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**VIA EMAIL: [wpcdraftdecision@era.wa.gov.au](mailto:wpcdraftdecision@era.wa.gov.au)**

Dear Alistair

**DRAFT TECHNICAL RULES FOR WESTERN POWER'S SOUTH WEST INTERCONNECTED NETWORK**

Thank you for the opportunity to comment on the Draft Technical Rules associated with the proposed Network Access Arrangement.

Verve Energy will rely on Rule 1.9.4 where it has identified that its currently installed plant may not comply with the proposed rules. Accordingly, the focus of review is on identifying aspects of the Rules that:

- may impact deleteriously, technically or commercially, on the operation of currently installed plant; or
- proposed new plant might, generically, have difficulty complying with.

We also advise that Verve Energy's interpretation is that, in implementing any modification, plant deemed to comply under Rule 1.9.4 will continue to be deemed to comply following modification and that a modification to the plant shall not create a requirement for that plant to have to subsequently fully comply with the Rules. It should be noted that it may not be technically or commercially viable to render fully compliant some currently installed plant.

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## Comment on Specific Draft Rules

- 3.2.1(c) This clause refers to harmonic injection. Harmonic injection is a current only, not voltage. The measured voltage is a function of the injected harmonic current and the relevant system impedance. The tables referenced only refer to harmonic voltages. This requires clarification. Limits on voltage harmonics at the point of common coupling will be more difficult to achieve in low fault level areas.
- 3.2.1(e) AS2344 defines in clause 7(c) "For substations and similar high voltage equipment installations, the measurement shall be performed at a distance of 20 m from the boundary of the installation. The boundary of the 'installation' should be defined. One would expect that this would ensure the interference would not be a problem. It is assumed that the generator is only responsible up to the connection point.
- 3.3.1(b) This clause requires insertion of "reasonable" directions. System operator could theoretically direct operation outside rules, or in breach of environmental licence, and in a manner to cause damage to plant. Is it also possible for a direction in breach of another rule (eg closure onto a dead busbar - ref Clause 3.5.2(d) (3)).
- 3.3.1(d) This could override the derogation provisions re power system stabilisers - which probably don't comply.
- 3.3.1(e) It can be argued that whenever a new "largest" unit is connected to the system it will run foul of this provision.
- 3.3.1(f) "transients" needs to be a defined term. When a modern gas turbine switches between pilot and pre-mix combustion there can be an active power swing of 10 to 15MW over a 2 to 3 second period. Does this constitute a transient?
- 3.3.2 The sweep up of an "altered connection" is dangerous. What constitutes an alteration? - plant uprates? C&I upgrade?. Could it trigger the removal of derogation provisions?
- 3.3.4.1(a) Unlikely to be able to comply without either running out of tapping range on GSUTs or hitting 330kV system highest voltage (363kV).
- 3.3.4.1(b)(1)(A) Implies machine could be dispatched virtually in synchronous compensator mode - not sustainable mechanically on thermal sets (due to differential expansion limits)
- 3.3.4.1(b)(1)(B) Not possible near 0MW - infringes loss of excitation protection at low MW loads. Also needs to be checked for allowability on older machines. - there is likely to be overheating in pistoy region of generator core at low MW loads. This clause uses the term 'at any level of power output' but does not clarify whether or not this is up to

and including rated power nor does it clarify steady state or transient conditions. These points will obviously impact on the ability of generators to comply.

3.3.4.3(a) most turbine manufacturers consider low frequency operation to be an accumulating fatigue on the LP blading in particular. This rule does not recognise this – theoretically there is no accumulated limit for operation above 47.5Hz. eg Stage D.

3.3.4.3(b) Underfrequency trips based on this specified criteria would have to be fitted in order to remove requirement for operator intervention. For gas turbines - the primary concern of under-frequency operation is compressor surge/stall. The compressor's surge/stall characteristics are inlet temperature related and it may be difficult to comply at high ambient temperatures.

3.3.4.3(c)(2) 0% volts for 22 cycles is, generally, unlikely to be achievable.

3.3.4.3(h)(2) requires qualification that the frequency is at nominal - Gas turbines in particular cannot sustain full output at reduced frequency. Reduced compressor speed = reduced combustion air flow = reduced fuel = reduced output for a machine already operating at full load. Similarly, thermal units may not sustain full output at reduced frequency, either through inability to increase steam flow to increase torque or loss of performance of auxiliaries if situation is sustained. Also, this clause does not seem to relate to frequency excursions – lower gas turbine output at lower frequency and does not give reasonable limits, expecting the active power to be exactly as pre-fault.

