POWER SYSTEM OPERATING INCIDENT REPORT – MULTIPLE CONTINGENCY EVENT FOLLOWING AN EARTHQUAKE IN VICTORIA ON 19 JUNE 2012 – FCAS REVIEW

PREPARED BY: Systems Capability

DATE: 15 January 2013

FINAL

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Abbreviations and Symbols

Abbreviation	Term
CCGT	Combined Cycle Gas Turbine
DI	Dispatch Interval
EMMS	Electricity Market Management System
EMS	Energy Management System
FCAS	Frequency Control Ancillary Service
FOS	Frequency Operating Standard
GT	Gas Turbine
HSM	High Speed Monitoring
MASS	Market Ancillary Services Specification
MW	Megawatt
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine
R5	Raise 5 minute/ Delayed FCAS service
R6	Raise 6 second/ Fast FCAS service
R60	Raise 60 second/Slow FCAS service
ST	Steam Turbine
UFLS	Under Frequency Load Shed

Contents

1 Introduction

At 2053 hrs on 19 June 2012, an earthquake in the Latrobe Valley area of Victoria resulted in the tripping of multiple generating units in Victoria and South Australia amounting to the loss of approximately 1955 MW of generation and 200MW of load in Tasmania due to under frequency load shedding. Please refer to the associated multiple contingency event report[1] for further analysis of the incident.

This report reviews the performance of frequency control ancillary services (FCAS) during the incident and has been prepared under clause 4.8.15 (c) of the National Electricity Rules (NER) to assess the adequacy of the provision and response of the FCAS.

The assessment of the provision of FCAS in this report is made against the Market Ancillary Services Specification[2] (MASS) and is based upon information provided by market participants and network service providers. Data from AEMO's Energy Management System (EMS) and Electricity Market Management System (EMMS) has also been used in analysing the incident.

All references to time in this report are to National Electricity Market time (Australian Eastern Standard Time).

[1] Multiple Contingency Event Following an Earthquake in Victoria on 19 June 2012 - http://www.aemo.com.au/Electricity/Resources/Reports-and-Documents/~/link.aspx?_id=FAEFAD9BF568444E91261194F0E5E32D&_z=z

[2] http://www.aemo.com.au/Electricity/Market-Operations/Ancillary-Services/Specifications-and-Standards/Market-Ancillary-Service-Specification

2 FCAS Performance

AEMO has conducted an analysis of the delivery of FCAS in response to this incident in accordance with the criteria detailed in the Market Ancillary Service Specification. This analysis was based on FCAS amounts enabled for dispatch interval 203 (20:55 hrs) on 19 June 2012.

Shortly after the incident, all generating units and loads enabled for R6 FCAS were requested to provide high speed data as per NER 3.11.7(a). This data, where provided, was used in the analysis of R6 response. If high speed data was not available, AEMO has estimated the response based on four second SCADA data from AEMO's Energy Management System. This approach is approximate only, particularly in the period from 0 to 6 seconds.

Analysis of R60 and R5 response is based on four second SCADA data sourced from the AEMO Energy Management System.

2.1 Mainland Frequency

The table below summarises the actual performance of frequency in the Mainland against the Frequency Operating Standard (FOS).

Condition	Frequency Operating Standard	Actual System Performance
Recovery	49.85 to 50.15 Hz within 10 minutes	4.1 minutes to recover
Stabilisation	49.5 to 50.5 Hz within 2 minutes	2.4 minutes to stabilise
UFLS Threshold	49.0 Hz	Threshold not breached
Containment	47 to 52 Hz	Frequency band not breached

Table 1 Mainland FOS - interconnected system

2.1.1 Mainland Frequency Analysis

The graph in Figure 1 shows the Mainland frequency deviation during the incident.

