

# *NON-MARKET ANCILLARY SERVICES*

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## Version Control

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V18	31/7/12	Added TOSAS to section 4 new section 4.3 and section 6	Peter Biddle	Shivani Mathur	Henry Gorniak	Steve Cronin
V17	30/4/12	Major review to align with Rule changes associated with NSCAS	Peter Biddle	Glenn Gillin		Henry Gorniak
v16	01/07/09	Change to AEMO document.	Alethia Stephens Martin Hoarau	Pablo Uribe		Martin Hoarau

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## 1. Purpose

This procedure is written and published in accordance with clause 3.11.6(b) of the National Electricity Rules and provides detail on the processes *AEMO* will use to *dispatch non-market ancillary services*, and the periodic reporting on the effectiveness of the *dispatch of non-market ancillary services* using criteria related to the performance of the *power system*.

This procedure only relates to those *non-market ancillary services* procured and *dispatched* by *AEMO*.

## 2. Glossary

- (a) In this procedure, a word or phrase *in this style* has the same meaning as given to that term in the NER.
- (b) In this procedure, capitalised words or phrases or acronyms have the meaning set out opposite those words, phrases, or acronyms in the table below.
- (c) Unless the context otherwise requires, this procedure will be interpreted in accordance with Schedule 2 of the *National Electricity Law*.

TERM	MEANING
NSCAS	Network Support and Control Ancillary Service
NCAS	Network Control Ancillary Service
SRAS	<i>System Restart Ancillary Service</i>
NLAS	Network Loading Ancillary Service
VCAS	Voltage Control Ancillary Service
TOSAS	Transient & Oscillatory Stability Ancillary Service

## 3. References

- National Electricity Rules

- Network Support and Control Ancillary Service Description<sup>1</sup>
- NSCAS *Dispatch* Guidelines consultation<sup>2</sup>
- SO\_OP5000 System Restart Overview

## 4. General Principles of Non-market ancillary services

*Non-market ancillary services* are defined in clause 3.11.1(c) of the NER and are split into two major categories, namely system restart ancillary services (SRAS) and network support and control ancillary services (NSCAS).<sup>3</sup>

Network Support and Control Ancillary Services are further divided into network loading ancillary service (NLAS), voltage control ancillary service (VCAS) and transient & oscillatory stability ancillary service (TOSAS).

Network loading ancillary service is the capability of reducing an active power flow from a *transmission network* in order to keep the current loading on *transmission elements* within their respective ratings following a *credible contingency event* in a *transmission network*.

Voltage control ancillary service is the capability to supply reactive power to, or absorb reactive power from, the *transmission network* in order to maintain the *transmission network* within its voltage and stability limits following a *credible contingency event* but excluding such capability provided within a transmission or distribution system or as a condition of connection.

Transient and oscillatory stability ancillary service is the capability to control power flow into or out of the transmission network to maintain the transmission network within its transient or oscillatory limits and to maintain or increase power transfer capability by improving transient or oscillatory stability.

Network Support and Control Ancillary Services may also be dispatched to provide a market benefit providing the benefit gained exceeds the cost of dispatching the service.

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<sup>1</sup> [http://www.aemo.com.au/en/Electricity/Market-and-Power-Systems/Ancillary-Services/~/\\_/media/Files/Other/electricityops/0160-0102%20pdf.ashx](http://www.aemo.com.au/en/Electricity/Market-and-Power-Systems/Ancillary-Services/~/_/media/Files/Other/electricityops/0160-0102%20pdf.ashx)

<sup>2</sup> AEMO Communication 981 dated 12 March 2012

<sup>3</sup> NSCAS was previously referred to as Network Control Ancillary Service (NCAS). AEMO has a number of existing NCAS contracts in place. These contracts will be *dispatched* as if they were NSCAS contracts until these contracts expire.

## 4.1 Network Loading Ancillary Service (NLAS)

This service is manually *dispatched* with no *pre-dispatch* forecast data provided. The requirement for NLAS will need to be identified in sufficient lead time to allow Ancillary Service Providers time to enable the appropriate service.

The requirement for NLAS is closely related to the type of limit being used for *transmission elements*. If all *transmission elements* are operating within their continuous limits and interconnectors are within secure operating limits, then there is no requirement to enable any NLAS. However, if a *transmission element* is operating to a reduced time dependant limit, then there will be a need to enable sufficient NLAS to reduce the post contingent flows back to within that elements' continuous rating.

Regardless of any requirement for *dispatch* of NLAS to manage power system security AEMO may also *dispatch* NLAS if a market benefit test is satisfied. This will be done by assessing the impact of the service on the objective function by utilising the marginal value of the relevant binding constraint. If the market benefit is greater than the enabling cost of the service the NLAS may be enabled.

