



**SCHEDULE OF PROPOSED CHANGES TO THE TECHNICAL RULES DATED 26 APRIL 2007
SUBMITTED TO THE ERA 1 October 2008**

LARGELY BASED ON 29 August 2008 SUBMISSION TO THE TRC AND FOLLOW-UP MEETINGS 4th and 24th SEPTEMBER

**The new text proposed for inclusion in the Technical Rules is shown in red pen underline.
The text proposed for deletion from the Technical Rules is shown in blue pen strikethrough.
Yellow shading in the first column indicates changes proposed after 29 August 2008**

No	Sec.	Section Title	Proponent/s	Issue	Discussion at Meeting	Action
1	Preface		Western Power	There is a need to update contact details for Western Power's contact person for Technical Rules following changes within Western Power (Peter Mattner took over responsibility for Technical Rules from Phil Southwell).		Action: Yes, Update contact details to those of Peter Mattner
2	n/a	Enforcement of the Rules	Western Power	<p>Western Power currently has the ability to enforce compliance with the Technical Rules under the <i>Electricity Industry (Access Code Enforcement) Regulations 2005</i> (ETAC).</p> <p>The issue with the ETAC is that the only means of enforcing compliance is to disconnect users.</p> <p>In practice, Western Power is not in a position to enforce compliance of the Technical Rules by disconnection due to the ramifications of undertaking such an extreme measure on both the users and Western Power.</p> <p>The ETAC does not, and cannot, provide a means to enforce financial penalties upon the user. Therefore there are no the practical enforcement measures under the ETAC to encourage the user to make the necessary</p>		<p>Action: Yes, Discuss the issue at the TRC meeting with the objective of:</p> <ul style="list-style-type: none"> - agreeing of the need to resolve the issue, - agreeing of the need to provide means for financial penalties for non-complying users through changes to the ETAC, - exploring alternative ways for enforcing the rules (other than disconnection) and best avenues how to achieve it. <p>Ideally, we would like the TRC to propose a resolution to the ERA.</p> <p>If that is not possible, then we would</p>

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				capital investment to correct the issue.		like the TRC to identify the issue (the need to impose financial penalties for non-compliance with the Technical Rules, only after a notification to rectify the non-compliance has been issued and the deadline expired) and pass it on to the ERA for resolution.
3 ex 2	Clause 1.4	Commencement	Western Power	Administrative change, to indicate the commencement date of the revised rules. Delete 1 July 2007 and replace it with DD/MM/YYYY		Action: Yes, Delete 1 July 2007 and replace it with DD/MM/YYYY" <u>“DD/MM/YYYY” 1 July 2007</u>
4 ex 3	Clause 1.9.2	Exemptions	Western Power	Administrative change to ensure consistency with operation of the Wholesale Electricity Market, to the effect that Western Power, as the Network Service Provider, cannot restrict operation of any plant.		Action: Yes, Renumber the existing text as new clause 1.9.2(a) and add the following new clause 1.9.2(b): <u>“(b) In processing requests for exemptions from these Rules, the Network Service Provider must assume that the power station with a:</u> <u>(1) synchronous generating unit, induction generating unit, inverter coupled generating unit or converter coupled generating unit will operate 24 hours a day</u> <u>(2) notwithstanding clause 1.9.2(b)(1), solar generating unit without energy storage will operate during daytime hours only;</u> <u>for 365 days a year, for an indefinite number of years, unless otherwise advised by the Independent Market Operator that the plant was registered for time or otherwise restricted operation.”</u>
5	Clause 2.2.2	Voltage step limits	Western Power	There is a need to update Table 2.2 for consistency with AS/NZS 61000.3.7-2001.		Add qualifier “and during <i>tap-changing</i> ” after “Pre- <i>tap-changing</i> (quasi steady state)” in

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				In addition, there is an editorial in the heading of the table for two “pre-tap-changing” columns, due to inconsistency with note 1, which includes “transformer tap action” in the list of routine switching operations. The heading should include the period during which the transformer tap action takes place.		<p>the header.</p> <p>Reformat Table 2.2 by merging two “pre-tap-changing” columns into one. The subtitle of the new column, 2nd row, to show that the new column applies to “Transmission and Distribution”.</p> <p>Insert Table 7 of AS 61000.3.7 (on page 9) into the 3rd row of the new column. Include voltage levels in the sub-header (which are defined on page 1 of AS/NZS 61000.3.7 (2001) for ease of reading. Include “EHV” in the “HV” sub-header, so that the limits apply to all voltage levels above 35kV.</p> <p>Replace the respective qualifiers “≥ 66kV” and “≤ 66kV” with “Transmission” and “Distribution” in the 2nd row of the two (existing) “Post-tap-changing” columns.</p> <p>Action: Yes, reformat Table 2.2 as explained here.</p>
6	Clause 2.2.10 Figure 2.2	Numbering of figures	ERA (Nick Parkhurst)	There is no Figure 2.1 in the Rules, but Figure 2.2 appears in chapter 2. Sequentially renumber the figures in chapter 2 without skipping any number.		<p>Action: Yes, Renumber Figure 2.2 as new Figure 2.1 and change the cross-references in the body of the text accordingly, as follows.</p> <p>Figure 2.2 to be new Figure 2.1, ie Figure 2.1Figure 2.2;</p>
7	Clause 2.3.7.3(b)	Long term voltage stability	Western Power	Clarification that long term voltage stability studies apply to transmission system only. Current situation was unintentionally created when former transmission and distribution codes were merged and word ‘transmission’ uncritically replaced by ‘transmission and distribution’.		<p>Action: Yes, clause 2.3.7.3(b), 1st row: Add “of the transmission system” after “The long term voltage stability analysis”, to read: “The long term voltage stability analysis <u>of the transmission system</u> must then be carried out...”</p>

