

Decision on Applications for exemption from certain requirements of the Technical Rules submitted by Western Power

Protection Schemes Mumbida-Mungarra and Mumbida-Three Springs 132 kV Lines

Supply to Karara Mining Limited

July 2012

Economic Regulation Authority

WESTERN AUSTRALIA

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DECISION

1. Western Power has submitted applications to the Economic Regulation Authority (**Authority**) for exemption from compliance with certain requirements of its Technical Rules in relation to the supply of electricity to Karara Mining Ltd (**KML**) and the proposed Mumbida Windfarm. The applications are made under section 12.40 of the *Electricity Networks Access Code 2004* (**Access Code**).
2. Technical Rules consist of the standards, procedures and planning criteria governing the construction and operation of an electricity network and are required under the Access Code for all covered networks. The Authority first approved and published Western Power's Technical Rules on 26 April 2007 which became effective from 1 July 2007. Revisions to the Technical Rules were approved by the Authority on 10 November 2011 and took effect from 23 December 2011.
3. Under section 12.40 of the Access Code, a service provider may apply to the Authority for an exemption from one or more requirements of its technical rules which apply to the service provider and all applicants, users and controllers of the covered network.
4. Section 12.41 of the Access Code requires the Authority to determine an application as soon as practicable as a reasonable and prudent person on reasonable technical and operational grounds and having regard to the effect the proposed exemption will have on the service provider and users of the network and any interconnected network. The Authority must grant the exemption if it determines that in all the circumstances, the disadvantages of requiring compliance with the Technical Rules are likely to exceed the advantages.
5. Under section 12.46 of the Access Code, the Authority may consult the public in accordance with Appendix 7. The Authority issued an invitation for submissions on 30 May 2012, with a closing date for submissions of 14 June 2012. As part of this consultation, the Authority prepared an issues paper to assist interested parties. A submission was received from Tesla Corporation which has been published on the Authority's website.¹
6. After consideration of Western Power's applications for exemption to the Technical Rules, independent advice from the Authority's technical advisor and public submissions, the Authority has determined that the disadvantages of requiring compliance with the Technical Rules are likely to exceed the advantages and, therefore, approves the applications.
7. The approved exemptions are:
 - exemption from clause 2.9.4 of the Technical Rules, specifically for protection clearance time for the future Mumbida – Three Springs and Mumbida – Mungarra 132 kV lines under abnormal operating conditions; and
 - exemptions in relation to the connection for KML:
 - in relation to the temporary supply arrangements prior to the Mid West Energy Project (**MWEP**) being completed: exemption from the requirement of clause 2.5.2.2 of the Technical Rules to design the 132 kV

¹ Economic Regulation Authority website:
http://www.erawa.com.au/2/156/48/electricity_access__technical_rules.pm

sub-network at Eneabba Substation to supply KML to N-1 criterion and instead base the design on a lower criterion of N-0.²

- in relation to the supply once the MWEF is complete: exemption from the requirement of clause 2.5.2.3 of the Technical Rules to design the 330 kV transmission network between Neerabup Terminal and Three Springs Terminal and the 330 kV Three Springs Terminal to supply KML to N-1-1 criterion and instead base the design on a lower criterion of N-0.

² Terminology such as “N-0” and “N-1” is commonly used for describing the level of security of the transmission system. Where loss of a single transmission element (a line, transformer or other essential piece of equipment) could cause a supply interruption to some customers, the level of security of supply is said to be “N” or “N-0”. “N-1” is a higher level of security and describes a network built to a standard such that a network element can be out of service without overloading the remaining elements or resorting to load shedding.

REASONS

Access Code Requirements

8. Section 12.41 of the Access Code requires the Authority to determine an application as soon as practicable as a reasonable and prudent person on reasonable technical and operational grounds and having regard to the effect the proposed exemption will have on the service provider and users of the network and any interconnected network. The Authority must grant the exemption if it determines that, in all the circumstances, the disadvantages of requiring compliance with the Technical Rules are likely to exceed the advantages.
9. Under section 12.43 of the Access Code, an exemption:
 - may be granted for a specified period or indefinitely;
 - may be subject to any reasonable conditions the service provider considers fit, in which case the network persons must comply with the conditions, or may be unconditional; and
 - may be varied or revoked by the service provider after reasonable notice to the network persons.

Western Power's Applications for Exemption

10. Western Power submitted two applications for exemptions to the Authority on 7 May 2012:
 - exemption from clause 2.9.4 of the Technical Rules, specifically for protection clearance time for the future Mumbida – Three Springs and Mumbida – Mungarra 132 kV lines under abnormal operating conditions; and
 - exemptions in relation to the connection for KML:
 - in relation to the temporary supply arrangements prior to the MWEP being completed: exemption from the requirement of clause 2.5.2.2 of the Technical Rules to design the 132 kV sub-network at Eneabba Substation to supply KML to N-1 criterion and instead base the design on a lower criterion of N-0.³
 - in relation to the supply once the MWEP is complete: exemption from the requirement of clause 2.5.2.3 of the Technical Rules to design the 330 kV transmission network between Neerabup Terminal and Three Springs Terminal and the 330 kV Three Springs Terminal to supply KML to N-1-1 criterion and instead base the design on a lower criterion of N-0.

