GUIDELINES FOR PREPARING LOCAL BLACK SYSTEM PROCEDURES

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Approved for *distribution* and use by:

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VERSION RELEASE HISTORY

Version	Effective Date	Summary of Changes
3.0	12 December 2019	Major review of guidelines and templates to better reflect *power system* conditions and new technology types
2.1	May 2013	First Issue

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1. INTRODUCTION

1.1. Purpose and scope

(a) These are the guidelines for preparation of *local black system procedures* (**Guidelines**), which AEMO publishes in accordance with clause 4.8.12(e) of the National Electricity Rules (**NER**).

(b) The Guidelines comprise an overview of the requirements for preparation, completion and submission of LBSPs by relevant *Registered Participants*, and LBSP templates (Templates) specifying the information requirements to be submitted for *generating systems*, *networks* and, where applicable, major *loads*.

1.2. Definitions and interpretation

(a) Terms defined in the National Electricity Law (NEL) and the NER have the same meanings in these Guidelines unless otherwise specified in this clause.

(b) Terms defined in the NER are intended to be identified in these Guidelines by italicising them, but failure to italicise a defined term does not affect its meaning.

(c) Other terms and abbreviations used in these Guidelines (including the templates) have the meanings given in the following table:

Term	Definition
AEMO	Australian Energy Market Operator Limited
DC Link	A direct current *two-terminal link*
DNSP	*Distribution Network Service Provider*
LBSP	*Local black system procedures*
MNSP	*Market Network Service Provider*
NEL	National Electricity Law
NER	National Electricity Rules
NSP	*Network Service Provider* (includes TNSP, DNSP and MNSP)
Operating Document	An operating manual or procedure provided by an NSP to AEMO relating to the NSP's *network*
SCADA	Supervisory control and data acquisition
SRAS	*System restart ancillary service*
Template	An LBSP template published by AEMO for use by a *Generator*, NSP or *Market Customer* in respect of its relevant facilities, and forming part of these Guidelines.
TNSP	*Transmission Network Service Provider*
TTHL	Trip to house load

(d) These Guidelines are subject to the principles of interpretation set out in Schedule 2 of the NEL.

1.2A Transitional provisions for application of version 3.0

(a) Version 3.0 of these Guidelines introduces new Templates, incorporating additional or amended information requirements from previous versions, particularly for *generating*

systems of various technology types. This section 1.2A specifies the dates by which relevant *Registered Participants* and applicants for registration must have submitted LBSPs to AEMO consistent with the information required in the new Templates.

(b) From the effective date of version 3.0 of these Guidelines (**effective date**) a *Registered Participant* must use the applicable new Template to submit an LBSP for a relevant *facility* for which:

(i) no LBSP has been submitted to AEMO prior to the effective date (including as part of an application for registration under Chapter 2 of the NER); or

(ii) an LBSP submitted to AEMO prior to the effective date must be updated in accordance with clause 4.8.12(d) of the NER.

(c) By 30 June 2020, each *Generator* and NSP must update and resubmit all LBSPs submitted to AEMO prior to the effective date, so that the LBSP includes all information specified in the applicable new Template.

(d) AEMO may agree to extend the time period for resubmission of an LBSP on request by a *Registered Participant*, if AEMO is satisfied that:

(i) the *Registered Participant* has provided all the information reasonably available to it by the relevant time;

(ii) the *Registered Participant* is not, with the exercise of all reasonable diligence, able to update its LBSP by the time otherwise required under this section; and

(iii) the delay in providing the outstanding information is unlikely to materially prejudice AEMO's ability to restore the *power system* after a *major supply disruption*. AEMO may agree to an extension of time on any conditions AEMO considers reasonable in the circumstances.

2. SUMMARY OF NER REQUIREMENTS

2.1. AEMO obligations

(a) NER 4.8.12(a) requires AEMO to prepare a *system restart plan* for managing and coordinating system restoration during any *major supply disruption*. AEMO prepares a confidential *system restart plan* for each *region* together with a *system restart plan* overview for all *regions*.

(b) AEMO must develop and publish guidelines for the preparation of LBSPs as required by NER 4.8.12(e).

