



AEMO Workshop: Commissioning

May 2018

Agenda

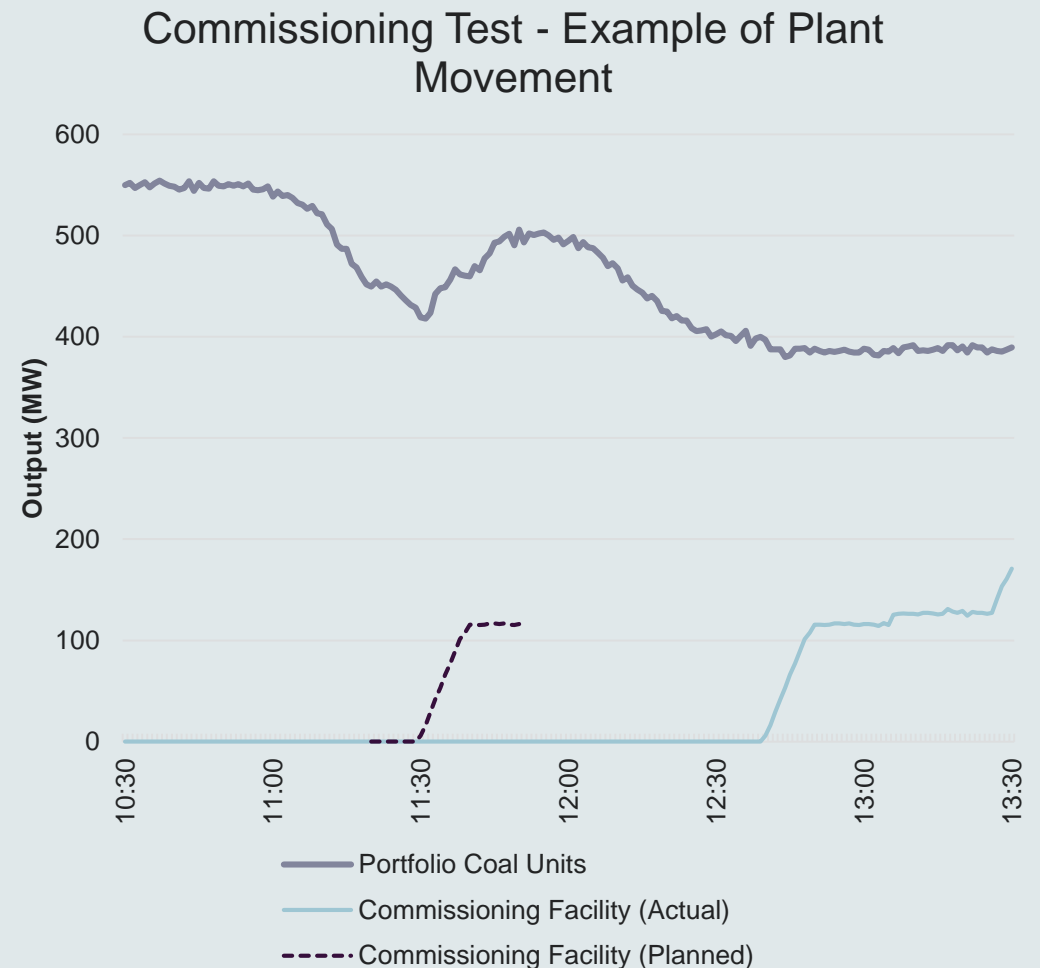
- Assumptions and intended outcomes
- AEMO's intended outcomes for Commissioning Tests
- For consideration – flexibility in approval of Commissioning Test Plans
- WEM Rule requirements and scenarios
 - WEM Rule requirements
 - Definitions
 - Scenarios
 - Assessment
 - Commissioning Test Plan occurring during Planned Outage
 - Commissioning Test not following significant maintenance
 - Commissioning Test during Planned Outage
 - Insufficient time to assess
 - Modification
 - Update of Commissioning Test Plan during Trading Day
 - Update of Commissioning Test Plan on Scheduling Day (or earlier)
 - Extension of Commissioning Test Plan beyond Commissioning Test Period
 - Operation
 - Dispatch of Facility for Commissioning Test Plan
 - Operation of Facility for Commissioning Test Plan
 - Delay
 - Delay of Commissioning Test within Trading Interval
 - Delay of Commissioning Test beyond Trading Interval but within Commissioning Test Period
 - Delay of Commissioning Test beyond Commissioning Test Period
- Conclusion and actions