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8 ex 4	Clause 2.3.10 (new) Clause 2.3.7.1(a)	Credible contingency events	Western Power	Improve clarity by relocating the list of credible contingency events into a separate clause.		Action: Yes , Relocate the list of credible contingencies of clause 2.3.7.1(a)(1) to (5) into a separate new clause 2.3.10(a) to (e).
9 ex 5	Clause 2.7	Standards	Western Power	Put back reference to these <i>Rules</i> and the IEEE Std. 80-2000 (taken out earlier by mistake). At the TRC meeting 24/9/08 agreed not to include reference to the IEEE standard in this clause.		Action: Yes , clause 2.7, include reference to these <i>Rules</i> after “complies with”, as follows: <u>“these Rules”</u>
10	Clause 2.7	Standards	Tiwest (Neil Liddelov)	At the inaugural TRC meeting on 4/9/08 NL suggested to investigate appropriateness of including reference to AS 2067 Switchgear Assemblies and Ancillary Equipment for Alternating Voltages above 1kV - 1984. At the 24/9/08 TRC meeting Kevan McGill (KMG) made a similar suggestion. Our findings can be summarized as follows. There is no Australian standard for earthing system design, and two sections of AS2067(1984) provide a brief summary, on less than a page, of key earthing system considerations: Section 5.5 Safety earthing of main electrical circuits, and; Section 5.6 Station earthing system. In addition, Appendix C provides several recommendations for the design of earthing systems (six pages). These three sections of AS2067 on earthing can be considered as a good starting point for a novice reader in the field, however, they cannot replace the breath and depth of IEEE Std. 80-2000. In addition, the brevity of AS2067 indicates its focus on empirical formulas for quick hand calculations, however	Any comments?	Action: Yes , refer to the ‘earthing clause’ clause 3.4.8(e), No. 26 here, and provide feedback on whether to retain or not the proposed explanatory box referring to AS2067(1984).

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				<p>no detailed comparison of the two standards has been carried out.</p> <p>Our further comparison of the two standards revealed that the AS2067(1984) is based on the old version of the IEEE standard (the latest at that time, IEEE Std.80-1976) (see the † footnote on page 29), hence there should not be any substantial difference between the two standards, other than changes to IEEE Std.80 made in year 2000. However, these changes appear not to be minor ones, as they are (in the Introduction) described as a “<i>major revision of this guide</i>” that include “<i>further extension of the equations for calculating step and touch voltages</i>”.</p> <p>Inclusion of reference to AS2067 in this rather high level clause 2.7 is therefore not considered appropriate.</p> <p>It may be useful to inform readers about AS2067, for example by including an explanatory box or a note in the ‘earthing’ clause 3.4.8(e), however we unsure about it. Any feedback from the TRC?</p>		
11	<p>Clause 2.9.4 Table 2.11</p> <p>Clause 2.9.4 Table 2.12</p>	Numbering of tables	ERA (Nick Parkhurst)	<p>There is no Table 2.10 in the Rules. Sequentially renumber the tables in chapter 2 without skipping any number.</p>		<p>Action: Yes, Renumber Tables 2.11 and 2.12 as new Tables 2.10 and 2.11 and change the cross-references in the body of the text accordingly, as follows.</p> <p>Table 2.11 to be new Table 2.10, ie Table 2.10Table 2.11;</p> <p>Table 2.12 to be new Table 2.11, ie Table 2.11Table 2.12;</p>
12	Clause 3.1	Introduction	Western Power	Clarification that the requirements apply at		

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ex 6				<p>site conditions.</p> <p>Climatic conditions vary throughout the SWIS and the temperature chart produced by the Australian Bureau of Meterology provides transparency on which maximum temperature applies at individual sites.</p>		<p>Action: Yes, clause 3.1, add new subclauses 3.1(b) & (c) as follows:</p> <p><u>“(b) The technical requirements apply at site conditions. It is the responsibility of the User to investigate local weather conditions that may affect the performance of their plant.</u></p> <p><u>(c) Refer to Figure 3.0 for the minimum values of the maximum summer ambient temperatures for the plant design that are acceptable to the Network Service Provider.”</u></p> <p>And renumber the remaining subclause (b) as new subclause (d). “</p>
13 ex 7	Clause 3.2.1(d)	Negative Sequence	Western Power	Limits, as portion of the total permissible quantity for the system of Table 2.6, to be set by the Network Service Provider (in a similar manner individual Users are allocated a portion of the total permissible harmonic distortion by clause 3.2.1(c)(1)		<p>Action: Yes, Change clause 3.2.1(d) to read as follows:</p> <p>“A User connected to all three phases must balance the current drawn in each phase at its connection point so as to achieve 30-minute average levels of negative sequence voltage at all connection points that are equal to or less than the values set out in Table 2.6 or <u>any limits allocated by the Network Service Provider under clause 2.2.5.</u>”.</p> <p>(NOTE: The emission limits for non-three phase loads to be included here.)</p>
14	New Clause 3.2.6	Islanding in the Distribution System	Western Power	There is a need to clearly state that islanding is not permitted in the distribution system, for safety reasons. This was as unintentional omission of a few years ago, while merging old transmission and distribution codes into these rules.		<p>Action: Yes, add new clause 3.2.6 Islanded Operation in the Distribution System as follows:</p> <p><u>3.2.6 Islanded Operation in the Distribution System</u></p>