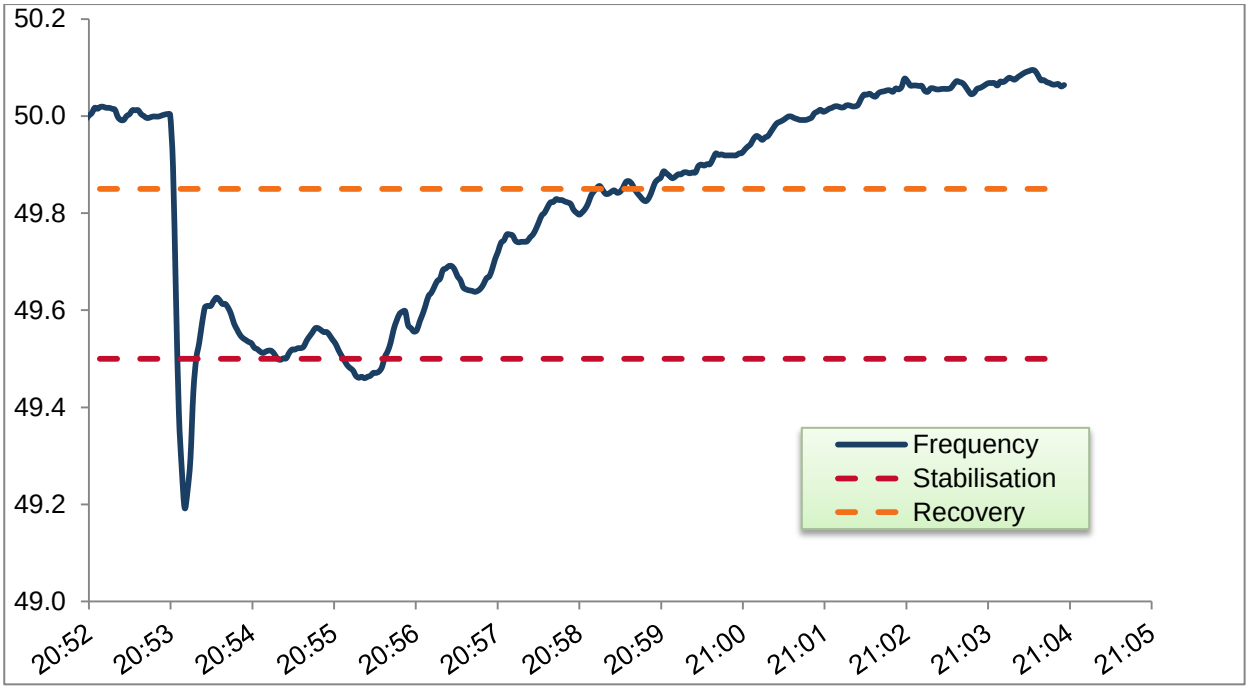

Figure 1 Mainland frequency on 19 June 2012

The power system frequency in the Mainland fell to a minimum of 49.2 Hz at 20:53:54 hrs. The power system responded to bring the system frequency back within the stabilisation lower limit in approximately 14 seconds. However, the system frequency fell below the stabilisation lower limit again after 122 seconds which is in violation of the Mainland FOS.

The frequency returned and remained in the stabilisation band after 146 seconds and returned within the recovery band lower limit within 245 seconds. The recovery criteria of the Mainland FOS were met.

2.1.2 Provision of FCAS in the Mainland

The figure below summarises the Mainland FCAS that was enabled and delivered from the enabled units during the incident.

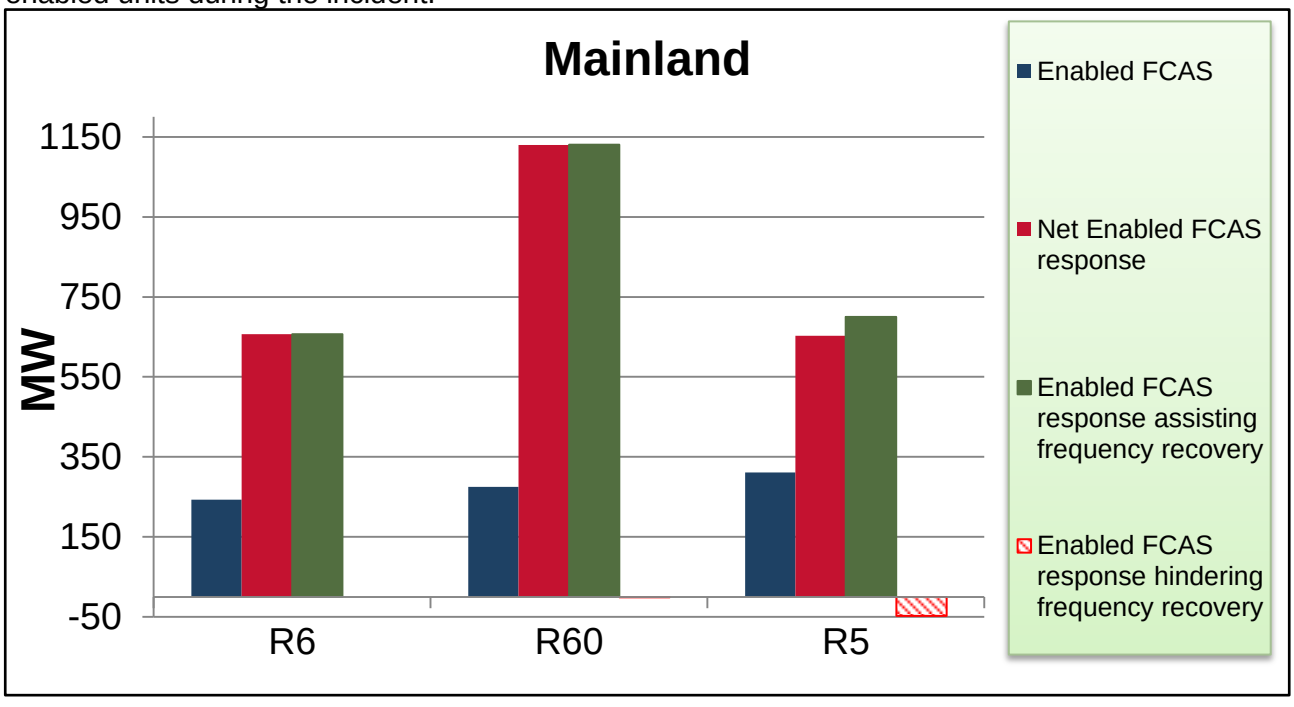

Figure 2 Mainland FCAS raise service from enabled units

In addition to the enabled units above, the following was also delivered from units not enabled for raise FCAS:[3]

