Options Available to Constellation to Address the Limerick Proposed Plant Protection System Component Interface Module Common Cause Failure Due to Latent Design Defects Issue (i.e., Lack of Sufficient Justification)

Background:

- To date, Constellation has not provided sufficient information to support its claim that component interface module (CIM) device used in the proposed plant protection system (PPS) is not susceptible to common-cause failure (CCF) due to latent design defects.

- Currently, Constellation plans to install the PPS into Limerick Unit 1 starting in April 2026. The licensee plans to make temporary modification to alternate rod insertion capability, standby liquid control system, and recirculation pump trip 30 days prior to installation to help facilitate installation. The U.S. Nuclear Regulatory Commission (NRC) staff decision should be issued by the beginning of March 2026 at the latest to support an April 2026 installation.

- Currently, Constellation is conducting factory acceptance testing of the proposed system on site and at its vendor facility.

- Based on revised draft responses to NRC staff's third round CIM request for additional information (RAI), Constellation plans to drop its claim that CIM device has adequate diversity and will rely solely on thorough testing.

- During the response period for the third round of CIM RAIs, Constellation conducted additional testing to support its claim of thorough testing. However, the additional testing was limited to the application logic and did not include testing the application logic and device hardware together.

Options Available to Constellation to Address the CIM issue (i.e., lack of sufficient justification that CIM device is not susceptible to CCF due to latent design defects):

Despite the numbering, the list is not in any particular order. The numbered bullets are used to help facilitate discussion about an individual option or combination of options. Additionally, the list is not an exhaustive list, it comprises options discussed within the NRC staff and does not include other options that Constellation and its contractors have identified.

The options listed would address the CIM issue but may not address the issue in time to support the April 2026 installation date. The time needed to complete any of the options would depend on the (1) time it takes Constellation to complete the work for an option, (2) time it takes Constellation to submit the information for an option, (3) the amount of information submitted by Constellation, (4) the quality of Constellation's submittal(s), and (5) time it takes NRC staff to review the supplement(s) to make a final decision.

1. Constellation can complete the thorough testing of the CIM device (i.e., both the application logic and hardware together) and then update the license amendment request (LAR) with a description of the testing and testing results.

2. Constellation can propose a license condition that describes a thorough testing program acceptable to the NRC to be completed prior to startup following the end of the April 2026 outage when the PPS will be installed and related acceptance criteria (i.e., a similar approach being used to address outstanding equipment qualification information).

3. Constellation could change the LAR to include a diverse means to perform needed action to cope with a potential consequence from CIM device CCF vulnerabilities without changing the design of the system (i.e., leverage the revised draft response to RAI 31 to be its effective diverse measures to mitigate potential consequence from CCF vulnerabilities).

4. Constellation through its vendor could change the design of the CIM device to include adequate diversity and then update the LAR with a description of the added diversity.

5. Constellation through its vendor could change the diverse protection system to not rely on the CIM as an effective measure to mitigate potential consequence from CCF vulnerabilities and then update the LAR with a system architecture description (i.e., make the Limerick design consistent with the Vogtle 3 and 4 licensing precedent).

6. Constellation could change the LAR to include a risk-informed approach to address CCF of the CIM device consistent with the approach described in Branch Technical Position (BTP) 7-19, Revision 9 (ML24005A077).

7. Constellation could change the LAR to include an alternative to the risk-informed approach described in BTP 7-19, Revision 9 to address CCF of the CIM device.

8. Constellation can conduct an assessment of the effects associated with residual CCF vulnerabilities that have not been eliminated from consideration or mitigated in some manner. It should demonstrate that the consequence of the residual CCF is acceptable. The assessment may use deterministic or risk-informed methods, or a combination of these.

9. Perform architecture modification to retain hardwired, manual, system-level actuation capability from the control room.

The NRC staff is presuming that any of the above options implemented by the licensee would be developed in a manner that would meet all applicable requirements. If an option is chosen by the licensee that involves only partially meeting a requirement, then Constellation would need to submit an exemption request to address any requirement with which the design does not fully comply.