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						<u>Islanded operation with loads other than own is not permitted in the distribution system for safety reasons.</u>
15 ex 8	Clause 3.3.3.1(d)	Reactive Capability	Western Power	Clarification that the requirement applies at the connection point.		Action: Yes , clause 3.3.3.1(d), last sentence, after “to provide”, add “at the connection point” as follows: <u>”at the connection point”</u>
16	Clause 3.3.3.3(b)	Frequency Capability	Western Power	<p>Add an explanatory box that Figure 3.4 includes a safety margin from Table 2.1 (frequency operating standards, set by the System Management on the basis of the generation reserves set by the Independent Market Operator (IMO)).</p> <p>In other words, Western Power, as the Network Service Provider, has limited influence over the frequency operating standards and system operation which is governed by the Market Rules.</p> <p>Consequently, Western Power, as the Network Service Provider, wishes to:</p> <p>(1) discharge its responsibility for decisions that may impair operation of the SWIS as is defined in Table 2.1, and</p> <p>(2) elevate the role of the System Management in decisions that potentially have major impact on their work and operation of the Wholesale Electricity Market.</p>	<p>New subclause (2) could be worded better (than the, now superseded, initial wording of 29/8/08 which is shown strikethrough below for the record):</p> <p><u>(2) Pursuant to clause 3.3.3.3(b)(1), a Generator must obtain approval from the System Management, including any terms and conditions, before seeking an exemption from compliance with this clause 3.3.3.3(b) from the Network Service Provider.</u></p>	<p>Action: Yes, clause 3.3.3.3(b), I</p> <p>Add an explanatory note to Figure 3.4:</p> <p><u>”Note: The requirements of Figure 3.4 provide a safety margin relative to the frequency operating standards of Table 2.1, within which a Generator may apply for an exemption from compliance from these Rules.”</u>,</p> <p>Together with two new subclauses:</p> <p><u>”(1) The Generator must demonstrate that the safety margin, relative to the frequency operating standards of Table 2.1, is achieved to satisfaction of the System Management.</u></p> <p><u>(1)(A) The proposed arrangement, if any, must not adversely affect System Management’s ability to meet its obligations under the Market Rules and these Rules.</u></p> <p><u>(1)(B) Pursuant to clause 3.3.3.3(b)(1)(A), the Generator has the sole responsibility for the installation, maintenance and correct operation of any such an arrangement.</u></p>

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						<u>(2) If the <i>generating unit</i> and the <i>power station</i> in which the <i>generating unit</i> is located is not capable of continuous uninterrupted operation within the frequency operating standards of Table 2.1 the <i>Network Service Provider</i> must not approve a request for exemption from this clause 3.3.3.3(b)."</u>
17 ex 10	Clause 3.3.3.3(f)	Post-Fault Reactive Power of a Power Station with Non-Synchronous Generating Units	Verve Energy	This clause is intended to safeguard against system low volts. Reactive absorption could be beneficial to the system during periods of high volts, while, at the same time, giving more flexibility to the generator design.		Add an explanatory box "This requirement is intended for undervoltage situations where a generator is potentially exacerbating the problem". WP Reply: Agree Action: Yes , add the following explanatory box at the end of clause 3.3.3.3(f): <u>"This requirement is intended for undervoltage situations where a generator is potentially exacerbating the problem"</u>
18 ex 11	Clause 3.3.3.3(h)(3)	Continuous Uninterrupted Operation	Verve Energy	The clause also needs qualifying to give more flexibility to the generator design and for consistency with the proposed change to clause 3.3.3.3(f).		Add the following words at the end of clause 3.3.3.3(h)(3) ", unless it is required by clause 3.3.3.3(f)". WP Reply: Agree Action: Yes , add the following words at the end of clause 3.3.3.3(h)(3) ", <u>unless it is required by clause 3.3.3.3(f)</u> ".
19	Clause 3.3.4.4(f)	Rate of response	Western Power (System Management)	The rate of governor response is an operational characteristic of individual generators that needs to be coordinated with those of other generators in order to avoid unnecessary oscillations (for example,		It is therefore proposed to include in clause 3.3.4.4(f)(1): a) reference to the need for coordination with the times stipulated in the Market Rules and spinning reserve ancillary services,

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				<p>coordination of primary and secondary frequency control).</p> <p>Where electricity markets exist, the rate of response needs to be coordinated with the Market Rules and spinning reserve ancillary services times (from 6 seconds to 21 minutes in WA) (6 – 66 sec; 1 – 7 min; 6 – 21 min). This is not properly acknowledged in the current wording of clause 3.3.4.4(f), probably because it went unnoticed until now.</p> <p>The response is defined by the response time (to reach 90% of the maximum expected response) and for how long that new output is sustained, refer to the two explanatory boxes in clause 3.3.4.4(f).</p> <p>For the purpose of coordination with the Market Rules, of major concern are dispatchable generators only, ie those of clause 3.3.4.4(f)(1).</p> <p>It is further envisaged that, for the purpose of coordination with the Market Rules, it would suffice to sustain the response for 10 seconds only (not for the typical 30 seconds referred to in the current wording of the clause), hence an appropriate change in wording will be proposed here. The 10 seconds are considered sufficient duration to ensure coordination with the market ancillary service.</p> <p>The proposed change would also provide more transparency and simplify the process by eliminating the need to include this time in the access contract.</p> <p>The System Management would manage the required coordination of the settings in the</p>		<p>b) retain 6 seconds rise/fall time, c) replace “30 seconds” with “not less than 15 seconds”, and d) reword as a rule.</p> <p>For clause 3.3.4.4(f)(2), include the above changes to reflect the characteristics of wind and solar plant.</p> <p>Action: Yes, clause 3.3.4.4(f)(1) to be reworded to read:</p> <p>(1) For <i>dispatchable generating units</i>, for any <i>frequency</i> disturbance, a scheduled <i>generating unit</i> must achieve at least 90% of the maximum response expected according to the droop characteristic within <u>6 seconds for thermal generating units (30 seconds for hydro generating units) and the new output must be sustained for not less than further 10 seconds. a time to be specified in the relevant connection agreement. The set values must coordinate with the Market Rules and spinning reserve ancillary service times.</u></p> <p>Delete explanatory box:</p> <p>“This time is typically 6 seconds for thermal generating units and the new output must be sustained for 30 seconds. The time is typically 30 seconds for hydro generating units and the new output must be sustained indefinitely.”, unless it is required by clause 3.3.3.3(f).</p> <p>(2) For <i>non-synchronous generating units</i>, for any <i>frequency</i> disturbance, a <i>generating unit</i> must achieve at least 90% of the maximum response expected within <u>2</u></p>

