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(Lodged electronically)

Amendment of the Market Ancillary Service Specification (MASS) Response to the Issues Paper

Delta Electricity operates the Vales Point Power Station situated at the southern end of Lake Macquarie in NSW. The power station consists of two 660MW conventional coal-fired steam turbo-generators. Delta Electricity welcomes this opportunity to participate in the review of the MASS.

The attachment provides responses to the issues paper. Delta believes the current MASS has been effective in supporting the provision of adequate levels of system security services and a major redesign of the specification is not required.

It is imperative that any amendment to the MASS does not require fundamental changes to the systems deployed by existing conventional plant. Costly redesigns will likely result in higher electricity costs to consumers which is contrary to the objective of this review.

A more effective MASS that encourages new entrants can be achieved through simplification of the design requirements and objectives, a reduction in the complexity of the verification process, encouraging self-verification of services by participants and the creation of consultative communication pathways between participants and AEMO.

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Yours sincerely

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1. Articulation of the principles underlying the market ancillary service specification

On page 22 of AEMOs issues paper, the articulation of the principles underlying the MASS is listed as the first key point for consideration in the review. However, there does not appear to be any specific questions posed by AEMO associated with this item.

In addressing the item, Delta Electricity understands from the issues paper that AEMO seeks to open the market up to newer technologies. AEMO appears to suggest, as a necessary part of this action, that the MASS needs to become less descriptive, defining principles of the services rather than, perhaps, the mathematical equations currently described (for the contingency services). Delta Electricity cautions against less defined services that permit wider interpretations of the requirements which could lead to less resultant services than are currently delivered.

In support of this point, the MASS is currently complex in its description of contingency services but arguably more broadly described for the regulation service.

Delta agrees that the current specifications for the verification of contingency services are unnecessarily complex. If actions to make the verification less complex can be achieved with no reduction in the current performances of participants, and no drop in the overall recovery time for each event, then Delta Electricity supports such action. Principle-based specifications which can be inconsistently interpreted by participants may inhibit efforts to maintain or improve the current performance.

2. Barriers for new entrants

What barriers to entry for new Market Participants and new technologies are contained in the current MASS and what options are available to overcome the barriers while maintaining the integrity of the markets?

Whilst the service verification for contingency services is described in complex formulas, it should be able to be applied consistently by participants. Delta Electricity, as a present registered supplier of FCAS services, does not consider the existing specification represents a barrier to entry.

Simplification of the design requirements and verification processes may encourage more participants to apply to provide the services. If the specification also provided for clear contact details to relevant AEMO personnel, participants may be encouraged to ask questions about new and existing services.

Do you agree with the approach to determining the performance of variable generation and if not, how should it be determined?

Delta Electricity considers that in accordance with scheduling processes used to predict variable generation and assign the dispatch targets for them, a common dispatch trajectory process should apply for variable generation as currently applies for synchronous generation. If another method is to be utilised, all technologies should be given the option to provide the service that carries with it the least cost outcome.

Other than high speed recorders, what options exist for verifying the performance of the plant while maintaining the integrity of the services?

Delta Electricity is comfortable with the reliance upon high speed recorders for providing data as presently specified in the MASS.

3. Definition of services

The current definitions of contingency services are considered adequate. The current definitions of the regulation services by contrast are less so. Delta Electricity supports regulation services definitions aligned to the points below:

- The definition can be consistently interpreted and the services required produced at a low cost.
- The definition results in services that can be consistently verified at a low cost.
- The definition should not require expensive plant modifications for existing suppliers to comply with or otherwise come with caveats permitting the existing generation to utilize the previous MASS for which they were constructed.
- The definition should promote a level playing field for all suppliers of the services.
- The definition should promote and require performance from all technologies that is consistently evaluated and regularly re-evaluated.

Delta Electricity's viewpoint on AEMOs specific questions regarding this issue are as follows:

Do you agree that the principle underlying the MASS should be related to the control of power system frequency, and not just the delivery of defined an amount of energy? What other principles do you believe are required?

