

**From:** Audrey Klett  
**Sent:** Tuesday, October 3, 2023 3:17 PM  
**To:** Flickinger, Stephen F:(Constellation Nuclear)  
**Cc:** Elena Herrera Torres  
**Subject:** NRC Request for Additional Information re. Limerick TSTF-477 LAR (EPID L-2022-LLA-0174)  
**Attachments:** Final RAI 4-19 for Limerick TSTF-477.docx  
  
**Expires:** Monday, January 1, 2024 12:00 AM

Steve,

Attached is a request for additional information (RAI, #4-19) for the subject LAR. As discussed earlier today, the NRC staff is requesting Constellation to respond to the RAI on or by October 31, 2023.

Thanks,

Audrey Klett, Senior Project Manager  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Division of Operating Reactor Licensing  
Plant Licensing Branch 1  
301-415-0489

**Hearing Identifier:** NRR\_DRMA  
**Email Number:** 2258

**Mail Envelope Properties** (SJ0PR09MB933683F5B1E305BB3F1CEC6887C4A)

**Subject:** NRC Request for Additional Information re. Limerick TSTF-477 LAR (EPID L-2022-LLA-0174)  
**Sent Date:** 10/3/2023 3:16:37 PM  
**Received Date:** 10/3/2023 3:16:00 PM  
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Tracking Status: None

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Tracking Status: None

**Post Office:** SJ0PR09MB9336.namprd09.prod.outlook.com

Files	Size	Date & Time
MESSAGE	429	10/3/2023 3:16:00 PM
Final RAI 4-19 for Limerick TSTF-477.docx		50883

**Options**

**Priority:** Normal  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:** 1/1/2024

**REQUEST FOR ADDITIONAL INFORMATION  
LIMERICK GENERATING STATION, UNITS 1&2  
DOCKET NOS. 50-352 AND 50-353  
EPID NO. L-2022-LLA-0174  
LICENSE AMENDMENT REQUEST FOR APPLICATION TO ADOPT TSTF-477, REVISION 3  
AND ASSOCIATED TECHNICAL SPECIFICATION CHANGES**

By letter dated November 17, 2022 (Agencywide Documents Access and Management System Accession No. ML22321A105), Constellation Energy Generation, LLC (the licensee) submitted a license amendment request (LAR) for the Limerick Generating Station, Units 1 and 2 to revise the technical specifications (TS) to adopt TSTF-477, Revision 3, "Add Action for Two Inoperable Control Room AC [Air Conditioning] Subsystems" (72 FR 141432, dated March 26, 2007; ML062510321), and make associated TS changes.

By email dated July 21, 2023 (ML23202A068), the U.S. Nuclear Regulatory Commission (NRC) staff sent the licensee a request for additional information (RAI). By letter dated August 30, 2021 (ML23242A217), the licensee responded to the request. The NRC staff also performed a licensing audit (audit plan dated July 27, 2023, ML23208A194).

The NRC staff has reviewed the information provided by the licensee in its application, as supplemented, and via the audit and has determined that the staff needs the following additional information to complete its review of the LAR. The following requests are numbered sequentially from the RAI sent on July 21, 2023. On September 28, 2023, the NRC and licensee staff had a clarification call. Updates to the RAIs based on this call are shown below in tracked changes.

As discussed with Mr. Stephen Flickinger of the licensee's staff on October 3, 2023, the NRC staff is requesting the licensee to respond to the RAI on or by October 31, 2023.

## **BACKGROUND**

### ***Regulatory Basis***

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.36(c)(2) requires that technical specifications (TS) contain limiting conditions for operability (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TS until the LCO can be met. Typically, the TS require restoration of equipment in a timeframe commensurate with its safety significance, along with other engineering considerations. The regulation under 10 CFR 50.36(b) requires that TS be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto.

### ***NRC Consideration of Risk Insights***

The proposed amendment is not a risk-informed amendment submitted in accordance with NRC Regulatory Guide 1.174 (ML17317A256). Therefore, the NRC staff does not review the licensee's probabilistic risk assessment models to determine their technical acceptability. However, the NRC staff considers qualitative risk insights and associated compensatory measures in its decision on the proposed change.