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				operational time frames.		<p><u>seconds for wind and solar generating units and the new output must be sustained for not less than 15 seconds. a time to be specified in the relevant connection agreement. The set values must coordinate with the Market Rules and spinning reserve ancillary service times.</u></p> <p>Delete explanatory box:</p> <p>"The time is typically 2 seconds for wind and solar generating units and the new output must be sustained indefinitely."</p>
20 ex 12	Clause 3.3.3.5(b)	Ramping Rates	Verve Energy	<p>This clause not to effectively apply to small generators of up to 10MW of total installed capacity because of no impact on the system and to permit them greater flexibility in design. The wording has also been modified to achieve continuity between the exemption for non-scheduled generating units, the total output of which is less than 10MW and the ramping rates that apply to non-scheduled generating units, the total output of which is greater than 10MW.</p> <p>NOTE: The "non-" in front of 'scheduled generating units' should not be in italics, as only a "scheduled generating unit" is a defined term. A "non-scheduled" generating unit is not a defined term.</p>		<p>Should read as: "The total <i>active power generation</i> of one or more non-scheduled generating units, within a power station or wind farm, must not increase or decrease at a rate exceeding 10MW per minute or 15% of the total of the <i>generator machines' nameplate ratings</i> per minute, whichever is the greater."</p> <p>WP Reply: We agree and propose the revised wording below.</p> <p>Action: Yes, clause 3.3.3.5(b) to read: <u>"A non-scheduled generating unit must not increase or decrease its active power output at a rate greater than 10MW per minute or 15% of the generator machines's nameplate rating per minute, whichever is the greater."</u></p>
21	3.3.3.7			<p>Shall we specify restart time for the electrical trip of the generator (of less than two hours)?</p> <p>The security risk window is opened longer (ie security reduced) the longer it takes to get the</p>		<p>Action: TRC to discuss.</p>

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				<p>unit back on-line.</p> <p>The specification would provide additional design input for the specification of new power plant.</p> <p>This is a routine event and deferred re-connection times keep the system in a vulnerable (for the next contingency), insecure state, for longer time.</p> <p>Electrical trip is that initiated by the protection action and executed (nearly instantaneously, without any prior warning) by opening the main circuit breaker.</p>		
22 ex 13	Clause 3.3.3.9(c)	Generating Unit Transformer	Verve Energy	<p>Small wind farms on distribution systems are not usually grid connected via transformers with online tap changing. This clause may be an impediment for connection of some type of generators the total output of which is less than 10MW</p> <p>Justification: To permit more flexibility for plant design,</p>		<p>Add an explanatory box stating that: The basis for negotiation is that the generator must meet the reactive power requirements of Clause 3.3.3.1 over the full range of network voltages of Clause 2.2.2.”</p> <p>WP Reply: Agree, but the proposed clarification is not needed because, as per Table 3.5, clause 3.3.3.9 does not apply to small generators.</p> <p>Action: No</p>
23 ex 14	Clause 3.3.4.4(e)(2)(B)	Frequency Control	Verve Energy	<p>The explanatory box is too prescriptive.</p> <p>Justification: The pitch control requirement should be removed to permit more flexibility for plant design.</p>		<p>Delete last sentence in the explanatory box, which reads: “Hence wind turbines must have pitch control fitted”.</p> <p>WP Reply: Agree</p> <p>Action: Yes, clause 3.3.4(e)(2)(B), explanatory box, last sentence. Delete the sentence. “Hence wind turbines must have pitch</p>

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						control fitted"
24 ex 15	Clause 3.4.8(e)	Substation Design	Western Power	Put back reference to these <i>Rules</i> and the IEEE Std. 80-2000 (taken out earlier by mistake)		Action: Yes , clause 3.4.8(e), include reference to the IEEE Std 80-2000 and these <i>Rules</i> , after "in accordance with", as follows: <u>"these Rules, IEEE Std. 80-2000, "</u>
25	Clause 3.4.8(e) Two new subclauses (1) &(2)	Substation Design	Western Power	Clarification to enable greater earthing grid design flexibility.		Action: Yes , clause 3.4.8(e), add two new subclauses (1) & (2) as follows: <u>"(1) If needed to meet the requirements of clause 3.4.8(e), the User's design must include installation of counterpoising conductors (bare or insulated, as case requires) in the supply and other power line corridors.</u> <u>(2) The Network Service Provider, or any other User, must not unreasonably withhold permission for extension of the earthing grid stipulated in clause 3.4.8(e)(1)."</u>
26	Clause 3.4.8(e), New subclause (3) & explanatory box	Substation Design	Western Power	The earth grid electrodes are not effective conductors of electricity if drilled into large rock formations. A geological survey to characterize soil characteristic is therefore essential for realistic earth grid design. The same applies to soil resistance, which is a key input parameter for specialized computer software. The need to mandate the geological survey and test measurement on the actual user's site was triggered by two recent experiences.		Action: Yes , add new sub-clause 3.4.8(e)(3) , that mandates a geological survey of the site to identify soil and soil resistivity testing as follows: <u>(3) The User's design of the earthing system must include a site geological survey for soil characterization and site soil resistivity test.</u> <u>(A) The geological survey and soil resistivity tests stipulated in clause</u>

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				<p>In one case the design was not effective because large rock formations were not suitable to accommodate earthing rods. In another case the consultant measured the soil resistance at the nearby public beach, at the high water mark, immediately after the tide peaked (as evidenced by the photograph with footsteps in the wet sand), and applied these unrealistically low values to the nearby power station site. Both projects experienced serious difficulties.</p> <p>The knowledge of the type of soil and its electrical characteristics is essential for more realistic earth grid design.</p>		<p><u>3.4.8(e)(3) must be carried out on the User's site.</u></p> <p><u>(B) Subject to clause 3.4.8(e)(1), the survey and tests must include the additional corridors where earthing conductors will be laid.</u></p>
						<p>Consider including the following explanatory box at the end of the earthing clause 3.4.8(e), as per 24/9/08 discussion:</p> <p><u>"Note that AS 2067 (1984) also provides a useful reference for switchgear earthing, though this standard is largely based on, now superseded, IEEE Std. 80-1974."</u></p>
27 ex 16	Clause 3.5.1(a)		Western Power	<p>Clarification that islanding protection is necessary to maintain power system security (as is defined in the Glossary). This is in contrast to the protection systems installed solely to cover risks associated with a User's equipment and which are at the User's discretion.</p>		<p>Action: Yes, clause 3.5.1(a), add new 2nd sentence:</p> <p><u>"For avoidance of any doubt, islanding protection is necessary to maintain power system security in the distribution system"</u>.</p>
28 ex 17	Clause 3.6.2(d)(2) Clause 3.6.10.1	Table 3.6	Verve Energy	<p>Can generators which take part in the System Control Centre's managed program to reduce the system peak load be permitted to do short term parallel testing for their own testing purposes during non-summer months. Islanding risk is reduced during daytime business hours and that would facilitate</p>		<p>Top (titles) row, field 'Short term test parallel'.</p> <p>Add a new note 2, "Generators which participate in the System Control Centre's managed program to reduce the system peak load will be permitted to do short term</p>