Assumptions and intended outcomes

- Assumptions for workshop
 - All scenarios relate to Facility which is an existing generating system
 - New generating systems yet to commence operation are not covered
 - All WEM Rules references to System Management refer to AEMO
 - There are complex settlement interactions affecting Reserve Capacity Refunds which are not covered
- Workshop outcomes
 - Scenarios resolved to satisfaction of all stakeholders
 - WEM Rule issues identified (as required)
 - Procedural requirements identified (as required)

AEMO's intended outcomes for Commissioning Tests

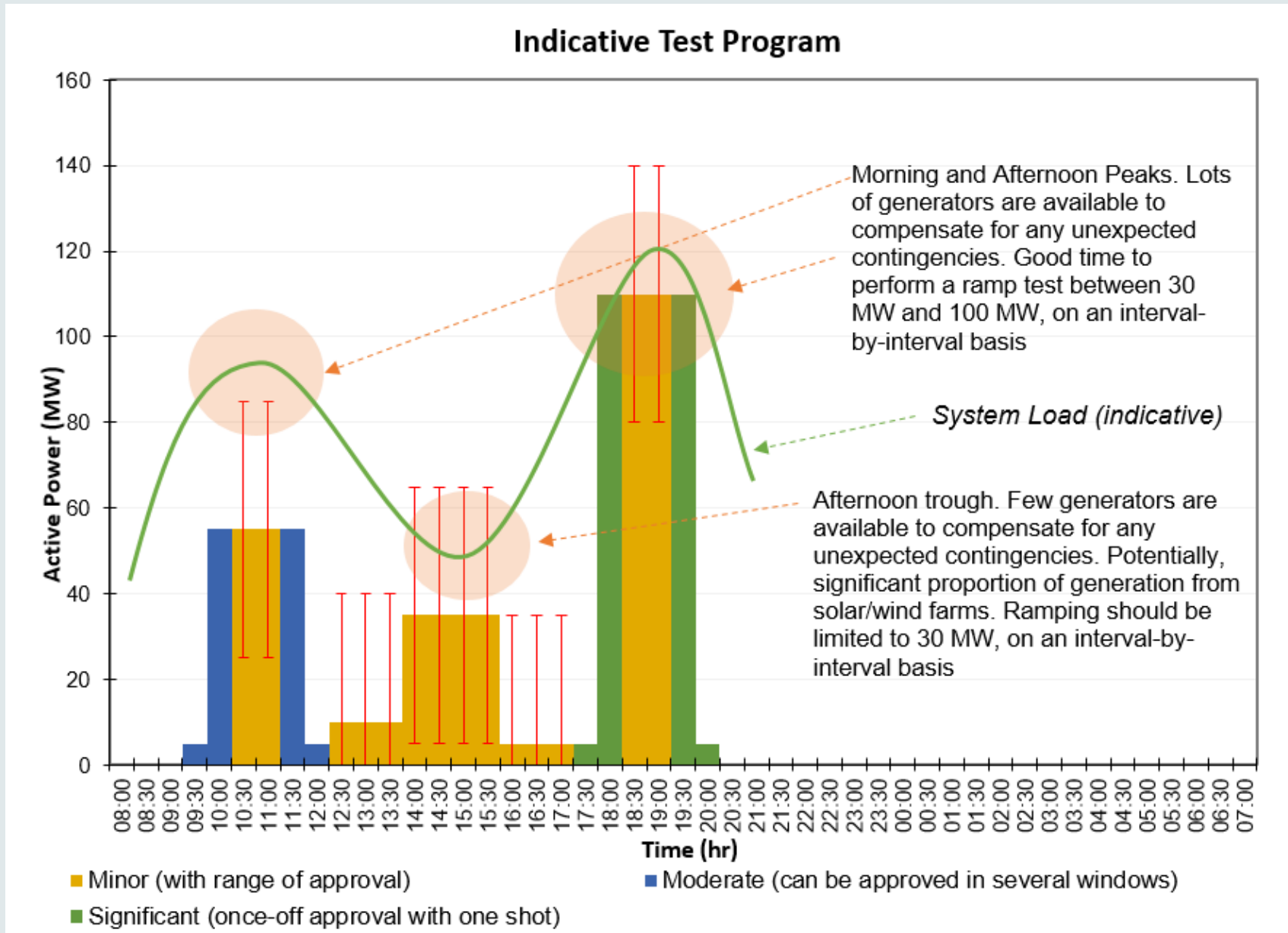
- Power System Security and Power System Reliability are maintained
- Market Participant can conduct Commissioning Tests at its proposed times
 - This flexibility is a two-edged sword. There are several examples where AEMO's attempt to accommodate commissioning has led to increased risk for the Power System
 - The SWIS is a small system with proportionally high changes in generation and demand - accommodating large movements of commissioning Facilities is becoming increasingly problematic



