~~ELECTRICITY INDUSTRY ACT~~

~~ELECTRICITY INDUSTRY (WHOLESALE ELECTRICITY MARKET) REGULATIONS 2004~~

~~WHOLESALE ELECTRICITY MARKET RULES~~

~~Power System Operation Procedure:~~

~~Communications and control systems~~

~~VERSION HISTORY~~

~~Power System~~
~~and Control Sy~~

~~1 SEPTEMBER 2009~~

POWER SYSTEM OPERATING PROCEDURE: COMMUNICATIONS AND CONTROL SYSTEMS

~~Balancing Market Commencement Day~~

~~Replacement o~~
~~Proposal PPCL~~

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1.0	1 September 2006	Power System Operating Procedure (Market Procedure) for Communications and Control Systems
2.0	Balancing Market Commencement Day	Replacement of the Procedure resulting from Procedure Change Proposal PPCL0021
3.0	xx mmmm 2018	Update to Procedure resulting from Procedure Change Proposal AEPC_2018_03

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1 PROCEDURE OVERVIEW

1.1. Relationship with the Wholesale Electricity Market Rules

1.1.1.1 This Power System Operation Procedure (PSOP): Communications and Control Systems (**Procedure**) has been developed in accordance with, clauses 2.35.4 and should be read in conjunction with,2.36A.5 of the Wholesale Electricity Market Rules (MarketWEM Rules).

1.1.1.2 References to particular MarketWEM Rules within the Procedure in bold and square brackets **[MRClause XX]** are current as of the Balancing Market Commencement Day.13 October 2017. These references are included for convenience only, and are not part of this Procedure.

3. This Procedure is subservientReferences to the Marketparticular Technical Rules. In the event of conflict between within this Procedure in bold and the Market Rules or any other document, the order of precedence iscurly braces **{Clause XX}** are current as set out in the Market Rules **[MR** of 1.**5.2]**.

1.1.1.3 This Procedure may include explanatory text, including quotations from the Market Rules. Such explanatory text is December 2016. These references are included for informationconvenience only, doesand are not form part of thethis Procedure, and is italicised and contained in a rectangular box.

1.2 A word or phraseInterpretation

1.2.1 In this Procedure:

(a) Terms that are capitalised but not defined in the Electricity Industry Act 2004, this Procedure have the meaning given in the WEM Rules;

(b) To the extent that this Procedure is contrary or inconsistent with the WEM Rules, the WEM Rules shall prevail to the extent of the inconsistency;

(c) A reference to the WEM Rules or Market Procedures includes any associated forms required or incontemplated by the RegulationsWEM Rules or Market Rules made under that Act, has Procedures; and Words expressed in the singular include the same meaning when used in this Procedure. plural or vice versa.

1.2.2 In addition, the following defined terms have the given meaning: given in Table 1Table 1.

a. Automatic Governor Control (AGC) means equipment operated by System Management, which sends signals to generating facilities participating in the AGC scheme to automatically adjust its output so as to maintain frequency or restore frequency within the Normal Operating Frequency Band.

RELATED DOCUMENTS

1. This document is related to, and should be read in conjunction with, the following documents:

a. PSOP – Dispatch

b. PSOP– Operational Data Points for Generating Facilities

~~c. PSOP – Commissioning and testing~~

~~d. PSOP – Power system security~~

~~Market~~Table 1 Defined Terms

Term	Definition
Automatic Generation Control (AGC)	Equipment operated by AEMO, which sends signals to generating facilities participating in the AGC scheme to automatically adjust its output so as to maintain frequency or restore frequency within the Normal Operating Frequency Band.
Energy Management System (EMS)	A system used to monitor and control elements of the SWIS in real time.
Inter Control-Centre Communications Protocol (ICCP)	A communications protocol used to send and receive SCADA messages between different EMS installations (typically located within different organisations).
Supervisory Control and Data Acquisition (SCADA)	Acquires data and remote devices and provides it to AEMO, and enables AEMO to supervise and control the power system from a remote location.

