11 July 2017

Mr Glenn Gillin
Manager - Operations Planning
Australian Energy Market Operator
GPO Box 200
Melbourne VIC 3001

Dear Mr Gillin

RE: Consultation on SRAS Guideline, Electrical Sub-Network Boundaries, NSCAS Tender Guidelines – Issues Paper

ERM Power Limited (ERM Power) welcomes the opportunity to respond to the Australian Energy Market Operator's (AEMO) Issues Paper for the System Restart Ancillary Services (SRAS) Guideline, Electrical Sub-Network Boundaries, Network Support and Control Ancillary Services (NSCAS) Tender Guidelines consultation published in June 2017.

About ERM Power Limited

ERM Power is an Australian energy company operating electricity sales, generation and energy solutions businesses. The Company has grown to become the second largest electricity provider to commercial businesses and industrials in Australia by load[1] with operations in every state and the Australian Capital Territory. A growing range of energy solutions products and services are being delivered, including lighting and energy efficiency software and data analytics, to the Company's existing and new customer base. ERM Power also sells electricity in several markets in the United States. The Company operates 497 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland. www.ermpower.com.au

General comments

ERM Power supports AEMO's timely review of the SRAS Guideline, Electrical Sub-Network Boundaries, NSCAS Tender Guidelines prior to commencing the tender process for the 2018 SRAS procurement contract. The events in September 2016 in South Australia serve as a reminder that whilst the probability of a system black event occurring is low, these events can and do occur and result in significant economic and social impacts.

The South Australia event also highlights that whilst AEMO may believe they have secured sufficient SRAS, events beyond AEMO's and participants' control can occur which results in the procured SRAS sources failing to provide the restart service when required.

[1] Based on ERM Power analysis of latest published financial information.

Events in South Australia question the logic currently applied in AEMO's SRAS procurement process that assumes the transmission network remains intact to facilitate the activation of SRAS if it is required. We believe this assumption needs to be reconsidered and AEMO's restart model amended to cater for low probability 'black swan' type events where sections of the transmission network may not remain intact.

ERM Power remains concerned that AEMO's restart model continues to be based on theoretical assumptions regarding the restoration of generation; we believe this restart model should be amended to allow for inclusion of observable historical outcomes regarding generator restoration profiles in the National Electricity Market. Currently it is our view that AEMO's restart plan is premised on all components achieving close to perfect outcomes and this may result in a false sense of security with regard to the timeliness of achieving a successful system restart being promoted to jurisdictions and consumers.

Proposed Testing Requirements

ERM Power supports AEMO's proposal to conduct an additional short notice (within 24 hours) test of contracted SRAS source in addition to the normal pre-planned annual test each year. Whilst there are a number of logistical issues to be considered, including the requirement for confidential advance notice to Network Service Providers (NSPs) to facilitate transmission arrangements required to complete the test at short notice, we do not believe these logistical issues are insurmountable.

We believe the major issue associated with the short notice test, which in effect is unplanned from the service provider's perspective, is the recovery of additional costs that will be incurred in performing this test. The SRAS provider must be allowed to recover all costs, including any Market costs incurred in conducting the test. To achieve this, we suggest the SRAS procurement contract include separate provisions for agreed cost recovery for both the annual planned test and the additional proposed short notice test. We also suggest the Market costs component would be best served by the use of an agreed formula referenced to the respective Regional Reference Price (RRP).

ERM Power supports the proposal that testing should be based on an end-to-end test, where the unit performing the test is tripped under system black simulated conditions and results in the unit resynchronising and loading to full load to complete the test. To simulate as near as possible conditions expected under a system black scenario, we believe the unit should be tripped from loading representative of expected unit load at time of peak system demand. Following resynchronisation, the steps for loading of the unit should be specified by AEMO in real time to again simulate as close as possible the random variation in loading that represents the most likely outcomes when restoring the system under system black conditions. This may include periods where loading on the unit may be unexpectedly decreased.

Assessment of reliability of a SRAS source

ERM Power supports the proposal by AEMO to develop a new methodology for the assessment of reliability for an SRAS source. In developing this methodology we believe AEMO should consider the issues discussed below.