For consideration: Flexibility in approval of Commissioning Test Plans

- AEMO is considering the following guidelines (with soft limits) for approval of Commissioning Test Plans- see example on next slide
- Movements between Trading Intervals can be categorised into:
 - Minor: $\leq \pm 30$ MW
 - Moderate: > 30 but < 100 MW
 - Significant: > 100 MW
- In approving:
 - Minor movements can be accommodated in any interval
 - Moderate movements can be accommodated over several windows (“plan B” type approach)
 - Significant movements can be accommodated only at set time for a “single shot”
 - If the window is delayed beyond a small timeframe determined by the Controller on the day, the test must be rescheduled and reapproved
- In addition, AEMO is considering approving a range of outputs where the base movement between intervals is minor (that is, $\leq \pm 30$ MW)
 - AEMO may be able to allow a variation in output from the approved level of ± 30 MW or ± 50 MVAR
 - That is, if Dispatch Instruction is within these ranges, AEMO will be satisfied that the Dispatch Instruction complies with the Commissioning Test Plan
 - In effect, AEMO is approving a range of outputs in the Commissioning Test Plan
 - This would allow bidding flexibility to navigate operational delays
 - This flexibility cannot be provided where the movement between intervals is not minor

For consideration: example



WEM Rules Requirements – important scheduling and approval Rules

- Commissioning Test is a series of activities which confirm the ability of a generating system to operate at different levels of output reliably [WEM Rule 3.21A.1]
- Market Participant conducting a Commissioning Test for an existing generating system that has undergone significant maintenance must conduct such tests under a Commissioning Test Plan approved by AEMO [WEM Rule 3.21A.2]
- AEMO may approve only a Commissioning Test Plan for an existing generating system that has undergone significant maintenance [WEM Rule 3.21A.3]
- Market Participant requesting permission for a Commissioning Test must use best endeavours to submit to AEMO its Commissioning Test Plan for approval at least 7 Trading Days prior to the start of the Commissioning Test Period [WEM Rule 3.21A.4]
- Commissioning Test Plan must contain [WEM Rule 3.21A.4]:
 - Facility and contact details,
 - details of the proposed Commissioning Test Period,
 - details of the proposed Commissioning Tests including an indicative test program and trip risk
- Commissioning Test Plan must represent the good faith intention of the Market Participant [WEM Rule 3.21A.5]
- AEMO must approve a Commissioning Test Plan unless, in its opinion [WEM Rule 3.21A.7]:
 - inadequate information is provided in the Commissioning Test Plan; or
 - conducting any of the proposed activities to be undertaken at the proposed times would pose a threat to Power System Security or Power System Reliability; or
 - inadequate time to properly consider the Commissioning Test Plan has been provided
- AEMO must notify a Market Participant as to whether it has approved a Commissioning Test Plan as soon as practicable but in any event no later than 8:00am on the Scheduling Day for which the Commissioning Test Plan would apply [WEM Rule 3.21A.9]
 - This approval sets the Facility's RCOQ to zero for the relevant intervals of the Trading Day; the RCOQ is set each Scheduling Day.
 - **Assumption:** this does not prevent AEMO from approving a Commissioning Test Plan after 8:00am

WEM Rules Requirements – important operational Rules

- If AEMO becomes aware that conducting any of the activities in an approved a Commissioning Test Plan at the proposed time would pose a threat to Power System Security or Power System Reliability, AEMO may delay the commencement of that Commissioning Test or cancel that Commissioning Test [WEM Rule 3.21A.11]
 - Assumption: relates to Commissioning Test Plan rather than Commissioning Test
- In conducting a Commissioning Test a Market Participant must conform to the most recent Commissioning Test Plan approved by AEMO [WEM Rule 3.21A.12]
- Where a Market Participant conducting a Commissioning Test cannot conform to the most recent Commissioning Test Plan approved by AEMO then it must [WEM Rule 3.21A.13]:
 - inform AEMO as soon as practicable; and
 - obtain AEMO’s approval of a Commissioning Test Plan for that Commissioning Test if it wishes to conduct that Commissioning Test
- A reference in the WEM Rules to an “approved Commissioning Test” means a “Commissioning Test specified in the most recent Commissioning Test Plan approved by AEMO” [WEM Rule 3.21A.17]
- The Market Participant must obtain verbal permission for AEMO to proceed with specified Commissioning Tests [PSOP: Commissioning Tests]

