NOTICE OF CHANGE TO SYSTEM STRENGTH REQUIREMENT AND SHORTFALL AT RED CLIFFS

National Electricity Rules – Rule 5.20C.2(c)

Change to minimum fault level requirement and shortfall at Red Cliffs 220 kV fault level node in the Victoria region

Date of Notice: 6 August 2020

This notice is intended to inform stakeholders that AEMO has:

- Assessed the post-contingency minimum fault level requirement at the Red Cliffs fault level node in Victoria is 1,000 MVA, subject to operating conditions.
- Updated its projections of available fault levels at Red Cliffs for the coming five-year period and considered these against the assessed minimum fault level requirement.
- In its role as System Strength Service Provider for the Victorian region, secured sufficient services from facilities in the West Murray area (spanning north-west Victoria and south-west New South Wales) to meet the assessed Red Cliffs fault level requirement effective for two years from the end of August 2020.

AEMO will publish full details about changes to the minimum fault level requirement and shortfall in the 2020 System Strength Report expected for release before the end of this calendar year.

Context for system strength analysis

System strength is a critical requirement for a stable and secure power system. A minimum level of system strength is required for the power system to remain stable under normal conditions and to return to a steady state condition following a system disturbance. System strength relates to the ability to maintain and control the voltage waveform and, among other things, can impact the stability and dynamics of control systems used in inverter-based resources[1]. Under the National Electricity Rules, system strength is represented by the three-phase fault level at designated fault level nodes.

The determination of system strength requirements and shortfalls in a rapidly transforming National Electricity Market is complex. The technologies and techniques required to identify and model interactions in power systems with growing penetrations of inverter-based resources (such as wind and solar generation and battery storage) continue to emerge and evolve.

[1] AEMO, *System strength in the NEM explained,* March 2020, at https://aemo.com.au/-/media/files/electricity/nem/system-strength-explained.pdf?la=en.

Assessment of Red Cliffs fault level requirements and shortfall

AEMO applied the System Strength Requirements Methodology[2] to assess the Red Cliffs minimum three phase fault level requirement. The latest analysis found that the requirements have changed since the 2018 publication of the requirements[3], and the 2019 notice of a fault level shortfall at Red Cliffs[4].

In summary, the minimum fault level requirement (post-contingency) at the Red Cliffs fault level node is now assessed as 1,000 MVA. Under some operating conditions the limit may be lower, but the required level is expected to be above the presently available fault levels when inverter-based generation sources are online. AEMO's latest assessment of both the requirement and available fault levels indicates that a shortfall exists of at least 66 MVA which would continue beyond 2024-25 if not addressed.

This assessment accounts for updated modelling and data inputs that more accurately reflect the operation of existing and new power system equipment, and consequent revision of the number of synchronous generating units assumed to provide adequate system strength in Victoria.

AEMO will convert the requirement to operating procedures over coming months in accordance with underlying operating conditions, including the number of projects operating in the area. This may mean that a lower fault level requirement can be applied under certain operating conditions.

Full details of the analysis and the updated requirement will be included in the 2020 System Strength Report expected for release by the end of 2020.

Meeting the fault level shortfall

The responsibility to make sufficient system strength services available to address the fault level shortfall rests with the System Strength Service Provider. AEMO has this role in Victoria. The published December 2019 notice of a Red Cliffs shortfall required that AEMO have services in place to address the shortfall by 1 January 2021. AEMO has now secured services from facilities in the West Murray region to meet the amended minimum fault level requirement, and will have the services in place by the end of August 2020.

These remediation agreements are an interim measure, under fixed term contracts, and AEMO intends to run an expressions of interest process to assess potential long-term and permanent options to meet these fault level requirements.

The assessment of this shortfall and its remedy does not remove the need for generators (where applicable) to mitigate their impact on system strength in accordance with the requirements of the National Electricity Rules and their connection agreements. AEMO's assessment assumes that applicable system strength remediation schemes for committed generation will be implemented and maintained, and any adverse system strength impact of new or altered generation and market network service connections will be fully remediated[5].

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[2] AEMO, *System Strength Requirements Methodology and System Strength Requirements and Shortfalls*, July 2018, at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/System-Security-Market-Frameworks-Review/2018/System_Strength_Requirements_Methodology_PUBLISHED.pdf.

[3] AEMO, *System Strength Requirements Methodology and System Strength Requirements and Shortfalls*, July 2018, at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/System-Security-Market-Frameworks-Review/2018/System_Strength_Requirements_Methodology_PUBLISHED.pdf.

[4] AEMO, *Notice of Victorian fault level shortfall at Red Cliffs,* December 2019, at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/System-Security-Market-Frameworks-Review/2019/Notice_of_Victorian_Fault_Level_Shortfall_at_Red_Cliffs.pdf

[5] Refer to AEMO, *System strength impact assessment guidelines*, effective 1 July 2018, at https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/system-security-market-frameworks-review.