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				efficient use of generation assets.		<p>parallel testing in non-summer months, if these tests are carried out during daytime business hours and with prior agreement with the local Network Operations Control Centre". Renumber the existing note 2 as note 3.</p> <p>WP Reply: The recommendation was implemented and then lost after removing Table 3.6 from the Rules. We now propose to add an explanatory box at the end of clause 3.6.2(d)(2) to accommodate the intent of former "Note 2": <i>"Generating units participating in peak lopping and system peak load management will be permitted to do short term parallel testing in non-summer months, if these tests are carried out during daytime business hours with the prior approval of the Network Service Provider's local control centre."</i></p> <p>Action: Yes, add the following explanatory note at the end of clause 3.6.2(d)(2): <i>"Generating units participating in peak lopping and system peak load management will be permitted to do short term parallel testing in non-summer months, if these tests are carried out during daytime business hours with the prior approval of the Network Service Provider's local control centre."</i></p>
29 ex 18	Clause 3.6.4(a)&(c) 3.6.5 4.1.3(a)(1), (b), (d), (e)(1) & (e)(3)(A)	Various	Western Power	Editorial correction		<p>WP Comment: Editorial which appears in some versions of the MS Word software but not in others.</p> <p>Replace, where necessary, reference to clause 0 with that to clause 3.6.</p> <p>Action: Yes, Clause 3.6.4(a) & (c), 3.6.5</p>

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						and 4.1.3(a)(1),(b), (d), (e)(1) & (e)(3)(A) Delete reference to " clause 0 " and replace it with hyperlink to " clause 3.6 "
30	Clause 3.6.5 Table 3.5 Clause 3.3.1	Generic requirements	Western Power	The generic requirements of clause 3.3.1 should apply to all generators, including small generators, particularly subclauses (f),(g) & (h). The subclause 3.3.1(a), in its present wording and if included in Table 3.5, would be inconsistent with the purpose of Table 3.5. Inclusion of the remaining subclauses (b) to (e) would not practically affect small generators of section 3.6, but may confuse novice readers.		Action: Yes, Consider at the TRC /SGWG meeting how best to resolve this issue. One option includes amending clause 3.3.1(a) to the effect to acknowledge Table 3.5 and including reference to clause 3.3.1 in Table 1. Another option would be to make no changes to clause 3.3.1 and to include in Table 3.5 reference to subclauses 3.3.1(f), (g) & (h) only (NOTE: as well as any future requirements of clause 3.3.1 that may apply to small generators of section 3.6).
31 ex 19	Clause 3.6.5 Table 3.5 Clause 3.3.4.5(c)	Voltage Control Systems	Verve Energy	On the grounds that small generators can often be regarded as negative loads To permit more flexibility in design, there should be the option of using either power factor control or fast acting voltage control for generators the total output of which is less than or equal to 10MW, unless power system studies show that fast acting voltage control is needed. Accuracy of voltage regulation should be stated in terms of equipment capability		Add a 2 nd paragraph to the clause so that it reads: "Clause 3.3.4.5(c)(2) For new non-synchronous generating units the total output of which is equal to or less than 10MW and connected to the <i>distribution system</i> , must, as a minimum, must be fitted with power factor control systems utilising modern technology, unless power system studies show the need for fast acting voltage control of clause 3.3.4.5(c)(1), which would typically occur in fringe of grid locations." WP Reply: Agree, however, Table 3.5 in clause 3.6.5 is a more suitable location for the proposed change. Action: Yes, clause 3.6.5, Table 3.5, place

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						<p>the following words immediately under the heading "Voltage control systems" (in the right column):</p> <p><u>"Except that <i>non-synchronous generating units</i> may be fitted with power factor control systems utilising modern technology, unless power system studies show that fast acting voltage and / or reactive power control systems complying with clause 3.3.4.5(c) are required."</u></p>
32 ex 20	Clause 3.6.8(b)	Power Quality and Voltage Change	Verve Energy	There should be at least 2 minutes delay between the connections of individual generators for the assessment to be based on the transients caused by connection of an individual generator (the largest one, if they are different). A 2 minute interval is used in other jurisdictions and it provides enough time for on-line tap changing to restore volts before the next generator connects.		<p>To make this change, at the end of the 2nd 4st sentence, add the words: "...at intervals of at least 2 minutes apart."</p> <p>WP Reply: Agree, however the change applies to the 2nd sentence, which should be replaced with "These requirements may be achieved by <i>synchronising individual generating units</i> at intervals of at least two minutes."</p> <p>Action: Yes, clause 3.6.8(c), 2nd sentence: Delete the existing wording "These requirements may be achieved by <i>synchronising individual generating units sequentially</i>" and replace it with: . <u>"These requirements may be achieved by <i>synchronising individual generating units</i> at intervals of at least two minutes."</u></p>
33 ex 21	Clause 3.6.8(c)	Power quality and Voltage Change	Verve Energy	Where a generator is providing voltage control services contracted by the Network Service Provider, there will be times where distributed generation increases or decreases distribution		Change the wording of 3.6.8(c) to read: Unless a <i>Generator</i> is contracted by the <i>Network Service Provider</i> for the provision of voltage control services – usually at

