

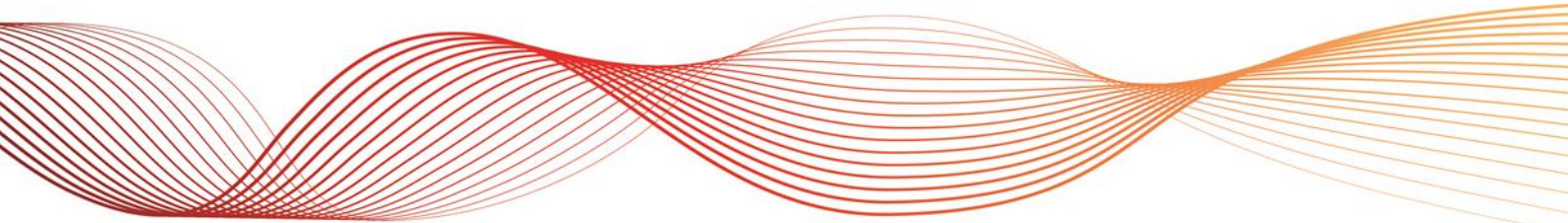


# SCHEDULING ERROR REPORT

9 MARCH 2017 –

MANIFESTLY INCORRECT INPUTS FOR DI ENDING 1015 HRS

Published: **October 2017**



# IMPORTANT NOTICE

## Purpose

AEMO has prepared this report using information available as at October 2017, unless otherwise specified.

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## 1. SUMMARY

On Thursday 9 March 2017, dispatch intervals (DIs) ending 1015 hrs to 1045 hrs were identified as subject to review under the automated procedures for determining a manifestly incorrect input in clause 3.9.2B of the National Electricity Rules (NER).

AEMO determined that DI ending 1015 hrs contained manifestly incorrect inputs (MIIs) due to a multitude of incorrect analogue SCADA values, which were used in central dispatch. In accordance with standard procedures, AEMO subsequently replaced all dispatch prices and market ancillary services prices with the corresponding prices for the last correct dispatch interval (DI ending 1010 hrs). These updated dispatch prices were used to determine the spot prices for trading interval (TI) ending 1030 hrs.

This report describes the circumstances of the event and provides the information to be published in accordance with NER 3.9.2B (g).



## 2. DESCRIPTION OF THE MII

### 2.1 Dispatch intervals subject to review

The trigger thresholds for identifying DIs as “subject to review” relate to changes in regional energy price and cleared interconnector flows, and are described in AEMO’s annual review of price revision triggers “Effectiveness of Procedures for Manifestly Incorrect Inputs”, located [here](#).

Table 1 lists the energy regional original price (ROP) for all regions, FCAS ROP for all regions, as well as the target flows on all interconnectors for DI ending 1010 hrs and DI ending 1015 hrs on Thursday 9 March 2017.

All times referenced in this report are market time (AEST).

**Table 1 Regional prices and interconnector flows for DI ending 1010 hrs and DI ending 1015 hrs**

		DI ending 1010 hrs		DI ending 1015 hrs	
		Raise	Lower	Raise	Lower
Energy ROP (\$/MWh)	NSW	83.20		105.96	
	QLD	44.99		72.52	
	SA	124.99		349.98	
	TAS	87.69		349.01	
	VIC	83.7		-1,738.79	
6 sec (Fast) ROP (\$/MWh)	NSW	2.80	0.00	14.99	0.01
	QLD	2.80	4.99	14.99	4.99
	SA	2.80	0.00	14.99	0.01
	TAS	5.00	0.00	337.817	0.12
	VIC	2.80	0.00	14.99	0.01
60 sec (Slow) ROP (\$/MWh)	NSW	1.48	0.00	6.80	0.01
	QLD	1.48	9.99	6.80	9.99
	SA	1.48	0.00	6.80	0.01
	TAS	2.39	0.00	2.39	0.18
	VIC	1.48	0.00	6.80	0.01
5 min (Delayed) ROP (\$/MWh)	NSW	2.00	0.15	2.09	0.15
	QLD	2.00	23.75	2.09	17.99
	SA	2.00	0.15	2.09	0.15
	TAS	2.10	0.15	2.10	0.00
	VIC	2.00	0.15	2.09	0.15
Regulation ROP (\$/MWh)	NSW	14.90	10.00	28.98	11.99
	QLD	14.90	33.60	28.98	29.83
	SA	14.90	10.00	28.98	11.99
	TAS	15.00	10.00	237.51	10.00
	VIC	14.90	10.00	28.98	11.99

		DI ending 1010 hrs	DI ending 1015 hrs
Interconnectors (MW)	N-Q-MNSP1	-164.30	-163.90
	NSW1-QLD1	-229.841	-259.07
	T-V-MNSP1 (MW)	-329.074	-125
	V-S-MNSP1 (MW)	144.00	220
	V-SA (MW)	560.00	508.958
	VIC1-NSW1 (MW)	143.858	-378.631

At 1024 hrs, AEMO replaced the dispatch prices for energy and market ancillary services for all regions for DI ending 1015 hrs with the prices from the last correct DI (DI ending 1010 hrs), in accordance with clause 3.9.2B(e) of the NER. Clause 3.9.2B(f) states that AEMO may only replace prices if no more than 30 minutes have elapsed since publication of dispatch prices for the dispatch interval subject to review.

