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Technical Specifications Task Force
A Joint Owners Group Activity

Proposed Generic Traveler to Address Inoperable Room Coolers

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Proposed Generic Traveler to Address Inoperable Room Coolers

- Problem Statement
  - Many plants have cooling equipment that supports Operability of Technical Specifications (TS) systems, collectively referred to here as "room coolers." In many cases, the room coolers are not required to be Operable by a TS LCO. When a room cooler is nonfunctional, the supported systems may be Operable if compensatory measures are implemented. However, the supported systems TS do not contain Actions that are appropriate for a nonfunctional room cooler.
- The TSTF is developing a Traveler to provide appropriate TS Actions for a nonfunctional room cooler.

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Design

- Room coolers are used to maintain the environment necessary for TS required equipment to be Operable.
- Room coolers may be heat exchangers using fluid systems (Service Water, Component Cooling Water, Emergency Chilled Water, etc.), refrigeration units, or fans and louvers.
- Room coolers may or may not be designed to operate following an accident with concurrent loss of offsite power.
- A single room cooler may support multiple TS systems in a single train, such as batteries, inverters, and switchgear.
- A nonfunctional room cooler may or may not result in the supported TS systems being inoperable depending on the environmental conditions and compensatory measures.

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Background

- Prior to conversion to the ISTS, some plant TS contained specific Actions for inoperable room coolers. During conversion, most of these Actions were removed.
- Some licensees believed that the TS Actions for the cooling medium should be applied (e.g., enter the Service Water System Actions for an inoperable room cooler) as the cooling medium and the room cooler contributed to the same objective.
- In the last few years, several licensees have received violations for entering the cooling medium Actions when the room cooler (fan, damper, motor, etc.) is nonfunctional.
  - e.g., Columbia IR05000397/2012004

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Background

- In response, several licensees submitted License Amendment Requests (LARs) to add Actions in the TS to address nonfunctional room coolers.
  - ANO, Callaway, Wolf Creek
- These LARs have not been successful. In the absence of 10 CFR 50.49 EQ test data (because supported equipment is typically located in a mild environment), it is difficult to perform an engineering evaluation of the effects of a loss of a room cooler on the supported equipment.
- In addition, room temperature rise calculations are inherently plant-specific.

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Background

- Most significant operational impact is for Callaway and Wolf Creek, which have an LCO 3.0.3 entry because both inverters on one bus are supported by the same room cooler.
- In 2012, Wolf Creek started a TS required shutdown and reached 89% RTP before restoring a nonfunctional room cooler.
- The TSTF is pursuing an approach that is generic, and provides appropriate Actions that protect public health and safety.

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LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- LCO 3.0.6 states:

  When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, an evaluation shall be performed in accordance with Specification 5.5.15, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

  When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

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LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- Why LCO 3.0.6?
- From the LCO 3.0.6 Bases:
  - "This exception is provided because LCO 3.0.2 would require that the Conditions and Required Actions of the associated inoperable supported system LCO be entered solely due to the inoperability of the support system. This exception is justified because the actions that are required to ensure the unit is maintained in a safe condition are specified in the support system LCO's Required Actions."
  - "The potential confusion and inconsistency of requirements related to the entry into multiple support and supported systems' LCOs' Conditions and Required Actions are eliminated by providing all the actions that are necessary to ensure the unit is maintained in a safe condition in the support system's Required Actions."

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LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- The Safety Function Determination Program (1/3)
  - "This program ensures loss of safety function is detected and appropriate actions taken. Upon entry into LCO 3.0.6, an evaluation shall be made to determine if loss of safety function exists. Additionally, other appropriate limitations and remedial or compensatory actions may be identified to be taken as a result of the support system inoperability and corresponding exception to entering supported system Condition and Required Actions. This program implements the requirements of LCO 3.0.6. The SFDP shall contain the following:
    a. Provisions for cross train checks to ensure a loss of the capability to perform the safety function assumed in the accident analysis does not go undetected,
    b. Provisions for ensuring the plant is maintained in a safe condition if a loss of function condition exists,

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LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- The Safety Function Determination Program (2/3)
    c. Provisions to ensure that an inoperable supported system's Completion Time is not inappropriately extended as a result of multiple support system inoperabilities, and
    d. Other appropriate limitations and remedial or compensatory actions.