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				system voltages by more than 2% towards the desired target voltage range.		<p>fringe of grid locations”, the steady state voltage rise at the <i>connection point</i> resulting from the export to the <i>distribution system</i> must not exceed 2%, and must not cause the voltage limits in Clause 2.2 to be exceeded</p> <p>WP Reply: Agree, with the following revised wording described below.</p> <p>Action: Yes, two changes to clause 3.6.8(c).</p> <ul style="list-style-type: none"> - Clause 3.6.8(c), beginning: Insert words “<u>Unless otherwise agreed with the network service provider,...</u>” and - Add the following explanatory box at the end of clause 3.6.8(c): “<u>The requirements of this clause 3.6.8(c) may be waived if the Generator is contracted by the Network Service Provider for the provision of voltage control services – usually at fringe of grid locations.</u>”
34 ex 21 A	Clause 3.6.9(d)	Remote Control, Monitoring and Communications	Verve Energy	For consistency with the Western Power submission to the Draft Technical Rules of 11 April 2006 due to the changed industry practice.		<p>Delete the last sentence in the clause that reads: “For generating units exporting above 1MW, a dedicated telephone link or other dedicated communication channel may be required.”</p> <p>WP Reply: We acknowledge the concern, however a better way to address it would be for the last sentence to read. “For <i>generating units</i> exporting above 1MW, a back-up speech communication channel pursuant to clause 3.3.4.3(d) may be</p>

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						<p>required”.</p> <p>Action: Yes, clause 3.6.9(d), last sentence: Delete the existing wording “For generating units exporting above 1 MW, a dedicated telephone link or other dedicated communication channel may be required” and replace it with: <u>“For generating units exporting above 1MW, a back-up speech communication channel pursuant to clause 3.3.4.3(d) may be required”.</u></p>
35 ex 22	Clause 3.6.10 Clause 3.6.10.4	Protection	Western Power	The 1 st sentence of clause 3.6.10.4(a) “This clause 3.6.10 applies only to <i>protection</i> necessary to maintain <i>power system security</i> .” Is better suited to be the 1 st sentence of clause 3.6.10.		<p>Action: Yes, move the 1st sentence of clause 3.6.10.4(a) “This clause 3.6.10 applies only to <i>protection</i> necessary to maintain <i>power system security</i>.” to be the 1st sentence of clause 3.6.10, as follows:</p> <p>Clause 3.6.10, 1st sentence: <u>“This clause 3.6.10 applies only to <i>protection</i> necessary to maintain <i>power system security</i>.”</u> and delete it from clause 3.6.10.4: “This clause 3.6.10 applies only to <i>protection</i> necessary to maintain <i>power system security</i>.”</p>
36 ex 23	Clause 3.6.10.1(a)	Protection General	Western Power	A typo in the cross-reference to “this clause”, the reference should be made to “clause 3.6.10” (not to “clause 3.6.10.1”)		<p>Action: Yes, replace erroneous cross-reference to clause 3.6.10.1 to that to clause 3.6.10, as follows. <u>“clause 3.6.10.1 clause 3.6.10.”</u></p>
37	Clause	Protection	Western Power	Clarification by more specific wording,		Action: Yes , Clause 3.6.10.1(g),

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ex 24	3.6.10.1(g) Explanatory box	General		"connection type" to be "earthing system"		explanatory box. Delete " connection type " and replace it with " <u>earthing system</u> "
38 ex 25	Clause 3.6.10.1(h) Explanatory box	Protection General	Western Power	Clarification by more specific wording, "vector surge" to be "voltage vector shift", and ""reverse power" to be "directional (export) power"		Action: Yes , Clause 3.6.10.1(h), explanatory box. Delete " vector surge " and replace it with " <u>voltage vector shift</u> " Delete " reverse power " and replace it with " <u>directional (export) power</u> "
39 ex 26	Clause 3.6.10.1(i)	Protection General	Western Power	Clarification by better wording, "reverse power" to be "directional (export) power"		Action: Yes , Clause 3.6.10.1(i), Delete " reverse power " and replace it with " <u>directional (export) power</u> "
40 ex 27	Clause 3.6.10.1(l)	Reference to clause 3.6.10.1	Western Power			WP Comment: Editorial which appears in some versions of the MS Word software but not in others. Replace, where necessary, reference to clause 3.6.101 with that to clause 3.6.10.1 Action: Yes , Clause 3.6.10.1(l), end. Delete reference to " clause 3.6.101 " and replace it with that to " <u>clause 3.6.10.1</u> "
41 ex 28	3.6.10.3(a), First row	Reference to clause 2.9.2(b)(1)		Clarification by including a cross-reference to improve readability. Clarification that islanding protection for small generators must comply with generic requirements for islanding protection in distribution system of clause 2.9.2(b)(2), that also apply to Western Power and other network Users. (This is in contrast to the protection systems installed solely to cover risks associated with		Include a cross-reference to clause 2.9.2(b)(2) at the beginning of this clause 3.6.10.3. Action: Yes , add the following words at the beginning of clause 3.6.10.3: " <u>The generic requirements of clause 2.9.2(b)(2) apply to the islanding protection of this clause 3.6.10.3.</u> "

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				a User's equipment and which are at the User's discretion.)		
42 ex 29	Clause 3.6.10.3(a), First row	Islanding Protection	Western Power	Delete unnecessary word "sustained" as is confusing. This editorial was agreed at the time but, somehow, not implemented.		<p>WP Comment: A newly found editorial, delete word "sustained". The change was agreed at the time and somehow not implemented.</p> <p>Action: Yes, clause 3.6.10.3(a), first row. Delete word "sustained". The beginning of subclause 3.6.10.3(a), should read as follows:</p> <p>"For sustained parallel operation (which excludes rapid or gradual bumpless transfer), islanding protection ... "</p>
43 ex 30	Clause 3.6.10.3(a), First row	Islanding Protection	Western Power	<p>Clarification by more specific wording, that at least one type of loss of mains protection must be used to perform the islanding function in each of the two protection schemes.</p> <p>Relaxation for non-exporting generators with the aggregate rating of less than 150kVA (from compliance with the requirement of clause 2.9.2(a)(3)) that both independent islanding schemes can be in the form of a directional power function.</p>		<p>Clarification by more specific wording, that at least one type of loss of mains protection must be used to perform the islanding function (where parallel operation is the mode of the generating unit).</p> <p>Where there is no export of power into the network and the aggregate rating is less than 150kVA, then the requirement can be further relaxed to that the both independent islanding <i>protection schemes</i> can be in the form of a directional power function that will operate for power export. Directional overcurrent relays may also be used for this purpose.</p> <p>Action: Yes, add new subclauses 3.6.10.3(a)(1) & (2), as follows:</p>