- 32.1 MW of slow raise FCAS (R60)
- 349.2 MW of delayed raise FCAS (R5)

The following sections summarise the performance of the enabled units in the Mainland to provide the various raise FCAS services.

2.1.2.1 Mainland - Fast Raise Response (R6)

A total of 242.8 MW of fast raise FCAS was enabled in the Mainland while 657.0 MW was actually delivered for the incident. The fast raise response of each enabled unit is summarised in the table below,

Region	Unit	Enabled (MW)	Delivered (MW)	Comments
NSW	Bayswater 1	21.0	52.0	Response appears correct
NSW	Bayswater 2	13.0	50.0	Response appears correct
NSW	Bayswater 3	13.0	44.4	Response appears correct
NSW	Bayswater 4	13.0	51.4	Response appears correct
NSW	Liddell 2	5.0	41.2	Response appears correct
NSW	Liddell 4	5.0	19.8	Response appears correct
NSW	Mount Piper 1	5.0	10.7	Response appears correct
NSW	Mount Piper 2	5.0	32.4	Response appears correct
Total (NSW)		**80.0**	**301.9**	
QLD	Gladstone 1	5.0	5.7	Response appears correct
QLD	Gladstone 2	5.0	1.1	**Unit appears not to have responded adequately**
QLD	Gladstone 3	5.0	50.5	Response appears correct

[3] R6 response for units not enabled was not evaluated as high speed data was not requested.

QLD	Gladstone 4	5.0	1.6	**Unit appears not to have responded adequately**
QLD	Gladstone 5	5.0	1.0	**Unit appears not to have responded adequately**
QLD	Gladstone 6	5.0	2.5	**Unit appears not to have responded adequately**
QLD	Stanwell 1	10.0	37.9	Response appears correct
QLD	Stanwell 2	10.0	31.0	Response appears correct
QLD	Stanwell 3	10.0	33.6	Response appears correct
QLD	Stanwell 4	10.0	36.3	Response appears correct
QLD	Tarong 3	10.0	36.8	High speed data unavailable. Based on 1-second data[4], response appears correct
Total (QLD)		**80.0**	**238.0**	
SA	Northern 1	3.3	0.0	**High speed data unavailable. Based on 4-second data, unit appears not to have responded adequately**
SA	Northern 2	0.5	4.6	Response appears correct
SA	Pelican Point	35.0	3.4	**High speed data unavailable.[5] Based on 4-second data, unit appears not to have responded adequately**
SA	Torrens Island B3	15.0	32.6	Response appears correct
SA	Torrens Island B4	10.0	27.4	Response appears

[4] 1-second data provided by Stanwell Corporation
[5] Data recorders were able to capture high speed data for GT 11 but failed to capture the high speed response of generating units, GT 12 and ST 18

				correct
Total (SA)		**63.8**	**68.0**	
VIC	Newport	10.0	46.9	High speed data unavailable. Based on 4-second data, response appears correct
VIC	Alcoa Portland 1	3.0	0.0	**High speed data unavailable. Based on 4-second data, unit appears not to have responded adequately**
VIC	Alcoa Portland 2	2.0	0.0	**High speed data unavailable. Based on 4-second data, unit appears not to have responded adequately**
VIC	Point Henry 1	2.0	0.0	**High speed data unavailable. Based on 4-second data, unit appears not to have responded adequately**
VIC	Point Henry 2	2.0	2.2	High speed data unavailable. Based on 4-second data, response appears correct
Total (VIC)		**19.0**	**49.1**	
Grand Total (Mainland)		**242.8 MW**	**657.0 MW**	

Table 2 Mainland Fast Raise (R6) Response

2.1.2.1.1 R6 FCAS Provider Responses

AEMO wrote to all FCAS providers where R6 response appeared to be inadequate or where high speed data was not provided.