2.2. Generator and NSP obligations

(a) NER 4.8.12(d) requires each *Generator* and NSP to develop LBSPs in accordance with the guidelines published by AEMO. These LBSPs must be consistent with any ancillary service agreements to provide SRAS, to which the *Generator* or NSP is a party.

(b) NER 4.8.12(d) also requires *Generators* and NSPs to review and if appropriate amend their LBSPs on request by AEMO or as a result of a significant change in circumstances (see section 4(a)(ii) of these Guidelines).

(c) According to NER 4.8.12(f), the LBSPs must provide sufficient information to enable AEMO to understand the likely condition and the capabilities of *plant* following any *major supply disruption* such that AEMO is able to effectively coordinate the safe implementation of the

system restart plan. The LBSPs must incorporate relevant *energy support arrangements* to which a *Generator* or NSP may be a party.

2.3. AEMO, Generator and NSP rights and obligations

(a) Each *Generator* and NSP must submit LBSPs to AEMO for approval, as required by NER 4.8.12(g). AEMO must take into account the guidelines for preparation of LBSP published under NER 4.8.12 (e) and the relevant components of the *system restart plan* in approving LBSPs.

(b) AEMO may request a *Generator* or NSP to amend its LBSP (in writing giving reasons) under NER 4.8.12(h). Requested amendments may include conditions in respect of any energy support arrangement, as AEMO reasonably considers necessary to ensure the integrity of the *system restart plan*. A *Generator* or NSP must comply with AEMO's reasonable requests for amendment, as required by NER 4.8.12(i).

2.4. Other Registered Participants

(a) The NER only require *Generators* and NSPs to prepare and submit LBSPs. However, in the event of a *black system*, it will be important for AEMO to understand the capabilities of major stabilising *loads* that may need to be energised at different stages in the *power system* restoration process.

(b) These Guidelines include provision for the owners or operators of major *load* facilities to prepare and submit LBSPs. Although this is not compulsory, it is highly desirable for AEMO to have this information when developing the *system restart plan*.

3. LOCAL BLACK SYSTEM PROCEDURES

(a) The LBSPs of *Generators* and NSPs are the main source of information for AEMO to understand the likely condition and the capabilities of *generation* and *network plant*, following supply disruptions resulting in an absence of voltage on part of the *power system*, causing disconnection of *power station*/s or the loss of supply to *loads*.

(b) Provision of accurate information in LBSPs is important for AEMO to be fully informed of the technical requirements and limitations of *power stations* and *network plant* in these conditions, to develop robust *system restart plans.*

(c) AEMO also needs to know about any obligations that a *Generator* or NSP may have under any *energy support arrangements* they may be a party to, for example to directly support the re-energisation of specified *load*. These arrangements should be incorporated into the LBSP where applicable. AEMO will endeavour to take account of them in developing the *system restart plan*, but may need to request changes if *power system* restoration cannot otherwise be performed efficiently in accordance with the principles of the *system restart plan*.

(d) In providing required information in the LBSPs, *Generators* and NSPs may make the basic assumption that *power stations* and *network plant* are not damaged due to the events that resulted in the *major supply disruption*. *Generators* and NSPs are encouraged to include additional scenarios that could occur in relation to *generation* and *network plant* following a *major supply disruption*, to demonstrate the status and the capabilities of *plant*. For instance where the *plant* configuration could reasonably deviate from normal operation prior to a *major supply disruption*, such as different control modes.

(e) AEMO understands that some of the information to be included in the LBSPs (such as expected timeframes) will need to be the *Generator*'s or NSP's best estimate. The following guidelines apply to estimated information:

(i) Estimates should be the reasonable best estimates of the likely actual capabilities of the relevant *plant* in *black system* conditions, considering the known limitations of the *plant*.

(ii) These will not necessarily be minimum or maximum capabilities or timeframes, and no allowances should be included for unknown limitations.

(f) If a *Generator* or NSP considers it appropriate to allow for a possible contingency, the issue should be specifically identified and the LBSP should describe what impact it may have on the relevant *plant* capability.

(g) The LBSP may include a reasonable disclaimer by the *Generator* or NSP on estimated information included in LBSPs, provided that all reasonable care is exercised in preparing those estimates.