Definitions

- **Commissioning Test**
 - A series of activities which confirm the ability of a generating system to operate at different levels of output reliably [WEM Rule 3.21A.1]
- **Significant Maintenance**
 - A degree of maintenance that must occur to allow a Commissioning Test Plan [WEM Rules 3.21A.2 and 3.21A.3]
- **Commissioning Test Plan**
 - Must contain information required, including [WEM Rule 3.21A.4]:
 - details of the proposed Commissioning Test Period,
 - details of the proposed Commissioning Tests including an indicative test program and trip risk
 - Multiple Commissioning Tests can occur in a single Commissioning Test Plan
 - **Assumption:** a Commissioning Test Plan can cover multiple Trading Days, with an Indicative Test Program provided for each day
- **Commissioning Test Period**
 - Start and end Trading Intervals and dates for the proposed Commissioning Tests [WEM Rule 3.21A.4(b)]
 - This indicates the first interval of commissioning and the last interval of commissioning, and is used for validation
- **Trading Day Commissioning Test Period**
 - For the purpose of this workshop: Start and end Trading Intervals for a specified Trading Day of the proposed Commissioning Tests provided in the Indicative Test Program
 - This is used to issue an Operating Instruction for each Trading Day
- **Indicative Test Program**
 - Schedule in the “Commissioning Test Plan template” (available on the Market Website) which indicates for interval of each Trading Day active and reactive power output, trip risk, and any specific tests being undertaken
- **Modified Commissioning Test Plan**
 - For the purpose of this workshop: Amendment of the Indicative Test Program for any Trading Day within the Commissioning Test Period
- **Commissioning Tests requiring verbal approval to proceed**
 - For the purpose of the Procedure: Tripping of the Facility or any other test with a high risk of tripping as indicated in the Indicative Test Program