The following responses have been obtained:

Unit	Company	Response	Due Date
Gladstone 2, 4, 5 and 6	CS Energy	CS Energy will investigate the response of the Gladstone units and respond to AEMO	31 January 2013
Pelican Point	GDF Suez	• GDF Suez will investigate the unit response and will notify AEMO of any remedial actions taken • In relation to the absence of high speed data due to data recorder failure, GDF Suez will implement procedures to routinely check the data recorders to minimize a	• 31 January 2013 • 31 January 2013

		reoccurrence	
Northern 1	Alinta Energy	• Alinta Energy will investigate the response of Northern 1 and provide a response to AEMO • In relation to the absence of high speed data, Alinta Energy will investigate and provide a response to AEMO	31 January 2013
Newport	Ecogen Energy	In relation to the absence of high speed data, Ecogen Energy has an agreement for AEMO to provide this data. AEMO will review the provision of this data and provide a response to Ecogen Energy	28 February 2013
Alcoa Portland 1 & 2 and Point Henry 1	Vic Power Trading	• Vic Power Trading will investigate the information and provide a response to AEMO • In relation to the absence of high speed data, Vic Power Trading has an agreement for AEMO to provide this data. AEMO will review the provision of this data and provide a response to Vic Power Trading	• 31 January 2013 • 28 February 2013

Recommendations:

- CS Energy will investigate the Gladstone generating unit response and advise AEMO of the outcome by 31 January 2013
- GDF Suez will investigate the Pelican Point response and advise AEMO of the outcome by 31 January 2013
- GDF Suez will implement procedures to routinely check the high speed data recorders at Pelican Point by 31 January 2013
- Alinta Energy will investigate Northern 1 response and advise AEMO of the outcome by 31 January 2013
- Alinta Energy will investigate high speed data issue on Northern 1 and advise AEMO of the outcome by 31 January 2013
- Vic Power Trading will investigate the response from the pot line loads and advise AEMO of the outcome by 31 January 2013
- AEMO will review the ability to provide high speed data in relation to Newport and the potlines and advise Ecogen and Vic Power Trading of the outcome by 28 February 2013

2.1.2.2 Mainland - Slow Raise Response (R60)

A total of 274.6 MW of slow raise FCAS was enabled in the Mainland while 1129.9 MW was actually delivered for the incident. The response of each enabled unit is summarised in the table below,

Region	Unit	Enabled (MW)	Delivered (MW)	Comments
NSW	Bayswater 1	21.0	94.4	Response appears correct
NSW	Bayswater 2	13.0	77.9	Response appears correct
NSW	Bayswater 3	13.0	64.9	Response appears correct
NSW	Bayswater 4	13.0	33.7	Response appears correct
NSW	Liddell 1	5.0	74.5	Response appears correct
NSW	Liddell 2	5.0	75.8	Response appears correct
NSW	Liddell 4	5.0	33.8	Response appears correct
NSW	Mount Piper 1	5.0	9.2	Response appears correct
NSW	Mount Piper 2	5.0	70.6	Response appears correct
Total (NSW)		**85.0**	**534.8**	
QLD	Gladstone 1	5.0	10.1	Response appears correct
QLD	Gladstone 2	5.0	-0.8	**Unit appears not to have responded adequately**
QLD	Gladstone 3	5.0	45.5	Response appears correct
QLD	Gladstone 4	5.0	3.3	**Unit appears not to have responded adequately**
QLD	Gladstone 5	5.0	1.9	**Unit appears not to have responded adequately**
QLD	Gladstone 6	5.0	5.4	Response appears

				correct
QLD	Stanwell 1	10.0	51.2	Response appears correct
QLD	Stanwell 2	10.0	38.1	Response appears correct
QLD	Stanwell 3	10.0	47.0	Response appears correct
QLD	Stanwell 4	10.0	63.2	Response appears correct
QLD	Tarong 3	10.0	68.1	Response appears correct
Total (QLD)		**80.0**	**333.0**	
SA	Pelican Point	30.0	92.7	Response appears correct
SA	Torrens Island B2	23.6	51.1	Response appears correct
SA	Torrens Island B3	30.0	44.8	Response appears correct
Total (SA)		**83.6**	**188.6**	
VIC	Loy Yang B1	5.0	11.6	Response appears correct
VIC	Newport	10.0	54.0	Response appears correct
VIC	Alcoa Portland 1	5.0	0.3	**Unit appears not to have responded adequately**
VIC	Alcoa Portland 2	2.0	0.3	**Unit appears not to have responded adequately**
VIC	Point Henry 1	2.0	0.5	**Unit appears not to have responded adequately**
VIC	Point Henry 2	2.0	6.8	Response appears correct
Total (VIC)		**26.0**	**73.5**	
Grand Total (Mainland)		**274.6 MW**	**1129.9 MW**	

Table 3 Mainland Slow (R60) Response

In addition to the FCAS provided by the enabled units above, the units in the table below also delivered slow raise FCAS despite not being enabled.

Region	Unit	Delivered (MW)	Comments
NSW	Eraring 2	42.6	
NSW	Wallerawang 8	16.2	
SA	Northern 1	-33.3	Although not enabled for R60, response may be a violation of Generator Performance Standard
VIC	Loy Yang B2	6.6	
Total		**32.1 MW**	

Table 4 Mainland slow (R60) response from other generating units

2.1.2.2.1 R60 FCAS Provider Responses

AEMO wrote to all FCAS providers where R60 response appeared to be inadequate.