³ Terminology such as “N-0” and “N-1” is commonly used for describing the level of security of the transmission system. Where loss of a single transmission element (a line, transformer or other essential piece of equipment) could cause a supply interruption to some customers, the level of security of supply is said to be “N” or “N-0”. “N-1” is a higher level of security and describes a network built to a standard such that a network element can be out of service without overloading the remaining elements or resorting to load shedding.

Western Power's Assessment

Mumbida Windfarm

11. Western Power considers that, in the case of the Mumbida Windfarm connection, the additional cost to implement a solution which is compliant under all operating conditions cannot be justified at this time because the cheaper non-compliant solution provides an acceptable technical outcome and better meets the Technical Rules objectives of section 12.1 of the Access Code.⁴

Karara Mining

12. In the case of the exemptions relating to KML, Western Power has advised that the exemption will apply to the KML load facility only, as load shedding and load tripping schemes will be installed as part of this connection to ensure other network customers do not experience a reduced quality and reliability of supply. Western Power considers the exemption is justified on the basis that:
 - It is consistent with the need for an exemption identified in Western Power's MWEF regulatory test submission approved by the Authority and also with the subsequent pre-approval new facility investment test (**NFIT**) determination by the Authority.
 - The intent of the N-1-1 planning criterion covering all 330 kV equipment embedded in the Technical Rules (to avoid the loss in supply to a large number of customers) is not reasonably applicable for supply to a distant single customer such as KML.
 - The additional cost of providing a fully compliant N-1-1 connection at Three Springs Terminal, estimated at \$461 million in real 30 June 2010 dollars (in addition to the capital cost of the MWEF solution) is clearly uneconomic to KML and other network users.
 - The additional cost of providing an N-1 connection at Three Springs Terminal as an alternative solution is estimated at \$79 million in real 30 June 2010 dollars. The Authority's final MWEF NFIT determination shows these higher costs would not meet NFIT and would require a major capital contribution from KML without additional major mining or other block loads connecting beyond KML's 120 MW.
 - The provision of a higher level of reliability (i.e. N-1 and N-1-1) at the 330 kV bus at Three Springs Terminal would only result in a marginal improvement in supply reliability for KML given that KML will be exposed to an N-0 level of supply reliability over its 110 km 330 kV transmission connection asset to its mine site.
 - In extensive consultation with KML over an extended period, KML has confirmed that an N-0 level of supply reliability is acceptable to the KML operation to avoid the additional costs of providing a higher level of supply reliability for its initial operations.
13. In its application, Western Power provided a copy of a letter from KML indicating support for Western Power's application and confirming understanding of the implications for KML. Western Power has also advised that a condition of the commercial agreements under which network services will be provided to KML is that the Authority grants any necessary exemptions or derogations to the Technical Rules in respect of the services provided.

⁴ The objectives for technical rules are that they are reasonable, do not impose inappropriate barriers to entry to a market, are consistent with good electricity industry practice and are consistent with relevant written laws and statutory instruments.

Public Submissions

14. Under section 12.46 of the Access Code, the Authority may consult the public in accordance with Appendix 7. The Authority issued an invitation for submissions on 30 May 2012, with a closing date for submissions of 14 June 2012. A submission was received from Tesla Corporation and has been published on the Authority's website. The issues raised by Tesla Corporation are discussed below under "Authority's Considerations".

Authority's Considerations

15. In considering whether to approve Western Power's applications for exemption from certain aspects of the Technical Rules, the Authority must, having regard to the effect the proposed exemption will have on the service provider and users of the network and any interconnected network, grant the exemption if it determines that in all the circumstances, the disadvantages of requiring compliance with the Technical Rules are likely to exceed the advantages.

Mumbida Windfarm

16. The Authority's technical adviser has carried out a high level review of Western Power's application and notes that:

Western Power is proposing to install a power line carrier (PLC) rather than the radio network it considers is required for full compliance with the protection requirements specified in the technical rules, at a saving of approximately \$1.4 million. With this solution the protection will fully comply with the requirements of the Technical Rules under normal operating conditions. However, the clearing time will be slower than the specified 115 ms only if the following events all occur at the same time:

- One of the 132 kV lines feeding into Mumbida substation is out of service; and
- The output of the Mumbida wind farm is less than 11.5 MVA; and
- The protection scheme on the remaining line that does not rely on the PLC communication link is unavailable or fails to operate correctly.

While it is quite likely that the situation in the first two bullets will occur simultaneously, having all three occur at the same time is much less likely. In addition, it is not clear that a slower clearing time would have an adverse affect on the operation of the network in this particular instance.

