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AEMC
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Dear Sir/Madam

Proposal for change to the NER

I wish to draw AEMC's attention to the potential need for a change to correct an apparent inconsistency in the NER (as at v188). This inconsistency can easily be resolved with a slight change to the location of the clause as detailed below. I therefore submit these two proposals as detailed below for your consideration.

Summary of change

Delete S5.2.5.9 (b)

Add the previous S5.2.5.9 (b) as a relocated clause below S5.2.5.9 (c).

Schedule 5.2 Conditions for Connection of Generators

S5.2.5.9 Protection systems that impact on power system security

This clause sets out two types of Access Standards:

- (a) Automatic Access Standard (hereafter AAS)
- (c) Minimum Access Standard (hereafter MAS)

S5.2.5.9 (a) states the requirement as:

> (2) each primary *protection system* must have sufficient redundancy ...
>
> (3) *breaker fail protection systems* must be provided ...

A proponent wishing to connect under an AAS based Connection Agreement is inherently required to comply to those two clauses.

Clearly there is no option to not have "sufficient redundancy", or not to have breaker fail protection if the proponent wishes to obtain an AAS-based Connection Agreement.

However, S5.2.5.9 (b) goes on to state that the proponent must comply with those two clauses if AEMO or the NSP considers it io necessary that the proponent must comply to them.

Nowhere under S5.2.5.9 (a) is there any requirement for the proponent to ask, let alone for AEMO and the NSP to undertake any consideration about the lack of such facilities. A proponent with AAS-based Connection Agreement will always comply with the two clauses regardless of any AEMO or NSP consideration.

I therefore propose that S5.2.5.9 (b) is irrelevant/redundant in itself and can be deleted as serving no purpose.

However, a proponent may seek an MAS-based Connection Agreement under S5.2.5.9 (c).

The MAS S5.2.5.9 (c) (1) states that protection systems must be provided, but makes no stipulation regarding "sufficient redundancy".

S5.2.5.9 (c) (2) has a slightly less onerous requirement for breaker fail protection systems under certain conditions.

A logical consideration of the MAS and the risks of not having sufficient redundancy or full breaker fail would suggest that such reduced obligations should in fact be reviewed in the manner described by the AAS clause S5.2.5.9 (b). However, (b) precedes clause S5.2.5.9 (c) and only gives AEMO and/or the NSP such "powers" for proponents seeking an AAS-based Connection Agreement.

Therefore, I propose that the clause currently designated as S5.2.5.9 (b) be redesignated as S5.2.5.9 (d) with wording adjusted to be as follows:

> In relation to an ~~automatic~~ minimum access standard under this clause S5.2.5.9, the Generator must provide redundancy in the primary protection systems under paragraph (a)(2) and provide breaker fail protection systems under paragraph (a)(3) if AEMO or the Network Service Provider consider that a lack of these facilities could result in:
>
> (1) a material adverse impact on power system security or quality of supply to other Network Users; or
> (2) a reduction in inter-regional or intra-regional power transfer capability,
> through any mechanism including:
> (3) consequential tripping of, or damage to, other network equipment or facilities of other Network Users, that would have a power system security impact; or
> (4) instability that would not be detected by other protection systems in the network.

This reallocation of S5.2.5.9 (b) as S5.2.5.9 (d) means that AEMO and/or the NSP have the ability to insist on "sufficient redundancy" and full breaker fail systems where necessary even if the proponent is seeking an MAS-based Connection Agreement.

Contribution to the National Electricity Objective "NEO"

Reliability and Security are key principles of the NEO. The clauses relating to "sufficient redundancy" is about AEMO and/or the NSP ensure through Connections Agreements that the possibility of a non-redundant protection system failing to clear a fault will not affect grid security. The emphasis on "ensure" is both pre-emptive analysis as well as that grid never actually becomes unstable.

Under the AAS, the methodology to "ensure" is defined as "having sufficient redundancy". No further questions asked.

During the MAS Connection Agreement negotiation phase, the existing clauses place no requirement in any degree for the Proponent to prove the grid will not become unstable with a total lack of redundancy, nor to even consider such an event.

Furthermore, the current clauses of the NER MAS provide no means for AEMO and/or the NSP to require additional redundancy measures be provided by the Proponent to prevent the grid instability as the result of an uncleared fault due to lack of sufficient redundancy.

Equally the existing MAS does not imply that there should be any action/penalty against the Generator should such an instability event occur.

Consequently, the existing clauses severely undermine AEMO and the NSP's obligations regarding Reliability and Security of the electricity system.

Correcting the clauses as proposed above will establish AEMO and the NSPs rights to enforce sufficient redundancy in all applications and to apply penalties should insufficient redundancy prove to have led to a grid instability following an uncleared fault.

Potential Impacts of the change to the Rules

In the case of AAS Connections, there is no impact as that inherently has "sufficient redundancy". (It is a moot point that should a fully redundant system (by whatever definition or degree of multiple layers of redundancy may mean) still fail to clear a fault, is that considered a breach of the Rules).

In the case of MAS Connections, the proponent would be required

1. to assess possible scenarios where a non-redundant primary protection system (i.e. to the exclusion of back up protection systems) fails to operate to clear a fault,
2. to assess the impact on grid stability of a fault not cleared within the required primary protection system operating time.

AEMO/NSP would be required to respond to the MAS proposal by

1. assessing any submitted technical analysis
2. undertaking their own analysis to establish their own assessment of likely protection system failure

Cost Implications of this Change

As far as Automatic Access Standard Connection Applications S5.2.5.9 (a), as the "sufficient redundancy" requirements are inherently met as the point of this proposal

a. There are no additional costs involved for the proponent.
b. There are no additional costs for the NSP, and in fact their costs are reduced by the removal of the implication to do additional, and superfluous/irrelevant studies about non-redundant systems which are not proposed in any case.

For Minimum Access Standard Connection Applications,

a. the changes specifically require the proponent and/or AEMO/NSP to undertake system studies in order to prove failure of non-redundant primary protection systems would not put the grid security at risk due to an uncleared/slow cleared fault. Such studies are logically implicit in the process of submitting an MAS, but currently there is no specific explicit obligation to do so.
b. Alternatively, or in consequence of the results of studies, the proponent can simply implement redundant forms of primary protection system redundancy.

Overall Benefits of this Change

The security of the power system is the prime objective of any protection system. This change ensures that adequate assessment of the risk of a failure of non-redundant protection systems will not put grid security at risk, or that sufficient primary system redundancy is implemented.

I trust that this proposal is sufficiently explained to enable your consideration and possible implementation.

However, in the event that you have further questions, please do not hesitate to contact me by email and or phone at your convenience.

Sincerely

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