The following responses have been obtained:

Unit	Company	Response	Due Date
Gladstone 2, 4 and 5	CS Energy	CS Energy will investigate the response of the Gladstone units and provide a response to AEMO	31 January 2013
Northern 1	Alinta Energy	Alinta Energy will investigate the response of Northern 1 in relation to the generator performance standards and provide a response to AEMO	31 January 2013
Alcoa Portland 1 & 2 and Point Henry 1	Vic Power Trading	Vic Power Trading will investigate the information and provide a response to AEMO	31 January 2013

Recommendation:

- CS Energy will investigate the Gladstone generating unit response and advise AEMO of the outcome by 31 January 2013.
- Alinta will investigate Northern 1 response and advise AEMO of the outcome by 31 January 2013.
- Vic Power Trading will investigate the response from the pot line loads and advise AEMO of the outcome by 31 January 2013

2.1.2.3 Mainland - Delayed Raise Response (R5)

A total of 311.0 MW of delayed raise FCAS was enabled in the Mainland while 652.8 MW was actually delivered for the incident. The response of each enabled unit is summarised in the table below,

Region	Unit	Enabled (MW)	Delivered (MW)	Comments
NSW	Bayswater 1	20.0	26.8	Response appears correct
NSW	Bayswater 2	16.0	31.6	Response appears correct
NSW	Bayswater 3	20.0	63.7	Response appears correct
NSW	Bayswater 4	16.0	19.6	Response appears correct
NSW	Mount Piper 1	25.0	4.2	**Unit appears not to have responded adequately**
NSW	Mount Piper 2	25.0	-46.8	**Unit appears not to have responded adequately**
NSW	Wallerawang 8	10.0	11.9	Response appears correct
Total (NSW)		**132.0**	**111.0**	
QLD	Mackay GT	13.0	5.9	**Unit appears not to have responded adequately**
QLD	Wivenhoe 2	120.0	283.1	Response appears correct
Total (QLD)		**133.0**	**289.0**	
SA	Torrens Island B2	10.0	63.1	Response appears correct
SA	Torrens Island B3	10.0	76.1	Response appears correct
SA	Torrens Island B4	10.0	76.5	Response appears correct
Total (SA)		**30.0**	**215.7**	
VIC	Loy Yang B1	5.0	6.7	Response appears correct

VIC	Alcoa Portland 1	5.0	-0.6	**Unit appears not to have responded adequately**
VIC	Alcoa Portland 2	2.0	1.6	**Unit appears not to have responded adequately**
VIC	Point Henry 1	2.0	0.9	**Unit appears not to have responded adequately**
VIC	Point Henry 2	2.0	28.5	Response appears correct
Total (VIC)		**16.0**	**37.1**	
Grand Total (Mainland)		**311.0 MW**	**652.8 MW**	

Table 5 Mainland delayed (R5) response

In addition to the units above, the following generating units also delivered delayed FCAS despite not being enabled.

Region	Unit	Delivered (MW)	Comments
NSW	Eraring 2	17.3	
NSW	Liddell 1	23.0	
NSW	Liddell 2	13.8	
NSW	Liddell 4	22.8	
QLD	Gladstone 1	4.0	
QLD	Gladstone 3	22.5	
QLD	Gladstone 4	28.6	
QLD	Gladstone 5	6.6	
QLD	Gladstone 6	4.3	
QLD	Stanwell 1	32.3	
QLD	Stanwell 2	33.1	
QLD	Stanwell 3	33.1	
QLD	Stanwell 4	30.0	
QLD	Tarong 3	25.1	
SA	Northern 1	-23.4	Although not enabled for R5, response may be a

			violation of Generator Performance Standard
SA	Northern 2	1.0	
SA	Pelican Point	55.3	
VIC	Loy Yang B2	2.8	
VIC	Newport	17.0	
Total		**349.2**	

Table 6 Mainland delayed (R5) response from other generating units

2.1.2.3.1 R5 FCAS Provider Responses

AEMO wrote to all FCAS providers where R5 response appeared to be inadequate.

The following responses have been obtained:

Unit	Company	Response	Due Date
Mount Piper 1 & 2	Energy Australia	• Investigations found that while Mount Piper 1 was capable of operating at full capacity under normal operating conditions, an issue at a mill meant that Mount Piper 1 would not be able to perform adequately for the delayed raise service. Operational staff had not communicated the limitations of the unit to trading staff. Operational staff were reminded to notify trading staff responsible for FCAS bids if limitations existed such that appropriate bids were made into the FCAS market • Mount Piper 2 did not respond adequately because of an incorrect design in the load demand and frequency controls of the unit control system. As a result, a runback was initiated which had failed to be blocked. The design of the controls was corrected and implemented on both Mount Piper 1 and 2 on August 2012.	N/A

Mackay	Stanwell Corporation	Stanwell Corporation will investigate the response of the unit and provide a response to AEMO	31 January 2013
Northern 1	Alinta Energy	Alinta Energy will investigate the response of Northern 1 in relation to the generator performance standards and provide a response to AEMO	31 January 2013
Alcoa Portland 1 & 2 and Point Henry 1	Vic Power Trading	Vic Power Trading will investigate the information and provide a response to AEMO	31 January 2013

Recommendation:

- Alinta will investigate the Northern 1 generating unit response by 31 January 2013
- Stanwell Corporation will investigate the Mackay GT delayed raise response by 31 January 2013
- Vic Power Trading will investigate the Portland 1, 2 and Port Henry 1 delayed load response by 31 January 2013

2.2 Tasmania Frequency

The table below summarises the actual performance of frequency in Tasmania against the FOS.