3.3.4.4 Likely to be problem for generators matching boiler & C&I systems to achieve this. Minimum declared machine loads could prevent compliance.

3.3.4.7(a) This is likely to present a problem for modern gas turbines. The control system logic usually prevents the operator shutting down the standby generator whilst the steam turbine is hot. Whilst the standby generator is operating in island mode a restart is usually not possible without over-riding programmed plant safety functions.

3.3.4.7(b) Hot restart times for machines following a trip will be an issue here.

3.3.4.10(b)(1) Possible non-compliance –some of our stations are synchronised in 1½ circuit breaker yards. In other than normal configuration (eg a busbar out of service etc) a trip of a generator could open end a transmission line. This could impact a user (or potential user). Could introduce liability. A qualification needs to be 'no impact provided switchyard is in normal configuration'.

3.3.4.10(d) Verve Energy cannot comply with this. Circuit isolators (all the xxx.5 devices) were passed to Western Power under ERIU directive.

- 3.3.5.1(a) Both provisions 1 & 2 require a reasonableness provision inserted. Network Services Provider has absolute right to cause considerable expense at its sole discretion. Also the RME includes the SCADA remote terminal unit – this therefore must be “owned” by the generator. In Verve Energy’s case this is not possible as, under ERIU decision, RTUs are Western Power’s property.
- 3.3.5.1(c)(3)(iii) & (iv) Not possible other than using switchyard metering (which is seen as Western Power’s property) currently as no dedicated “net” tariff metering is fitted.
- 3.3.5.3 (c),(d) & (e) Problematic. We have access to Telstra services by microwave link to the PSTN. However there is no redundancy. Western Power has been winding back the PAX network for some time. At one location for example it is integrated into the station PABX. It may be necessary to draw on the provisions of clause (e) and require Network Services Provider to provide back up (via the microwave network). What is the Network Services Provider’s specification for the equipment required?
- 3.3.5.4(e)(1)(A) Is “of up to 5%” an error? That would mean 1 % is OK. Should it be a minimum of 5%?
- 3.3.5.4(e)(1)(D) Seems to be at odds with the runback provisions of 3.3.4.4. (latter is more arduous) Read 3.3.5.4(f)(1) in conjunction – implies generating units must be able to achieve a 20MW load increase within 6 seconds held for 30 seconds. Boiler drum level and combustion controls are unlikely to be able to respond.
- 3.3.5.4(f) No reference is made specifically to gas turbine plant. The Wholesale Electricity Market (“WEM”) Market Rules specify three response times for spinning reserve and two response times for load rejection.
- 3.3.5.5(a)(5) Droop compensation is utilised on our gas turbine plant. Boost compensation seems unusual as it implies a positive feedback system. It would then be expected that one generator would always attempt to take the entire reactive power load, similar to having all generators operating in isochronous mode.
- 3.3.5.5(d) “power output and /or shaft speed” ‘and/or’ should probably be ‘and’ only.
- 3.3.5.5(j) The Network Services Provider would be expected to have the preliminary settings. Does this clause mean that the Network Services Provider can request changes and it becomes the responsibility of the generator to then do all the calculations and prepare the test procedure?
- 3.3.4 Implies all station transformer connections in the 132kV switchyard are considered loads. This is at odds with treatment under the Market Rules (net output of the station?)
- 3.4.1(b) requires the qualification of ‘reasonable’.

3.5.2 Why are generator facilities referred to when the glossary defines a consumer as a user who consumes electricity supplied through a connection point?

3.5.2(d)(3) This clause effectively prevents black starting of the system.

4.1.1(i) Is the facility provider held responsible for the security of the equipment left on site?

4.1.3 This has major implications as it specifies in some detail what testing and recommissioning is required to demonstrate ongoing compliance with rules. This provision needs further exploration as it assumes plant is compliant. Where testing reveals a deficiency it specifies how/when remedial action is required. How does this fit with derogation under Rule 1.9.4?

4.1.3(d) The expected first step should be to raise the issue with and request explanation from the generator. If not satisfactory, the tests should then be conducted.

4.2.1(a) What is the definition of "replacement equipment"?

5.5.3 Referencing error in document.

**End of Comments**

Thank you again for the opportunity to comment on the Draft Technical Rules.

Yours sincerely



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