(h) AEMO will treat completed LBSPs as *confidential information*, subject to the protected information regime in the National Electricity Law, sections 54 to 54H. AEMO will provide LBSPs for *Generators* and NSPs in a *region* to the respective regional TNSP to assist in the development of the *system restart plan*.

3.1. Local black system procedures for Generators

(a) *Generator* LBSPs must contain sufficient information for AEMO to understand the capability of the *generating system* to restart and return to stable operation and restore minimum and maximum *generation* capacity following a *major supply disruption* in the part of the *network* to which it is connected.

(b) The *Generator* LBSPs must summarise internal procedures of the *power stations*, and include as an attachment the proposed switching sequences for use by the *Generator*'s staff during restart of *generating units*. The proposed switching sequences must represent a credible scenario and include sufficient detail to be used for planning and training purposes, enabling AEMO and the relevant NSP to understand the complexity, timing and potential dependencies or break points.

(c) The information required in *Generator* LBSPs is summarised in this section. A detailed list of information to be provided is covered in the *Generator* LBSP Template.

(d) *Generators* are required to complete and submit an LBSP for each *generating system* that they own, operate or control. *Generators* must submit LBSPs to AEMO electronically by emailing to the following email address: **system_restart_advice@AEMO.com.au**.

(e) The broad areas of information to be provided in an LBSP for a *generating system* are:

(i) general information on the *plant*;

(ii) identification of the responsibilities and relationships with other parties;

(iii) assessment of an emergency situation and safe shut down of *generating units*;

(iv) restart of *generating units* and high-level strategies applied by the *Generator* in the event of a *major supply disruption*;

(v) technical and operational information that AEMO needs to consider in developing *system restart plans*;

(vi) details of any relevant *energy support arrangements* to which the *Generator* is a party; and

(vii) contingency plans if a *generating unit* fails during system restoration.

(f) In addition to the above, specific information is to be provided depending on *plant* types or *connection* arrangements, including for:

(i) *embedded generating units*;

(ii) *asynchronous generating units*, including wind and solar *generation*, and energy storage systems; and

(iii) *generation* with TTHL capability.

(g) The Template indicates the sections to be completed for each type of *generating system*. Within the sections to be completed for a *generating system* of the given type, if any item of information is not relevant to that *generating system*, the *Generator* must indicate that it is not applicable.

(h) As required by the NER, if a *Generator* is contracted as an *SRAS Provider*, the relevant LBSP must be consistent with the *Generator*'s SRAS agreement with AEMO.

(i) AEMO may request information in addition to that specified in the Template, if reasonably required to understand the *plant* capabilities and limitations.

3.2. Local black system procedures for NSPs

(a) The NSP LBSPs must contain sufficient information for AEMO to understand the capability of the NSP to restore the *network* following disruption of supplies to a major part of its *network*.

(b) The NSP LBSPs must summarise internal switching procedures followed by NSP operations staff following *major supply disruptions* and include, as an attachment, the proposed switching sequences. The proposed switching sequences must represent a credible scenario and include sufficient detail to be used for planning and training purposes, enabling AEMO to understand the complexity, timing and potential dependencies or break points.

(c) The information required in NSP LBSPs is summarised in this section. A detailed list of information to be provided is covered in the NSP LBSP Template or in a separate Template for DC Links. In respect of a DC Link, only the information in the DC Link Template is required.

(d) NSPs are required to complete and submit an LBSP for each *network* (including a *transmission network*, *distribution network* or separate DC Link) that they own, operate or control prior to registration as an NSP. The circumstances in which an LBSP for an existing *network* or DC Link must be re-submitted or updated are set out in sections 1.2A and 4 of these Guidelines.

NSPs must submit LBSPs to AEMO electronically by emailing to the following email address: **system_restart_advice@AEMO.com.au**.