Where a smaller energy source, such as diesel generators or a small open cycle gas turbine, is to be used as the initial energy source to physically restart a large unit, the sizing and capability of this initial energy source must be taken into consideration. This should include an assessment of energy requirements to ensure security of other units at a multi-unit power station as well as the energy requirements for the SRAS unit and the level of redundancy contained in this initial energy source, i.e., if a medium-sized gas turbine required 10 MW for unit restart, five off - 2 MW units would all need to be available to achieve a restart, if one diesel generator was not available the GT could not achieve a successful restart. In this case seven off – 2 MW units may be needed to be installed to provide a level of redundancy for the initial restart source.

The number of physical generating units offered as available as a SRAS source. A four unit power station would have a higher probability of achieving a successful SRAS restart as opposed to a two unit or single unit facility. This is of critical importance when the restart source offered is based on achieving a successful trip-to-house outcome given the historically low success rate of trip-to-house SRAS sources during actual system black events. In effect, this is an assessment of station as opposed to individual unit availability.

The assessment of reliability should also include a historical assessment of unit return to service performance, a timely resynchronisation factor, which could be calculated based on data where a unit has come out of service for any reason and been resynchronised within 24 hrs. This would generally be a reasonable representation of what could be expected to occur under a *system black* scenario. This assessment should analyse the timing of achieving resynchronising compared to initial bids and rebids during the return to service. Where unit(s) exhibit repeated historical outcomes of delays in returning a unit to service under these conditions, this should be taken into account for assessing the potential to reliably supply SRAS. Where unit(s) at a power station have a history of delays in returning a unit to service under this set of conditions, there is a reasonable probability that they will be unable to meet the SRAS objective to restart the power system in a timely manner.

The network connection and network flow paths available for the SRAS source provide energy into the grid to provide the restart energy for other units. A unit connected via a single circuit breaker and single network connection to one other generator would have less redundancy, and therefore, lower reliability than a generator connected by a double bus double breaker or breaker and a half connection arrangement and multiple network flow paths to multiple generators. In assessing the network availability, the calculation should include both in-service trips, time out of service and failed attempts to energise any network component in the flow path.

Taking the above factors into account, and given that the failure of any one of the above components would lead to the SRAS source being unavailable to fulfil its purpose, the assessment of the reliability of a restart source could be calculated using the following formula:

> *Initial restart energy source availability **x** station availability of SRAS source **x** timely resynchronisation factor **x** network flow path availability*

Worked example:

- Initial restart energy source availability = 95%
- Station availability of SRAS source = 97% (2 unit station - % time when at least one unit is available)
- Timely resynchronisation factor = 80%
- Network flow path availability = 99%

In this example, the reliability of the restart source is 0.95 x 0.97 x 0.8 x 0.99 = 73%.

Diversity of SRAS Sources

ERM Power believes that SRAS sources should be provided from diverse geographical locations, should be provided from a diverse set of SRAS source types and should allow for diversity in energy fuel source.

Diversity of geographical location should ensure that each SRAS source has an individual and discrete network flow path(s) to deliver SRAS energy to other generators.

Diversity of SRAS source type should ensure a mixture of different types of SRAS sources are available to provide restart energy to the electrical sub-region. We do not believe it is prudent to procure all or the majority of restart sources based on one type of restart source, e.g. all restart sources for an electrical sub-region are trip-to-house.

Diversity of fuel source should ensure that multiple restart sources are not dependent on a single fuel source, e.g. a single gas pipeline. Given the uncertainty that gas will be available for use in the event of a system black event, a restart source capable of gas or liquid fuel operation would be preferable to a source capable of gas fuel operation only.

Determination of electrical sub-region boundaries

In assessing the location of electrical sub-region boundaries, ERM Power suggests that AEMO include the potential for a 'black swan' event to occur where a major switching or terminal station has failed and all network elements terminating at the location are no longer available for use to complete the restart of the system. This would also simulate the loss of multiple transmission lines due to multiple tower failure.