~~c.~~1.3 Purpose and application of this Procedure ~~– Balancing Facility Requirements~~

~~COMMENCEMENT~~

~~1. This~~The purpose of this Procedure ~~replacement has effect from the Balancing Market Commencement Day.~~

~~1 SCOPE~~

~~1.~~1.3.1 ~~This Procedure has been developed in accordance with the Market Rules **[MR2.35.4]** and documents~~is to document the communications and control systems required to be in place to enable ~~System Management~~AEMO to dispatch:

~~a.~~(a) Scheduled Generators, Non-Scheduled Generators, Dispatchable Loads and Demand Side Programmes that are controlled directly by a Market Participant; ~~and~~

~~b.~~(b) Scheduled or Non-Scheduled Generators where ~~System Management~~AEMO, by agreement with the relevant Market Participant, has operational control of that Facility; and

~~c.~~(c) Interruptible Loads whose operation may be triggered by a fall in power system frequency.

~~2.~~1.3.2 The Procedure specifies the main features of the speech, data and control systems that must be in place between the Market Participant and System Management for the purpose of:

~~a.~~(a) ~~issuing~~Issuing, acknowledging and responding to Dispatch Instructions, Dispatch Orders, Operating Instructions and directions; and

~~b.~~(b) ~~monitoring~~Monitoring the MW output and connection status of Facilities; and

~~c.~~(c) ~~enabling~~Enabling prompt response to directions of System Management; and

~~d.~~(d) ~~communicating~~Communicating on other matters relating to the operation of the power system.

1.3.3 This Procedure applies to:

(a) AEMO to ensure that it has the communications and control system requirements necessary

~~*Note that the processes for implementing Dispatch Instructions are covered in the PSOP: Dispatch.*~~

to support the dispatch process;

(b) Market Participants and Network Operators in complying with this Procedure in respect of communication and control system requirements.

1.4 Associated documents

1.4.1 The following documents in Table 2~~Table 2~~ (available via the Market Web Site) provide background information to this Procedure:

Table 2 Background Documents

Reference	Title	Location
	PSOP: Dispatch	AEMO Website
	Guideline for Operational Data Points	AEMO Website
	Automatic Balancing Control (ABC) and Automatic Generation Control (AGC) Interface Requirements	AEMO Website
	PSOP: Commissioning and Testing	AEMO Website
	PSOP: Power System Security	AEMO Website
	Market Procedure: Balancing Facility Requirements	AEMO Website
	AEMO Standard for Power Systems Data Communications	AEMO Website

2 OPERATIONAL COMMUNICATIONS AND CONTROL SYSTEMS REQUIREMENTS

2.1 General

2.1.1 AEMO must document the communications and control system requirements necessary to support the dispatch process **[Clause 2.35.4]**.

2.1.2 AEMO must develop a Guideline for Operational Data Points, detailing the general requirements for SCADA data points.

2.1.3 AEMO may specify SCADA points required for each Registered Facility or Facility intending to register. These could be in addition to those required by the Network Operator.

2.1.4 The specification in step 2.1.3 must be reasonable and in accordance with the Guidelines for Operational Data Points.

2.1.5 AEMO must specify a reasonable timeframe for a Registered Facility to meet any new or revised specifications made in step 2.1.3.

2.1.6 Market Participants and Network Operators must ensure the relevant Facility meets the specification in step 2.1.3 by the timeframe specified in step 2.1.5.

2.1.7 AEMO may, acting reasonably, revise the specification in step 2.1.3 at any time.

~~2.1~~2.2 Balancing Facilities

2.2.1 All Facilities participating in the Balancing Market must comply with the Market Procedure: Balancing Facility Requirements.

~~1.~~2.2.2 The communication requirements for Balancing Facilities not having special conditions imposed by ~~the IMO pursuant to the Market Rules **[MR 7A.1.11]**~~AEMO under step 2.3.1, or specifically exempted under step 4.2, are that such Facilities:

~~a.~~(a) be able to receive, and acknowledge Dispatch Instructions, Dispatch Orders and Operating Instructions via ~~System Management's~~AEMO's SCADA system ~~and/~~or ~~System Management's~~AEMO's secure business-to-business gateway; ~~and~~

~~b.~~(b) have SMS ~~and/~~or email capability at the location that is able to receive Dispatch Instructions, Dispatch Orders and Operating Instructions from ~~System Management~~AEMO; and

~~c.~~ have duplicated 24x7 telephone services ~~(~~or other voice communications~~)~~ in place for communication with ~~System Management, including the receipt and acknowledgement of Dispatch Instructions~~AEMO as a backup

(c) mechanism for ~~System Management's~~AEMO's SCADA system or ~~System Management's secure business-to-business gateway,~~AEMO's IT systems.