(e) The broad areas of information to be provided in an LBSP for a *network* are:

(i) capability of control centre business continuity (and back up control centres) following the loss of primary supplies, capabilities of emergency supplies, high level strategies to conserve emergency supplies;

(ii) availability of communication systems (normal and emergency), groups who have access/use these systems and the capability of continued use following a significant supply disruption;

(iii) length of time the NSP supervisory systems (SCADA monitoring and control) are likely to remain operational following the loss of primary supplies and high-level strategies to conserve emergency supplies;

(iv) activation of LBSP within the NSP system, including safe shutdown and preparation of the *transmission/distribution network* to accept supply, the high-level strategy of preparing individual *substations* to accept supply and critical locations where staff are required;

(v) synchronising points available within the *transmission network* and at connection points to the *distribution network*, and their settings;

(vi) technical limitations/requirements of respective *network* including any dynamic reactive support *plant* and synchronous condensers that AEMO should be aware of when restarting the *transmission/distribution network*;

(vii) specific requirements of major time critical *loads* connected to the NSP *network*;

(viii) details of any relevant *energy support arrangements* to which the NSP is a party;

(ix) operating arrangements between TNSPs and DNSPs to liaise restoration of the *power system* following a significant supply disruption; and

(x) ability of a TNSP or DNSP to deliver discrete *loads* as required by AEMO.

(f) Where applicable, an NSP's LBSP may specify that the information relevant to a particular item is provided in an Operating Document previously given to AEMO by that NSP, but only if:

(i) the section of the Operating Document containing that information is specifically identified in the LBSP;

(ii) the NSP must promptly submit an updated LBSP to AEMO if the section of the Operating Document referenced in the LBSP is no longer correct or the Operating Document no longer incorporates the required LBSP information.

3.3. Local black system procedures for major loads

(a) AEMO may request the *Market Customer* in respect of a major *load*, or the owner or operator of such a *load*, to provide an LBSP to AEMO. While this is not a requirement under the NER, this will assist AEMO in development of the *system restart plan*. It will also allow AEMO to consider timeframes for restoration of major industrial *loads* during system restart.

(b) If requested, LBSPs for major *loads* should be submitted to AEMO electronically, to the following email address: **system_restart_advice@AEMO.com.au**.

4. REVIEW AND UPDATE OF LOCAL BLACK SYSTEM PROCEDURES

(a) *Generators* and NSPs are responsible for ensuring that the information in its LBSP reflects the current performance and capabilities of its *plant* at all times. As such, AEMO expects *Generators* and NSPs to review an LBSP:

(i) whenever there is a change to the primary *plant* or secondary *plant* or their operation, that would impact the information contained in the existing LBSP;

(ii) on any other 'significant change of circumstances' in relation to the *facility* (NER 4.8.12(d), which AEMO interprets to include, without limitation:

(A) in conjunction with the commencement, expiry or termination of an SRAS agreement or an energy support arrangement;

(B) a change to the registered performance standards; or

(C) any alteration to a *generating system* to which clause 5.3.9 of the NER applies; and

(iii) routinely at regular intervals (once every two years is suggested as a guide) even where no material changes have taken place in that period, as performance can change over time.

(b) Where corrections or additions are identified following an LBSP review, the *Generator* or NSP must immediately notify AEMO of the items requiring amendment, and submit an updated version of the LBSP to AEMO as soon as reasonably practicable. The same email address is to be used for notifications and updated LBSPs: **system_restart_advice@AEMO.com.au.**

5. LOCAL BLACK SYSTEM PROCEDURES APPROVAL PROCESS

(a) AEMO will assess the adequacy of the information provided in new or updated LBSPs and the consistency of LBSPs with the *system restart plan* and any SRAS agreements, before approval. [NER 4.8.12 (g)].

(b) AEMO is required to develop its *system restart plan*s consistent with the system restart standard. These plans incorporate SRAS procured to enable restoration of *regional* supply capacity within certain timeframes defined in the system restart standard. AEMO will assess whether the capability and strategies detailed in LBSPs are sufficient for the *power system* to be restarted to support the *system restart plan*. If the strategies detailed in *Generator* and/or NSP LBSPs are not adequate, AEMO will use NER 4.8.12(h) to request changes to the strategies presented by *Generators* and/or NSPs in their LBSPs as required.

(c) AEMO will consider the impact of *Generator*/NSP obligations associated with the energy support agreements the *Generators*/NSPs may be party to, in developing *system restart plan*s. If the *Generator*/NSP obligations are likely to cause delays in restoring the *power system*, AEMO will impose suitable conditions in respect of the energy supply agreement/s and request amendments to the relevant LBSPs.