*Plant Response to a Postulated High Energy Line Break (HELB)*

During the audit, the licensee indicated that the Limerick HELB design basis postulates a hypothetical guillotine type line break, isolates it via an isolation valve or reactor scram, copes with its associated environmental conditions, and achieves plant safe shutdown. The licensee also indicated that the hypothetical turbine enclosure HELB worst case vulnerabilities are a main steam system steam break of a 26" pipe and a feedwater system high energy liquid break of either a 20" or 34" pipe. The licensee indicated that routine operator rounds can detect small steam and liquid leakage well before the margin to piping rupture is challenged.

The plant response to a feedwater line break outside primary containment is described in Section 15.6.6 of the Updated Final Safety Analysis Report (UFSAR). Section 15.6.6.2.2 of the UFSAR states the following:

It is assumed that the normally operating plant instrumentation and controls are functioning. Credit is taken for the actuation of the reactor isolation system and ECCS [emergency core cooling system]. The RPS [reactor protection system] (MSRVs [main steam relief valves], ECCS, and CRD [control rod drives]) and plant protection system (RHR [residual heat removal] heat exchangers) are assumed to function properly to assure a safe shutdown. The ESF [engineered safeguards features] and RCIC/HPCI [reactor core isolation cooling/high pressure coolant injection] systems are assumed to operate normally.

Section 15.6.6.2.3 of the UFSAR indicates that a feedwater line break outside primary containment can be isolated, and that either the RCIC or HPCI systems can provide adequate flow to the vessel to maintain core cooling and prevent fuel clad failure. This section also indicates that a single failure of either the HPCI or the RCIC system would still provide sufficient flow to keep the core covered with water.

REQUESTS FOR ADDITIONAL INFORMATION:

4. Clarify which supplementary cooling provisions discussed in the LAR that the licensee is requesting NRC staff review and approval and that are beyond the scope of TSTF-477, Revision 3. Describe the function of the temporary chiller water hose/jumper modification and why NRC approval is needed. (Refer to Audit Question 1.)
5. Confirm whether all doors between the safety-related control enclosure, control room envelope, and nonsafety-related turbine enclosure are qualified HELB barriers. (Refer to Audit Question 2.)
6. Regarding the configuration of the temporary chiller water hose (jumpers):
  - a. Describe (e.g., via a simplified sketch or drawing) the temporary chiller water hose's (jumper's) proximity to the control room (including a description of where the jumper will be located and routed from the turbine enclosure to the control enclosure). (Refer to Audit Question 3.)
  - b. Are any doors to other rooms kept open to facilitate the routing of jumpers? (Refer to Audit Question 13.b.)

- c. Are the rooms along the path of the jumpers to the control room HVAC cooling coils served by any cooling systems? (Refer to Audit Question 13.c.)
7. Provide a high-level description of factors that make a catastrophic pipe failure in the turbine building unlikely in the plant configuration requested in the LAR. (Refer to Audit Question 7.)
8. ~~[DELETED] In its response to Audit Question 1, the licensee indicated that the peak temperature conditions incorporating power rerate and MUR is estimated to be less than or equal to 135 degrees Fahrenheit (°F) and that this may result in a loss of equipment function to certain types of equipment in room 619 if a hypothetical unit 1 HELB occurred concurrently with the HELB door open while in the LCO. Has the licensee evaluated the capability of control room HVAC equipment, such as damper and valve actuators, located in room 619 to remain functional during the LCO action statement at 135 °F (if not, explain why an evaluation is not necessary)? (Refer to Audit Question 1.)~~
9. Discuss how operators can detect (1) leakage in the turbine enclosure prior to a HELB, including the leak rates that may be detected, and (2) a HELB occurring. (Refer to Audit Questions 3 and 8.)
10. Describe the conditions under which implementation of the proposed jumper supplementary cooling provision will be precluded if leakage is detected? (Refer to Audit Question 16.)
11. Describe whether control room habitability is affected if there is a HELB or if the temporary chiller water hose (jumper) breaks while the HELB door is partially blocked open. Does the control room habitability envelope include control room cooling equipment, safety related filters, etc. located in the same room? Please confirm whether a HELB impact would propagate to this room and, if yes, what measures would be needed to address the temperature and habitability. (Refer to Audit Questions 5 and 15.a.)
12. ~~Regarding the licensee's response to Audit Question 5, c~~Confirm whether a dual unit shutdown starts as soon as the control room technical specification temperature limit is exceeded, given that this limit could be exceeded before the 72-hour LCO expiration. (Refer to Audit Questions 5 and 15.b.)
13. ~~Regarding the licensee's response to Audit Question 5, c~~Confirm whether, if the drywell temperature exceeded the TS limit, Unit 1 would be shut down and Unit 2 would continue to operate until the expiration of the 72-hour LCO, provided the control room temperature is maintained within the TS acceptance level using chiller water from Unit 1 drywell chiller. (Refer to Audit Questions 5 and 15.c.)
14. Please confirm whether, in addition to Control Room HVAC, the control building chillers also support other HVAC equipment (e.g., Battery Rooms). When the chillers are not operating, how are the non-control room HVAC systems supported? (Refer to Audit Question 14.d.)
15. Describe the actions operators would take if leakage was detected in the turbine enclosure prior to a HELB. (Refer to Audit Question 9.)