17. The submission from Tesla Corporation noted Western Power's comment that the "additional cost to implement a solution which is compliant under all operating conditions cannot be justified at this time because the cheaper non-compliant solution provides an acceptable technical outcome...". Tesla Corporation considers this argument could be applied to many situations and that it is unclear why, in this situation, Western Power is satisfied a cheaper non-compliant solution is acceptable. Tesla Corporation is concerned that the allowance of a "cheaper" solution does not appear to be applied evenly across the board, and considers Western Power should provide guidance as to which particular situations Western Power would accept a "cheaper non-compliant solution" for connection projects. Tesla Corporation also considers it is not clear what, if any, risk Mumbida will be taking in exchange for lower capital costs.
18. The Authority notes the concerns raised by Tesla Corporation. However, for the purposes of determining whether to approve the application for exemption, the Authority can only consider the circumstances relating to the exemption application.

Notwithstanding, the Authority agrees that to ensure efficient development of the network it is important that consideration is given, where appropriate, to cheaper non-compliant solutions where the costs of requiring compliance with the Technical Rules exceeds the advantages. To ensure such analysis is being conducted evenly across the board it would be helpful if Western Power provided guidance to interested parties regarding how cheaper non-compliant solutions are identified and evaluated.

19. The Authority notes the advice of its technical adviser which considers it is unlikely a situation which causes a slower clearing time would occur. Furthermore, the Authority's technical adviser considers that, in any case, it is not clear that a slower clearing time would have an adverse impact on the operation of the network. Taking account of the additional cost required for a fully compliant scheme, the Authority considers the disadvantages of requiring compliance with the Technical Rules are likely to exceed the advantages.

Karara Mining

20. The Authority's technical adviser has carried out a high level review of Western Power's application and notes that:

KML is prepared to take supply under n-0 reliability which means that, in the event of a contingency occurring, supply can be maintained to all other connected customers.
21. In its submission, Tesla Corporation considered that KML is implementing a cheaper connection, but is taking a higher level of risk by accepting that the lower reliability may result in load shedding and tripping to its own facilities. Tesla Corporation supported the notion that market participants should be allowed to save on capital expenditure if the risk of reliability is borne by the same participant. Tesla Corporation considered it is clear in this case that KML is accepting risk in return for lower costs.
22. The interim supply arrangements and final supply arrangements are considered separately below.

132 kV Contingent and Interim Supply Stages

23. The Technical Rules require N-1 compliance for 132 kV transmission lines. Western Power's application notes it has not identified any reasonable alternative option under which a fully compliant N-1 supply planning criterion can be met to provide KML with a reference service supply from the existing 132 kV sub-network at Eneabba substation during the Contingent and Interim Supply stages.
24. Western Power's application includes a letter from KML stating that it understands the meaning of the N-0 criterion and its impact on KML's operations and that such criterion is acceptable to KML.
25. The Authority notes that supply will be maintained to all other connected customers at the level required by the Technical Rules.
26. Taking account of the matters discussed above, the Authority considers the disadvantages of requiring compliance with the Technical Rules during the 132 kV contingent and interim supply stages are likely to exceed the advantages.

330 kV Final Supply Stage

27. The Authority notes Western Power's statement that:

The 330 kV network at the time of drafting the Technical Rules was considered to be a “bulk supply” transmission network used to transfer power in bulk to Western Power’s entire SWIS customer base and so was incorporated into the N-1-1 provision as stated in the Section 2.5.2.3 of the Technical Rules.

28. Western Power states that:

When the Technical Rules were drafted the intent of Clause 2.5.2.3: N-1-1 Criterion, as is stated in the clause, was to impose a higher standard of service reliability on parts of the Western Power transmission system where the occurrence of a credible contingency during planned maintenance of another related network element would result in the loss of supply to a large number of customers. The N-1-1 criterion was adopted to avoid widespread disruption or broad economic impact of unserved energy arising from major supply interruptions.

29. Western Power does not consider that the proposed exemption will lead to a credible contingency resulting in the loss of supply to a large number of customers, or cause widespread disruption or broad economic impact. Western Power estimates the cost of an N-1-1 compliant solution to be \$461 million in addition to the expenditure already required for the MWEF (Southern Section).

30. Western Power has identified that conversion of the proposed double circuit 330 kV MWEF transmission line to operate with both circuits at 330 kV voltage level is a potential solution to providing N-1 supply planning criterion level at the 330 kV Three Springs Terminal. However, this would increase the costs by \$79 million, compared with an N-0 supply planning criterion level.

31. In its application Western Power advises KML has not sought to achieve this improved N-1 level of supply reliability due to the significant additional costs that would be incurred and a recognition that KML’s own 110 km 330 kV transmission connection asset (from Three Springs to the mine site) has been built to an N-0 level of supply reliability. This is confirmed in the letter from KML included with Western Power’s application.

32. Taking account of the matters discussed above, the Authority considers the disadvantages of requiring compliance with the Technical Rules for the 330 kV final supply stage are likely to exceed the advantages.