## 4.2 Voltage Control Ancillary Services (VCAS)

AEMO will use Network Analysis applications, EMS Contingency Analysis (CA) or violating constraints to determine the requirement for reactive support.

This ancillary service is divided into two categories according to the means of provision and payment structure – generation mode and synchronous compensation mode.

### 4.2.1 Generation Mode

This service is for the provision of reactive capability in excess of that defined in a generating unit's registered performance standard.

Under the terms of the NCAS Agreements the VCAS for generating units in generation mode can only be activated in the following manner,

- If a *credible contingency event* occurs, the NCAS equipment must automatically generate reactive power.

As such AEMO cannot manually *dispatch* a generator to its VCAS contracted level.

### 4.2.2 Synchronous Compensation Mode

Generating Units *dispatched* in synchronous compensation mode for reactive power ancillary service may be used either to maintain system security or to enhance network transfer. An enabling payment is made for these services. These generating units (in synchronous compensation mode) will be *dispatched* only after all no cost options have been utilised.

Regardless of any requirement for *dispatch* of VCAS to manage power system security AEMO may also *dispatch* VCAS if a market benefit test is satisfied. This will be done by assessing the impact of the service on the objective function by utilising the marginal value

of the relevant binding constraint. If the market benefit is greater than the enabling cost of the service the VCAS may be enabled.

### 4.2.3 Constraining generating units

Should the reactive power requirements still not be satisfied after all the contracted reactive power capacity of generating units in generation mode (unconstrained) and synchronous compensation mode then for the purpose of maintaining a secure operating state, selected contracted generating units in generation mode may be constrained to a lower level of real power output where this would result in the provision of more reactive power. Compensation payments would apply in accordance with the ancillary service agreements.

### 4.3 Transient and Oscillatory Stability Ancillary Service (TOSAS)

AEMO will use its transient and oscillatory monitoring applications to determine any requirement for TOSAS.

Regardless of any requirement for *dispatch* of TOSAS to manage power system security *AEMO* may also *dispatch* TOSAS if a market benefit test is satisfied. This will be done by assessing the impact of the service on the objective function by utilising the marginal value of the relevant binding constraint. If the market benefit is greater than the enabling cost of the service the TOSAS may be enabled.

### 4.4 System Restart Ancillary Services (SRAS)

Contracted Service Providers will receive availability payments for the provision of this service. There will be no ongoing *dispatch* of this Service as it is paid on an availability basis. Contracts will be awarded to Service Providers who would then be expected to maintain system restart capability.

In the event of a black system condition or major supply disruption, SRAS will be selected according to their availability to assist in the restoration of the affected part of the power system and the Service Providers will be instructed to provide the service. Refer to SO\_OP5000 System Restart Overview for more detail.

#### 4.4.1 Insufficient System Restart Service

In the event that the minimum number of SRAS is not available, *AEMO* is to decide what action should be reasonably taken.

*AEMO* will determine the expected length of time that the SRAS is likely to be unavailable.

If it is expected that sufficient SRAS will be available again within a week, and there is not a greater than normal risk to the power system, then *AEMO* will take no action. However during this period *AEMO* will closely monitor the situation.

If the SRAS is expected to be unavailable for a period in excess of 1 week, then *AEMO* may initiate the following procedure to determine the potential availability of SRAS:



- Identify any participants who could potentially be directed to provide SRAS in the affected electrical sub-network(s).
- AEMO shall commence preliminary discussions (non-binding) with those participants who are considered likely to be available to be directed. Such discussions would be aimed at establishing:
  - the capability of the participant to adequately comply with the direction,
  - estimate of the likely financial impact on the participant of a direction,
  - any other matters considered relevant by either AEMO or the participant.
- All this information must be recorded by AEMO to facilitate subsequent determination of compensation to affected parties.
- AEMO will then decide which participant(s) may be directed during a black system condition or major system disturbance and which plant to be used, taking into account the information gained, with a view to meeting the SRAS shortfall in a manner that minimises the cost of the service.
- If required due to a black system condition of a major system disturbance AEMO may then direct sufficient suitable participants to make available additional SRAS to meet the shortfall. When directing participants, AEMO will ensure that each directed participant understands that it is being directed under Rules clause 4.8.9.

#### **4.5 Network Control and System Restart Ancillary Service Conformance**

The issue of conformance for the NSCAS and SRAS will continue to be addressed through the Ancillary Services Agreements.