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						<p><u>“(1) A specialist loss of mains protection function must be included in each of two independent protection schemes.”</u></p> <p><u>“(2) Where there is no export of power into the network and the aggregate rating is less than 150kVA, both independent islanding protection schemes can be in the form of a directional power function that will operate for power export. Directional overcurrent relays may also be used for this purpose.”</u></p>
44 ex 31	Clause 3.6.10.3(b), First row	Islanding Protection	Western Power	Clarification by more specific wording on what type of islanding protection is required - that at least one type of loss of mains protection must be used to perform the islanding function.		<p>Action: Yes, clause 3.6.10.3(b) should be changed to read:</p> <p><u>“Generating units designed for gradual bumpless transfer must be protected with at least one type of <i>loss of mains protection islanding protection scheme</i>. The protection functions used must be selected and set to enable them to detect the islanding condition.”</u></p>
45 ex 32	Clause 3.7.3 Clause 3.7.7 Clause 3.7.8.3	Re-confirmation of correct operation	Verve Energy	This clause prescribed that protection system test results had to be certified by a Chartered Professional Engineer with NPER status, which was considered to be too restrictive and represented a cost imposition to small inverter connected generators less than 30kVA.		<p>This clause 3.7.8.3 to be changed to read:</p> <p><u>“(a) A User must design, install and commission the inverter energy system in <i>good working order</i>, in accordance with <i>good industry practice</i> and as recommended by the manufacturer.</u></p> <p><u>(b) A User must maintain the integrity of the protection and control systems of the inverter energy system so that they comply with the requirements of these Rules, AS4777-2005 and the access contract <i>connection agreement</i> at all times.”</u></p> <p><u>(c)(b) The User must test the inverter</u></p>

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						<p>protection systems for correct functioning at regular intervals not exceeding 5 years. The <i>User</i> must arrange for a suitably qualified person to conduct <u>and certify</u> the tests <u>and supply the results to the Network Service Provider.</u></p> <p>(d)(a) The <i>Network Service Provider</i> may elect to inspect the proposed installation from time to time to ensure continued compliance with these requirements. In the event that the <i>Network Service Provider</i> considers that the installation poses a threat to safety, to the <i>quality of supply</i> or to the integrity of the <i>distribution system</i>, it may <i>disconnect the inverter energy system generating equipment.</i></p> <p>WP Reply: Agree, with the revised wording proposed here, however the respective clauses 3.7.3 and 3.7.7 are more suitable location for items (a) and (b) proposed here.</p> <p>Action: Yes, as follows. Clause 3.7.3 should be changed to read as follows: Item (a) proposed here to become new clause 3.7.3(e) and renumber the existing clause 3.7.3(e) as new clause 3.7.3(f): <u>“(e) A <i>User</i> must design, install and commission the inverter energy system in accordance with good industry practice and as recommended by the manufacturer.</u></p> <p>(f)(e) Should it be necessary to change any parameter of the equipment as installed and contracted, approval must be sought from Network Service Provider. Subsequently,</p>

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						<p>the Network Service Provider will determine whether a revised application is required.</p> <p>Clause 3.7.7 should be changed to read as follows: The last sentence of existing clause 3.7.7 to become new clause 3.7.7(a) and item (b) proposed here to become new clause 3.7.7(b):</p> <p><u>(a)</u> The <i>User</i> must provide the information required by the <i>Network Service Provider</i> prior to approval being given.</p> <p><u>(b)</u> <i>A User must maintain the integrity of the protection and control systems of the inverter energy system so that they comply with the requirements of these Rules, AS4777-2005, and the connection agreement at all times.</i></p> <p>Clause 3.7.8.3 to be changed as requested in items (c) and (d) here.</p>
46 ex 33	Clause 3.7.6.2, Table 3.7	Required switches	Users	Delete the 2 nd row of Table 3.7, "Supply to the User from the inverter only", as is confusing and not relevant to parallel operation and connection to the Western Power's distribution network.		<p>Action: Yes, Clause 3.7.6.2, Table 3.7.</p> <p>Delete the 2nd row of the table, as follows: "OFF ON Supply to the User from the inverter only"</p>

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47 ex 34	Clause 3.7.9, Table 3.9	Signage Examples	Western Power	Warning labels of Table 3.9 are shown white letters on red background. These are old colours, as AS4777 refers to AS1319 that states that warning/hazard signs should be yellow with black writing.		Action: Yes, Clause 3.7.9, Table 3.9, the 1 st column, the 1 st two rows. Change “white letters on red background” to “black letters on yellow background” to comply with ASAS1319, as follows: “Colour: yellow red , black white letters”.
48 ex 35	Clause 3.6.5 Table 3.5 Clause 3.7.6.2, Table 3.7 Clause 3.7.7.5, Table 3.8 Clause 3.7.9, Table 3.9	Numbering of tables	ERA (Nick Parkhurst)	There is no Table 3.4 and 3.6 in the Rules. ‘Old Table 3.6” was deleted, but the remaining tables in Chapter 3 were not re-numbered accordingly.		Action: Yes, Renumber Tables 3.5 to 3.9 as new Tables 3.4 to 3.7 and change the cross-references in the body of the text accordingly, as follows. Table 3.5 to be new Table 3.4, ie Table 3.4 Table 3.5 ; Table 3.7 to be new Table 3.5, ie Table 3.5 Table 3.7 ; Table 3.8 to be new Table 3.6 Table 3.6 Table 3.8 ; Table 3.9 to be new Table 3.7 Table 3.7 Table 3.9 ;
49	Clause 3.3.3.3c(2) Figure 3.5a Clause 3.3.3.3(e) Figure 3.5b Clause 3.7.6.2 Figure 3.6	Numbering of figures	Western Power	The notation of Figures 3.5a and 3.5b is inconsistent with sequential numbering used in the remainder of the Rules.		Action: Yes, Renumber Figures 3.5a, 3.5b and 3.6 as new respective Figures 3.5 to 3.7 and change the cross-references in the body of the text accordingly, as follows. Figure 3.5a to be new Figure 3.5, ie Figure 3.5 Figure 3.5a ; Table 3.5b to be new Table 3.6, ie Figure 3.6 Figure 3.5b ; Table 3.6 to be new Table 3.7 Figure 3.7 Figure 3.6 ;