Delta Electricity's view is that, as the market operator, it is AEMO's obligation to track and determine whether frequency is being adequately controlled across the entire NEM. Therefore, other than a review of the MASS, AEMO should also consider the breadth and reliability of its instrumentation and the resultant breadth of frequency data it monitors. A more detailed and widespread measurement of system frequency may be required by AEMO for its AGC control system to calculate and dispatch more complex and localised regulation services.

Delta's present fast and slow contingency services already consider frequency as part of the response delivery. The size of the delivered response is proportional to the size of the frequency deviation and the service decays at the same rate as the recovery of frequency back to the normal band. However, if the system frequency is volatile, unsteady, decaying or increasing due to system wide unpredictability, no single Unit can control such a situation.

As contingency services are provided in events corresponding to larger frequency deviations, and appear to be functioning adequately, the existing principles and verification requirements for the contingency services could be considered, although complex, to be appropriate for the purpose.

Given these principles, what is the most appropriate performance measure for regulation services?

The present regulation service is delivered at four second intervals by AEMOs AGC. Therefore performance cannot be measured at less than 4-8 seconds (time for detection and then time for dispatch delivery). Delta has observed that the AEMO AGC regulation dispatch has on occasions acted against the local frequency control provided automatically by the turbine fly-ball governor and associated thermal plant's coordinated control system. This apparent mismatch should be considered further in a review of the AEMO AGC dispatch system. It is recommended that AEMO consider in more detail their regulation dispatch system design, its delivery relevant to its reading of frequency and the operation of existing closed loop automatic regulation systems that cannot be influenced by AEMO's energy dispatch

signal except by way of response to the resultant frequency changes that occur. These issues should be addressed to ensure that performance measures required by the MASS are robust.

Delta's observation of increasing frequency events indicates that more regulation services may need to be dispatched in all NEM regions.

What should AEMO consider when drafting of a detailed description of the transition requirements from one contingency service to the next?

AEMO should consider the consequence of any revised MASS on existing services currently designed for the existing MASS before producing any retrospective requirements on the existing services.

Delta Electricity's fast and slow services are variable controllers as defined by the existing MASS and act in proportion to the frequency deviation and decay in proportion to the recovery of the recorded frequency back towards the normal band. The orderly transition takes place for 6 or 60s responses which vary by the amount of MWs that are added (or removed) depending on whether the enabled responses are 6s, 60s or both.

Therefore, Delta's systems are less defined by delivery time and more defined by the size of the frequency deviation and the speed of response of the turbine throttling system to a change in the turbine demand delivered to governor load setter by the DCS.

The Vales Point 5 minute delayed service is a switched control which is not proportional in size to the frequency deviation and activates immediately on detection of the AEMO assigned frequency trigger level. Frequency recovery and cessation of the delayed service is as required by the present MASS but by the nature of it being "switchable" it is a step change result on the turbine demand and the transition is only made orderly by turbine mechanical-hydraulic (Fly-ball governor) control.

A change in the specification for transition may be expensive to participants if it requires them to change the installed design and therefore whilst any revised specification can be mandated for new entrants, changes to the specification ought not to mandate a redesign of existing systems.