Scenarios – valid Commissioning Test Plan

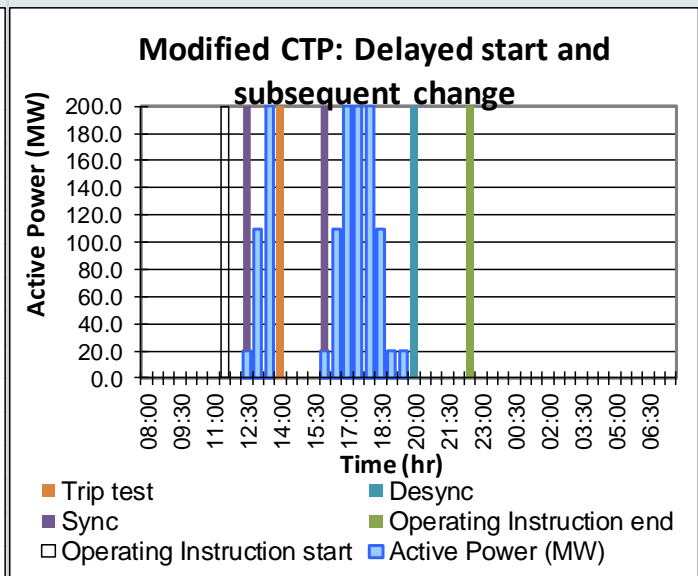
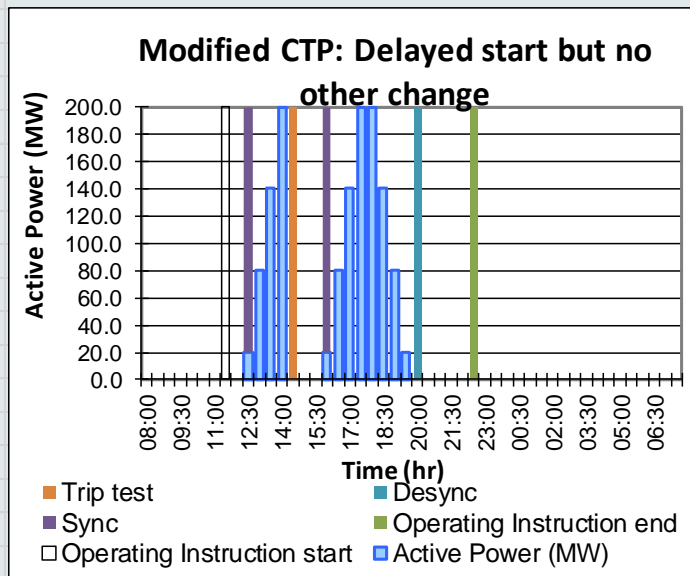
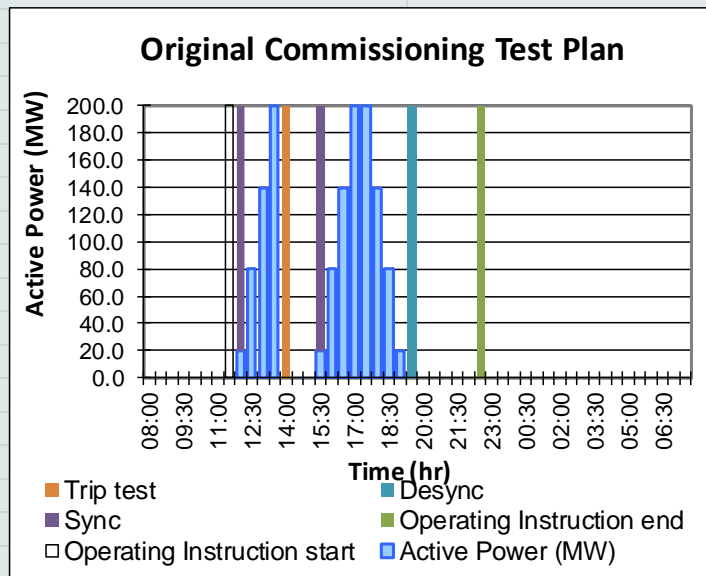
- Commissioning Test Plan occurring during Planned Outage
 - A Commissioning Test is a series of activities which the Facility operates at different levels of output [WEM Rule 3.21A.1]
 - An Outage Plan is for the removal from service (or derating) of an item of equipment [WEM Rule 3.18.4A]
 - A Commissioning Test Plan requires the Facility to have undergone significant maintenance [WEM Rule 3.21A.2]
 - **Assumption:** The two definitions are inconsistent and therefore a Commissioning Test Plan cannot occur during a Planned Outage
- Commissioning Test Plan not following significant maintenance
 - AEMO will qualify an Outage Plan as “significant maintenance” where:
 - It conforms to the requirements of WEM Rule 3.18.5(a); that is:
 - One year in advance; and
 - Greater than 10 MW; and
 - Duration of more than one week; or
 - Technical Rules compliance is required, that is where any of the proposed tests include:
 - changes/upgrades to equipment or control system settings which may have an adverse impact on Power System Security (noting that such changes must be approved by Western Power); or
 - temporary or permanent changes to the mode of operation (e.g. manual excitation control, power system stabiliser status, governor droop control) which may have an adverse impact on Power System Security; or
 - any special testing outside of normal ramping operation that may have an adverse impact on Power System Security (e.g. voltage reference step change, active power step change, load rejection test, frequency bias step change). The proposed tests are intended as a formal demonstration of performance/compliance with the Technical Rules; or
 - The maintenance is of a sort which, in the Market Participant’s opinion, requires commissioning so the Facility can be reasonably assured of operating at a satisfactory level of reliability for its full Capacity Credits; or
 - Otherwise, where the Market Participant justifies the maintenance is significant.
 - If the Outage Plan does not qualify, then the Commissioning Test Plan is not valid and AEMO is unable to assess
- Commissioning Test during Planned Outage
 - The WEM Rules preclude a Commissioning Test from occurring during a Planned Outage
 - The WEM Rules would appear to preclude approval of a Planned Outage when the Market Participant intends to operate during the Planned Outage
 - However, WEM Rules do not preclude operation in accordance with the Balancing Merit Order during a Planned Outage

Scenario – insufficient time to assess

- When Commissioning Test Plan first received, if less than 20 business days prior to commencement of Commissioning Test Period, then AEMO will determine whether sufficient time is available to assess [WEM Rule 3.21A.7(d)]
 - AEMO must determine based on the individual circumstances of each Commissioning Test Plan
- If Commissioning Test Plan or Modified Commissioning Test Plan received such that there is insufficient time to assess prior to 8.00am on the Scheduling Day
 - AEMO must reject the Commissioning Test Plan [WEM Rule 3.21A.9]
 - AEMO must negotiate with the Market Participant to identify a satisfactory time for the Commissioning Test Plan which can be approved [WEM Rule 3.21A.10(a)]
- When Modified Commissioning Test Plan received after 8.00am on the Scheduling Day:
 - If received on:
 - Scheduling Day, then AEMO must assess whether there is sufficient to approve prior to the Trading Day
 - Trading Day, and the modified plan does not include unreasonable increases in risk to the power system or major changes to the Indicative Test Program, then AEMO must assess whether the modified plan can be assessed prior to the relevant Balancing Gate Closure
 - If AEMO does not have sufficient time to assess, AEMO:
 - Must reject the amended Commissioning Test Plan
 - Will assess the Modified Commissioning Test Plan for approval on the following Trading Day