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50	Clause 4.2.2	Commissioning	Western Power	The design safety and compliance with the Rules need to be certified before energizing the installation.		<p>Action: Yes, add new sub-clause 4.2.2(b)(1) to that effect as follows:</p> <p><u>(1) The Network Service Provider must not approve energization of the User's equipment before the User's design has been certified by a Chartered Professional Engineer with National Professional Engineer's Register Standing qualified in the relevant discipline for compliance with these Rules and safety to satisfaction of the Network Service Provider.</u></p>
51 ex 36	Clause 4.2.5	Commissioning Tests	Western Power	<p>Commissioning of the earthing grid must be carried out by an independent party that was not involved in the project: design (including soil resistivity testing used to determine the soil model for the design) or installation of the earthing grid.</p> <p>This is required to prevent conflict of interest.</p>		<p>Action: Yes, add new clause 4.2.5(b) to that effect, as follows:</p> <p><u>"(b) Commissioning of the earthing grid must be carried out by an independent party that was not involved in the project: design, installation or soil resistivity testing."</u></p> <p>And renumber the remaining clauses (b) to (g) as new clauses (c) to (h).</p>

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52 ex 37	Clause 4.2.5	Commissioning Tests	Western Power	<p>Certification of the earthing grid must be carried out by an independent party that was not involved in the project: design (including soil resistivity testing used to determine the soil model for the design) or installation of the earthing grid.</p> <p>This is required to prevent conflict of interest.</p>		<p>Action: Yes, add new subclause 4.2.5(c)(1) (to the existing subclause (b)), to that effect, as follows:</p> <p><u>“(1) Certification of the earthing grid must be carried out by an independent party that was not involved in the design or installation of the earthing grid.”</u></p>
53 ex 38	Clause 4.3.4(b)	Involuntary Disconnection	Western Power	<p>A typo in the cross-reference to “clause 4.3.5”, the reference should be made to “clause 4.3.6” (not to “clause 4.3.5”)</p>		<p>Action: Yes, replace erroneous cross-reference to clause 4.3.5 to that to clause 4.3.6, as follows.</p> <p><u>“clause 4.3.6 clause 4.3.5”</u></p>
54 ex 39	New clause 4.3.7	Disconnection for safety	Western Power	<p>If a User’s plant relies on other plant(s) to meet the safety earthing requirements, that plant must be disconnected each time the earthing connection to other plant (it depends to meet the safety requirements) is disconnected.</p>		<p>Action: Yes, add new clause 4.3.7 to that effect, as follows:</p> <p><u>“New clause 4.3.7 Disconnection for Safety</u></p> <p><u>If a User’s plant relies on other plant(s) to meet the safety earthing requirements, then the Network Service Provider or System Management must disconnect the User’s plant each time the earthing connection to other plant(s), it depends to meet the safety requirements, is disconnected.</u></p> <p>And renumber the remaining clause 4.3.7 to new clause 4.3.8.</p>

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55 ex 40		ATTACHMEN T 1 - GLOSSARY	Verve Energy	The meaning of a 'non-synchronous generating unit' is ambiguous and needs defining for clarity.		<p>A definition of "non-synchronous generating unit" should be added to the glossary to read: "Any <i>generating unit</i> other than a directly connected <i>synchronous generating unit</i>.</p> <p>WP Reply: Agree</p> <p>Action: Yes, Glossary.</p> <p>Define new term <u>"non-synchronous generating unit"</u> as <u>"any generating unit other than a directly connected synchronous generating unit"</u>.</p>
56 ex 41		ATTACHMEN T 11 – TEST SCHEDULE	Verve Energy	<p>Generator tests are required to verify the performance of all generators who provide ancillary services to the Wholesale Electricity Market.</p> <p>Consulted with the System Management (SM) after the re-convened TRC met on 4/9/08.</p> <p>The SM believes that the performance tests regarding ancillary services should be under the authority of Market Rules, which also provide the required transparency through the ERA, IMO & MAC processes and publications.</p> <p>The proposed, when implemented, would keep all market related issues under 'one roof', provide transparency and streamline implementation.</p>		<p>Western Power and System Management to initiate resolution of this issue of quality standards for provision of ancillary services through market processes, not through the Technical Rules.</p> <p>Western Power and System Management to propose quality standards and test schedule for individual ancillary services of the Wholesale Electricity Market Rules through a market mechanism.</p> <p>Action: No.</p>

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57 ex 42		ATTACHMENT 13 – EARTHING DATA	Western Power	Earthing system design and performance has emerged as an issue to be addressed to provide clarity and transparency.		Action: Yes , add new Attachment 13, see the draft Rules .
58		ATTACHMENT 13 – EARTHING DATA	Western Power	<p>There is a need to specify key earth design input parameters early in the project, for an example refer to AS2067(1984), Appendix A – INFORMATION TO BE GIVEN WITH ENQUIRY AND ORDER.</p> <p>That list, which is intended to be given to the access applicant early in the process, should streamline the design and certification and help to avoid unnecessary delays.</p>		<p>Action: Yes, include the list of key input earth grid design parameters at the beginning of Attachment 13.</p> <p>That list will be provided separately (as is not included yet in the current draft of Attachment 13).</p>