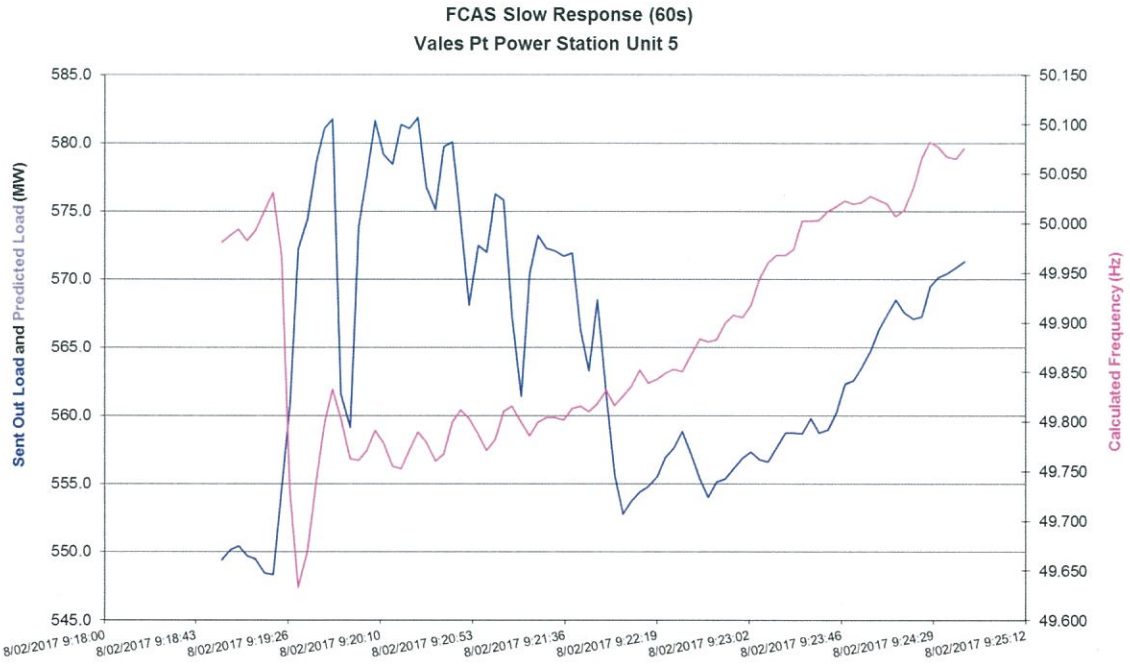
What limitations exist to inhibit the ability of plant to resume standard operations in a timely manner following the recovery of local frequency?

There are limitations due to the design of the plant, the amount of spinning reserve and the level of over or under firing that is required to meet the MASS, the deviation in frequency for the particular event and the general conditions of the system at the time of the event. Changes in the MASS that require more spinning reserve to be maintained have large fuel and cost implications to a coal fired Unit.

There are no limitations on the Vales Point plant that prevent a resumption of standard operations assuming the system recovery is in accordance with the AEMC/Reliability Panel's determined frequency operating standards and no further event occurs before the Unit has time to fully recover from any previous event. If multiple contingency events are occurring in short intervals between each event, then the limitations on any required sustained recovery are the constraints set by the plant's physical characteristics. These are considered for in the services currently registered for FCAS.

One limitation inherently in the current overall process on the system is the present volatility of experienced frequency. If the overall recovery of the system frequency, as being controlled by AEMOs AGC and the FCAS delivery of all connected machines in the NEM, is not smooth, the fly-ball governor

of the Vales Point turbines will respond to any resultant erraticism and attempt to retard it leading to further complexity in the overall control. Here is an example of a response to a typical contingency event in recent times.



The pink trace displays the recovery of local frequency but it is far from smooth in its recovery and its fluctuating nature appears to result in fluctuating load response from the fly-ball governor and the unit's coordinated controls. Although the response is erratic, Delta's machines met the MASS for this event. Such charts display the present difficulties being experienced because the system frequency, which all synchronous units are locked into, is no longer as steady as it was in 2001 when the frequency operating standards were first relaxed.

4. Performance parameters and verification requirements

The current verification methods of contingency services are considered costly but adequate. The current verification methods of the regulation services by contrast are unclear or incomplete. Delta Electricity supports performance parameters and verification requirements for regulation services that:

- can be consistently interpreted at low cost;
- can be consistently performed at low cost;
- do not require expensive plant modifications for existing suppliers to comply with or otherwise come with caveats permitting the existing generation to utilize the previous MASS for which they were constructed;
- promote a level playing field for all suppliers of the services; and
- demand a consistent performance from all technologies.

Delta Electricity also supports any increased monitoring by the Operator. It has been some time since high speed data was requested from Vales Point as part of an AEMO investigation into particular contingency events.

Delta Electricity's viewpoint on AEMOs specific questions on this issue are as follows:

In your opinion, what is the most practical and efficient method of measuring the performance of generating units or loads registered to provide regulating raise or regulating lower services?

Delta Electricity considers that there is no easy way to measure and tightly control frequency in the current market as newer and different technologies continue to enter in increasing numbers. It is considered that thermal and other large frequency controlling plants will continue to offer effective market ancillary services whilst new technologies emerge.

