

December 19, 2024

Subject: Statement of no significant hazards resulting from license amendment request

Reference: NBSR Facility License TR-5, Docket 50-184

The NIST Center for Neutron Research (NCNR) is requesting an amendment to the facility license related to the modification of Technical Specifications. As required by 10 CFR 50.91(a), the following analysis is presented to show the proposed amendment does not create a significant hazard using the criteria of 10 CFR 50.92(c).

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed amendment to modify the Technical Specifications 3.2.2 and 4.2.2 to require that the inner plenum flow be operable during reactor operations does not involve a significant increase in the probability or consequences of an accident previously evaluated. Here are the reasons:

Alignment with Safety Analyses: The proposed amendment ensures that the Technical Specifications align with the existing technical basis and safety analyses, which already require both inner and outer plenum flow channels to be operational. This alignment strengthens the safety measures already in place and does not introduce new risks or change the evaluated accident scenarios.

No Increase in Accident Probability: By requiring both plenum flow channels to be operational, the amendment maintains the current safety margins and operational conditions. This does not increase the likelihood of any accidents, as it ensures the reactor operates within the already analyzed and approved conditions.

No Increase in Accident Consequences: The amendment does not alter the existing safety systems or introduce new failure modes. It reinforces the requirement for both plenum channels, which are critical for maintaining adequate cooling and preventing overheating. Therefore, the consequences of any previously evaluated accidents remain unchanged because the fundamental safety functions are preserved.

Corrective Actions and Safety Measures: The immediate actions taken, including the issuance of Shift Supervisor Instructions and training for reactor operators, demonstrate proactive measures to ensure compliance and safety. These actions support the safe operation of the facility and reinforce the existing safety protocols.

Extend of Conditions: As part of the engineering review, accident scenarios and thermal hydraulic analysis models used in the Amendment 15 are verified to be in synchronization with TS 2.2, TS Table 3.2.2 (as proposed in this ECN), TS Table 4.2.2 (as proposed in this ECN) and listed scram setpoints in the updated FSAR Table 7.1.

In conclusion, the proposed amendment to require both inner and outer plenum flow channels to be operable during reactor operations does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

The set of accidents previously evaluated in the UFSAR includes design basis accidents such as loss of coolant accidents (LOCAs), other pipe ruptures, reactivity insertion events, and other similar events that the facility is required to withstand.

The proposed amendment makes both inner and outer plenum flow channels to be operable for all reactor operations except when permitted by TS 2.2(4) and 3.3.1(1). These flow channels are not accident initiators. There are no new scenarios of accidents based on the proposed changes. The change eliminates the possibility of scenarios that were not previously evaluated in the existing safety analyses. Hence, there are no new accident analysis necessary.

In conclusion, the proposed amendment does not create the possibility of a new or different kind of accident from any previously evaluated, and it does not introduce new failure modes or increase the likelihood of existing failure modes beyond what has already been analyzed in the UFSAR.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

The proposed amendment to modify Technical Specifications 3.2.2 and 4.2.2 to require that the inner plenum flow be operable during reactor operations does not involve a significant reduction in the margin of safety. This conclusion can be supported by the following points:

Safety Analysis Compliance: NCNR License Amendment No. 15 (March 2023), recently updated the Relap-5 thermal-hydraulic model of the reactor and validated current correlations used in evaluations. The amendment included specific analysis for the Throttling of Coolant Flow to the Outer Plenum and Throttling of Coolant Flow to the Inner Plenum and determined limiting thermal hydraulic conditions. In all of the relevant safety analysis scenarios the scram occurs 0.4 seconds after the flow has reached the trip value, accounting for instrumentation delays, and require the reactor outlet, and both the inner and outer plenum flow channels to be operable. Therefore ensuring that both inner and outer plenum flow channels as operable aligns the Technical Specifications with the safety analysis, thus maintaining the designed safety margins.

Technical Basis for Flow Rates: The existing technical specification for the inner and outer plenum flow is based on maintaining a critical heat flux ratio (CHFR) of at least 2 even in the unlikely event that reactor power, coolant flow, and outlet temperature simultaneously reach their Limiting Safety System Settings (LSSS). By requiring both of the inner and outer plenum flow channels to be operable, the amendment ensures that these flow rates—and hence the CHFR—are maintained in all conditions, preserving the safety margins.

Historical Precedent and Regulatory Compliance: The amendment reinstates the requirement that was in place until Amendment 11 (May 1984), which required both plenum channels to be operable. This historical precedent, combined with the lack of technical basis for the removal of this requirement, suggests that reinstating the operability requirement does not introduce new risks but rather reinforces existing safety practices.

Therefore, the proposed amendment does not involve a significant reduction in the margin of safety as it ensures consistency with the safety analysis and maintains the necessary CHFR for safe reactor operation.