Condition	Frequency Operating Standard	Actual System Performance
Recovery	49.85 to 50.15 Hz within 10 minutes	5.7 minutes to recover
Stabilisation	48.0 to 52.0 Hz within 2 minutes	0.2 minutes to stabilise
UFLS Threshold	47.96 Hz	UFLS triggered
Containment	47.0 to 55.0 Hz	Frequency band not breached

Table 7 Tasmania FOS – interconnected system

2.2.1 Tasmania Frequency Analysis

The graph in Figure 3 shows the Tasmania frequency deviation during the incident.

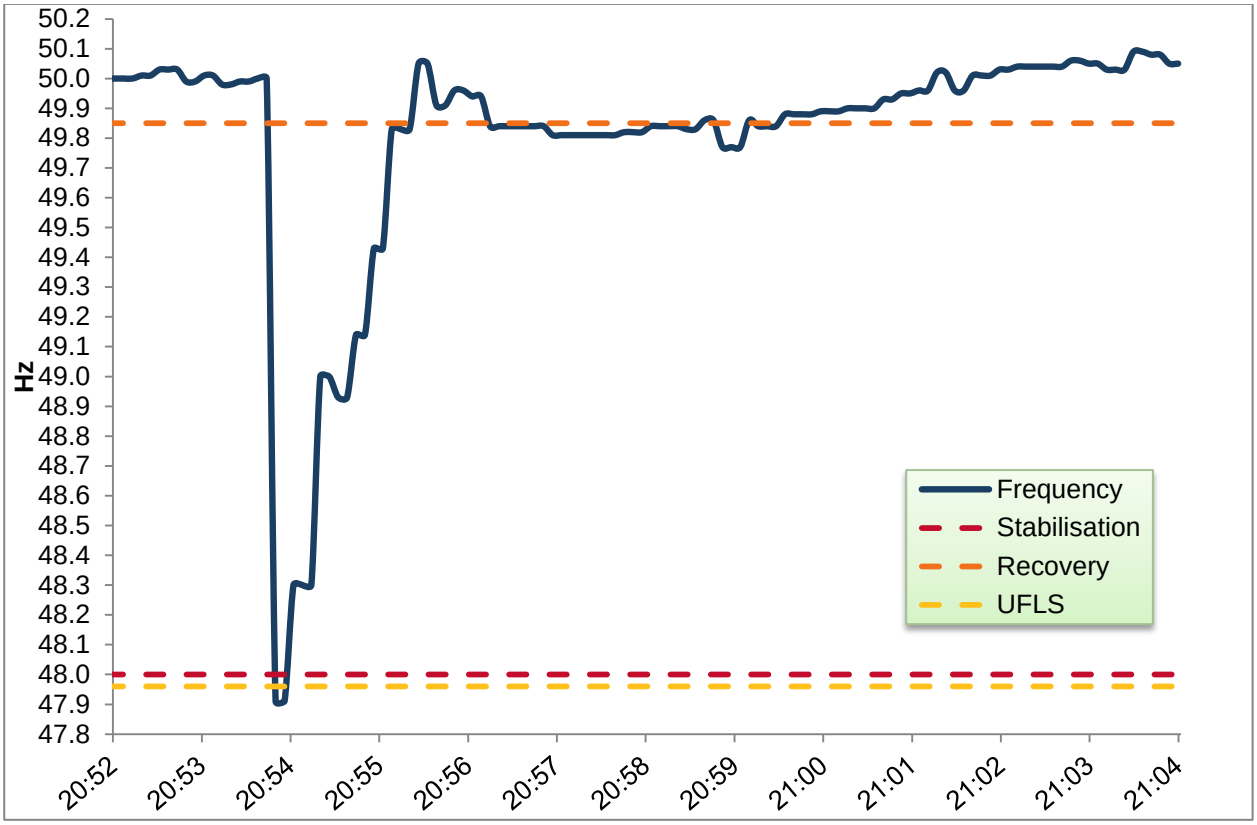

Figure 3 Tasmania frequency on 19 June 2012

The loss of approximately 1955 MW from the Mainland resulted in a drop in Mainland frequency. The Basslink frequency controller responded as expected to increase the export from Tasmania from approximately 130 MW to 580 MW into Victoria. This resulted in a frequency excursion in the Tasmanian frequency from 49.99 to 47.95 Hz.