The specification requires more definitive expectations for the regulation services but mandated redesigns of existing system should take place only if participants are proceeding to alter relevant equipment associated with these services in projects the participant initiates.

AEMO are advised to coordinate on-line testing of the regulation delivery to confirm a Unit's actual response performance and encourage any simple improvements that are possible. Retrospective assignment of a new regulation design to existing systems should not be mandated but continual performance measured against a benchmarked test should be expected and any detected performance that represents a risk to system stability discouraged.

As part of improvements, AEMO could develop a communication pathway for participants to share responses and report difficulties seeking AEMO advice on how improvements could be achieved by coordinated action between AEMO AGC control responses and a participant's control system.

What are the limitations to your plant's ability to perform accurately and in a timely manner to AGC signals for regulation services? And if so how can these be overcome?

There are limitations due to the design of the plant, the amount of spinning reserve required to meet the MASS, the deviation in frequency for the particular event and the resultant level of over or under firing and the general conditions of the system at the time of the event. Changes in the MASS that require more spinning reserve to be maintained have large fuel and cost implications to a coal fired Unit.

Delta Electricity's Vales Point Units are designed for synchronous operation on a 50Hz network. They were designed for a much tighter frequency control than is now required in the NEM. The automatic fly-ball governor systems of the turbine may be able to be relaxed to suit a wider tolerable frequency band but it is unlikely the response of these systems can assist an erratic system frequency or be easily tuned to meet a performance criteria defined by AEMO especially if the system frequency at the time of testing is erratic.

Do you agree with the principles for contingency verification and if not what principles should apply?

The present verification process for contingency services is complex but can be consistently applied. The use of AEMOs FCASVT should be encouraged to ensure a consistent verification is taking place.

What amendments are required to the FCASVT to better represent the performance of your plant?

The tool appears to be adequate.

5. Allocation of switching controller settings

Delta Electricity currently provides a switched controller for the delayed service.

Delta Electricity's viewpoint on AEMOs specific questions on this issue are as follows:

What limits exist in switching controllers on potential range of frequency settings and can this be adjusted?

Vales Point provides the existing services to meet the existing MASS taking into account the use of spinning reserve, the time it takes to rebuild the reserve, the sizing of boiler drums, the costs of providing the service, the consumption of plant life and resultant maintenance costs etc. Therefore, the current frequency controls can be modified within tight constraints. Revised settings that require more reserved energy are expected to have expensive consequences on fuel use, plant life and maintenance costs and will result in higher prices for the services.

The switched controller Delta Electricity utilises is adjustable and the frequency settings are not restricted but are also not expected to exceed the 47 to 52Hz system standard.

Finer steps on the selection of frequency activation should be possible but AEMO should keep in mind that the switching controllers may not be detecting frequency as fast as the high speed recorders. AEMO may need to consider and define what resolution of detection for these services is required. If changing the specification, AEMO should consider the impact of retrospective application and permit existing systems to remain as previously designed with upgrades occurring on a voluntary basis.

The Vales Point DCS has a control block for these settings and AEMO only needs to advise of new settings for them to be implemented. The only delay in implementation would be a procedural one to document, assess and approve or reject the request. Implementation of new settings can be performed by Unit operators. Rejection of a request would not occur without reported engineering reasons. On the other hand, regular adjustments are not expected for this service and if required, it is suggested that AEMO should consider and define a more automated process for adjustment.

The amount of energy the controller applies is also adjustable but is set to levels considered appropriate for the current registered service and the safe operation of the Vales Point Units. Revised settings that require more reserved energy are expected to have expensive consequences on fuel use, plant life and maintenance costs and will result in higher prices for the services.

Do you agree with the proposed principles for the allocation of switching controller frequency settings? If not what principles should apply?

The switched controls have not been heavily utilised at Vales Point at the current frequency settings allocated by AEMO in 2012. At these current settings, over delivery as suggested by AEMO in the Issues paper is not presently an issue at Vales Point.

The proposed principles of meeting the frequency operating standards with flexibility, fairness and certainty are supported by Delta Electricity where inexpensive solutions to achieve them are possible.