POSITION PAPER: SYSTEM MANAGEMENT BLACK START REQUIREMENTS ON THE SWIS

Introduction

System Management (SM) has identified a requirement for new Black Start Generators to provide System Restart Services (SRS) to its South West Interconnected System (SWIS) during a system shutdown or black out. With this 'Position Paper' SM encourages Generation Companies planning a new power station that will connect to the SWIS to consider including black start capability as an integral capability of their planned new generating unit(s), and to consult with SM in this regard. This 'Position Paper' is not a legally binding document, and does not imply that SM will enter into any contract in regard to black start generators. This 'Position Paper' is simply to facilitate discussions around the subject matter it presents.

SM considers open cycle gas turbines, both industrial (Frame) and aero derivative types, to be the most suitable generating units for providing black start capability to the SWIS.

SM is concerned immediately to have black start generation established in the Collie area of WA.

Definitions

A Black Start Generator is a generating unit that has the ability to start and close its output circuit breaker onto a dead bus without energy being supplied to it from other generating units.

A System Restart Service is the service provided by a black start generator when used to assist with re-energisation of the SWIS in the event of a system shutdown.

Requirements

Generation Companies should be aware of the following requirements for Black Start Units

- Each Black Start Unit should have a nominal power output of not less than 20 MW.
- Sufficient fuel reserve should be available to run each Black Start Unit for a minimum of 48 hours during a system black out.
- The ability to provide at least three sequential black starts, to allow for possible tripping of the Transmission/Distribution System(s) during the re-instatement period and possible tripping of the Black Start Generator during the black start starting sequence itself.

- A mitigation plan is required for common mode failure in critical starting equipment that renders black start units inoperable. For example, install an emergency hook up for a mobile generator to replace a failed diesel starting generator.
- Permission from the environmental authority to waiver air pollution restrictions for extended operation of a Black Start Unit at reduced load levels during a black start event.
- Stable operation at low loads between 1 MW and 5 MW.
- Each Black Start Unit must be able to operate in isochronous governor mode to automatically regulate frequency.
- When not operating in isochronous mode each Black Start Unit must operate during re-energisation of the SWIS in droop governor mode with governor response enabled, at a minimum response value of 4% droop.
- The control systems of each Black Start Unit must be capable of setting generator output at fixed MW values, and of setting generator terminal voltage to regulate at fixed voltage values.
- Each Black Start Unit must be capable of operating in a voltage range between 95% and 105% of its rated terminal voltage.
- Each Black Start Unit must be capable of absorbing reactive power from the SWIS while operating within the stable under excitation area of its generator capability curve (leading VARs).
- Of each Black Start Unit that is not manned 24/7, SM may require remote control from its System Operations Control Centre (SOCC) in a system shutdown event for the purpose of system re-energisation.
- Each black start facility must maintain an SM approved emergency communication system with SOCC.
- Each black start facility must maintain an SM approved emergency communications plan for mobilisation of its operating personnel to meet a 60 minute time response.

Conclusion

This 'Position Paper' has indicated SM's need to acquire new black start generation, and has defined some essential requirements with which Generating Companies should be familiar when considering black start capability for their generators.

For further information please contact:

Brendan Clarke
System Operations Development Engineer
Market Strategic Development
Ph: (08) 9427 940
Email: brendan.clarke@westernpower.com.au