The minimum frequency experienced at 20:53:47 hrs crossed the threshold for the Tasmania UFLS which is set to trigger at 47.96 Hz resulting in the shedding of 200 MW of major industrial

load. Frequency recovered to within the stabilisation band within 0.2 minutes and to within the recovery band within 5.7 minutes. The Tasmania region frequency operating standard was met for this event.

2.2.2 Provision of FCAS in Tasmania

The figure below summarises the Tasmania FCAS that was enabled and delivered from the enabled units during the incident.

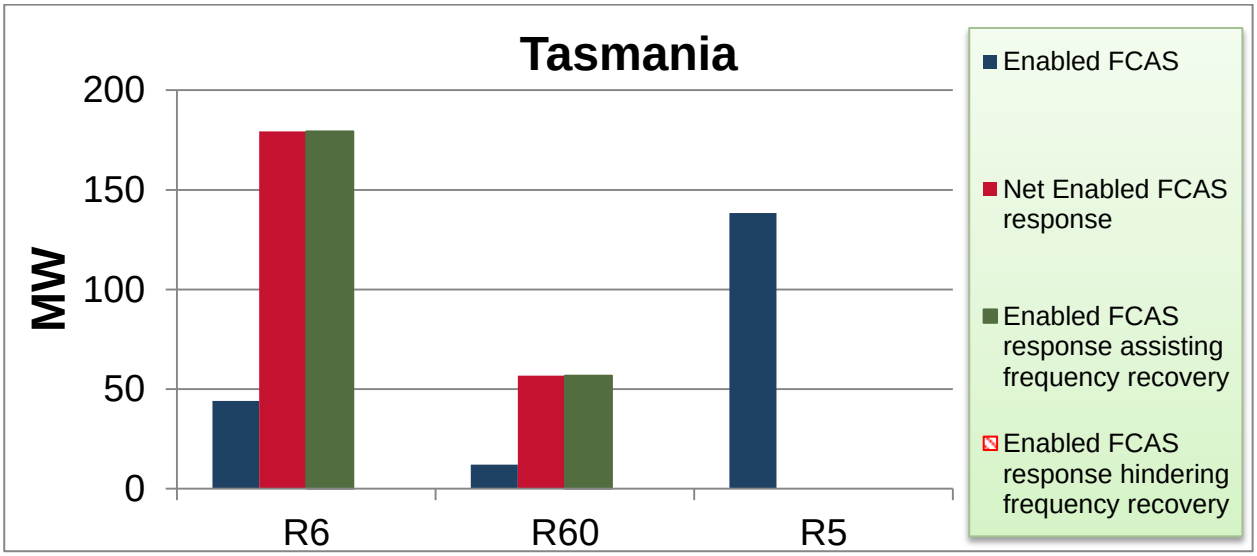

Figure 4 Tasmania FCAS raise service from enabled units

The following sections summarises the performance of the generating units enabled to provide raise FCAS services in Tasmania.

In addition to the enabled units, 322.2 MW of slow raise FCAS (R60) was also delivered from units not enabled for raise FCAS.

2.2.2.1 Tasmania - Fast Raise Response (R6)

A total of 44 MW was enabled in Tasmania for fast raise service. When the incident occurred, approximately 179.3 MW was delivered. The response of each enabled unit is summarised in the table below,

Region	Unit	Enabled (MW)	Delivered (MW)	Comments
TAS	Bastyan	2.1	0.8	**Unit appears not to have responded adequately**
TAS	Cethana	1.0	1.4	Response appears correct
TAS	Fisher	2.0	1.3	**Unit appears not to have responded adequately**
TAS	Gordon	27.4	128.7	Response appears correct
TAS	John Butters	2.0	15.1	Response appears correct

TAS	Mackintosh	1.2	0.2	**Unit appears not to have responded adequately**
TAS	Meadowbank	2.9	25.8	Response appears correct
TAS	Tribute	0.6	1.5	Response appears correct
TAS	Tungatinah	4.7	4.5	Response appears acceptable
Grand Total (TAS)		**44.0 MW**	**179.3 MW**	

Table 8 Tasmania fast raise (R6) response

2.2.2.1.1 R6 FCAS Provider Responses

AEMO wrote to Hydro Tasmania regarding generating units with R6 responses that appeared to be inadequate.

The following responses have been obtained:

Unit	Company	Response	Due Date
Bastyan, Fisher and Mackintosh	Hydro Tasmania	Hydro Tasmania agrees that the fast raise response of the units was not adequate. The FCAS bids of these units have been adjusted accordingly while Hydro Tasmania investigates the cause. Hydro Tasmania will notify AEMO of any remedial actions taken	31 January 2013

Recommendation:

- Hydro Tasmania will investigate Bastyan, Fisher and Mackintosh generating unit fast raise response and advise AEMO of the outcome by 31 January 2013

2.2.2.2 Tasmania - Slow Raise Response (R60)

A total of 12.1 MW was enabled in Tasmania for the slow raise service with 56.7 MW of slow raise FCAS delivered. The response of each enabled unit is summarised in the table below,

Region	Unit	Enabled (MW)	Delivered (MW)	Comments
TAS	Meadowbank	8.0	36.0	Response appears correct
TAS	Poatina 110	4.1	20.7	Response appears correct
Grand Total (TAS)		**12.1 MW**	**56.7 MW**	

Table 9 Tasmania slow raise (R60) response

In addition, the following generating units delivered slow raise FCAS despite not being enabled.

