



To Whom It May Concern,

## **Response to NER S5.2.5.10 Guideline Consultation**

Thank you for this opportunity to provide feedback on the proposed guidelines for S5.2.5.10 assessment and compliance. Blackbox RTS is a Melbourne based company which provides practical solutions to the problems faced by generators participating in the NEM.

Our Blackbox RTS Stability Monitor is specifically designed to meet the existing NER requirements of S5.2.5.10, integrates seamlessly into generator's existing SCADA system and is commercially available today.

## **Opportunities and challenges in meeting S5.2.5.10**

### **Opportunities to improve system stability**

The Australian power system has been historically very stable, thanks mainly to careful system planning and operation practices. As the NEM moves towards asynchronous generating systems, incidents of instability have been observed in the four mainland states. Implementing equipment like the Blackbox RTS Stability Monitor will allow operators to act quickly to identify unstable generators and act accordingly.

### **Requirement to disconnect**

One of the key challenges in the current wording for S5.2.5.10 is that the automatic access standard requires generators to disconnect if instability is detected. Automatic tripping for detected instability should be avoided as far as possible.

The concern here is that if many generators observe an oscillation which is spread over a wide area (for example, the west Murray zone), these systems will all be primed to disconnect if their algorithms determine that they are contributing excessively to the oscillation. Should this be the case, it is possible that a situation can arise where more generation is lost than there is spinning reserve available, which also happened in the 2016 blackout in South Australia.

A much safer option is for an automatic rebid which would allow NEMDE to redispatch power from elsewhere respecting system constraints. In extreme situations, an operator with an understanding of the wider system can manually disconnect a single particularly unstable generator and then reassess the situation. Other automated actions such as changing control modes or operating points could be implemented without introducing a risk to the wider power system.

### **Recognition of instability in the power system**

Power system instability is certainly undesirable, but occasional episodes of instability have and will continue to occur on any practical power system. Automatic tripping systems for detected instability creates the potentially catastrophic risk of multiple uncontrolled generator tripping.

Installation of a system such as the Blackbox RTS Stability Monitor will give network operators the ability to detect and safely act on network instability in minutes rather than hours, as is currently the case.



## Clarity of S5.2.5.10

### **Vague definitions in Power System Stability Guidelines (PSSG)**

S5.2.5.10 directly references the PSSG and relies on these for assessment of instability. The PSSG are very vague in this regard and do not provide actionable guidance on how generators should comply with S5.2.5.10. For example, Section 2.1.3, titled "*Large-signal control system stability criteria*" states that:

*...for the calculation of transient stability... variations in active power, reactive power or voltage magnitude output must be in accordance with their performance standards and, if the contingency event is a fault:*

- *should be designed and operated to have a halving time of less than 5 seconds in the period between when the generating unit or generating system output is restored and 10 seconds after fault clearance; and*
- *after that time, must be adequately damped.*

One interpretation of this requirement could be that a generator which observes a voltage oscillation at its connection point for more than 10 seconds should have a system to disconnect it from the system. This would clearly be terrible engineering practice and could easily collapse the system as previously noted.

Finally, it should be noted that the GPS is a legal document and generators can and have been prosecuted for not complying with their requirements. As such, the requirements in the GPS (and, by extension, S5.2.5 of the NER) should be clear to anyone reading them, either today or potentially 25+ years in the future when many generators being built today will still be in operation.

### **Assessment criteria**

At present, it is undocumented how AEMO and NSPs will assess systems for compliance with this performance standard. If this information is available ahead of time it can reduce the iterations required to agree this performance standard, and learnings from earlier projects can be applied to later ones, further improving the efficiency of the process.

## Development of a system to meet S5.2.5.10

The Blackbox RTS Stability Monitor has been developed in the spirit of the Power System Stability Guidelines and current requirements of S5.2.5.10. Using off the shelf hardware, it can detect instability and determine whether it is originating from within the generator or elsewhere in the power system.

The logic within the Stability Monitor is fully customisable and can be readily adapted to site or state specific requirements, or even changes in S5.2.5.10 itself.

Although the Stability Monitor possesses great flexibility, we believe the instability detection algorithm should not be any more complex than needed to detect and assess the generators contribution and relay this information back to the system operators. As far as possible, consistent requirements throughout the NEM will minimise the time to implement this system, which is a key concern for many generators.



## Summary

The requirements of S5.2.5.10 are unclear and the introduction of guidelines for this performance standard will make sure NSPs, AEMO and generators all have a common understanding of what is required for this clause. As far as possible, the requirements of the GPS should not be open to interpretation by the reader.

Power system instability is certainly undesirable, but occasional episodes of instability have and will continue to occur on any practical power system. Automatic tripping systems for detected instability creates the potentially catastrophic risk of multiple uncontrolled generator tripping.

Implementing equipment like the Blackbox RTS Stability Monitor will allow operators to act quickly to identify unstable generators and act accordingly.

If you would like to discuss further, please feel free to contact me.

Yours sincerely,

Patrick Rossiter, Founder, Blackbox RTS Pty. Ltd

 **Blackbox RTS**