Scenarios – modification

- Extension of Commissioning Test Plan beyond Commissioning Test Period
 - **Assumption:** an extension of the end of the Commissioning Test Period will require a new Commissioning Test Plan (that is, not a modification of an existing Commissioning Test Plan)
 - AEMO must perform a full assessment of risks for the new Trading Intervals
 - To set RCOQ to zero for STEM and Balancing, AEMO must approve the new Commissioning Test Plan by 8am of the Scheduling Day
- Update of Commissioning Test Plan after 8am on the Scheduling Day during Trading Day



Able to assess if submitted with sufficient time before

8am on the Scheduling Day	Yes	Yes	Yes
After 8am on the Scheduling Day	No	Yes	Yes
On the Trading Day	No	No	Yes

Scenarios – dispatch and operation

- Dispatch of Facility for Commissioning Test Plan
 - Market Participant must conform to the most recent Commissioning Test Plan approved by AEMO [WEM Rule 3.21A.12]
 - Bids must be in accordance with approved CTP [WEM Rule 7A.2.3]
 - AEMO will dispatch in accordance with Balancing Merit Order
 - Market Participant must comply with the most recently issued Dispatch Instruction [WEM Rule 7.10.1]
- Operation of Facility for Commissioning Test Plan
 - Synchronisation must be in accordance with the CTP [WEM Rule 7.9.4.(c)]
 - If the Market Participant cannot conform to the most recent approved CTP then it must notify AEMO and (if it still wishes to complete the Commissioning Test) submit a Modified Commissioning Test Plan [WEM Rule 3.21A.13]
- Delay of Commissioning Test by AEMO within Trading Interval
 - AEMO may delay a Commissioning Test if conducting any of the activities at the proposed time would pose a threat to Power System Security or Power System Reliability [WEM Rule 3.21A.11]
 - Market Participant to indicate whether Commissioning Test Plan can still be met
 - If Market Participant can still meet Dispatch Instruction target (eg by ramping quicker), then update of CTP is not required
 - Otherwise, Participant must submit Modified Commissioning Test Plan
 - Note that Participant must update bids in accordance with the approved CTP
- Delay of Commissioning Test by AEMO beyond Trading Interval but within Commissioning Test Period
 - If a specific test is not required (such as a trip test) and Facility can still comply with Dispatch Instruction then a Modified CTP is not required
 - Otherwise:
 - A Modified Commissioning Test Plan is required
 - If the output profile in the original CTP would endanger Power System Security (eg change in output greater than ramp rate allows) then AEMO will issue a Dispatch Instruction
 - Note: constrained-on and constrained-off payments not relevant to Facilities undergoing commissioning
- Delay of Commissioning Test beyond Commissioning Test Period
 - See “Extension of Commissioning Test Plan beyond Commissioning Test Period”

Suggestions for Commissioning Test Plans

- Commissioning Test Period
 - Set end time at end of Trading Day
- Indicative Test Program
 - Set start and end time for each Trading Day to cover entire day – zero output when not synchronised
 - Arrange specific tests at times most likely to be approvable
 - Specific tests require setup, for example extra coverage of Spinning Reserve
 - Commissioning should only take place when there is sufficient plant on the system to maintain system security
 - Trip tests to be done at time of flat system load profile
 - Embed flexibility in the Indicative Test Plan
 - Operation must be in accordance with Dispatch Instructions, and bids must be in accordance with Commissioning Test Plan
 - To minimise impact of delays on need to modify Commissioning Test Plan, build in ramping flexibility so that specific tests do not need reassessment
 - In general, AEMO will have assessed that there is sufficient system capability to accommodate a Facility undergoing commissioning
 - However, modifying the timing of specific tests may require re-assessment
 - Don't cancel the Commissioning Test Plan or bring forward the end of the Commissioning Test Plan after 8am on the Scheduling Day
 - Settlements appears to require alignment between STEM, Operating Instructions and ex-post information to avoid Reserve Capacity Refunds applying

Actions

- To be determined at workshop