish those notices due to the operational parameters associated with the intervention, and it is noted that all eligible Participants 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 on 22 May 2018

Time	Events / comments
22 May 2018	
1001 hrs	Non-credible loss of multiple network elements at the Ross substation. This included: <ul style="list-style-type: none"> • Ross 275/ 132 kV no. 2, 3 and 4 transformers. • Ross 275 kV SVC. • Ross 275 kV no. 2 Bus reactor.
1015 hrs	Constraint set Q_RS_200 invoked from DI ending 1020 hrs. Constraint equation Q_RS_200 begins violating from DI ending 1020 hrs.
1019 hrs	Origin Energy Limited submitted a rebid de-committing Mt Stuart GT unit 1 & 2 immediately.
1021 hrs	AGL Hydro Partnership submitted a rebid de-committing Townsville GT unit 1 immediately.
1025 hrs	<ul style="list-style-type: none"> • Direction issued to Origin Energy Limited for Mt Stuart GT unit 1 & 2 to synchronise and follow dispatch targets. • Constraints applied to Mt Stuart GT unit 1 & 2 in central dispatch from DI ending 1035 hrs on 22 May 2018.

³ See 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.

Time	Events / comments
1033 hrs	AEMO published MN62895 declaring that a non-credible contingency event had occurred, with AEMO reclassifying this event to being a credible contingency event.
1052 hrs	AEMO published MN62897 declaring a direction was issued to a QLD participant.
1120 hrs	AEMO published MN62898 declaring that an AEMO intervention event had commenced and that all dispatch intervals (DIs) during the AEMO intervention event would be intervention price DIs. AEMO further notes that intervention pricing would not be implemented during this AEMO intervention event.
1126 hrs	AEMO published MN62899 declaring the cancellation of the direction. The direction to Mt Stuart GT unit 1 & 2 was cancelled and constraints were revoked.
1137 hrs	AEMO published MN62902 reclassifying the contingency event to being a non-credible contingency event.

3.1 Adequacy of responses to AEMO inquiries

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 from Origin Energy and AGL, prior to issuing the direction on 22 May 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 direction to Mt Stuart GT unit 1 & 2 resulted in approximately 33 megawatt hours (MWh) of generation being added to the market.

4.1 Application of intervention pricing

Intervention pricing was not applied for this event in accordance with NER 3.9.3(b), as the need to restore power system security could not be met by directing a plant located at the regional reference node. AEMO issued a market notice (MN62898) to inform the market that intervention pricing would not be implemented during the intervention price dispatch intervals.

5. Conclusions and further actions

On 22 May 2018, AEMO issued a direction to Origin Energy Limited to maintain power system security, in response to a non-credible contingency event 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, and seeking market response from all generators capable of meeting the requirements. The market was informed after the 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 power system security following a non-credible contingency event generally arises at short notice, as in this instance. It is not always practicable to publish market notices in advance of the intervention itself because significant control room resources are dedicated to seeking and processing the information necessary to quantify the requirement and timing, then determining the most appropriate option for intervention.