In addition, we believe AEMO should consider a maximum number of network elements required to be energised to move restart energy from the SRAS source to other generators within the electrical sub-network. As identified in the September 2016 South Australian system black event, each additional network element required to be energised increases the risk that the restart source will be unable to restart other generators when required to do so.

ERM Power also believes that in determining the electrical sub-regional boundaries, AEMO modelling and restart plan should not allow for the use of non-contracted SRAS sources as absent ongoing maintenance and routine testing these historical SRAS sources, as demonstrated by events during the South Australia restart process, may no longer be available for dispatch if required by AEMO.

ERM Power is concerned that due to the length and multiple network elements between electrical sub-regions and between a number of current SRAS sources and other generators within these electrical sub-regions the current electrical sub-regions within the NEM are less than optimum from a system restart perspective and this will lead to higher economic loss and social disruption than would otherwise be the case if improvements in electrical sub-region boundaries were implemented.

Calculation of aggregate reliability

In calculating aggregate reliability, we believe AEMO needs to allow for the probability that multiple SRAS sources may fail simultaneously, whilst the probability of this is very low, nevertheless, the potential for this to occur exists and should be factored into the calculation.

Currently, AEMO has yet to offer any proposed calculation for the calculation of aggregate reliability for review and comment. We look forward to AEMO providing their proposed calculation during the second stage of this consultation.

SRAS Tender process and register of interest to provide SRAS

ERM Power is concerned that currently the majority of restart sources are based on plant that is aging with an expectation that over time most of these restart sources will retire from the NEM. In addition, as this plant ages, the cost to maintain the necessary equipment to achieve a successful restart and to comply with the proposed testing regime increases which will result in increased costs to consumers for SRAS procurement. Potentially, newer more flexible plant once modified to provide SRAS may provide a lower overall cost to consumers and provide a more technically optimum service than the existing SRAS sources.

To date the relatively short length of SRAS contract, three years with an option, exercised by AEMO, of two annual yearly extensions has acted as a barrier to entry for the provision of new restart services entering the NEM. The capital costs to modify plant, in particular plant with flexible restart and loading capabilities to facilitate an optimum system restart, needs to be recovered to allow these new services with potentially lower overall cost SRAS providers to arrive. The historically short contracting period requires large capital costs recovery payments, increasing the length of the SRAS contract period to eight to ten years allows this capital costs to be smoothed over a longer period and will promote entry of new service providers which may be more technically optimum and provide lower overall costs to consumers.

We believe AEMO should more carefully consider the potential for overall lower cost to consumers and the benefits of supporting the entry of newer more flexible plant that longer contract periods may provide.

With regards to AEMO's proposed procurement process for contracts to commence in July 2018, ERM Power believes a process similar to previous years should be implemented to initiate the procurement process. In the first stage an expression of interest (EOI) for the offer of potential SRAS sources should be issued. From this EOI, AEMO should prepare a short list of participants from which formal offers would be sought for the provision of SRAS.

We also support the proposal contained within the draft guideline for a participant to provide an EOI or offer to provide SRAS to AEMO at any time. We also agree that AEMO not be required to accept this offer should it deem the additional service unnecessary. However, where a shortfall has been identified and acknowledged by AEMO in SRAS for an electrical sub-region, then where an offer has been made that complies with the SRAS Guidelines for a region where a shortfall exists, then from a good governance perspective, AEMO should prepare a report for the Reliability Panel and the Australian Energy Regulator as to the reasons behind the rejection of the unsolicited offer.

Conclusion

ERM Power supports AEMO's timely review of the SRAS Guideline, Electrical Sub-Network Boundaries, NSCAS Tender Guidelines prior to commencing the tender process for the 2018 SRAS procurement contract. The events in September 2016 in South Australia serve as a reminder that whilst the probability of a System Black event occurring is low, these events can and do occur and result in significant economic and social impacts.

We have raised a number of issues which we believe AEMO need to consider more fully during this consultation and offered some suggestions with regard to testing and the assessment of reliability of a SRAS source for AEMO's consideration. We believe these proposals will enhance both the effectiveness and overall costs of the SRAS procurement process and result in beneficial outcomes for the power system during future system restart events.

Please contact me if you would like to discuss this submission further.

Yours sincerely,

[signed]

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