  A loss of safety function exists when, assuming no concurrent single failure, no concurrent loss of offsite power, or no concurrent loss of onsite diesel generator(s), a safety function assumed in the accident analysis cannot be performed. For the purpose of this program, a loss of safety function may exist when a support system is inoperable, and
    a. A required system redundant to the system(s) supported by the inoperable support system is also inoperable, or
    b. A required system redundant to the system(s) in turn supported by the inoperable supported system is also inoperable, or

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LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- The Safety Function Determination Program (3/3)

  c. A required system redundant to the support system(s) for the supported systems (a) and (b) above is also inoperable.

  The SFDP identifies where a loss of safety function exists. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered. When a loss of safety function is caused by the inoperability of a single Technical Specification support system, the appropriate Conditions and Required Actions to enter are those of the support system.

- All plants that have converted to ISTS have implemented an SFDP.

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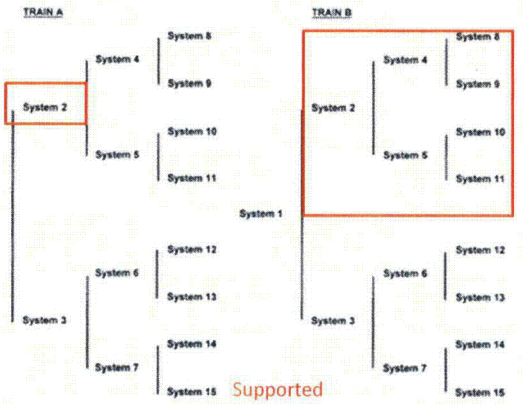
LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- LCO 3.0.6 and the SFDP ensure that only a single train of equipment is inoperable and that the facility can respond to an accident.

If Train A, System 2 is inop, then loss of Train B Systems 2, 4, 5, 8, 9, 10, or 11 can result in a loss of a safety function.



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LCO 3.0.6 and the Safety Function Determination Program (SFDP)

- LCO 3.0.6 only applies when the support system is required to be Operable by a TS LCO.
- During the development of the ISTS and LCO 3.0.6, it was recognized that LCO 3.0.6 does not apply for nonfunctional support systems that do not have a TS LCO, such as room coolers.
  - The industry did not see this as a problem for the reasons discussed above.

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Safety Justification

- A very short Completion Time or immediate shutdown are not appropriate for nonfunctional room coolers as the supported equipment is functional.
- Engineering judgment suggests that the likelihood of an event occurring during a forced shutdown would be greater than operating for a short period of time with an inoperable room cooler, because should an accident occur during the Completion Time:
  - offsite power (and other cooling equipment) is available,
  - The heat load in the room may be less than the conservative assumptions in the accident analysis,
  - The accident may not be the limiting event for the equipment in the room.

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Regulatory Analysis

- The proposed LCO would satisfy 10 CFR 50.36(c)(2)(ii) Criterion 2 (initial condition) or Criterion 3 (mitigating equipment).
- 10 CFR 50.36(c)(2) states:

  "When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met."
- No other regulation governs licensee actions when a TS LCO is not met.

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Conclusion

- Recent inspection activity has pointed out that the historical approach to addressing an inoperable room cooler is inappropriate.
- Plant-specific engineering LARs to allow time to perform preventative and corrective maintenance have been unsuccessful, leading some plants to forego online maintenance, even when warranted.
- The TSTF proposes to add a new LCO to the TS on room coolers that contains appropriate Conditions and Required Actions.
- LCO 3.0.6 and the SFDP will ensure that appropriate actions will be taken if a nonfunctional room cooler results in a loss of function.

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Discussion

- Does the NRC staff see any "fatal flaws" in the proposed approach?
- What aspects of the justification should be emphasized in the Traveler?
- Is there any regulatory guidance (Regulatory Guides, Standard Review Plan sections, Branch Technical Positions, etc.) not identified by the TSTF that should be considered in creating the Traveler?

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Next Steps

- Draft the TSTF Traveler
- Need for another presubmittal meeting?
- Submit the Traveler

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