Initially, AEMO publishes that a dispatch interval is subject to review. This is overwritten and prices are indicated as firm when AEMO either replaces or accepts the original prices. By default, original prices are made firm after 30 minutes.

## 2.2 Determination of Manifestly Incorrect Inputs

At 1010 hrs on 9 March 2017, a malfunction of the SCADA process occurred during a planned EMS data failover on the Mansfield server. This resulted in a multitude of analogue SCADA values being incorrectly identified as good quality. Accordingly, these values were used by NEMDE for DI ending 1015 hrs, resulting in a large variation in dispatch and triggering the price revision process.

As a result of the incorrect SCADA values, several constraint equations violated for DI ending 1015 hrs, as shown in Table 2 below.

**Table 2 List of violated constraint equations for DI ending 1015 hrs**

Constraint Equation	LHS	RHS	
NSA_V_BDL02_20	9.98	20.00	Bairnsdale Unit 2 >= 20 MW for Network Support Agreement
T_TAMARCCGT_GCS	162.90	109.08	Tamar Valley 220 kV CCGT Generation Control Scheme (GCS) constraint to manage effective size of generation contingency for loss of Tamar CCGT. Limit output of Tamar CCGT based on load available and/or armed for shedding by Tamar GCS.
V::N_NIL_S2	-270.50	-1,788.39	Out = NIL, prevent transient instability for fault and trip of a HWTS-SMTS 500 kV line, SA accelerates, Yallourn W G1 on 500 kV.
V::N_NIL_SD	408.46	-959.40	Out = NIL, prevent transient instability for fault and trip of a HWTS-SMTS 500 kV line, SA decelerates. Constraint active for SA flows above 500 MW VIC to SA only, swamped otherwise.
V::N_NIL_V2	-251.32	-1,530.93	Out = NIL, prevent transient instability for fault and trip of a HWTS-SMTS 500 kV line, VIC accelerates, Yallourn W G1 on 500 kV.
V^SML_NSWRB_2	220.00	195.96	Out = NSW Murraylink runback scheme, avoid voltage collapse for loss of Darlington Pt to Buronga (X5) 220kV line
V_S_NIL_ROCOF	508.96	0.00	Out = NIL, limit VIC to SA Heywood interconnection flow to prevent Rate of Change of Frequency exceeding 3 Hz/sec in SA immediately following loss of Heywood interconnector.

The AEMO control room determined that numerous analogue SCADA values were incorrect, despite these values being identified as good quality. Consequently, the control room deemed these incorrect values to be Manifestly Incorrect Inputs. The EMS data failover changes were reversed, and correct SCADA values were available to NEMDE for DI ending 1020 hrs.

### 3. SCHEDULING ERROR

A scheduling error occurs when AEMO determines that a dispatch interval contained a manifestly incorrect input (refer to clause 3.8.24(a)(3) of the National Electricity Rules).

As DI ending 1015 hrs was the only interval affected by the MII, a scheduling error occurred in this dispatch interval only.

To assess the market impact due to the scheduling error, AEMO did a simulated rerun of the NEMDE dispatch file for DI ending 1015 hrs on 9 March 2017, replacing the incorrect SCADA values with SCADA values from DI ending 1010 hrs. A total of 5 MWh of generation was constrained off across all regions due to the MII.

Under NER clause 3.16.2(a), Market Participants affected by a scheduling error may apply to a dispute resolution panel established under NER clause 8.2.6A for a determination on whether they are entitled to compensation.

### 4. CORRECTIVE ACTION

As a result of the incident, AEMO has undertaken the following actions:

- Procedures have been modified to ensure that database load model errors are obvious and captured at the appropriate time.
- Market real-time interface (Sampler MMS) on the EMS system is now enabled if EMS is receiving data from TNSPs.

### 5. CONCLUSION

AEMO automated procedures identified DIs ending 1015 hrs to 1045 hrs on 9 March 2017 as being subject to review, and AEMO subsequently determined that DI ending 1015 hrs contained a Manifestly Incorrect Input due to a malfunction of the SCADA process during a planned EMS data failover. All dispatch and ancillary services prices for DI ending 1015 hrs were replaced with the most recent correct prices, being those determined for DI ending 1010 hrs.

Accordingly, DI ending 1015 hrs is a scheduling error under clause 3.8.24(a)(3) of the National Electricity Rules.



## ABBREVIATIONS

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
DI	Dispatch Interval
EMS	Energy Management System
FCAS	Frequency Control Ancillary Service
MW	Megawatt
MWH	Megawatt Hour
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine
NER	National Electricity Rules
NSW	New South Wales
NSW1-QLD1	New South Wales – Queensland Interconnector
N-Q-MNSP1	Directlink Interconnector
QLD	Queensland
QNI	Queensland – New South Wales Interconnector
ROP	Regional Original Price
SA	South Australia
SCADA	Supervisory Control and Data Acquisition
TAS	Tasmania
T-V-MNSP1	Basslink Interconnector (MNSP)
VIC	Victoria
VIC-NSW	Victoria – New South Wales Interconnector
V-SA	Victoria – South Australia Interconnector
V-S-MNSP1	Murraylink Interconnector

## GLOSSARY

Term	Definition
Supervisory Control and Data Acquisition	Supervisory Control and Data Acquisition is a system that gathers real-time data from remote terminal units and other communication sources in the field and enables operators to control field devices from their consoles.