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To: [Justin Hawkins](#)
Cc: [Greg Cranston](#); [Manny Savoc](#)
Subject: NRC Staff response to Question re: IEEE 603-1991 and Completion of Protective Action (Project 99902049)
Date: Monday, July 17, 2023 10:10:00 AM

Hi Justin –

Please find the NRC staff response to the SMR (Holtec) question regarding the subject topic.

If you have questions or need more information, please let us know.

Thanks,
Carolyn

Background and Questions:

The Reactor Protection System is required to meet IEEE 603-1991, which has a requirement on “Completion of Protective Action”:

The safety systems shall be designed so that, once initiated automatically or manually, the intended sequence of protective actions of the execute features shall continue until completion. Deliberate operator action shall be required to return the safety systems to normal. This requirement shall not preclude the use of equipment protective devices identified in 4.11 of the design basis or the provision for deliberate operator interventions. Seal-in of individual channels is not required.

I interpret this to mean that once an ESF is demanded the components must latch in their protection state until completion of the protective action AND being unlatched/reset by operator action.

Our question is on allowing a latch to be reset automatically by the protection or control system. There are some functions that may have a reliability benefit by unlatching automatically under certain scenarios, specifically the charging line isolation such that feed and bleed could automatically occur (without operator action) during certain beyond design basis events. All other ESF functions are intended to remain latched for the SMR-160 design. **Would allowing this specific charging line isolation function to automatically unlatch under certain scenarios be acceptable to the NRC staff?** For further context, it appears previous designs (AP1000) have been approved where all ESF functions are not latched (specifically charging line isolation only).

NRC Staff Response:

An automatic latch reset feature described would not meet the regulatory requirement for completion of protective action as specified in Clause 5.2 of IEEE 603-1991 if the automatic reset function were to occur prior to the system achieving completion of the protective action or if the automatic reset function occurs without performance of a deliberate operator action. Therefore, an exemption from regulatory compliance would need to be requested with justification for doing so. Such an exemption from regulatory requirements will need to be evaluated with consideration of alternative means of providing necessary protective actions before a determination of acceptability can be made by the NRC.

Regarding the referenced AP 1000 design, an evaluation of compliance with the Completion of Protective Action criteria was performed and the design was determined to be compliant with the regulatory criteria with no exception. See the publicly available Final Safety Evaluation Report – NUREG-1793, Supplement 2 – AP1000 Design Certification Amendment, (ADAMS Accession No. ML112061231, Page 7-26) for additional information on the AP1000 safety evaluation determination for Clause 5.2 of IEEE 603-1991.