Region	Unit	Delivered (MW)	Comments
TAS	Bastyan	21.1	
TAS	Cethana	5.2	
TAS	Fisher	4.7	
TAS	Gordon	180.8	
TAS	John Butters	97.7	
TAS	Mackintosh	18.6	
TAS	Reece 2	8.3	
TAS	Tribute	-2.9	Although not enabled for R60, response may be a violation of Generator Performance Standard
TAS	Tungatinah	32.3	
TAS	Tamar Valley CCGT	-43.6	Although not enabled for R60, response may be a violation of Generator Performance Standard
Grand Total		**322.2 MW**	

Table 10 Slow (R60) Response from other Tasmania generating units

AEMO noted that the output of Tribute and Tamar Valley CCGT may be in contravention to the generator performance standard[6]. AEMO wrote to Hydro Tasmania and Aurora Energy to enquire about the Tribute and Tamar Valley CCGT unit response respectively.

[6] NER S5.2.5.11 Frequency Control

The following responses have been obtained:

Unit	Company	Response	Due Date
Tamar Valley CCGT	Aurora Energy	Aurora Energy have investigated the unit and provided AEMO with a response. AEMO will review the information against the generator performance standards	25 January 2013
Tribute	Hydro Tasmania	Hydro Tasmania will investigate the unit response in regards to the generator performance standards	31 January 2013

Recommendation:

- AEMO will review the information provided by Aurora Energy regarding the Tamar Valley CCGT generating unit and provide a response by 25 January 2013
- Hydro Tasmania will investigate the Tribute generating unit and provide a response by 31 January 2013

2.2.2.3 Tasmania - Delayed Raise Response (R5)

No delayed raise FCAS was required to be delivered during the incident because the Tasmania power system frequency had returned to the normal operating band.

3 Conclusions

An analysis of FCAS responses found that a small number of FCAS providers did not appear to deliver the enabled amount of FCAS. AEMO has contacted the relevant providers and is working with the providers to ensure that the generating units or loads will be able to meet the targets in the future.

Despite the failure of these providers to deliver the enabled FCAS, this is not considered to have had a significant impact of the frequency response due to the significant level of over-delivery of FCAS from other providers.

A number of FCAS providers were not able to provide high speed data in accordance with the NER and the Market Ancillary Service Specification. Without this data, an accurate assessment of the fast raise performance of units enabled by AEMO could not be determined. AEMO is working with the FCAS providers to ensure that this data will be available for future events.

4 Summary of Recommendations

4.1 Fast Raise (R6)

- CS Energy will investigate the Gladstone generating unit response and advise AEMO of the outcome by 31 January 2013
- GDF Suez will investigate the Pelican Point response and advise AEMO of the outcome by 31 January 2013
- GDF Suez will implement procedures to routinely check the high speed data recorders at Pelican Point by 31 January 2013
- Alinta Energy will investigate Northern 1 response and advise AEMO of the outcome by 31 January 2013
- Alinta Energy will investigate the high speed data issues at Northern 1 and advise AEMO of the outcome by 31 January 2013
- Vic Power Trading will investigate the response from the pot line loads and advise AEMO of the outcome by 31 January 2013
- AEMO will review the ability to provide high speed data in relation to Newport and the potlines and advise Vic Power trading and Ecogen Energy of the outcome by 28 February 2013
- Hydro Tasmania has revised its unit FCAS bids while it investigates the Bastyan, Fisher and Mackintosh generating unit FCAS response. Hydro Tasmania will advise AEMO of the outcome by 31 January 2013

4.2 Slow Raise (R60)

- CS Energy will investigate the Gladstone generating unit response and advise AEMO of the outcome by 31 January 2013
- Vic Power Trading will investigate the response from the pot line loads and advise AEMO of the outcome by 31 January 2013

4.3 Delayed Raise (R5)

- Stanwell Corporation will investigate the Mackay GT delayed raise response by 31 January 2013
- Vicpower will investigate the Portland 1, 2 and Port Henry 1 delayed load response by 31 January 2013

4.4 Performance Standards

- Alinta Energy will investigate the Northern 1 response and advise AEMO of the outcome by 31 January 2013
- AEMO will review the information provided by Aurora Energy regarding the Tamar Valley CCGT generating unit and provide a response by 25 January 2013
- Hydro Tasmania will investigate the Tribute generating unit response by 31 January 2013