~~unless specifically exempted under step 3.2 below.~~

~~2. Until the later of the Trading Day starting on 5 December 2012 or six months after System Management publishes its secure business-to-business gateway specification. System Management will deem internet access via System Management's portal will be deemed as meeting the requirement specified in step 2.1.1(a).~~

2.2.3 Market Generators participating in the Balancing Market must comply with the Automatic Balancing Control (ABC) and Automatic Generation Control (AGC) and AGC Interface Requirements.

~~2.2~~2.3 Balancing Facilities with special conditions imposed

2.3.1 AEMO may determine that a Balancing Facility does not meet the relevant specifications of the Balancing Facility Requirements, and may impose special conditions [**Clause 7A.1.11**].

~~1.~~2.3.2 The communication requirements for Balancing Facilities which have had special conditions imposed ~~by the IMO pursuant to the Market Rules **[MR 7A.1.11]**~~under step 2.3.1 are that such Facilities must have:

~~a.~~(a) ~~internet~~Internet access via ~~System Management's~~AEMO's portal or ~~System Management's~~AEMO's secure business-to-business gateway; and

~~b.~~(b) ~~telephone~~Telephone services ~~(~~or other voice communications~~);~~; and

~~c. either:~~

~~i.~~ Communications~~SMS; or~~

~~ii. e-mail,~~

(c) ~~communications~~ in place for the receipt of Dispatch Instructions~~.~~, being either:

(1) SMS; or

(2) e-mail.

~~2.~~2.3.3 A Facility is not required to comply with step ~~2.2.1~~2.3.2 if either:

~~a.~~(a) ~~step 3.2~~step 4.2 below applies, or

~~b.~~(b) the ~~Facility has had~~ conditions imposed ~~on it under the Market Rules **[MR 7A.1.11]**~~by AEMO in accordance with step 2.2.1 specifically ~~exempting~~exempt the requirements of step ~~2.2.1.~~2.3.2.

> ~~*Note that the above Facilities are also required to comply with the PSOP: Operational Data Points for Generating Plant*~~

~~2.3~~2.4 Facilities providing Load Following Ancillary Service

~~1.~~2.4.1 All Facilities providing Load Following Ancillary Service must be connected to ~~System Management's~~AEMO's Automatic Generation Control (AGC) system ~~with all signals required for handshaking~~ as per ~~System Management's~~ the Automatic Balancing Control (ABC) and Automatic Generation Control (AGC ~~interface signal protocol fully operational.~~) and AGC

Interface Requirements.

~~1. System Management must publish the AGC signal protocol on the Market Web Site as part of the Operating Protocol template.~~

~~2.4~~2.5 Facilities providing Spinning Reserve

~~1.~~2.5.1 All Facilities providing Spinning Reserve must have duplicated 24x7 monitored voice communications in place for communication with ~~System Management.~~AEMO or as detailed in a contract.

2.2.5.2 All Facilities providing Class AInterruptible Loads contracted with AEMO to provide Spinning Reserve as defined in the PSOP: Ancillary Services must be

Facilities providing Class B and Class C Spinning Reserve may also be connected to System Management's AGC system by agreement between System Management and the Market Participant.

connected to System Management's AGChave communications and control system requirements in accordance with that contract.

2.52.6 Facilities providing Load Rejection Reserve

1.2.6.1 All Facilities providing Load Rejection Reserve must have theduplicated 24x7 monitored voice communications requirements outlined in the PSOP: Ancillary Servicesplace for communication with AEMO or as detailed in a contract.

2.62.7 Facilities providing Interruptible Load, Network Control Service, System Restart Service or Dispatch Support Service

1. The communications and control system requirements for:

a. a Facility providing Network Control Service, Facilities contracted with AEMO to provide System Restart Service or Dispatch Support Service; or

b. an Interruptible Load,

2.7.1 shall must be in accordance with the contract under which the service is provided.

2.7.2 Facilities providing Network Control Services must meet the requirements specified in step 2.2 or as specified by AEMO.

2.72.8 Demand Side Programmes

1.2.8.1 A Market Customer who operates a Demand Side Programme must provide duplicated monitored telephone contacts from 7 am until 7 pm on Business Days that will to allow System ManagementAEMO to communicate Dispatch Instructions to the Market Customer. during the times specified in Appendix 1 (h)(ix) of Standing Data.

