GUIDELINES FOR PREPARING LOCAL BLACK SYSTEM PROCEDURES

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DATE: 12 December 2019
## VERSION RELEASE HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Effective Date</th>
<th>Summary of Changes</th>
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<tr>
<td>3.0</td>
<td>12 December 2019</td>
<td>Major review of guidelines and templates to better reflect <em>power system</em> conditions and new technology types</td>
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<td>2.1</td>
<td>May 2013</td>
<td>First Issue</td>
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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:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AEMO</td>
<td>Australian Energy Market Operator Limited</td>
</tr>
<tr>
<td>DC Link</td>
<td>A direct current two-terminal link</td>
</tr>
<tr>
<td>DNSP</td>
<td>Distribution Network Service Provider</td>
</tr>
<tr>
<td>LBSP</td>
<td>Local black system procedures</td>
</tr>
<tr>
<td>MNSP</td>
<td>Market Network Service Provider</td>
</tr>
<tr>
<td>NEL</td>
<td>National Electricity Law</td>
</tr>
<tr>
<td>NER</td>
<td>National Electricity Rules</td>
</tr>
<tr>
<td>NSP</td>
<td>Network Service Provider (includes TNSP, DNSP and MNSP)</td>
</tr>
<tr>
<td>Operating Document</td>
<td>An operating manual or procedure provided by an NSP to AEMO relating to the NSP’s network</td>
</tr>
<tr>
<td>SCADA</td>
<td>Supervisory control and data acquisition</td>
</tr>
<tr>
<td>SRAS</td>
<td>System restart ancillary service</td>
</tr>
<tr>
<td>Template</td>
<td>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.</td>
</tr>
<tr>
<td>TNSP</td>
<td>Transmission Network Service Provider</td>
</tr>
<tr>
<td>TTHL</td>
<td>Trip to house load</td>
</tr>
</tbody>
</table>

(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 plans 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 plans. 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.