16. Discuss how operators would shut down the plant if a HELB occurs during the proposed jumper supplementary cooling provision (refer to Audit Questions 4, 6, 12, 16, and 19), including:
- a. A discussion of the equipment that would be relied upon to shut down the plant and if this equipment would be affected by the HELB. (Refer to Audit Questions 6 and 19.3.a.)
  - b. A discussion of the procedures that operators would use to shut down the plant (refer to Audit Questions 9, ~~and~~ 16, and 19.3.b), including any:
    - i. verifications that these procedures are adequate to shut down the plant during the postulated conditions (refer to Audit Question 19.3.c)
    - ii. procedure changes required for operators to be able to shut down the plant during the postulated conditions (refer to Audit Questions 16 and 19.3.d)
    - iii. additional training required for operators to be able to shut down the plant during the postulated conditions (refer to Audit Question 19.3.e)
  - c. A discussion of whether operators can close the HELB door between the turbine enclosure and control enclosure building if a HELB occurs during the proposed jumper supplementary cooling provision and if this action can be credited as a possible mitigative action. (Refer to Audit Question 4.)
  - d. In its response to Audit Question 6, the licensee indicated that a potential HELB event with the HELB door propped open is bounded by the fire analysis for fire area 27, which assumes the complete loss of equipment in this fire area. Please confirm whether the fire safe shutdown in this area relies on an alternative shutdown (e.g., confirm whether a safe shutdown can be performed from the control room) or any equipment in the turbine enclosure that could be affected by a HELB. (Refer to Audit Question 12.)
17. Regarding the components in Room 619, what are the limiting components at the elevated temperature environment, and are any of them safety related and required for safe shutdown? (Refer to Audit Question 13.a.)
18. Regarding application of current TS:
- a. Is the TS equipment in Control Enclosure Room 619 considered inoperable/inoperative under the current TS if the HELB door under consideration is inoperable/inoperative? (Refer to Audit Question 18.1.)
  - b. Which technical specification LCO action statements is the licensee required to enter if the HELB door under consideration is inoperable/inoperative? (Refer to Audit Question 18.3.a.)
  - c. Would Technical Specification 3.0.3 be entered if the HELB door is breached or only if a HELB occurred while the HELB door is breached? (Refer to Audit Question 19.1.)

19. During the audit, the licensee indicated (ref. audit question 18.3.b) that the submitted LAR requests NRC approval to not enter the Technical Specification action statements associated with temporarily defeating the subject HELB door's function. The TS footnote, as currently proposed does not include an exception to entering the technical specification action statements associated with temporarily defeating the subject HELB door's function. The proposed TS footnote, which states, "Supplemental cooling provisions, if required, may be implemented under this condition," would still require entry into these conditions because an explicit exception is not included.

Limerick LCO 3.0.1 states:

Compliance with the Limiting Conditions for Operation contained in the succeeding Specifications is required during the OPERATIONAL CONDITIONS or other conditions specified therein, except as provided in Specification 3.0.8. Upon failure to meet the Limiting Conditions for Operation, the associated ACTION requirements shall be met, except as provided in Specifications 3.0.5, 3.0.6, and 3.0.9.

As indicated in the audit response, LCO 3.0.9 cannot be applied to the CREFAS, SGT, and EDGs. Therefore, the conditions associated with these LCOs would be entered in accordance with LCO 3.0.1.

The NRC requests the licensee to either explain how the conditions associated with the LCOs discussed above would not be required to be entered with the currently proposed TS, or address (e.g., via revised TS markups) the apparent inconsistencies with the action statement completion time associated with the proposed footnote and the completion times associated with the TS action statements entered when the HELB door's function is temporarily defeated.