3 GENERATORS OPERATED BY SYSTEM MANAGEMENT

3.11.1 Application

1. This section 3 applies to Market Participants with Facilities operated by System Management pursuant to the Market Rules **[MR 7.8]**.

2. Except for the Verve Energy with respect to the Verve Energy Balancing Portfolio, System Management may only operate Facilities for which a formal Operating Protocol detailing the mechanism and limitations of control has

~~been executed between System Management and the relevant Market Participant.~~

3. ~~The Operating Protocol referred to in step 3.1.2 must include a definition of the protocols and electronic interfaces to be used by System Management in carrying out the remote operation and control functions (SCADA technical specification)~~
4. ~~System Management must publish an Operating Protocol template on the Market Web site.~~

~~3.2 Exemption of Facilities under System Management control from communications requirements~~

~~1. System Management may exempt a Balancing Facility from meeting one or more of the requirements of, as applicable, step 2.1 or step 2.2 if that Facility is operated by System Management pursuant to the Market Rules **[MR 7.8]**.~~

2.9 Network Operator

2.9.1 Western Power must provide AEMO with access to its operational voice communications system **{Clause 3.3.4.3}**. This can be either via physical access to a phone turret, or through connection to AEMO's operational voice communication system (via communications links provided by AEMO).

2.9.2 The operational voice communications system must provide:

(a) voice communications to Western Power's control rooms (primary and backup) independent of the public switched telephone network; and

(b) voice communications to Market Participants, independent of the public switched telephone network (where the list of Market Participants is to be agreed between AEMO and Western Power)[1].

~~3.3 Automatic execution of Dispatch Instructions and Dispatch Orders through AGC~~

~~1. If so permitted under the Operating Protocol referred to in step 3.1.2, System Management may execute one or more Dispatch Instructions or Dispatch Orders relating to that Facility through AGC..~~

~~4~~3 LOSS OF COMMUNICATION ~~FACILITIES~~SYSTEMS

~~1.~~3.1.1 Where a major loss of communications occurs, the electronic data~~/~~, control systems and some of the voice communication circuits referred to in ~~Section 2 of this Procedure~~step 2 may become unavailable. Where a Facility continues to operate after major loss of communications, the Market Participants and ~~System Management~~AEMO must revert to speech communications, including the use of back up voice communications for the transfer of all Dispatch Instructions, Dispatch Orders and other operational information.

3.1.2 In the event indicated in step 3.1.1, AEMO may use the system in step 2.9.1 to support the dispatch process.

~~2.~~ Where ~~System Management's~~AEMO's Control Centre has been evacuated

~~*Under such circumstances, an Emergency Operating State is likely to exist.*~~

and dispatch services shift to ~~System Management's~~AEMO's emergency control centre, ~~telephone contact~~AEMO will issue a Dispatch Advisory with ~~System Management must be made via a series of emergency telephone numbers ("the emergency contact list").~~

[1] The Technical Rules **{Clauses 3.3 and 3.6.9(d)}** currently only require backup voice communications for generators with a capacity of 10MW or greater and generators above 1MVA that have been deemed to require this.

~~3. System Management must provide Market Participants with the emergency contact list, and advise Market Participants as soon as, and by whatever means, practicable when the emergency contact list is to be used.~~

~~4.~~3.1.3 ~~Market Participants must provide System Management with emergency telephone~~appropriate contact details.

~~5.~~3.1.4 Where a Market Participant can no longer adhere to the communications requirements outlined in ~~section 2 of this Procedure~~step 2 due to a major loss of communications~~ as outlined in step 5.1~~, the relevant Market Participant must advise ~~System Management~~AEMO as soon as practicable, and by whatever means,~~ practicable~~ that the emergency contact details are to be used for the purposes of communicating with the relevant Facilities.

~~*It is the Market Participant's responsibility at all times to maintain the integrity of its communications facilities. A communications failure does not relieve the Market Participant's obligation to follow all Dispatch Instructions and other directions from System Management. Note that the provisions under step 4.5 are only intended to apply as a short term measure (i.e. hours rather than days).*~~

GENERATORS OPERATED BY

~~*Due to the higher volume of Dispatch Instructions required in a competitive balancing environment, any loss of communications that resulted in System Management relying on voice communications would be likely to result in the system being placed in a High Risk Operating State.*~~

4 AEMO

4.1 Application

4.1.1 AEMO may, by agreement with a Market Participant, maintain operational control over aspects of a Registered Facility [**Clause 7.8.1**].