### **5. Ancillary Services Dispatch Instructions**

For NLAS and VCAS, confirmation of availability will be established prior to any instruction being issued. The requirement for the service will be notified by telephone to the Service Provider via the normal operational contact and then, a *dispatch* instruction will be issued via the market systems.

Each manual *dispatch* instructions for ancillary services will include the following detail:

- Time the *dispatched* service level is changed
- Particular service to be *dispatched*
- Amount of service required (if applicable)
- Mode of operation, if applicable

Refer to SO\_OP5000 System Restart Overview for procedures associated with *dispatch* of SRAS.

## 6. Appendix A. Reporting

In Accordance with NER 3.11.6, AEMO has developed procedures for reporting to Participants, on a periodic basis the effectiveness of the *dispatch of non-market ancillary services*.

### 6.1 Voltage Control Ancillary Service (VCAS)

The reactive power criteria relating to the performance of the power system is that the *transmission network* is to be maintained within its voltage and stability limits following a credible contingency event.

A reactive power ancillary service, where there is a contracted service that meets the requirements, would be effectively *dispatched* where the *transmission network* was maintained within its voltage and stability limits following a credible contingency event.

The reporting criteria to be used for reactive power ancillary service is the exceedance or not of voltage or stability limits following a credible contingency event.

### 6.2 Network Loading Ancillary Service (NLAS)

The network loading criteria relating to the performance of the power system is that the current loadings on *transmission elements* are to be kept within their respective ratings following a *credible contingency event* in a *transmission network*.

An NLAS, where there is a contracted service that meets the requirements, would be effectively *dispatched* where the active power flow from a *transmission network* is reduced and keeps the current loading on interconnector *transmission elements* within their respective ratings following a *credible contingency event* in a *transmission network*.

The reporting criteria to be used for NLAS is the exceedance or not of ratings of interconnector *transmission elements* following a credible contingency event.

### 6.3 Transient and Oscillatory Stability Ancillary Service (TOSAS)

The transient and oscillatory stability criteria relating to the performance of the power system is that the *transmission network* is to be maintained within its transient and oscillatory stability limits following a *credible contingency event* in the *transmission network*.

A transient and oscillatory stability ancillary service, where there is a contracted service that meets the requirements, would be effectively *dispatched* where the *transmission network* was maintained within its transient and oscillatory stability limits following a credible contingency event.

The reporting criteria to be used for transient and oscillatory stability ancillary service is the exceedance or not of transient or oscillatory stability limits following a credible contingency event.

## 6.4 System Restart Ancillary Service (SRAS)

An SRAS is required to deliver its contracted service, when requested by AEMO, in response to a system restart or major system disturbance.

The reporting criteria to be used for system restart ancillary service is the *dispatch* of the contracted service in line with its contract requirements following a black system or major system disturbance condition occurring.

## 6.5 Reporting

Refer to table 1 for the details relating to reporting on the effectiveness of the *dispatch* of *non-market ancillary service*.

Non-market ancillary service	Event	Criteria for effectiveness of <i>dispatch</i>	Reported items	Reporting Period
Network loading	credible contingency event	Where there was a network loading ancillary service that met the requirements, whether the ratings of <i>transmission elements</i> were exceeded following a credible contingency event	Salient power system conditions. Number of events where thermal ratings were exceeded and details of the amount of service delivered and the amount expected.	A report will be issued following each <i>credible contingency event</i> for which NLAS was enabled. Where no such events occurred a routine report will be issued on an annual basis.
Voltage Control	credible contingency event	Where there was a voltage control ancillary service that met the requirements, whether the voltage limit is exceeded by greater than 1.5kV for more than five minutes following a credible contingency event.	Salient power system conditions. Number of events where limits were exceeded and details of the amount of service delivered and the amount expected.	A report will be issued on voltage control credible contingency events on a monthly basis. Where no reportable events occurred, a routine report will be issued quarterly.
Transient and Oscillatory Stability	credible contingency event	Where there was a transient and oscillatory stability ancillary service that met the requirements, whether the transient or oscillatory stability limits of the transmission network were exceeded following a credible contingency event	Salient power system conditions. Number of events where limits were exceeded and details of the amount of service delivered and the amount expected.	A report will be issued following each <i>credible contingency event</i> for which TOSAS was enabled. Where no such events occurred a routine report will be issued on an annual basis if a TOSAS contract existed for that time period.
System restart	black system condition	Where a system restart service was able to meet a requirement - whether	Salient power system conditions. Number of times a system restart service	A report will be issued following each black system condition. Where no reportable

		the service was <i>dispatched</i> .	was <i>dispatched</i> .	events occurred a routine report will be issued on an annual basis.
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Table 1 - Reporting