4.1.2 Except for the Balancing Portfolio, AEMO may only operate Facilities in step 4.1.1 if a formal Operating Protocol detailing the mechanism and limitations of control has been executed between AEMO and the relevant Market Participant.

4.1.3 The Operating Protocol referred to in step 4.1.2 must include a definition of the protocols and electronic interfaces to be used by AEMO in carrying out the remote operation and control functions (SCADA technical specification).

4.2 Exemption of Facilities under AEMO control from communications requirements

4.2.1 If a Facility is operated by AEMO under step 4.1.2, AEMO may exempt a Balancing Facility from meeting one or more of the requirements of steps 2.2.2 or 2.3.2.

4.3 Automatic execution of Dispatch Instructions and Dispatch Orders through AGC

4.3.1 If so permitted under the Operating Protocol referred to in step 4.1.2, AEMO may execute one or more Dispatch Instructions or Dispatch Orders relating to that Facility through AGC.

5 REQUIREMENTS NECESSARY TO REMOTELY MONITOR THE PERFORMANCE OF A NETWORK

5.1 General

5.1.1 AEMO must document in the Power System Operation Procedure the communications and control system requirements necessary to enable it to remotely monitor the performance of a Network **[Clause 2.36A.5]**.

5.2 Directions to a Network Operator

5.2.1 Where AEMO determines that it must issue a direction to a Network Operator under clause 2.36A.3 of the WEM Rules, AEMO must:

(a) identify the required changes (consulting with the Network Operator and other Market Participants where appropriate).

(b) document the required changes.

(c) issue the direction to the Network Operator .

5.2.2 The Network Operator must respond within 10 Business Days with a proposed implementation timeframe.

5.2.3 Where AEMO agrees with the proposed implementation timeframe, the Network Operator

must implement the changes within that timeframe **[Clause 2.36A.4(a)]**.

5.2.4 Where an implementation timeframe cannot be agreed, senior managers from AEMO and the Network Operator must meet to agree a timeframe.

5.2.5 Where an implementation timeframe cannot be agreed by senior managers from AEMO and the Network Operator, AEMO acting reasonably will determine the implementation timeframe and the Network Operator must comply with this timeframe **[Clause 2.36A.4(a)]**.

5.3 Provision of Participant SCADA

5.3.1 Where the Network Operator is the SCADA service provider for a Market Participant, the Network Operator must act reasonably to implement the relevant specification determined in step 2.1.1 by the timeframe determined in 2.1.5. This implementation must include any change to the Network Operator's Energy Management System (EMS) and the Inter Control-Centre Communications Protocol (ICCP) as detailed in the IMS Interface Market Procedure.

5.3.2 AEMO may issue a direction under step 5.2.1 to meet the requirements of step 5.3.1.

5.3.3 A Network Operator must consult with AEMO to determine any specific SCADA requirements for new or modified Market Participant Facilities to be implemented within the Network Operator's EMS **{Clauses 3.3.4 and 3.4.10}**.

5.4 Data Communications Standard

5.4.1 AEMO's communication and performance requirements indicating the data communications standard for information provided by the Network Operator are detailed in the AEMO Standard for Power Systems Data Communications available on the Market Web Site.

5.4.2 Where a Network Operator is required to modify equipment to meet the standard in step 5.4.1, AEMO may agree with the Network Operator on a reasonable timeframe for implementation.

5.5 SCADA System and EMS Data via ICCP

5.5.1 The requirements for the ICCP link between AEMO and Network Operators for the provision of data are detailed in the standard indicated in step 5.4.1.

5.5.2 AEMO must specify the data to be sent via the ICCP link, which may include controls and indications.

5.5.3 The configuration of the ICCP link will be based on an agreement between the parties and both AEMO and the Network Operator will each be responsible for its costs of implementing and maintaining its respective infrastructure.

5.5.4 Where a Network Operator is required to modify equipment to meet the standard in step 5.5.1 or the requirements in step 5.5.2, AEMO may agree with the Network Operator on a reasonable timeframe for implementation.